KADIR HAS UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES

STOCK PRICE REACTIONS TO DIVIDEND CHANGES: A COMPARATIVE TEST OF SIGNALLING THEORY AND MARKET EFFICIENCY IN THE EMERGING EMEA STOCK MARKETS

DISSERTATION

AHMET CIHAN SARAOĞLU

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"I, Ahmet Cihan Saraoğlu, confirm that the work presented in this dissertation is my own. Where information has been derived from other sources, I confirm that this has been indicated in the dissertation."

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ABSTRACT

STOCK PRICE REACTIONS TO DIVIDEND CHANGES: A COMPARATIVE TEST OF SIGNALLING THEORY AND MARKET EFFICIENCY IN THE EMERGING EMEA STOCK MARKETS

Ahmet Cihan Saraoğlu
Doctor of Philosophy in Finance and Banking
Advisor: Prof. Dr. Ömer L. Gebizlioğlu
June, 2017

This thesis aims to compile evidence across the major stock exchanges in the EMEA, namely Turkey, Russia, Poland and South Africa, to draw a comparison on semi-strong form market efficiency by analysing the impact of new information transmitted through changes in dividend policies on stock prices between 2005-2016 using the event study methodology. It expands the literature by presenting a multi-country comparison of market efficiency in the EMEA, which has never been addressed before. Moreover, it pays particular attention to statistical issues related to the event studies and estimates expected returns using the ARMA–ARCH/GARCH/EGARCH models instead of the frequently used simple market model. Finally, it investigates the role of sell-side equity research analysts in the efficient dissemination of information and compares the results on a cross-country basis.

Empirical findings of the thesis confirm the signalling theory in all four markets; price reactions to dividend initiations and omissions are significant, but stronger for omissions (leverage effect). The thesis then investigates the speed at which markets make price adjustments using VaR predictions and finds that all four markets are inefficient in following order from most inefficient to least inefficient: Poland, South Africa, Russia and Turkey. It then splits stocks based on analyst coverage to find that wider analyst coverage leads to lower agency costs and faster pricing. Particularly, it presents evidence of information leakage for stocks with limited coverage in Russia, Poland and South Africa. Moreover, the thesis finds that dividend initiations in Turkey, Russia and South Africa and omissions in Turkey are priced efficiently only in the case of wide analyst coverage.

Keywords: information content of dividends hypothesis, efficient market hypothesis, event study, dividend payout policy, speed of price adjustment, volatility modelling, GARCH, EGARCH, Turkey, Russia, Poland, South Africa

ÖZET

HİSSE SENEDİ FİYATLARININ TEMETTÜ DEĞİŞİKLİKLERİNE TEKPİLERİ: SİNYALİZASYON TEORİSİ VE PİYASA ETKİNLİĞİNİN GELİŞMEKTE OLAN EMEA HİSSE SENEDİ PİYASALARINDA KARŞILAŞTIRMALI TESTİ

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Haziran, 2017

Bu tezin amacı 2005 ve 2016 yılları arasında temettü dağıtım politikalarındaki değişiklikler vasıtasıyla piyasaya iletilen yeni bilgilerin hisse senedi fiyatları üzerindeki etkilerinin olay etüdü methoduyla incelenmesi ve yarı güçlü formda etkin piyasa hipotezinin gelişmekte olan Avrupa, Orta Doğu ve Afrika (EMEA) ülkeleri; Türkiye, Polonya, Rusya ve Güney Afrika'nın borsaları için test edilmesi ve karşılaştırılmasıdır. Yapılan çalışmanın literatüre başlıca katkısı piyasa etkinliğinin EMEA için daha önce yapılmamış olan ülke karşılaştırmasını sunmasıdır. Buna ek olarak, çalışmada olay etüdü çalışmalarında karşılaşılan istatistiki sorunlar değerlendirilerek beklenen getirinin tahmininde sıklıkla kullanılan basit piyasa modeli yerine ARMA-ARCH/GARCH/EGARCH modelleri kullanılmıştır. Son olarak, hisse senedi analistlerinin bilginin piyasaya etkin bir biçimde yayılmasındaki rolü araştırılmış ve ülkeler bazında karşılaştırılmıştır.

Tezin ampirik bulguları temettünün bilgi içeriği hipotezini dört piyasa için de onaylamaktadır. Piyasaların temettü ödemesine başlama ve durdurma duyurusu durumlarında istatistiki olarak anlamlı tepkiler gösterdikleri; ödemenin durdurulması halindeki tepkilerinin daha kuvvetli olduğu saptanmıştır (kaldıraç etkisi). Daha sonra, piyasaların yeni bilgiyi fiyatlara yansıtma hızı riske maruz değer yaklaşımıyla incelemiş ve dört piyasada da etkinsizlikler tespit edilmiştir. Piyasalar etkinsizlik seviyelerine göre çoktan aza doğru Polonya, Güney Afrika, Rusya ve Türkiye olarak sıralanmıştır. Hisseler onları takip eden analistlerin sayısına göre ikiye ayırıldıktan sonra testler tekrarlanmış ve analistlerin vekalet maliyetini düşürdükleri, yeni bilginin fiyatlanmasını hızlandırdıkları görülmüştür. Ayrıca, Rusya, Polonya ve Güney Afrika'da sınırlı sayıda analistin takip ettiği hisselerin temettü duyurularından önce olası bilgi sızıntılarına rastlanmıştır. Ek olarak, analistler tarafından yakından takip edilen hisse senetlerinin Türkiye, Rusya ve Güney Afrika'da temettü ödemesine başlamaları ve Türkiye'de ödemeyi durdurmaları halinde yeni bilgiyi diğer hisse senetlerine göre daha etkin fiyatladıkları belirlenmiştir.

Anahtar Kelimeler: temettünün bilgi içeriği hipotezi, etkin piyasa hipotezi, fiyatlama hızı, volatilite modellemesi, GARCH, EGARCH, Türkiye, Rusya, Polanya, Güney Afrika

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I must express my heartful thanks to my parents, my grandfather and my fiancé, who have bear the pain of my absence patiently. I am indebted to them for their boundless love and encouragement.

Finally, I thank and remember each and every person who helped me directly and indirectly during the completion of this thesis, which has been the most significant academic challenge I ever had to face.

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List of Abbreviations

AAR	Average Abnormal Return
ACAR	Average Cumulative Abnormal Return
ADF Test	Augmented Dickey Fuller Test
AIC	Akaike Information Criterion
APT	Arbitrage Pricing Model
ARCH	Autoregressive Conditional Heteroskedasticity
BIST	Borsa Istanbul
bn	Billion
BoD	Board of Directors
BRICS	Brazil, Russia, India, China, South Africa
CEE	Central Eastern Europe
DR	Depository Receipt
EGARCH	Exponential Generalized Autoregressive Conditional Heteroskedasticity
EM	Emerging Markets
EMH	Efficient Market Hypothesis
EU	European Union
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
IPO	Initial Public Offering
ISE	Istanbul Stock Exchange
i.i.d.	Independent and Identically Distributed
JSE	Johannesburg Stock Exchange
MICEX	Moscow Stock Exchange

MM	Modigliani and Miller
mn	Million
MSCI	Morgan Stanley Capital International
NYSE	New York Stock Exchange
PLN	Poland
pp	Percentage Points
RU	Russia
SA	South Africa
TR	Turkey
US	United States
USD	United States Dollar
VaR	Value at Risk
WIG	Warsaw Stock Exchange
YoY	Year over year

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter presents an overview of the research undertaken as part of this dissertation. It first introduces the context of the study, its objectives and significance for the existing literature on information content of dividends and market efficiency. Section 1.2 provides background information on the subject. Section 1.3 discusses the objectives of the study. Section 1.4 presents the specific research questions we addressed and the hypotheses we tested in this study, while Section 1.5 outlines how the rest of the thesis is structured. Finally, Section 1.6 concludes the chapter.

1.2 Background of the Study

Dividend policy has been perplexing for the economics of corporate finance for decades. Although in a perfect capital market, dividends should not matter for share values, an overwhelming majority of the empirical research suggests that dividends are actually of great importance (Ball and Brown (1968), Pettit (1972), Aharony and Swary (1980), Woolridge (1983), Asquith and Mullins (1993), Ryan et al. (2000)). There are five leading views on the impact of a dividend policy on the value of a company: i.) MM's (1961) famous dividend irrelevance theory and the opposing relevance theories which include ii.) the bird in the hand; iii.) signalling; iv.) agency cost and v.) the tax clientele hypothesis. None of the dividend relevance theories alone, can explain the phenomenon as they lack utter empirical support. That said, Lintner's (1956) signalling theory, also known as the information content of dividends hypothesis, seems to make the most successful attempt.

Considering that managers possess private (insider) information about their firms' future prospects, they may use various signalling devices to disseminate this information to the public. According to the information content of dividends hypothesis, dividend announcements can be used as a vehicle to communicate information to the market about a firm's future earnings and growth. This would close the information gap between managers and shareholders, thereby unlocking the true value of the firm to the market.

The information content of dividends hypothesis is well known and much empirical research has tested the hypothesis with the majority of the results being in favour. According to Frankfurter et al. (2003), 73 studies have been published on the information content of dividends hypothesis between 1960 and 2000 in the U.S. alone. While the evidence from the developed world is overwhelming, the literature of empirical research on developing countries is sparse. For instance, according to Başdaş and Oran's (2014) thorough review of event studies on the Turkish stock market between 1997 and 2013, there were only four studies that analysed cash dividend announcements impact on share prices. In this study we tried to fill this gap by testing the theory for four emerging EMEA stock exchanges defined as developing by the MSCI country classification criteria: Turkey, Russia, Poland and South Africa, with more recent data than most other papers in circulation.

Interpretations of event studies of signalling theory in financial markets also give us an idea on the informational efficiency of those markets. According to the efficient market hypothesis (EMH), an assets' current price fully reflects all available information. If dividends do convey information relevant for the valuation of a firm, the validity of the semi-strong form EMH can be empirically tested by examining the effects of public announcements of dividends on share prices. Hence, another purpose of this study is to measure the speed of price adjustments to new information in emerging EMEA markets and to compare them from an efficiency stand point. We believe that the results should be of importance to managers who are responsible of framing their firm's dividend policy, investors who can adopt trading strategies to exploit potential inefficiencies and for regulatory authorities who may feel the necessity to tighten regulations and supervision in order to augment market efficiency.

According to Fama (1965), in an efficient market keen competition among market participants will cause the full effect of new information on intrinsic values to be reflected instantaneously in the actual prices. In other words, due to fierce competition between investors, research analysts, stockbrokers, etc., share prices are generally appropriate, i.e. neither cheap nor expensive. If the market is indeed efficient, however, all the effort and resources devoted to equity research in the past decades by sell-side analysts at investment banks would be unwarranted. This dilemma is the main inspiration for this thesis, which investigates whether the existence of sell-side equity research analysts improves the semi-strong form efficiency of the four emerging EMEA markets in question.

1.3 Objectives and Significance of the Study

This study mainly aims to compile evidence across the major stock exchanges in the emerging EMEA, namely Turkey, Poland, Russia and South Africa to draw a comparison on market efficiency by analysing the abnormal impact of new information transmitted through changes in dividend policies on stock prices between 2005 and 2016. We adopted the event study methodology for this purpose. Although there is already vast event study literature available on developed markets, in particular on the U.S., testing the market efficiency hypothesis is challenging because much of the evidence from emerging markets is not particularly rich. Moreover, most of the research is focused on the financial implications of corporate announcements in a single country. Hence, this study expands the literature by presenting a multi country comparison of market efficiency in the emerging EMEA, which has not been addressed before in such a comprehensive manner.

Selecting an event of interest in multiple countries requires more caution than in single-country settings. We selected cash dividend announcements of listed companies as our event due to the greater availability of data and comparable disclosure and payout policies in the countries of interest. The selection of dividend payouts as an event also transforms the study into an implicit test of the significance of the information conveyed through dividend announcements in the sense of Lintner (1956).

Event studies of semi-strong form market efficiency suffer from the "joint-hypothesis" problem described by Fama (1991), meaning that all tests are simultaneously a test of both the expected return model and market efficiency. Our literature review demonstrates that the research on emerging markets relies heavily on the simple market model that ignores ARCH effects. Aiming to improve the accuracy of expected return forecasts and avoiding potential biases, we proposed a hybrid Ordinary Least Squares (OLS) model with an ARMA term, which we called the extended market model, to account for the autoregressive behaviour of stock returns that may appear due to relatively lower trading volumes of emerging market stocks (thin trading effect) when compared with developed markets. Furthermore, for events with significant ARCH effects we chose the best fit among the ARCH, GARCH and EGARCH models to estimate the abnormal returns and the variance of abnormal returns. For the events without ARCH effects, we used the market model or the extended market model. We combined the results achieved for all the events in each dividend group to get the cumulative abnormal returns. We then tested the null hypothesis that there is no reaction to dividend announcements.

Our study also investigates the role of sell-side equity analysts in the dissemination of information and compares our results on a cross country basis. More specifically, we checked whether stocks covered by a large number of analysts: 1) recognize the information transmitted by firms through changes in dividend policies and 2) price new information in a more efficient manner than other stocks. Inspired by the research of Ulusoy and Onbirler (2014) and Demiralay and Ulusoy (2014), we used the Value at Risk method (VaR) based on the ARMA and GARCH models in order to compare the speed of price adjustments to new information across the emerging EMEA and evaluate the role of analysts in market efficiency. VaR is commonly used among researchers and market participants to measure the maximum possible loss for an asset portfolio over a period of time within a fixed level of confidence. To our knowledge, however, this study is the first attempt in emerging EMEA event study literature to use VaR in significance testing.

Lastly, this dissertation was intended to test the informational efficiency of emerging EMEA markets for each year between 2005 and 2016 to gauge whether the level of market efficiency improved over time, i.e. whether markets learned from their experiences. However, we had to omit this from the scope of our thesis since the sample size per country in a given year is in many cases too low and impairs the power of the test statistics. This issue may be addressed in future research by relaxing the criteria for dividend changes, so that the sample size increases.

1.4 Research Questions of the Study

This section outlines the main research questions, along with a set of sub questions, which are formally addressed in this study. The dividend signalling theory pioneered by Lintner (1956) argues that changes in dividends contain signals about firms' future earnings prospects. Dividend increases are seen as positive news since they signal to shareholders that the future cash flows of the firm will be high enough to sustain dividends at the new level. On the other hand, dividend decreases are viewed as negative news since company managements are reluctant to lower the payout unless there is a substantial worsening in their future cash flow forecasts. Studies about the information signalling theory can be tested by examining whether the announcements of dividends lead to abnormal returns in shares. According to the semi-strong form of the EMH, all public information is instantly and appropriately valued and reflected to the share prices by the market.

In this study, we used companies' cash dividend announcements as a source of information and tested whether the market makes use of this new information in the context of market efficiency. For this purpose, we allocated dividend announcements from each country in to three dividend groups based on the year-on-year (YoY) changes in their nominal dividends: dividend initiations (good news), dividend omissions (bad news) and unchanged dividends (no news). We further analysed whether sell-side equity research analysts have a role in the efficient dissemination of new information and augmented the market efficiency by splitting each dividend group into subgroups based on the number of analysts following the stocks. We used our findings to draw conclusions on the level of market efficiency in four emerging EMEA countries and compared them with each other. Our main research questions and sub questions are elaborated below.

Main question 1 Does the information content of divided hypothesis hold for the aggregate emerging EMEA stock market?

Sub question 1.1. Do stocks react more to negative news than to positive news (leverage effect)?

Sub question 1.2. Does the information content of divided hypothesis hold for individual emerging EMEA stock markets?

Sub question 1.3. How fast do emerging EMEA markets price in the information disseminated with dividend announcements?

Main question 2 Do sell-side equity research analysts help the dissemination of information?

Sub question 2.1. Do markets price in new information faster with analysts' help?

Sub question 2.2. In which EMEA markets do analysts improve the dissemination of information?

Sub question 2.3. Which emerging EMEA markets price in new information faster with the help of analysts?

We have designed following hypothesis to answer the research questions:

H_0: Average abnormal returns (AAR) on the event day T, the next day T+1 or the average cumulative abnormal return (ACAR) in the [T; T+1] window are equal to zero.

H_1: Sign of the dividend change and the sign of any of the AAR on the event day, the next day T+1, the ACAR in the [T; T+1] window, the ACAR in the [T; T_2] window are not positively correlated.

H_2: Average cumulative abnormal return (ACAR) in the selected event window [T_1+1; T_2] is equal to zero.

H_3: ACAR in the post event window [T; T_3] does not revert below the VaR limit after day T+1.

H_4: ACAR in the post event window [T; T_3] revert below the VaR limit faster in case stocks with limited analyst coverage.

Note that we intentionally seek non-zero returns on the event date and the following day in H_1 since it is not clear at what time the dividend announcements are disclosed during the event day. In case the dividend announcements are made after market hours, the initial impact on returns is likely to take place on day one rather than on day zero.

1.5 Thesis Structure

This dissertation conducts a cross-country investigation into the semi-strong form market efficiency in the emerging EMEA. In addition, it tests whether announcements of changes in dividend policies contain relevant and new information for the valuation of firms and whether sell-side equity research analysts play a role in the efficient dissemination of this new information.

The dissertation is both theoretical and empirical in nature. The current chapter is an introduction, which expounds on the background of the study including its scope, objectives and its contribution to the existing literature on dividend policies and market efficiency. It presents the specific research questions addressed and the hypotheses tested in the thesis. The rest of the thesis is structured as follows:

Chapter 2 elaborates on the theoretical groundings of the EMH. It discusses the theory's evolution and the methods used to test the different forms of EMH. It is shown that the fair game price behaviour model and the event study methodology are the primary tools to test the semi-strong form EMH.

This dissertation uses changes in dividend policies, particularly cash dividends, as sources of new information to test the semi-strong form EMH. We attempt to outline why dividends should matter for the valuation of a firm in Chapter 3. The chapter reviews the basic theories on the relevance of dividends for the valuation of a firm and provides an overview of the key empirical studies that tested these theories.

An understanding of the possible differences in the regulatory environment in the emerging EMEA countries is needed for an accurate cross-country comparison. Chapter 4, therefore, scrutinizes the regulatory environment. It provides descriptive information on the stock exchanges evaluates the dividend payment procedures and legal framework and compares the taxation of dividend income and capital gains in emerging EMEA countries.

Chapter 5 discusses the design of our empirical study and the extended market model that we used to calculate expected abnormal returns. Chapter 6 presents the findings of our empirical tests and our answers to the main and sub research questions. Chapter 7 summarizes the general findings of the study, discusses its limitations and makes recommendations for future research to build on the findings of this current study.

The remainder of the thesis contains three appendices. Appendix A discusses the event study methodology in detail. Appendix B provides supplementary data to

Chapter 5. Lastly, Appendix C discusses two alternative price formation models, which we ultimately opted not to use, but which we note deserve special attention and can be used in future research.

1.6 Conclusion

This chapter provided an introduction to the dissertation, discussed its context, laid out its objectives, its contribution to the existing literature and finally outlined how the rest of the chapters are organized. The next chapter will begin to discuss the theoretical framework of the dissertation concentrating on the EMH.

CHAPTER 2

EFFICIENT MARKET HYPOTHESIS

2.1 Introduction

This introductory chapter discusses the efficient market hypothesis in a theoretical framework. We start with covering the concept of efficiency in section 2.2 and then expand the discussion in to definition and conditions of efficient market hypothesis in subsections 2.2.1 and 2.2.3. We then discuss the types of price behaviour models that are used to bring the efficient market hypothesis in a testable format. Lastly, we discuss the different levels of market efficiency in subsection 2.2.2 and the methods used to test the hypothesis. Section 2.3 concludes the discussion. Note that we have spared a review of the literature on the historical development of EMH given that a vast number of through reviews are already present, e.g. Fama (1969), Dimson and Mussavian (1998), Ang et al. (2011), Sewell (2011), Boya (2013), Shamshir and Mustafa (2014), Titan (2015).

The relevance of the chapter for our study relates to identifying the sufficient conditions for semi-strong form market efficiency and deciding which price formation process (model), information set and testing method to use. Accordingly, an expected return (fair game) model, that simply states that there is no way to use publicly available information at any time to earn a return beyond that which is consistent with risk inherent in the security, looks appropriate (Elton et al. 2009). The information referred to by the fair game model varies with the type of market efficiency being tested. For semi-strong form tests, information is defined as announcement of new information. That is, announcement of cash dividend decisions, in our case. The studies of such announcements are termed “event studies”.

2.2 Concept of Market Efficiency

The concept of market efficiency has been first introduced by the Bachelier (1990) and has been continuously studied since then. It refers to instantaneous and full incorporation of all available information and expectations by market participants in to financial asset prices at any given time. Therefore, in an efficient market investors should not be able to develop investment strategies that will consistently generate abnormal profits. Bachelier described this by saying *“past, present and even discounted future events are reflected in market price, but often show no apparent relation to price changes”*.

The concept of market efficiency is built on the “random walk theory” which claims that financial asset price changes are independent of each other and are driven by new information that arrive the market on a random basis. In Samuelson’s (1965: 41) words:

> *“In competitive markets there is a buyer for every seller. If one could be sure that a price would rise, it would have already risen. Arguments like this are used to deduce that competitive prices must display price changes perform a random walk with no predictable bias.”*.

As evidence accumulated in support of the random walk theory, attention shifted towards an investigation of price setting process which would produce such a result.

Fama (1965) defines an efficient market as a market where large numbers of rational and profit-maximizing participants actively compete with each other and where current information is freely available to all. This competition leads to a state, where, at any point in time, actual prices of assets already reflect the effect of events that have occurred in the past and that the market expects to take place in the future. Hence, in an efficient market current price of an asset is a fair estimate of its intrinsic value. This equilibrium level of prices should enable allocation of resources in an economically efficient way.

Since the term “efficiency” is ambiguous, it is worth to shed some light on what it means from a capital markets stand point. There are three types of efficiency in capital markets:

1. **Operational efficiency:** Operational efficiency (also called transactional efficiency) emphasizes the way resources are employed to facilitate the operation of the market. In an operationally efficient market, participants should be able to execute trades and receive services at a price that should be fairly close to actual cost required to provide them. Hence, risk/reward profile of the transactions would not be deteriorated by excessive frictional costs, which would lead to prudent capital allocation.
2. **Allocational efficiency:** A market is called allocationally efficient if it facilitates the achievement of a “Pareto optimal” allocation of resources. Under Pareto optimality, funds should be effectively allocated to most productive investments and stock markets provide a mechanism to channel scarce resources among computing real investments (Omay 2010).
3. **Informational efficiency:** A market in which intrinsic values of assets fully reflect all available information at any time is called informationally efficient (also called pricing efficient or fair game efficient). The efficiency of a market is principally measured by its informational efficiency. Perhaps the most important question for the financial markets is whether future asset prices can be predicted or not. Efficient market hypothesis suggests that

future price of an asset cannot be modelled using past price data. Prices follow a random walk. Thus, in an efficient market methods such as technical and fundamental analysis are fairly useless for forecasting how asset prices will evolve in the future.

The vast literature of empirical research on market efficiency is concerned with whether prices fully reflect particular subsets of information, such as earnings releases, dividend announcements, mergers and acquisitions, etc.. Yet, it is obvious that the hypothesis that securities prices instantaneously and fully reflect all available information is an extreme (Fama 1969). Although there is no truly efficient market, the hypothesis can be used to categorize markets depending on the level of efficiency as weak, semi-strong and strong.

Finally, existence of intelligent market participants such as technical analysts (also called as chartists) and fundamental analysts who aim to profit from discrepancies between actual prices and intrinsic value tends to neutralize systemic behaviour in price series. While fundamental analysts help incorporating all available information into current prices, chartist cause past price movements and news to be efficiently reflected into current prices.

2.2.1 Efficient Market Hypothesis

The early version of the efficient market hypothesis (EMH) states that asset prices instantaneously and fully reflect all available information (Fama: 1965). However, this version of the hypothesis has a strong precondition that information and trading costs, i.e. the cost of getting prices to reflect the new information, are zero (Grossman and Stieglitz: 1980). Jensen (1978) proposed a more relaxed and economically more sensible version of the hypothesis which says that prices reflect information to the point where the marginal benefit of acting on information do not exceed the marginal costs. We refer to the latter version of the EMH in this thesis as we empirically test it.

In order to determine whether a market is efficient or not, the above hypothesis needs to be tested. However, it is very ambiguous and has no testable implications. To refine the hypothesis to a testable one, the process of price formation needs to be specified first. It is assumed that expected return models can be utilized to state conditions of market equilibrium (Fama 1969). Submartingale and random walk models are two special cases of expected return models that have important empirical implications.

2.2.1.1 Expected Return (Fair Game) Model

Mathematical expression of the expected return model is as follows:

$$\mathbf{E}(\tilde{P}_{j,t+1}|\Phi_t) = [1 + E(r_{j,t+1}|\Phi_t)]P_{j,t} \qquad (2.1)$$

E stands for expected value operator

$P_{j,t}$ stands for price of security j at time t

$r_{j,t}$ stands for one period percentage return of security j at time t

Φ stands information that is expected to be "fully reflected" to security

price at time t

According to the model, the expected price of security j at time t+1 based on information Φ, is equal to the price at time t multiplied by the equilibrium expected return projected on the basis of information Φ. In other words, information Φ should be fully utilized to in determining the expected return. This has a major empirical implication since it rules out the possibility of profitable trading strategies based only on the available information Φ. The expected excess market value of security j at time t+1, expressed as $x_{j,t+1,}$ should be equal to zero if it is a "fair game" with respect to information Φ. This puts the efficient market hypothesis in a testable form.

$$x_{j,t+1} = P_{j,t+1} - E(P_{j,t+1}|\Phi_t) \tag{2.2}$$

$$E(x_{j,t+1}|\Phi_t) = 0$$

2.2.1.2 Submartingale Model

Submartingale model is expressed as follows:

$$E(\tilde{P}_{j,t+1}|\Phi_t) \geq P_{j,t} \quad or \quad E(r_{j,t+1}|\Phi_t) \geq 0 \tag{2.3}$$

Above expression states that expected value of next period's price, as projected on the basis of the information Φ, is equal or greater than the current price. If expected returns and price changes are zero, then the price sequence follows a martingale (Fama 1969).

A submartingale in prices assumes that expected return conditioned on information Φ is non-negative. This implies that trading rules based on information Φ cannot outperform a policy of buying and holding the security for the period in question. Empirical evidence on the market efficiency model can be driven by testing such trading rules against the submartingale model.

2.2.1.3 The Random Walk Model

Based on the statement that in an efficient market current price of a security fully reflects all available information, the random walk model says that successive price changes are independent and identically distributed.

$$f(r_{j,t+1}|\Phi_t) = f(r_{j,t+1}) \quad (2.4)$$

$$E(\tilde{r}_{j,t+1}|\Phi_t) = E(\tilde{r}_{j,t+1})$$

The first expression says that conditional and marginal return of security j is identical. The second expression says that the mean distribution of $r_{j,t+1}$ is independent of the information available at time t. The implication of a process of this type is that the best prediction of security price for the next period is the current price, i.e. the process does not allow predicting the change. The change is absolutely random. Hence, the random walk model has some testable implications for the weak form EMH.

2.2.2 Degrees of Market Efficiency and Relevant Tests

Models that are represented above are used to refine the efficient market hypothesis in a testable one. However, in order to test the hypothesis the information set has to be refined in a testable way, too. There are three different degrees of market efficiency and they are defined according to the information set that is utilized in testing the hypothesis.

2.2.2.1 Weak Form Market Efficiency

The weak form EMH suggests that security prices already reflect all past information that can be derived by examining market trading data such as the history of past prices, trading volume, etc. (Bodie, Kane and Marcus 2002). In this form of efficiency there is no relationship between past and future price movements. Hence, trends analysis (charting) is useless. The weak form EMH is most commonly tested one compared to the other two and most of the evidence bears directly on the random walk model. Tests are naturally based on an examination of the relationship between current and past stock prices. Several statistical techniques such as run tests, unit root tests, serial correlation tests and variance ratio tests have been commonly used for this purpose.

The random walk model and the weak form EMH were tested frequently in both developed and developing countries. Although weak form EMH was strongly supported by evidence from US and UK markets in 1960s and 1970s, the conclusion was less clear for other countries. Especially, starting from 1980s many studies showed a number of anomalies that disturbs the weak form EMH, such as January effect, the holiday effect, the weekend effect, the small size effect. Comprehensive reviews of the empirical evidence can be found in Fama (1969), Granger (1975), Hawawini (1984), Fama (1991), Lo (1997), Sewell (2011).

2.2.2.2 Semi-strong Form Market Efficiency

Semi-strong form EMH suggests that all publicly available information such as fundamental data on the firm's product line, quality of management, balance sheet composition, patents held, earnings forecasts, dividends and accounting practices, should be fully reflected in security prices, in addition to past prices that are considered in the weak form EMH (Bodie, Kane, Marcus 2002). In a semi-strong form efficient market, fundamental analysis, which is the valuation of stocks based on fundamental factors, such as company earnings, growth prospects, etc., cannot be used to build profitable trading strategies, since all public information is already incorporated into the value of a security (Yener 1993). Semi-strong form EMH is commonly tested through event studies, in which the concern is the speed of adjustment to publicly available information, e.g. announcement of dividends, earnings releases, stock issues, etc.. A thorough review of event study method and empirical evidence on semi-strong form EMH from both developed and developing countries is provided in later parts of the thesis.

2.2.2.3 Strong Form Market Efficiency

The strong form EMH goes beyond the semi-strong form to state that stock prices can reflect all the information relevant to the firm, even if the information is only accessible to the company insiders. If a market is strong form efficient it must be both weak form and semi-strong form efficient, i.e. both technical and fundamental analysts cannot beat the market to make abnormal returns.

Insider information can be defined as information that is only likely to be known by the managers of the company to which the information relates (Ball et. al 1989). According to Fama (1991), three groups can have access to such information: corporate managers; professional investment managers (fund managers); equity analysts. Note that insider trading is forbidden and seen as a criminal activity in all the stock exchanges in the world.

When examining insider trading, one would expect that insiders trading on privileged information would purchase before price increases and sell after price decreases and test for such pattern. Alternatively, event study methodology is employed to test for the presence of abnormal returns earned by insiders. Similarly, examining fund managers' ability to deliver abnormal returns can confirm that they have private information. Studies performed for strong-form EMH are less frequent than for weak and semi-strong form EMH. While empirical evidence confirms that corporate insiders have monopolistic access to private information (Jaffe (1974)), many studies found that fund managers do not beat the market if adjusted for the risk and transaction costs they incur (Cowles (1944), Jensen (1968), Henriksson (1984), Chang and Lewellen (1984)). Fama (1991) argues that most of these results consistent with Grossman and Stiglitz's (1980) noisy rational expectations model, in which informed investors are compensated for their information costs. We spare a deeper review of the strong-from EMH literature as it falls beyond the scope of our study.

2.2.3 Sufficient Conditions for Market Efficiency

Fama (1970: 387) describes the sufficient conditions for capital market efficiency as follows:

1. There are no transactions costs in trading securities
2. All available information is available to all market participants without any costs
3. All agree on the implications of current information for the current price and distributions of future prices of each security.

Note, however, that the above described conditions are extremes. In fact, Fama affirmed that these conditions are not applicable in real life where there are transaction costs, information is costly and individuals do not necessarily agree on the implications of the information. Consequently, he stated that *"Fortunately, these conditions are sufficient for market efficiency but not necessary"*. The level of efficiency of a market depends on the degree it satisfies the above conditions.

In essence, markets do not become efficient automatically. It is the actions of profit maximizing, rational investors that eliminate inefficiencies. Damodaran (2012: 146) explains this as follows:

> *"The market efficiency should provide the basis for a scheme to beat the market and earn excess returns. For this to hold true 1) the asset which the*

source of inefficiency has to be traded; 2) the transactions costs of executing the scheme have to be smaller than expected profits from the scheme. Moreover, there should be profit maximizing investors who 1) recognize the potential for excess return; 2) can replicate the beat the market scheme that earns excess return; 3) have the resources to trade on the stock until the inefficiency disappears."

2.3 Conclusion

Chapter 2 laid down the theoretical groundwork of our empirical study. Key takeaway are as follows:

We find Jensen's (1978) relaxed version of EMH that takes into account the information and transaction costs economically more sensible and stick with it throughout our study.

Testing the semi-strong form EMH requires us to use an expected return (fair game) model to forecast share price movements, adopt the event study methodology, decide on the type of new information that is relevant to the valuation of the shares, and pick the relevant significance tests. Thus, we evaluate alternative asset pricing models in later parts of the thesis and developed a hybrid market model (OLS/GARCH). We also explicitly discuss the event study methodology. We study its historical development, summarize landmark empirical studies done with it, explain the general flow of the study and review the event studies performed on emerging EMEA stock markets of our concern.

Event studies require a source of new information with implications on the valuation of shares to test the speed of price adjustment and, hence, the semi-strong form EMH. We have decided to use cash dividend announcement as new information. Chapter 3 discusses why capital structure decisions and dividend policies, cash dividends in particular, matter for the valuation of firms.

CHAPTER 3

DIVIDEND POLICY THEORIES

3.1 Introduction

This dissertation uses changes in dividend policies, particularly cash dividends, as source of new information to test the semi-strong form EMH. But, before we proceed to the empirical part of the dissertation, we attempt to outline why dividends should matter for the valuation of the firm. In this chapter, we review the basic theories on the relevance of dividends for the valuation of the firm and provide an overview of the key empirical studies that tested these theories. The chapter is organized as follows: In section 3.2, we briefly define the terms dividend and dividend policy. Subsection 3.2.1 discusses MM's (1961) dividend irrelevance proposition. Subsection 3.2.2 discusses four major dividend relevance theories: 1) information content of dividends hypothesis (or the signalling theory) (Lintner 1956), 2) agency cost and free cash flow hypothesis (Jensen and Meckling 1976), 3) bird in the hand theory (Gordon 1959), 4) tax effect (clientele) hypothesis (MM 1961, Elton and Gruber 1970).

3.2 Dividend Policy Theories

We start this section with brief definitions of dividends and dividend policy, on which we expand the discussion. According to the Capital Markets Board of Turkey, the term dividend refers to:

> *"an amount decided by the general assembly of shareholders to be distributed to shareholders and other persons sharing the profit over the net profit of period or over other sources of dividend distribution as of the end of accounting periods within*

the frame of the policy determined by the general assembly of shareholders" (2014:1).

In other words, dividend refers to a portion of net income which is distributed among the shareholders of the firm.

Lease et al. define the dividend policy as *"the practice that management follows in making dividend decisions, or in other words, the size and patterns of cash distributions over the time to shareholders"* (2000: 29). According to Moyer et al., *"dividend policy determines the ultimate distribution of the firm's earnings between retention (that is reinvestment) and cash dividend payments to shareholders"* (2001: 516). In other words, dividend policy is the guideline the firm follows when making dividend decisions. Its importance lies in the fact that retained earnings are an important source of internal financing for long-term growth of the firm, while dividends reduce the cash funds of the firm.

The influence of capital structure and dividend policy on the valuation of companies has been comprehensively examined in corporate finance literature with no firm conclusion reached to date. There exists a wide range of theories on the issue, but they can be broadly grouped into two categories: dividend irrelevance and relevance theories. We outline five of these theories below which, in our view, cover a great deal of the theoretical work undertaken so far.

3.2.1 Dividend Irrelevance Theory (Modigliani and Miller 1961)

Dividend irrelevance theory is first proposed by Modigliani and Miller and argues that in an ideal economy characterized by perfect and complete capital markets, rational behaviour and perfect certainty, a firm's investment and dividend policies have no effects on share price or shareholders' return (Modigliani and Miller 1961). According to MM, value of a firm is determined by the earning power of its assets and its investment policy. Rational investors are interested in their total return, and not whether they receive it in the form of dividends or capital gains. Moreover, they understand that the value of a firm is only determined by its capacity to obtain earnings through its assets, i.e. investment policy and its business risk, and not by the way earnings are separated between dividends and retained earnings. Thus, the dividend is the difference between earnings and investments, i.e. the residual (Vieira 2007:13). MM's dividend irrelevance theory is built on the following assumption:

1. no taxes
2. no capital market frictions (i.e. no transactions or bankruptcy costs)
3. symmetric access to credit markets (i.e. firms and individuals can borrow and lend an unlimited amount at the same rate)
4. no information asymmetry (i.e. firms' financial policy reveals no information).

Given the assumption of no taxes, MM argues that capital structure of a firm is irrelevant for its value. Thus, the value of the firm should not change on the back of higher dividends, as long as it sells stocks to raise new funds. MM also argues that investors should be indifferent to dividends from a cash flow perspective, as they can replicate any desired stream of payment by purchasing or selling equity.

MM mathematically expresses that dividends are not direct determinants of the firm value. Authors define rate of return on the firm' shares as:

$$r_t = \frac{d_t + p_{t+1} - p_t}{p_t} \ or \ equivalently, \qquad (3.1)$$

$$p_t = \frac{1}{1 + r_t}(d_t + p_{t+1})$$

d_t stands for dividends per share at time t

p_t stands share price at time t

The value of the firm is then expressed as:

$$V_t = \frac{1}{1 + r_t}(D_t + V_{t+1} - m_{t+1}\, p_{t+1}) \qquad (3.2)$$

m_t stands for the number of new shares sold

The last term m_{t+1} p_{t+1} is the value of new shares sold to outsiders to finance the firm's dividend payments and investments, which can be expressed as:

$$m_{t+1}\, p_{t+1} = I_t - (X_t - D_t) \qquad (3.3)$$

I_t stands for the level of the firm's investments

X_t stands for net income for the period

Replacing the above expression in the previous equation, we can express the value of a firm independent of dividends.

$$V_t = \frac{1}{1 + r_t}(X_t - I_t + V_{t+1}) \qquad (3.4)$$

MM argument is elegant but this does not explain why companies, investors, investment analysts are so interested in dividend announcements (Rodoplu 2008). Numerous empirical researches challenged the MM theory saying that the underlying assumptions do not hold in real world, dividend policy is an expansion of the capital structure decision and a company should distribute dividends when its investment opportunities are not expected to generate such a high return as the required rate of return on equity. Brennan's (1970) asset pricing model implied that investors require higher returns from high dividend yield stocks to compensate the tax disadvantage of dividend income relative to capital gains income. However, Black and Scholes (1974) empirically tested Brennan's model and concluded that it is not possible to show that the expected return on high dividend yield stocks are materially different from low dividend yield stocks, either before or after taxes. Moreover, Miller and Scholes (1978) showed that investors can offset the tax liability of the dividend income using the tax deductible interest charges on borrowed funds. Since taxes on dividend income can be mitigated, a firm's value should be independent of its dividend policy. On the other hand, Litzenberger and Ramaswamy (1979) found a positive relationship between dividend yields and stock returns. DeAngelo and DeAngelo (2006) showed that MM's proof of dividend irrelevance assumes that the amount of dividends distributed is equal or greater than the free cash flow generated by the fixed investment policy. They claimed that, if retention is allowed, dividend policy is not irrelevant.

3.2.2 Dividend Relevance Theories

Although MM's (1961) argues that dividend policy does not matter for the value of the firm, actions of both financial managers and shareholders tend to support the view that dividend policy does affect the value of the firm. On the other hand, there seems to be no consensus to date on what makes dividends so important. In this section, we review the leading dividend relevance theories, with a special focus on information content of dividends hypothesis that we are going to empirically test in subsequent parts of our study.

3.2.2.1 Signalling Theory (Information Content of Dividends Hypothesis)

Adverse selection problem (information asymmetry) was first formulized by Ackerlof (1970). Signalling theory is fundamentally concerned with reducing the information asymmetry between two parties and dealing with the adverse selection problem (Spence 2002). Spence's signalling model was developed in the context of labour markets and suggested that agents should take actions to distinguish themselves from their lower-ability counterparts. The precondition for this action to be useful as a signalling device is that they bear an opportunity cost. The signal of information must be credible (i.e. costly) to prevent false signalling by others in the marketplace.

Signalling theory in the context of dividends claims that changes in dividend policy convey information about the management's expectations on the firm's future cash flows and value. The information asymmetry between insiders (managers) and outsiders (shareholders) may cause the intrinsic value of the firm to be unavailable to the market. In order to close this information gap and unlock the true value of the firm, managers can use changes in dividends as a vehicle to communicate information to the market about the firm's future earnings and growth. Dividends fit Spence's (1973) description of signal since they entail costs, that is, dividends generate a shortfall in resources that requires raising capital. Indeed, Modigliani and Miller (1961) suggested that in an imperfect market, share prices may respond to changes in dividends.

The information content of dividends is first noticed by Lintner (1956), who interviewed managers of 28 listed US stocks mainly to understand the factors affecting dividend payments. Lintner stated that companies sought to have a stable dividend policy and avoid doing changes that might have to be reversed the following year as they think that shareholders value companies with stable or gradually increasing dividends at a premium. Dividends are only increased if management feels comfortable that future cash flows of the company will be adequate to sustain higher payout ratios. By the same token, companies are very reluctant in cutting or omitting dividends in order not to send negative signals to the market about the company's earnings prospects and financial health.

In our view, the most important feature of Lintner's study is the fact it claims that annual earnings are not the only parameter that companies consider while deciding on dividend payments. Managers also take into account non-public information on the firm like upcoming debt repayments, capex, working capital needs and expected profitability in coming years when deciding on dividend payments. This means that dividends contain information in addition to the financial statements of a company and this non-public information helps to diminish the information gap between insiders and outsiders. Thus, changes in dividend payments convey information that needs to be priced in. The information content of dividends hypothesis also suggests the possibility of an optimal dividend policy (Copeland and Weston 1988). The benefit of signalling through dividend changes should be compared with the tax disadvantages of dividends over capital gains for that purpose. Important conclusions of Lintner's study are listed below:

1. Net income is the most important but not the only variable for determining dividend payments.
2. Managers believe that shareholders prefer stable or gradually increasing dividend payments and firms delivering this trade at premium valuations to their peers.

3. Managers care more about the change in dividends than the absolute value paid.
4. Most managers avoid changing dividend payments if they believe that they will have to alter it again next year.
5. Companies have long-term dividend payout ratio targets. A permanent shift in expected future income does not cause an immediate proportional shift in dividends; instead dividends adapt gradually. Moreover, companies refrain from cutting or omitting dividends in order not to send negative valuation signals to the market.
6. Newly founded firms and companies in growth phase tend to pay lower dividends, while large and mature companies pay more.

Lintner explained the factors affecting dividend payment decisions of a mature company with the below target-adjusted formula.

$$D_t - D_{t-1} = a + c\,(D_t^* - D_{t-1}) + u_t \qquad (3.5)$$

$$D_t^* = rP_t$$

D^*_t stands for target dividend

D_t stands for dividends paid in year t

D_{t-1} stands for dividends paid in year t

r stands for target payout ratio

P_t stands for net income in year t

c stands for partial adjustment factor

The constant “a” in the equation is usually positive which implies that firms are more inclined to increase rather than decrease their dividend payments. The partial adjustment factor "c" increases parallel to the conservatism of the firms, which means that the conservative the firm is, the slower is the adjustment in dividend payments towards the long-term target. According to Lintner, this model explains roughly 85% of the changes in dividend payouts of the 28 firms in his sample.

Lintner's model has been empirically tested and enhanced by many academicians. Fama and Babiak (1968) applied the model to a pooled annual data of 392 major industrial firms in US between 1946 and 1964, and found empirical support for managers' reluctance to change dividends and for the smoothing of dividends. In addition, they have argued that Lintner's model performs better if the constant term is removed and previous year's net income is added as a variable.

While Lintner's sample mostly contained healthy firms with dividend increases, DeAngelo and DeAngelo (1990) investigated whether financially distressed firms change their dividend policies in the anticipated direction. Their sample contained of 167 NYSE firms with losses during 1980 and 1985, and their results showed that all firms with persistent negative bottom lines during those years have reduced or omitted dividends, while those firms with transitory losses kept their dividends unchanged. Thus, their results were supportive of the dividend signalling hypothesis by showing that dividends have information content in that knowledge of that a firm has reduced dividends improved the ability of current earnings to predict future earnings.

Dewenter and Warther (1998) empirically tested the information content of dividends hypothesis by performing an event study of dividend initiations and omissions for US and Japanese firms. They documented that dividend initiations result in statistically significant positive abnormal returns on the first day following the dividend announcement, while omissions result in statistically significant negative returns. They have applied Lintner's model to their sample and found evidence supporting the smoothing of dividends and managers' reluctance to cut dividends.

Baker et al. (2002) surveyed executives of listed US firms that consistently paid dividends to get their views about dividend policy and the relationship between dividend policy and firm value. Around 90% of the participants stressed that dividends should not be increase if they cannot be maintained. Managers largely agreed that the market places greater value on stable dividends and a firm should only change dividends if there is a sustainable shift in earnings. Furthermore, 60% of the participants agreed that a firm should have a target dividend payout ratio and periodically adjust its payout ratio towards that target. All in all, results of the study supported Lintner's model to a large extent.

Empirical tests of information content of dividends hypothesis are quite popular. An impressive number of studies using diverse samples found that unexpected changes in dividend policy disseminates information and the market price of shares increase (decrease) with increases (decreases) in dividends (Campbell et al. 1996). Pettit (1972), Aharony and Swary (1980), Woolridge (1983), Asquith and Mullins (1993), Ryan et al. (2000) are some of the early papers that provided supportive evidence using event study methodology.

Ofer and Siegel (1987) provided evidence that equity analysts revise their earnings forecasts upwards following the announcement of an unexpected dividend hike by an amount positively related to the size of the unexpected dividend change. They also show that these revisions are positively related to the change in share price surrounding the announcement.

Michaely et al. (1995) found that the magnitude of share price reactions to dividend omissions is greater than for initiations. Their results are consistent with those of Healy and Palepu (1988). Moreover, they found that prices continue to drift in the same direction in long-run, which contradicts with the EMH.

DeAngelo et al. (1992) found that firms reduce or cut dividends only in case of deep and persistent earnings problems. Their evidence supports Lintner's view that managers are in general reluctant to reduce dividends. On the other hand, they have shown that the information content of dividends is significant only when current earnings are distorted by one-offs and transitory effects. Dividends have little information content in random samples, because current earnings seem to be an essentially sufficient mean of forecasting earnings for most firms. Their results were also supported by Jensen and Johnson (1995).

While supporting Lintner's hypothesis, Amihud and Li (2006) also found that information content of dividends has been gradually declining since mid-1970s parallel to increasing institutional holdings in shares since institutional investors exploit their superior information and buy shares before dividend changes. Authors linked the declining propensity of firms to initiate or increase dividends to the decreasing information content.

Vermaelen (1981) demonstrated that stock purchases may convey information like dividends. Furthermore, repurchases may be more attractive because of advantageous tax treatment of capital gains. Results show that most of the price reaction happens on the announcement day with no further price drift in following days. Hence, findings are consistent with the signalling theory and semi-strong form EMH.

All in all, most of the empirical tests of information content of dividends hypothesis are supportive. Dividend increases (decreases) are clearly associated with positive share price reactions. However, there seems to be no consensus on what information dividends signal and why less costly techniques are not used (Easterbrook 1994). Watts (1973) found that the relationship between future earnings changes and current unexpected dividend changes is positive and therefore consistent with the information hypothesis. However, future earnings changes that are conveyed by unexpected dividend changes are very small. Hence, information content of dividend changes is trivial. His results are confirmed by Gonedes (1978) and Grullon et al. (2005).

Lang and Litzenberger (1988) found that average returns associated with announcements of large changes in dividends is higher for companies that overinvest. Their analysis of the changes in analysts' earnings forecasts surrounding dividend announcements support the overinvestment (free cash flow) hypothesis over the cash flow signalling hypothesis.

Vieira and Raposo (2007) tested the information content of dividends and signalling hypothesis for Europe. Share price movements confirmed the information content hypothesis for UK, but not for Portugal and France. They also found an inverse relation between dividend and earnings changes, which contradicts with Lintner's hypothesis.

Since the focus of our empirical study will be on the information content of dividends, we have further expanded our review with more recent empirical studies on emerging EMEA stock markets. These can be found in Appendix A.4 on page 203.

3.2.2.2 Agency Cost and Free Cash Flow Hypothesis

Modigliani and Miller's (1961) concept of perfect capital markets assumes that the interest of managers and shareholders do not interfere. Yet, this assumption is frequently violated in the real world. An agency problem arises when 1) the principal (e.g. shareholders) and agent (e.g. managers) have conflicting interests and goals; 2) it's difficult and expensive for the principal to verify what the agent is actually doing (Eisenhardt 1989). The agency problem is a separate field of research that has important implications for dividend policy of firms. Application of the theory in finance took place with Jensen and Meckling's (1976) study where they have formulated the agency cost of equity and debt.

From the perspective of agency theory, both the owners and the managers of a firm are utility maximizers. The former tries to maximize the value of the firm, while the latter peruses its personal interest when possible. Self-motivated behaviours of managers could be superfluous or perquisite expenditure, lower asset utilization, work shrinking attitudes or expropriation of the funds. These behaviours can be controlled via agency cost mitigating factors such as the dividend policy.

The positive relationship between the dividend change and abnormal return can be explained with the free cash flow hypothesis that comes forward from the agency theory (Kadıoğlu 2008). According to Jensen (1986), dividends can be used by shareholders to monitor and discipline managers. Managers are tempted to keep free cash flows at company level to avoid the risk of bankruptcy. They may be tempted to waste these resources on low risk, but negative net present value projects. Furthermore, they may use the free cash flows to do perk consumption for their self-interest. If, however, they payout the free cash flows as dividends, the resources under their control would decrease which would diminish their control and power, thereby reducing the risk of overinvestment for shareholders.

Easterbrook (1984) argues that firms with high dividend payout ratios are likely to tap the debt capital markets frequently to fund new projects. This would reduce the agency cost of monitoring of managers. When firms issue new debt or shares, their financials and investment projects are reviewed by investment bankers who act as a monitor for the collective interest of shareholders and the purchasers of new instruments. Furthermore, dividend payments would increase the debt/equity ratio of the firms and transfer the risk of new projects from shareholders to bondholders. This would help to get rid of managers' risk aversion and encourage them to peruse positive net present value projects. The threat caused by failure to meet debt servicing serves as an important effective motivating force to make managers more effective (Jensen 1986). All in all, increase in dividends have positive information content since they signal that agency cost will be reduced, managers' behaviour will be aligned with that of shareholders and investing in projects with negative net present value will be less likely.

Rozeff (1982) created a model to determine the optimal dividend payout ratio using agency cost as a variable. According to Rozeff,

> *''if agency cost declines as dividend payout is increased and if transactions costs of financing increase as dividend payout is increased, the minimization of the sum of these two costs produces a unique optimum for a given firm''* (1982: 251).

Rozeff used the below regression model to test the relationship between dividend payout and explanatory variables that proxies for agency costs and transaction costs of external financing. He used actual and forecast revenue growth rates and the beta coefficient of the firm as proxies for transaction costs of financing. If a firm is going to grow fast in the future, a prudent management would lower the payout ratio to avoid costly external financing. Beta is higher if a firm has high financial leverage. Hence, Rozeff (1982) hypothesized that dividend payout will be negatively related with a firm's beta. Two variables are used to measure the cost decrease associated with increasing dividend payout ratios. As minority shareholders' own a larger portion of the firm's paid-in capital, they ask for higher dividends for better monitoring of the management. On the other hand, dividend payouts should be negatively related with the percentage of paid-in capital owned by insiders. Rozeff tested his model for a sample of 1000 firms, for a time period between 1874 and 1980 and presented evidence supporting the relationship of agency costs and dividend policies.

$$PAY = c + \beta_1 INS + \beta_2 GROW_1 + \beta_3 GROW_2 + \beta_4 BETA + \beta_5 STOCK + \varepsilon \tag{3.6}$$

INS stands for percentage of common stock held by insiders

$GROW_1$ stands for average revenue growth for the past 5 years

$GROW_2$ stands for forecast of average revenues growth for next 5 years

BETA stands for beat coefficient of the stock

STOCK stands for average payout ratio of last 5 years

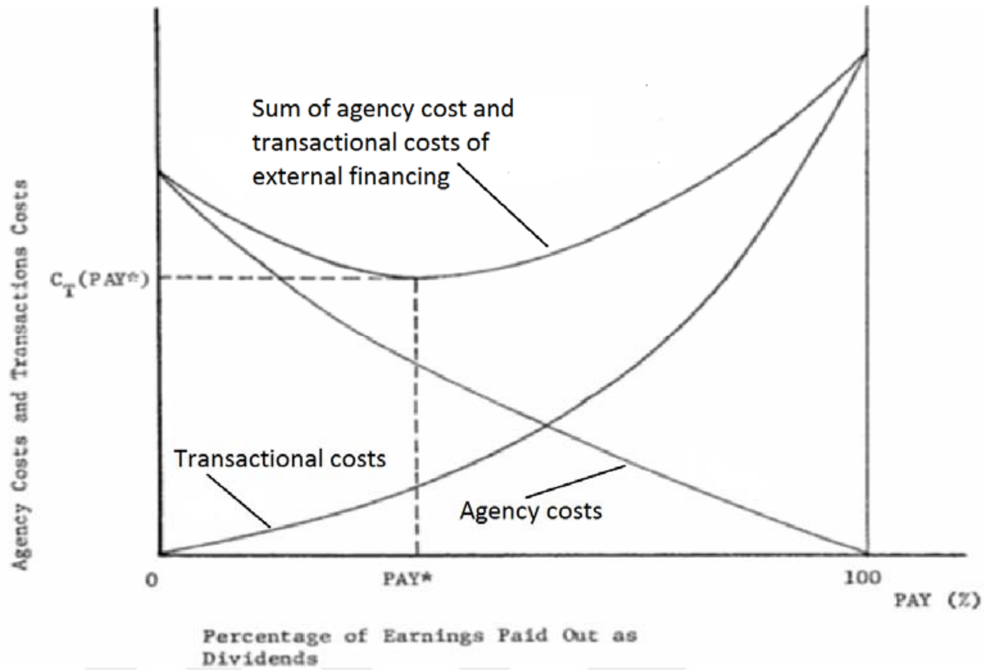

Figure 3.1: Relationship between dividend payout ratio, agency cost and transactional costs of external financing (Rozeff 1982: 252)

3.2.2.3 Bird in the Hand Theory

Bird in the hand theory is initially proposed by Gordon (1959) as a counter argument against MM's dividend irrelevance theory and claims that investors prefer dividends (a bird in the hand) to uncertain capital gains (bird in the bush). That is, expected future dividends should be discounted at a lower rate than expected capital gains when arriving to the value of a firm. The model works with the assumption that there are two opportunity rates: one for the firm (cost of capital) and one for the investors (expected rate of return on equity). If the cost of capital is higher than the expected rate of return, the firm should retain all its earnings and vice versa.

The valuation model proposed by Gordon (1963) to determine the intrinsic value of a stock is based on a future series of dividends that grow at a constant rate. Using this model, he mathematically showed that investors' expected rate of return decreases as the dividend payout ratio increases, because the cash received from dividends is more certain than future capital gains. Hence, an increase in dividend payout ratio increases the value of the firm if r > k.

$$P_0 = \frac{Y_o(1-b)}{k-br} \tag{3.7}$$

Y_o stands for income of a share of stock at the yearend of t = 0

b stands for fraction of income the firm is expected to retain

r stands for expected return on equity

k stands for cost of capital at which the firm's dividends are discounted to reach their present value

P_0 stands for the stock price at t = 0

MM (1961) criticized the model and called it as the ''bird in the hand fallacy'', arguing that a change in dividend policy only implies a change in the distribution of total return between dividends and capital gains. Investors can manufacture the desired dividend payout ratio by buying and selling shares. Thus, the required rate of return on equity for investors does not change with the dividend policy. Bhattacharya (1979) supported MM's view by saying that the risk of a firm is determined by the riskiness of its projects' cash flows rather than how it distributes these cash flows to shareholders. Litzenberger and Ramaswamy (1982) and Blume (1980) found positive relationship between payout ratios and required return on equity, which contradicts both with MM's dividend irrelevance proposition and with Gordon's bird in the hand theory.

Gordon and Bradford (1980) showed that relative value of dividends to capital gains is higher using a variant of CAPM. Graham and Dodd (1951) assigned dividends three times the weight of earnings in their security valuation formula, which supports the bird in the hand theory.

3.2.2.4 Tax Effect (Clientele) Hypothesis

In their seminal paper MM (1961) argued that in a perfect capital market where tax rates on dividends and capital gains area identical, dividend policies are irrelevant for the value of firms. However, in the real world dividends are usually taxed at higher rates than capital gains. Moreover, dividends may be subject to withholding tax, while capital gains are subject to income tax. That is, taxes on capital gains are collected at the time they are realized, which allows investors to decrease the net present value of their tax liabilities by deferring them. The tax hypothesis suggests that dividends have a negative impact on the valuation of stocks since they are taxed higher than capital gains and rational investors would require higher expected returns on shares of dividend paying stocks.

An outcome of different tax treatments is the division of investors into dividend tax clienteles (Frankfurter, Wood and Wansley 2003). Shareholders may face different tax rates for dividends and capital gains depending on whether they are personal or institutional investors. Hence, they sort themselves into client groups based on the dividend policy of the firm so that they minimize their tax liabilities (Rodoplu 2008). Investors in high marginal tax brackets would form a clientele that holds low yielding stocks and vice versa. Consequently, a change in the dividend policy of the firm may cause investors to rebalance their portfolios, thereby affecting the firm's share price.

The clientele effect implies that firms can shape their dividend policy decision based on the investors they would like to attract (Litzenberger and Ramaswamy

1979). At the same time, however, it means that firms will have difficulties in changing that established dividend policies.

The tax-adjusted dividend literature is divided into CAPM based studies and ex-dividend day studies. Brennan (1970) was the first to develop a valuation model, the after-tax CAPM that takes into account the different taxation of dividends and capital gains, as well as the varying tax rates between investors in different income classes. His model supported the tax hypothesis, that expected return is an increasing function of dividend yield. Brennan noted that: ''*The intuitive interpretation of this result is that for a given level of risk, investors require a higher total return on a security the higher is its prospective dividend yield, because of the higher rate of tax levied on dividends than on capital gains.*'' (1970: 423).

$$E(R_i - r_f) = b_0\beta_i + c_0(d_i - r_f) \tag{3.8}$$

R_i stands for before tax total return rate on the asset

β_i stands for systematic risk

c_0 stands for weighted average of marginal tax rates of investors

d_i stands for dividend yield on the asset

r_f stands for risk free rate

Several studies empirically tested Brennan's model. If the coefficient c_0 of the dividend factor is positive, the results support the tax hypothesis on dividend paying shares. Black and Scholes (1974) found insignificant dividend coefficients, and hence concluded that expected returns on high dividend yield stocks do not differ from that of low dividend yield stocks either before or after taxes. This also implies that changes in dividend policies do not affect stock prices. On the other hand, Litzenberger and Ramaswamy (1980), Blume (1980) and Keim (1985) presented evidence that dividend yield coefficients are positive and significant. Elton and Gruber (1970) examined the ex-dividend day behaviour of stock prices to determine the tax brackets of different tax clienteles and have then investigated the relationship between dividend yields and implied tax brackets. Their results were supportive of tax clientele hypothesis showing that high payout firms attract investors in relatively lower tax brackets.

The tax effect hypothesis has been criticized by Miller and Scholes (1978) who argued that investors can avoid taxes through dynamic investment strategies. Investors who receive dividend income can simultaneously borrow funds to buy tax free senior securities. The deductible interest charges on the loan can be used to reduce the tax exposure from the dividend income and neutralize the tax discrimination against dividends.

3.3 **Conclusion**

"The nearly universal policy of paying substantial dividends is the primary puzzle in the economics of corporate finance." (Feldstein and Green 1983:17). Although in a perfect capital market, dividends should not matter for share values, an overwhelming part of the empirical research suggests that dividends are of great importance. However, none of the relevance theories we have discussed in this chapter can explain this phenomenon by itself as they lack utter empirical support. That said, Lintner's (1956) signalling theory seems to be making the most successful attempt. Shareholders' strong preference for dividends despite the tax liability causes corporate dividend policies to be sticky and announcements regarding the chance of dividend policy to have a material impact on share price (Myers 1993). Frankfurter et

al. (2003) reviewed an important part of the early empirical studies on information content of dividends and signalling hypothesis published between 1960s and 2000 on US stock market. Out of the 73 papers they have reviewed only 8 were not supportive.

Given the consensus that dividend announcements affect share prices, we used them as the source of new information that has to be incorporated in to share price, in our empirical test of semi-strong form EMH. Moreover, the greatest amount of research on dividend relevance theory focused on developed markets (e.g. US, UK, EU) while the evidence from developing countries seems limited. Hence, our study will also help broadening the literature for emerging EMEA countries, Turkey, Russia, Poland and South Africa.

CHAPTER 4

THE REGULATORY ENVIRONMENT IN EMERGING EMEA

4.1 Introduction

The purpose of this study is to investigate the level of stock market efficiency in emerging EMEA countries (namely Turkey, Russia, Poland and South Africa) using dividend announcements as source of new information that needs to be priced in. An understanding of the possible differences in the regulatory environments of these countries is needed to conduct an accurate cross-country comparison of the results. This chapter deals with the regulatory environment that was applicable during the period covered in this study, i.e. from the end of 2004 until the end of 2016. This focuses on the aspects relevant to the purpose of this study.

Section 4.2 describes emerging markets in an MSCI context. Section 4.3 provides descriptive information on the emerging EMEA stock exchanges in consideration and compares them with those in developed countries. Section 4.4 evaluates the dividend payment procedures and legal framework, while Section 4.5 compares the taxation of dividend income and capital gains in EMEA countries. The conclusion is set out in Section 4.6.

4.2 Emerging Markets and the MSCI Emerging Markets EMEA Index

MSCI indexes were launched by Morgan Stanley Capital International in 1968 to measure equity market performances. The MSCI offers over 16,000 constituents and indexes which are widely used by institutional investors to benchmark their portfolios. MSCI indices are commonly used as the basis of passive investment products like exchange traded funds (MSCI).

MSCI classifies markets as developed, emerging and frontier, based on their economic development, size, liquidity and accessibility. Countries that bear some of the characteristics of a developed market but fail to meet the standards to be one are commonly referred to as emerging markets. The importance of emerging markets as an asset class has been increasing on the back of the decoupling theory. While the US economy and EU economies entered recession between 2008 and 2012, emerging market economies have been resilient, helping them to attract decent portfolio investments.

Figure 4.1: GDP growth rates of developed and emerging market countries

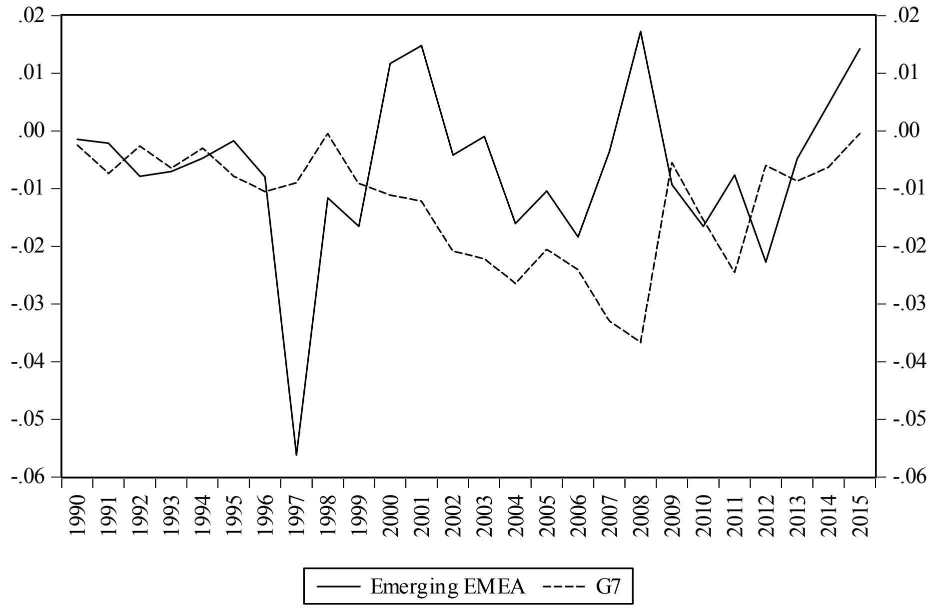

Figure 4.2: Portfolio inflows to developed and emerging markets (as a % of GDP)

Strong fund inflows into emerging markets in recent years made them fertile ground for market efficiency literature. In this thesis, we have focused on four emerging market countries - Turkey, Russia, South Africa and Poland - and compared the informational efficiency of their stock markets. These four countries are the largest constituents of the MSCI Emerging Markets EMEA Index, which is a USD based index that captures large and mid-cap representation across ten emerging market countries in Europe, the Middle East and Africa. With 163 constituents, the index covers roughly 85% of the free float-adjusted market capitalization in each country (MSCI).

Table 4.1: Country and sector weights in MSCI Emerging Markets EMEA Index

Country	Weight	Sector	Weight
South Africa	46%	Financials	36%
Russia	22%	Energy	18%
Poland	9%	Consumer discretionary	16%
Turkey	8%	Telecommunication services	8%
Qatar	6%	Materials	6%
Others	9%	Consumer Staples	6%
		Industrials	4%
		Healthcare	3%
		Utilities	2%
		Others	1%

4.3 Institutional Background of Stock Exchanges in the Emerging EMEA

This section provides some brief background information on the emerging EMEA stock exchanges in question and compares them with each other on key metrics such as market capitalization and liquidity. Table 4.2 illustrates that EMEA stock exchanges trail their developed world peers on almost all key metrics. Stock exchanges in emerging countries are also significantly younger than the stock exchanges of developed countries. None of the stock exchanges we covered in this study have capital controls in place.

Among the four emerging EMEA exchanges in question, the South African exchange appears to be the most developed with a much more substantial market capitalization in absolute terms and also when compared to the country's GDP. While having the smallest market capitalization, the Turkish stock exchange stands out with its relatively high average daily trading volume. The Polish stock exchange has the highest number of companies listed, but its market capitalization and trading volume are relatively limited, since most of the listed companies are small or medium size enterprises. The Russian market has the lowest number of listed stocks, but a relatively large market capitalization. It is dominated by large oil and gas companies. However, the trading volume on the Russian stock market is relatively low since most large cap companies cross-list their stocks.

Table 4.2: Emerging EMEA stock market statistics

Country	**TURKEY**	**RUSSIA**	**POLAND**	**SOUTH AFRICA**
Main stock exchange	Borsa Istanbul	Moscow Exchange	Warsaw Stock Exchange	Johannesburg Stock Exchange
Year of foundation	1986	1995	1991	1947
Number of companies traded (YE16)	414	245	890	405
Market capitalization (YE16, USDbn)	174	780	258	745
Market turnover (FY16, USDmn)	1,221	496	190	1,545
Benchmark index	BIST100	MICEX BMI	WIG20	TOP40
Settlement period	T+2	T+0	T+3	T+5
Country	**FRANCE**	**GERMANY**	**US**	**UK**
Main stock exchange	Euronext Paris	Deutsche Borse	New York Stock Exchange	London Stock Exchange
Year of foundation	1724	1585	1792	1801
Number of companies traded (YE16)	1,256	1,428	2,400	1,906
Market capitalization (YE16, USDbn)	2,278	1,688	27,000	2,705
Market turnover (FY16, USDmn)	2,431	4,722	68,700	6,800
Benchmark index	CAC40	DAX	DJI / S&P 500	FTSE100
Settlement period	T+2	T+2	T+3	T+2

4.3.1 Borsa Istanbul (BIST)

The BIST is the sole exchange entity of Turkey, following the merger of the former Istanbul Stock Exchange (ISE), the Istanbul Gold Exchange and the Derivatives Exchange (VOB) under a single umbrella in 2013. The ISE, the predecessor of the BIST, started trading at the end of 1985. The number of outstanding securities has rapidly increased since its establishment and had reached 414 by the end of 2016. While the number of listed companies is the second highest among the four EMEA stock markets we have investigated, the total market capitalization of listed stocks is the lowest among the four. However, the BIST has the second highest cash equity trading volume among EMEA stock markets, placing it as one of the most important emerging markets. The market's relatively high liquidity attracts foreign investors, who held roughly 62% of the free float of the shares as of the 2016 year-end (Şeker Yatırım 2016). The BIST also differs from other emerging EMEA stock exchanges since it is not privately owned. However, a public offering of the BIST is on the government's agenda ("2016 Yılında Halka Arz" 2016).

The BIST is open for trading from Monday to Friday, with two continuous sessions between 10:00 – 13:00 and between 14:00 – 18:00. These sessions are preceded and succeeded by brief opening and closing call auctions. In order to prevent excess volatility from arising, price limits are set at ±10% for each session and calculated over a base price, which is found by the rounding the previous session's weighted average price to the nearest tick. Trades are cleared two days after the day of transaction. The clearing agency is Takasbank.

4.3.2 Moscow Stock Exchange (MOEX)

Until 2011, Russia had two exchanges; the Russian Trade System (RTS) and the Moscow Interbank Currency Exchange (MICEX). In 2011, they were merged under the Moscow Exchange (MOEX). Established in 1995, the Russia Trade System (RTS) was the first regulated stock market in Russia. MICEX Group, the other exchange, was established in 1992 by the Central Bank of Russia (CBR) and leading commercial banks. The RTS was more active in derivatives trading while the MICEX was more active in cash equities (Serikova 2012). Following the merger between the two exchanges, the new joint exchange, MOEX, was listed in 2013. The MOEX still calculates both RTS and MICEX indices. The difference between the two indices is that the RTS index is USD denominated, while the MICEX Index is denominated in Russian Rubles.

The total market capitalization of listed stocks in MOEX is the second highest in the emerging EMEA after the JSE. However, it has the fewest listed stocks. The market is dominated by a small number of large cap oil & gas, banking and metals & mining stocks. Oil and gas companies make up 52% of the market capitalization of the total exchange. The MICEX also has a lower average daily trading volume than other emerging EMEA stock exchanges since almost all large cap companies have cross listing in the stock exchanges of developed countries. Shcherbakova (2007) argues that poorly regulated and liquidity constrained equity markets encourage emerging market companies to cross-list their equity in foreign stock exchanges. Russian firms frequently use depository receipts (DRs) for this purpose. In this case, a custodian bank buys a certain number of the underlying domestic shares and issues DRs against them. A DR is a security that has a legal claim on the cash flows from the deposited shares. In our study, we have only focused on stocks listed on the local exchange and disregarded their DRs.

Russian companies more often have dual class shares (common and preferred) than companies in other emerging EMEA countries. This is because the Russian government created two classes of shares when it privatized its industries. Common shares are similar to those found in other countries. However, Russian preferred shares are quite different to those in other countries, since they hold special voting and cash flow rights. They were distributed by the Russian government to the employees of the firms so they would become shareholders (Goetzmann et al. 2002). The articles of association of most companies require preferred shares to receive a fixed percentage of their annual net earnings as dividends (typically 10%), while dividends to common shares are not usually defined and are fully at the management's discretion (Mei 2003). Most of the time, these preferred shares are also traded on the exchange together with the common shares. In order to avoid double counting due to existence of dual class shares, we have excluded preferred shares from our sample of dividend announcements in the Russian stock market. We also believe an analysis of the dividends on preferred shares would provide relatively little information on companies' future cash flow streams, since they are fixed in most cases.

The MOEX operates from Monday to Friday with continuous trading from 09:45 to 18:45. Trades are settled and cleared two days after the day of transaction. The clearing agent is the National Clearing Centre (NCC). The MOEX imposes limits on price fluctuations. Accordingly, in any given trading day, stock prices may not change more than ±30% with respect to the previous day's closing price – a band almost 3 times wider than the price limits imposed by the BIST and WSE.

4.3.3 Warsaw Stock Exchange (WSE)

Although the Warsaw Stock Exchange (WSE) is part of the group of developing and young stock exchanges, it was first opened as long ago as 1817 (it was then called the Warsaw Mercantile Exchange). However, it was closed in 1915 with the occupation of Warsaw during the First World War. It was only after the fall of the communist regime in 1989 that the Warsaw Stock Exchange could be re-established. The market developed gradually through privatization and public offerings of state-owned companies. Therefore, the market was initially dominated by large privatized companies. With the process of privatization largely complete, small and medium sized companies have dominated the IPO market over the past decade. In recent years, the WSE has become one of Europe's most dynamic IPO markets with 433 companies, including 54 foreign companies, listed on its main market, and 403 companies listed on the NewConnect market as of December 31, 2016 (GPW).

The WIG has the highest number of listed stocks of the four emerging EMEA countries in our study. However, this is largely due to the NewConnect market that is operated by the WSE outside the regulated market as an alternative trading system. The NewConnect market was formed in 2007 and consists of smaller high growth companies, especially in the tech sector. Disclosure requirements for companies listed on the NewConnect are significantly reduced compared to the regulated market. In the period of trading, the company is supported by an investment company acting as market maker whose purpose is mainly to ensure the liquidity of trading in the company's shares. All shares are traded in a continuous system (GPW). We have excluded companies listed on the NewConnect market from our sample of listed Polish stocks due to the looser accounting and disclosure requirements, as well as the very thin trading volumes. The existence of the NewConnect market also explains why the total market cap of listed Polish companies is the second lowest in our sample and its average daily trading volume is the thinnest, even though it has the highest number of listed companies.

The WSE operates from Monday to Friday with continuous trading from 09:00 to 17:00. Trades are settled and cleared three days after the day of transaction. The clearing agent is the Polish Central Counterparty Clearing House (UCG). The WSE imposes price limits on price fluctuations. Accordingly, the stock price may not vary by more than ±10% from the reference price. If a price cannot be determined within these price brackets the following procedure applies. If the imbalance of the buy and sell orders (or vice versa) exceeds a ratio 5 to 1, no trade is executed and a nontransactional price is announced at the upper (lower) price limit in case of a buy (sell) order surplus.

4.3.4 Johannesburg Stock Exchange (JSE)

The Johannesburg Stock Exchange is the only equity exchange in South Africa. It is operated by JSE limited, a company that has been listed on its own main exchange since 2006. The establishment of JSE dates back to the 1880s, and it is therefore the oldest exchange in the emerging EMEA. It is also the biggest and most developed stock exchange in the emerging EMEA in terms total market capitalization of listed companies and average daily trading volume. The JSE equity market is dominated by consumer stocks which comprise 32% of the exchange's total market capitalization (JSE).

The JSE operates from Monday to Friday with continuous trading from 09:00 to 17:00 preceded and succeeded by opening and closing auctions. Trades are settled and cleared five days after the day of transaction. However, the JSE is currently working on migrating the settlement cycle to T+3. Share Transactions Totally Electronic Limited is the licensed central securities depository (CSD) for the equity market and it performs electronic settlement and clearing of all trades. Like other stock exchanges, the JSE also imposes daily price limits on equities to prevent excess volatility. However, unlike other exchanges, the JSE does not use a fixed percentage band. Price limits differ according to the stock price and vary between ±6% and ±2% (JSE).

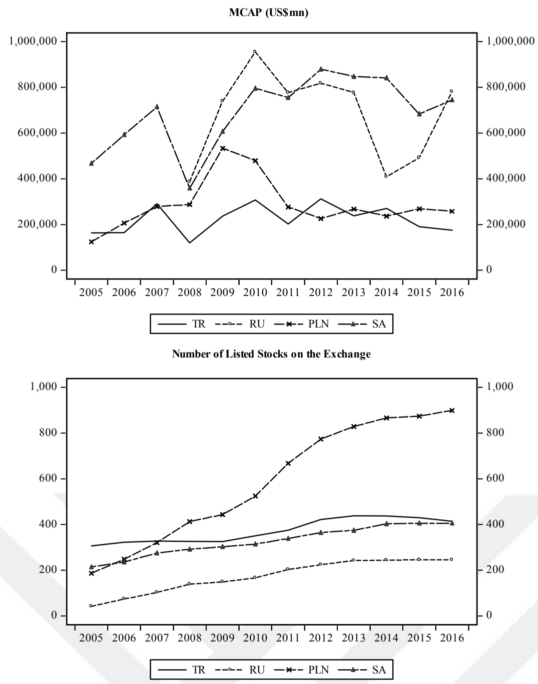

Figure 4.3: Emerging EMEA stock market statistics

Table 4.3: Sectoral breakdown of companies listed on the emerging EMEA stock exchanges

	BIST		MICEX
Financials	33%	Energy	52%
Consumer Cyclical	15%	Financials	19%
Industrials	12%	Basic Materials	16%
Basic Materials	11%	Telecommunications Services	4%
Energy	10%	Consumer Non-Cyclical	4%
Consumer Non-Cyclical	9%	Utilities	3%
Telecommunications Services	8%	Technology	1%
Technology	1%	Industrials	1%
Utilities	1%	Consumer Cyclical	1%
Healthcare	0%	Healthcare	0%
	WIG		**JSE**
Financials	60%	Consumer Goods	32%
Energy	10%	Financials	21%
Utilities	8%	Basic Materials	18%
Consumer Cyclical	7%	Consumer Services	12%
Basic Materials	6%	No Sector scheme returned	5%
Consumer Non-Cyclical	3%	Telecommunications	4%
Industrials	3%	Industrials	4%
Healthcare	1%	Health Care	3%
Telecommunications Services	1%	Technology	0%
Technology	1%	Total	100%

4.4 Dividend Payout Procedure and Legal Framework in the Emerging EMEA Stock Markets

This section elaborates on the types of dividends and the chronology and payment procedure of cash dividends in emerging EMEA stock markets.

4.4.1 Types of Dividend Payments

Dividend payments can be in the form of cash dividends or capital appreciation on the shares. Cash dividends include regular, special, extra, or liquidating dividends (Damodaran 2011). Dividends in the form of capital appreciation include share dividends (bonus issues), splits and share repurchases. Many companies use a combination of these payment methods (Brav et al. 2005). Figure 4.4 shows that cash dividends are the most common type of dividend in emerging EMEA countries. Naturally, special, extra and liquidation dividends are seldom distributed. However, share buy backs are also quite rare in the EMEA. Van der Merwe (2010) puts this down to the fact that most emerging market companies do not have access to cheap debt to fund repurchases. Most companies pay their regular cash dividends annually after their annual general assembly of shareholders. South African companies appear to be an exception in this regard with most companies preferring to pay interim dividends.

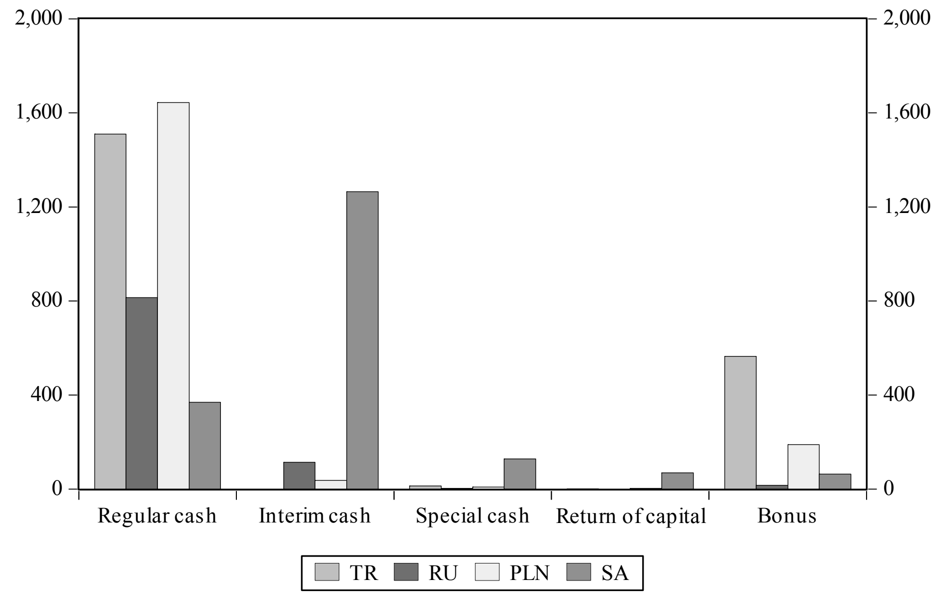

Figure 4.4: Types of dividend payments between 2005 and 2016 (number of events)

4.4.2 Cash Dividend Payment Chronology

Cash dividends are proposed by a firm's board of directors (BoD) and decided by the general meeting of shareholders. Note, however, that directors' proposals are rarely rejected or amended by the shareholders. The dividend payment time line is as follows:

1. **Declaration date:** The firm's board of directors decides whether or not to distribute dividends to shareholders. This date is the basis of the signalling theory discussed in the previous chapter. According to Damodaran (2011: 699):

   ''By announcing its intent to increase, decrease, or maintain dividend size, the firm conveys information to financial markets. Thus, if firms decide to change dividend payments size, this would be the date that the reaction to the change is most likely to occur.''

2. **Ex-dividend date:** The share price declines by the amount of the dividend per share on the ex-dividend date. Investors would have had to purchase the shares

by this date in order to receive dividends. The ex-dividend date usually occurs two to three weeks after the general assembly.

3. **Record date:** The firm closes its books and prepares the list of shareholders on the record date, which is usually the same day as the ex-dividend date, or a few days later.
4. **Payment date:** This is the date that the dividends are distributed to shareholders. According to Asquith and Mullins (1983), the ex-dividend date and the payment date should not have any impact on the share price since the market has ample time to respond to the dividend announcement.

4.4.3 Dividend Payment Procedure in Turkey

Companies listed on the BIST distribute profits pursuant to the decision taken by their general assembly, in line with their articles of association, provisions of the Turkish Commercial Code and Capital Markets Law. Public companies may decide against distributing any dividends. Where a decision to pay dividends is settled, the procedure of payment should be initiated by the end of the accounting period to which the general assembly relates to.

The net distributable earnings of the financial period are determined after deducting the previous years' losses (if any) from the current period's net earnings and allocated to the following:

1. 5% of the net earnings are set aside as first legal reserves until the first reserve reaches 20% of the paid-in capital.
2. A first dividend is separated from the amount remaining equal to 20% of net distributable income plus any donations made within the year. The general assembly may, on the BoD's recommendation, decide in favour of first dividends

being distributed in cash and/or in the form of shares, or may decide against distributing a dividend and retain the amount within the firm. First dividends were mandatory for listed stocks until 2009, and the minimum payout ratio was 30% until 2006.

3. After the first legal reserve and first dividend have been subtracted from the net earnings, firms may allocate all or part of the remainder as a second dividend to board members and/or employees (up to 2% of the annual net earnings) or to shareholders, or retain it as extraordinary reserves.
4. 10% of the amount of earnings remaining after 5% of the paid-up capital is set aside from the sum decided to be allocated to shareholders and other participants is set aside as a secondary legal reserve.

Before the legal reserves that must be put aside in accordance with the law and before the first dividend is distributed in cash and / or as shares, no decision can be taken to separate reserves, endorse profit for the following year or allocate dividends to preferred shareholders. Note that a firm may distribute dividends even if it writes a net loss in the related period, by using the reserves set aside in previous years to maintain dividend stability (Cizre 2013).

Capital Markets Law requires listed companies to announce their dividend decisions no later than the announcement of their AGM agenda. According to the Turkish Commercial Code, companies must hold an AGM within 3 months of the end of fiscal year. Dividends are required to be paid to shareholders within 5 months of the end of the financial calendar. The Capital Markets Board has only permitted Turkish companies to pay dividends in instalments since January 2014 (Communiqué on Dividends). Hence, almost all cash dividends announced throughout the period of our study were annual dividends. Dividend payments are reflected to the share price on the first session of the first payment date by deducting the tax-free (gross) dividends per share from the weighted average price calculated for the last session.

4.4.4 Dividend Payment Procedure in Russia

Listed Russian companies follow governing provisions of the Federal Law on Joint Stock Companies, the Federal Law on Securities Market and the Code of Corporate Conduct recommended by the instruction of the Federal Commission for the Securities Market of the Russian Federation relating to payment of dividends by joint stock companies. These regulations define the terms and basis for the payment of dividends on outstanding shares, regulate the procedure for making a decision on the dividend payment, defining the amount of dividends and informing the shareholders of the company's dividend policy, as well as the decisions made by the general assembly in respect to the dividend payment.

The BoD submits its recommendations regarding the amount of dividends and procedure of dividend payment to the general assembly. The BoD's recommendations regarding the amount of dividends subsequent to the results of the reporting period should be submitted to the company's shareholders under the applicable law in such a way that shareholders are able to make the final decision during the general assembly, which takes place at least once between March and June.

Berdnikova and Erogova (2014) argue that the timing and mechanism of dividend payments in Russia are an important problem for investors. While dividends may be obtained within three days in many countries, a much longer period may be required in Russia. Although Russia did change the dividend payment procedure with effect from the end of 2013, the change does not cover the timeframe of our study, except for three years.

According to the new regulation, the dividend record date may not be later than 20 days after the date of the resolution of the AGM where the dividend payment was approved. Before the change, the dividend record date had been the date on which the AGM approved the dividend payment. The new regulation also amended the time period for dividend payments. Until 2014, dividends had to be paid within 60 days of the date the decision to pay the dividends was passed in the AGM unless a different term for the payment was written in the company's articles of association or determined in the AGM. The new regulation provides that dividends must be paid within no more than 25 days of the dividend record date.

4.4.5 Dividend Payment Procedure in Poland

Listed Polish firms follow governing provisions of the Polish Commercial Companies Code and their articles of association in order to distribute dividends. The amount of dividends may not exceed the profit for the last financial year increased by the undistributed profits for previous years and by distributable amounts transferred from the supplementary capital and reserve capital created out of profit. Uncovered losses, own shares, and amounts which should be transferred from the last financial year's profit to the supplementary capital or reserve capitals should be deducted from this amount. Shareholders entitled to shares on the date of resolution on the distribution of profit are entitled to a dividend for a given financial year (HG).

The decision on the distribution of net profit and dividend payment is made by the general assembly. The BoD issues a proposal on distribution of net profit and, having obtained the opinion of the Supervisory Board, submits it to the general assembly. In accordance with the Polish Commercial Companies Code, an AGM of shareholders should be held within six months of the end of each financial year. The company is required to inform the WSE forthwith of passing a resolution on distribution of net profit for the shareholders' dividend, specifying the amount of the dividend, dividend right (record) date and the dividend payment date. The dividend record day may be established when passing the resolution on dividend distribution or during three months following the resolution date. According to the regulation the time between the dividend record date and dividend payment date must be at least 10 days. The payment of a dividend is carried out through the National Depository for Securities which transfers dividend amounts directly to the securities accounts maintained by brokerage houses for the persons eligible to receive the dividend (Asseco).

As shown in Figure 4.6, Poland has the lowest number of dividend paying stocks. Sawicz (2014) explains that the ratio has declined in recent years because of the strong growth of a number of private companies making their debut on the WSE. These companies rarely decide to pay dividends in their first year. Indeed, as these companies are in the early stages of their development, they seek to build their development capital by withholding profits and by improving their credit rating. Equally importantly, many listed companies have not developed long-term dividend policies. Finally, the tighter capital requirements introduced by the Polish Financial Supervisory Authority (KNF) following the global financial crisis in 2008 and 2009 caused many banks to cut or suspend their dividend payments to preserve capital over the past couple of years (KNF). The financial sector has a weighting of roughly 60% in the MSCI WIG index.

4.4.6 Dividend Payment Procedure in South Africa

The governing provisions for dividend payments by publicly traded South African companies are the Companies Act 2008 (previously the Companies Act 1973), the Johannesburg Stock Exchange Listing Requirements, the King's Code and the Report on Governance of South Africa and their memorandum of incorporation. Dividend payments are extremely loosely defined in the South African Companies Act under the payments to shareholders section (KPMG 2008). All dividends and other distributions by a company need to comply with the act. The most typical distributions are dividends declared by a company to its shareholders, although the definition of distributions extends to other forms of payments or transactions by a company in favour of its shareholders. All distributions to shareholders require BoD approval and must satisfy the solvency and liquidity test. Distributions are extremely widely defined and include dividends and share buy-backs. If any distribution does not comply with these provisions, the distribution may be declared void and the directors of the company may be personally liable (The Companies Act 71 of 2008).

According to the Companies Act, profits available for distribution are defined as a company's accumulated realized profits, so far not previously utilized by distribution or capitalization, less its accumulated, realized losses which have not previously been written off in a reduction or reorganization of capital duly made (Van Der Linde 2008). In other words, distribution from unrealized profits or from current profits without making up losses incurred in the past is not permitted. On the other hand, bonus share issues may still be funded from unrealized profits. The determination of profits available for distribution must be based on profits, losses, assets and liabilities, certain provisions, share capital and reserves, including undistributable reserves.

While firms in other emerging EMEA countries usually pay dividends once a year, South African companies commonly pay an interim dividend as well as a final dividend. Final dividends are declared at the end of the financial year whereby the directors and shareholders are aware of the company’s annual financial results. The procedure for payment is that, having made the necessary declaration of solvency, the BoD submits its recommendation regarding the amount of dividends procedure of dividend payment to the general assembly, where the final decision is made.

The procedure for declaring an interim dividend is simpler than for a final dividend. Interim dividends may be paid at any time throughout the year and are calculated before the company's annual earnings have been determined. The solvency requirements apply to interim dividends as much they do to final dividends but the articles of association usually provide that they can be decided upon solely by the directors and, unlike final dividends, may be paid without shareholder approval.

According to the Companies Act, a general assembly should be convened annually within 6 months of the company’s financial year end, but not more than 15 months after the date of the previous meeting (SASOL 2012). According to JSE listing requirements, the declaration of dividends must be announced immediately. The timetable for dividend payments is as follows (JSE 2015).

Table 4.4: Timetable for cash dividend payments in the JSE

Day	Event
D - 15 Declaration date	Publication of declaration data
D - 10 Finalization date	Publication of finalization information
D - 5 Last day to trade	Last day to trade
D - 4 List date	Securities start trading ex-dividend
D + 0 Record date	Record date to determine who receives the dividend
D + 1 Pay date	Transfer of funds

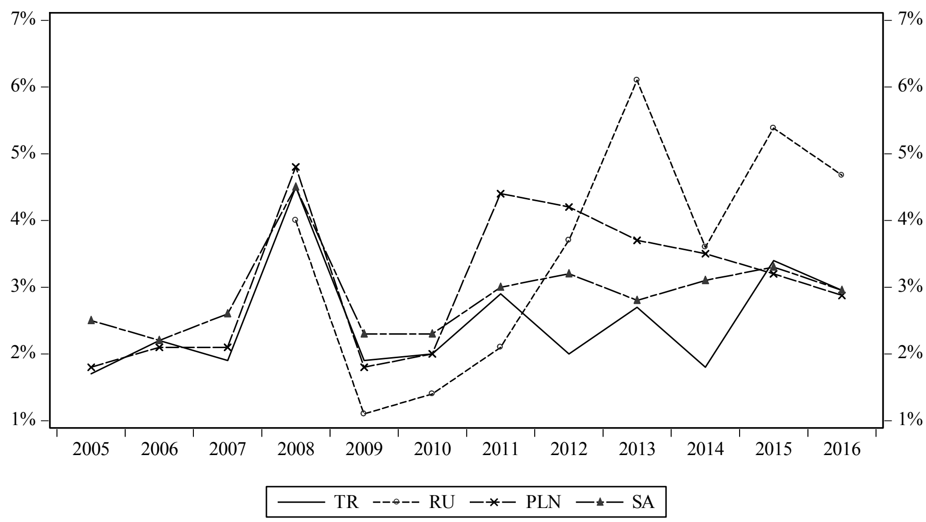

Figure 4.5: Dividend yield of emerging EMEA stock exchanges

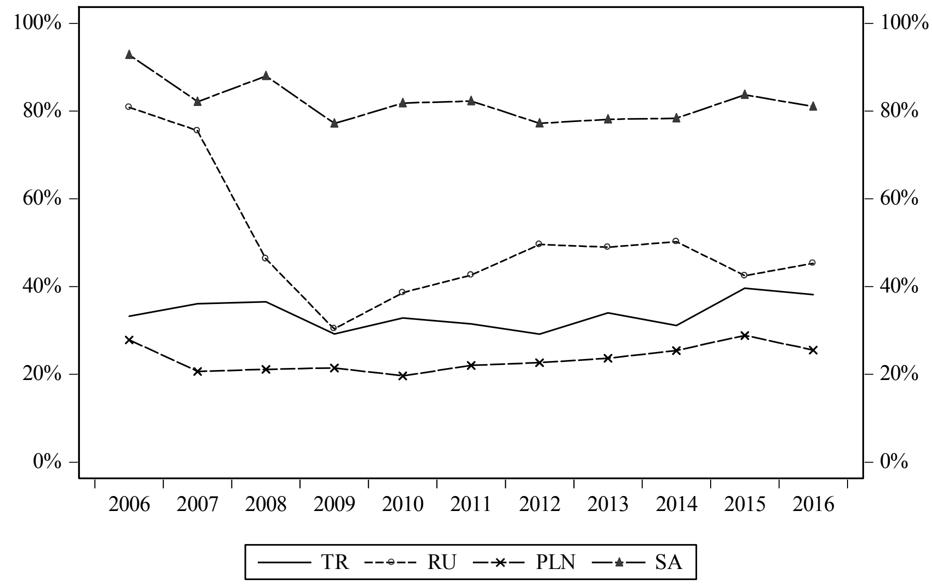

Figure 4.6: Number of cash dividend announcements / # of listed companies

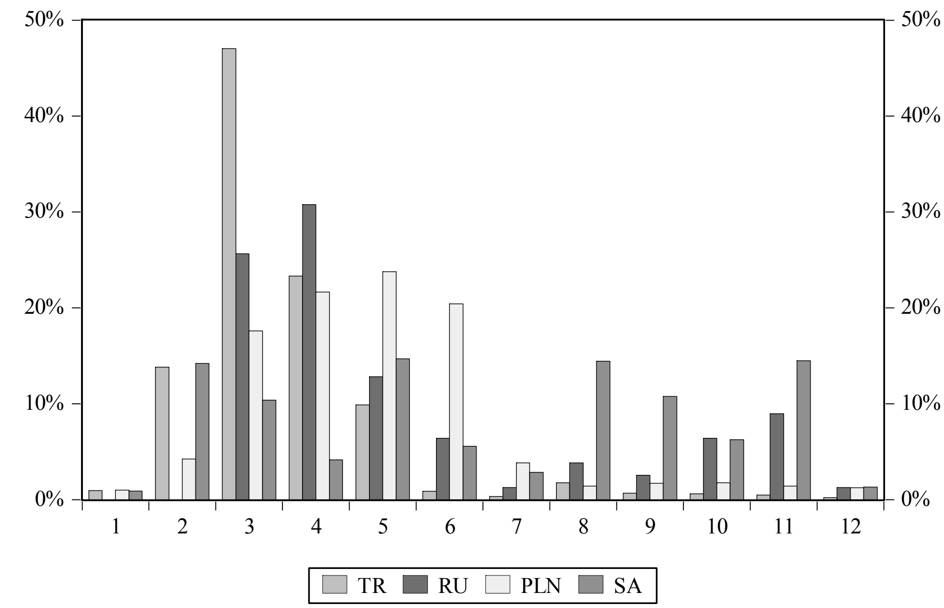

Figure 4.7: Breakdown of cash dividend announcements per month between 2005 and 2016

4.5 Taxation of Dividends and Capital Gains in the Emerging EMEA Countries

The tax clientele hypothesis suggests that rational investors' preference between dividends and capital gains is a function of the difference in tax rates levied on the two. According to the theory, companies shape their dividend policies by taking into account the tax brackets of the clientele they wish to attract. While dividends are usually taxed at higher rates than capital gains, the picture is mixed in emerging EMEA as we illustrate in Table 4.5.

Table 4.5: Taxation of dividends and capital gains in the emerging EMEA[1]

	Individuals		Corporations	
	Resident	**Non-resident**	**Resident**	**Non-resident**
TURKEY				
Capital gains on equities	0% withholding tax	0% withholding tax	20% corporate income tax	0% withholding tax
Dividends on equities	15% withholding tax	15% withholding tax	0% withholding tax	15% withholding tax
POLAND				
Capital gains on equities	19% personal income tax	19% withholding tax	19% corporate income tax	19% withholding tax
Dividends on equities	19% withholding tax	19% withholding tax	19% corporate income tax	19% withholding tax
RUSSIA				
Capital gains on equities	13% income tax	30% income tax	20% corporate income tax	20% withholding tax
Dividends on equities	13% withholding tax	15% withholding tax	13% withholding tax	15% withholding tax
SOUTH AFRICA				
Capital gains on equities	maximum effective capital gains tax rate 13%	0% capital gains tax	maximum effective capital gains tax rate 19%	0% capital gains tax
Dividends on equities	15% withholding tax	15% withholding tax	0% withholding tax	15% withholding tax

Turkey does not tax capital gains in most cases, which largely explains why the number of dividend paying stocks is at the lower end of the four emerging EMEA countries we have analysed. Solely from the tax hypothesis's point of view, Turkish stocks should not react positively to dividend initiations. That is supported by the

[1] Possible reductions and eliminations under tax treates are disregarded.

finding of our event study shown in later chapters. Note that although the corporation tax rate for residents is 20%, earnings of mutual funds, real estate investment trusts and pension funds are exempt from corporation tax (GIB).

The Russian tax system favours dividends over capital gains. Note that non-residents were estimated to own roughly 70% of the free float of Russian stocks in 2014 (Kuchma 2014). According to the Russian tax regime, these investors are liable to a 15% withholding tax for dividend income, versus a 20% to 30% tax on capital gains. The relatively advantageous tax treatment of dividends may explain statistically significant reaction of Russian stocks to dividend initiations. On the other hand, the lack of a significant reaction to dividend omissions conflicts with the tax effect hypothesis.

South Africa has a bigger domestic institutional investor base than other emerging EMEA countries (Figure 3.1), which are exempt from taxes on dividend income. Consequently, dividend changes act as bigger signal of valuation than in other countries. Our analysis in the next section shows that share price reactions to dividend changes are in the direction anticipated by the tax effect hypothesis. The reaction to dividend omissions is especially strong.

Poland applies flat tax rates on capital gains and dividend income, implying that dividend policies should be irrelevant in determining the value of firms (MM 1961). On the other hand, the results of our event study demonstrate that the price reaction to dividend cuts is significantly negative.

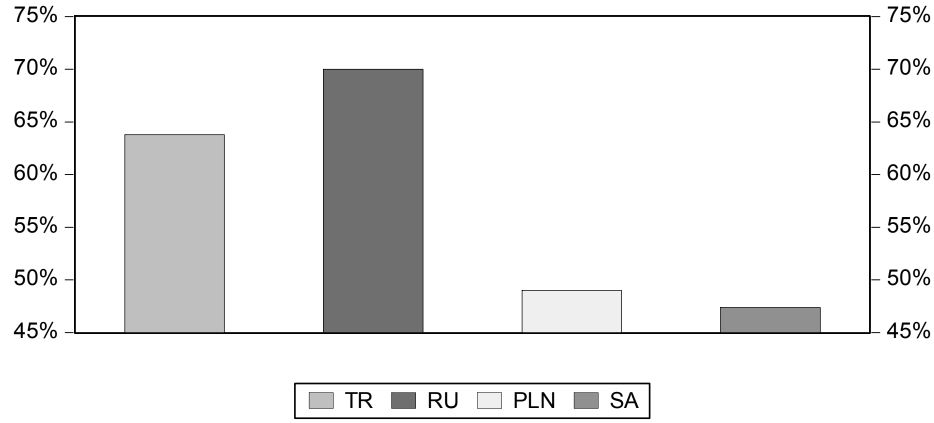

Figure 4.8: Foreign investors' ownership in listed stocks' free float as of 2015

4.6 Conclusion

This chapter reviewed the stock market structure, dividend payout procedure, dividend types and taxation in emerging EMEA countries. Our main conclusions are as follows:

The Turkish and South African stock exchanges are significantly bigger than the Russian and Polish stock exchanges in terms of market capitalization and daily trading volume (liquidity). The relatively low number of listed stocks and cross-listing of large companies depresses the liquidity of the Russian stock exchange. Similarly, the limited number of large, blue-chip stocks listed on the Polish stock exchange curtails its liquidity. Note that thin trading may result in excess volatility and slower price adjustment to new information in these exchanges. Moreover, both stock exchanges lack sector diversification. Some 60% of the market value of the Polish stock exchange is derived from companies operating in the financial sector, while 68% of the market value of the Russian stock exchange comes from oil & gas and metals & mining companies. The Turkish and South African stock exchanges appear relatively well diversified.

Dividend payment procedures are similar in all emerging EMEA countries. While almost all Turkish, Russian and Polish companies pay dividends once a year, the majority of South African companies pay dividends in instalments. Listed South African companies have well established dividend policies, apparent from the high percentage of dividend paying companies in total (Figure 4.6). The ratio of companies distributing dividends is lowest in Poland, due to the high capital requirements imposed on Polish financial companies, which make up 60% of the aggregate market value of the stock exchange. We have also found that an overwhelming proportion of the companies in the emerging EMEA announce their dividends between March and May, after declaring their full-year financial statements (Figure 4.7). The fact that the chronologies of cash dividend payments are similar may improve the cross-country comparability of semi-strong form EMH, in our view.

The tax rate on capital gains is not always lower than on dividend income in the emerging EMEA. Poland applies the same tax rate on both sources of income, impairing the explanatory power of the tax effect (clientele) hypothesis to a large extent for this market. The Russian tax code favours dividends over capital gains, while Turkish tax code favours capital gains over dividend income. South African tax code favours dividend income over capital gains for resident institutional investors, who own the majority of the listed stocks' free float. This explains the relatively high number of dividend paying companies in the exchange relative to other countries. Furthermore, our empirical analysis finds that changes in dividend policy have a larger impact on share prices in South Africa than in other countries.

The dissertation has so far covered the theoretical aspects of the dividend policy theories and the EMH, as well as the regulatory environment that governs dividend payments. We utilize this theoretical knowledge and background information to design our empirical test of information content of dividends hypothesis and semi-strong form EMH in emerging EMEA countries in the next chapter and evaluate our findings in the following chapter.

CHAPTER 5

DESIGN OF THE STUDY

5.1 Introduction

This chapter describes the design of our study. We first discuss the time period investigated and the source of the data collected in section 5.2. Sample selection criteria applied to the dataset and classification of events into dividend groups is described in section 5.3. Section 5.4 draws the timeline of the study, i.e. the length of estimation, event and post-event periods used and reasons why we have chosen those particular lengths. Subsequent section deals with the model selection for each individual security in our dividend groups and residual diagnostics. With the exclusion of poorly fitted models, we reach the final sample. Section 5.7 concludes the chapter.

Ability to reach reliable statistical inferences in event studies of signalling theory and market efficiency heavily depends on the accuracy of the expected return models used. The relevance of this chapter to our study relates to avoiding potential biases that may arise due to poorly fitted expected return models. Our review of recent event studies of market efficiency in emerging EMEA (Appendix A) and Başdaş and Oran's (2014) thorough review of almost all event studies published in Turkey reveal that an overwhelming portion of them unquestioningly rely on the simple market model when forecasting expected returns. On the other hand, using a relatively long 1000 days estimation period, we found that the residuals and squared residuals of the simple market model are in many cases correlated, which hampers the power of the significance tests significantly. Within this chapter we present evidence on the shortfalls of the simple market model and propose an hybrid model where we extend the market model with an ARMA term and switch to GARCH family models in case of ARCH effects.

5.2 Data and Sources

Measurement interval for an event study can be set as daily, weekly or monthly, with the first being the most common choice. Morse (1984) stated that using daily stock returns is more powerful than monthly when applying event study methodology since daily data allows investigating the daily reactions of share prices on an event day and increases the statistical power of the significance tests. This conclusion is supported by Brown and Warner (1985) and Abu Khalaf (2012). At the present time, event studies almost exclusively use daily returns (Soronika et. al 2013). Hence, we have used daily stock returns in our study, similar to a majority of event studies in emerging EMEA concentrating on dividend announcements.

Comparability and availability of data is crucial for multi country event studies. To ensure this, we have relied on a single database, namely Bloomberg database[2], to gather the cash dividend declaration dates and daily closing prices for all stocks listed in the selected emerging EMEA stock exchanges. Our sample starts with 30/12/2004 and ends with 30/12/2016. We have deliberately started the study with 2005 since Turkey had been applying inflation accounting in previous years, which disturbs YoY comparability of dividends.

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[2] Bloomberg is an online database providing current and historical financial quotes, business newswires, and descriptive information, research and statistics on over 52,000 companies worldwide (Columbia University Libraries).

5.3 Sample Selection Criteria

After collecting the dataset, we have classified stocks into three dividend groups based on the below described dividend change model and then screened the groups using various other criteria. Final, dividend groups are reached by eliminating stocks for which our hybrid expected return model showed a poor fit. Constituents of the final dividend groups can be found in Appendix B.

5.3.1 Dividend Change Model

After collecting the dataset, we have allocated stocks from each country in to three dividend groups based the YoY on changes in their nominal dividends. First, we define the dividend process as a martingale, that is, agents expect future dividends to be unchanged.

$$E[D_{i,t}] = D_{i,t-1} \tag{5.1}$$

$E\left[D_{i,t}\right]$ *stands for expected dividend from firm i for year t*

$D_{i,t-1}$ *stands for previous year's dividend*

Our dividend expectation model has its background from reluctance to change dividends hypothesis of Lintner (1956), which assumes that managers are unlikely to change dividends unless they perceive substantial change in future economic condition of their firm. According to signalling theory, firms convey information to the market through changes in dividend policy. Firms with good future prospects take actions that are not easily duplicated by firms with poor prospects. Paying cash dividends is one way to achieve this, since the firm is making a long-term commitment to future dividend payments. Price of a firm's shares is therefore likely to react positively to an increase in dividends (Firer et al. 2009).

On the back of these theories, we have grouped firms listed on emerging EMEA stock exchanges in to three groups based on their cash dividend payments. A dividend announcement is considered a positive event if a company, that has not paid dividends the previous year, pays a dividend. We have grouped and labelled these shares as **"good news"**.

$$D_{i,t} - E[D_{i,t}] = D_{i,t} \tag{5.2}$$

A dividend announcement is considered a negative event if a company, that has paid dividends the previous year, omits payment for the next year. We have grouped and labelled these shares as **"bad news"**.

$$D_{i,t} - E[D_{i,t}] = -E[D_{i,t}] \tag{5.3}$$

Finally a dividend announcement is considered a neutral event if the absolute change in dividends is less than 10%. We have grouped and labelled these shares as **"no news"**. The ±10% level is decided arbitrarily. In practice, dividends rarely stay unchanged in absolute terms. For instance, between 2005 and 2014, there were only 10 events where dividends were kept unchanged YoY in absolute terms in Turkey.

$$D_{i,t} - E[D_{i,t}] \leq 10\% * |E[D_{i,t}]| \tag{5.4}$$

5.3.2 Other Selection Criteria

After creating the three dividend groups, we have split each group in to two based on the number of analysts covering the stock. Stocks that are covered by more than 5 analysts are grouped together, while stocks covered by 5 or less analysts form another group. The 5 analyst threshold is arbitrarily selected.

After grouping the stocks based on the above mentioned dividend change model, we have applied the following selection criteria:

1. A continues time series of daily closing prices should exist for each security in the timeframe of the event study [T_0; T_3].
2. All securities within the sample should be ordinary shares, i.e. preferred shares, GDRs, ADR, etc. are excluded from the sample.
3. Stocks with rights issues, stock splits and share buybacks within the calendar year of the cash dividend announcement are excluded from the sample.
4. Stocks that paid special cash dividends or interim dividends within the same calendar year of the dividend announcement are excluded from the sample. Only regular final cash dividends are taken into account.
5. For our extended market model (the fair game model), that is the basis of our parametric tests, we have used the readily available market value weighted indices, BIST broad market, MICEX broad market, WIG broad market and JSE broad market index as market proxies.

Table 5.1 shows the number of stocks and events in our sample by country and by dividend group. Information on constituents of each dividend group is provided in Appendix B. Accordingly, we have 736 events in our final sample.

Table 5.1: Number of stocks and events in sample by country and by dividend group

	All	Good news	No news	Bad news
Total number of stocks	701	261	243	197
TR	232	89	66	77
RU	87	29	28	30
PLN	203	104	55	44
SA	179	39	94	46
Total number of events (gross)	1002	313	456	233
TR	332	120	110	102
RU	108	31	47	30
PLN	251	120	85	46
SA	311	42	214	55
Eliminations due to poor model fits	266	85	128	53
TR	102	38	39	25
RU	27	5	15	7
PLN	55	28	15	12
SA	82	14	59	9
Total number of events (net)	736	228	328	180
TR	230	82	71	77
RU	81	26	32	23
PLN	196	92	70	34
SA	229	28	155	46

5.4 Time Line of the Event Study

Our event study is composed of three time frames; the estimation window, the event window and the post event window. Following chart and table illustrates these time frames.

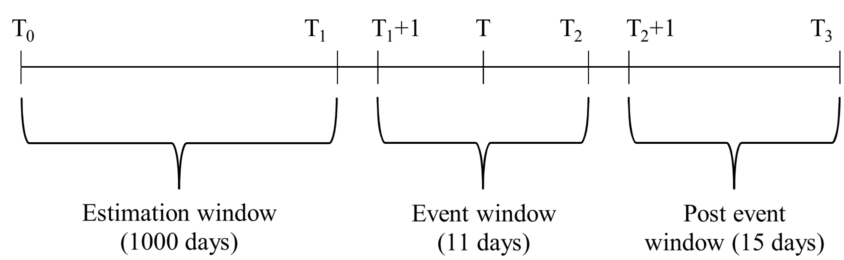

Figure 5.1: Event study time line

Table 5.2: Notations of the event study time line

Event date	$T = 0$
Event window	$T_1 + 1 = T - 5$ to $T_2 = T + 5$
Estimation window	$T_0 = T - 1005$ to $T_1 = T - 6$
Post event window	$T_2 + 1 = T + 6$ to $T_3 = T + 20$

We define day "0" as the event day for a given security, i.e. the day the dividend decision is made public. For each security we have used 1026 daily return observations starting at day -1005 and ending at day +20 relative to the event. The first 1000 days in this period is (-1005 through -6) is designated as the "estimation period", and the following 11 days (-5 through +5) is designated as the "event window". Our post event window, where we examine relatively longer term impact of the new information disclosed on security returns, consists of 15 days (+6 through +20).

Armitage (1995) showed that a vast portion of event studies using daily data have an estimation window of 100 to 300 days. As we show in succeeding parts of the thesis, an overwhelming portion of the event studies on emerging EMEA stock markets rely on the simple market model and use 100 to 200 days of data to estimate the parameters, too (page 205). However, our estimation of this model for our dataset revealed frequent presence of autocorrelation and ARCH effects in residuals. In order to avoid potential biases the poorly fitted simple market model may cause and to improve the forecasting accuracy, we have preferred GARCH family models to estimate expected returns.

Several papers including Hwang and Pereira (2004) demonstrated that small samples lead to violations of the non-negativity condition for the GARCH model's parameters. Ng and Lam (2006) estimated GARCH(1,1) models for sample sizes from 300 to 3000 using closing prices of the NASDAQ index. They recommended using 1000 observations in order to have a high correlation of conditional variances. Thus, we have set the length of our estimation window to 1000 days in order to improve the forecasting accuracy of our expected return models.

Brown and Warner (1985) showed that the power of the test statistics significantly deteriorates if the event date is not precisely pinpointed. In our study, we use the initial official announcement of the dividend decision of companies as the event date. Emerging EMEA countries of our interest have similar dividend regulations and distribution procedures as discussed in previous chapter. The process starts with BoD decision to pay or not to pay, and how much to pay. BoD decision is then proposed at the upcoming Annual General Meeting (AGM) and gets approved or declined. Since the initial announcement on dividends is the BoD decision, we have defined it as our event date. Dividend announcement dates are taken from Bloomberg.

Event window length widely differs between studies with the length ranging anywhere between -1 to 1, to -30 to 30 days. Selection of the length is somewhat subjective. However, it is customary to include days before the event date to the event period to control for information leakages, predictions and anticipations about the event (Başdaş and Oran 2014). We have adopted two different approaches when selecting the event window. For our tests of signalling theory we have used a relatively shorter event window of 11 days [-5;+5]. We did so due to two reasons. First, longer event periods lower the power of the test statistics, which can lead to incorrect conclusions. Second, there is always the possibility of having the problem of contaminating events in the same period, i.e. news other than the event under investigation which may affect the share price (Armitage 1995). It is difficult to check all of the other news that would happen around the dividend announcement date. A shorter event window enables to better control for confounding effects (Gurgul et al. 2006).

Besides the [-5; 5] event window, we also check 2 days rolling windows. Our aim with that is to see whether there are any significant abnormal returns especially in the [-1; 0] and [0; 1] windows. While Bloomberg gives the date of the dividend announcement, it does not specify the exact time of it. The announcement may have come before market opening, intraday or after market close. We have highlighted in previous chapter that emerging EMEA stocks are widely owned by foreign investors who may be located in remote destinations. Especially, investors located in Asia may not be able to react to new information disclosed in the afternoon (local time) before the next trading day due to time difference between countries. In such case, the event day is rather the next trading day. Hence, checking the [0; 1] window reduces the event date/time misspecification risk. For instance, in case of a good news event the average cumulative abnormal return (ACAR) in [0;1] window may be statistically significantly different than zero, although average abnormal return (AAR) on day 0 is not. In such case, we still see this as evidence in favour of the information content of dividends hypothesis and no violation of semi-strong form EMH.

5.5 Statistical Analysis

Before we proceed to modelling expected returns, we provide the descriptive statistics of our sample. Section 5.5.1 covers the descriptive statistics for the daily returns of each dividend group and the market indices. Constituents of each group and dividend announcement dates are provided in Appendix B. Section 5.5.2 checks whether time series are stationary or not using a unit root test.

5.5.1 Descriptive Statistics

Similar to most event studies, we focus on the cross sectional mean of returns for each dividend group. Stock and index returns are calculated as logarithmic returns over the daily closing prices.

$$R_{i,t} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) \tag{5.5}$$

$P_{i,t}$ *stands for stock price of firm i on day t*

$P_{i,t-1}$ *stands for stock price of firm i on day t-1*

Our dataset is a mixture of time series and cross-sectional data, commonly called panel or pooled data. In order to draw overall inferences for the estimation window, we have pooled the data for each country and dividend group using econometrics software Eviews and then calculated the descriptive statistics. To illustrate how pooling the data works we provide the formula to calculate the mean return of each dividend group below. For each dividend group, average returns across sample members for day t is computed as follows:

$$\bar{R} = \frac{1}{1000}\frac{1}{N}\sum_{t=-1005}^{-6}\sum_{i}^{N} R_{i,t} \tag{5.6}$$

N *stands for number of events in a dividend group*

$\bar{R}$ *stands for average return of stocks in the dividend group*

Table 5.3: Descriptive statistics of pooled stock returns in the estimation window

Country	**TR**	**TR**	**TR**	**TR**	**TR**	**TR**	**RU**	**RU**	**RU**	**RU**	**RU**	**RU**	**PLN**	**PLN**	**PLN**	**PLN**	**PLN**	**PLN**	**SA**	**SA**	**SA**	**SA**	**SA**	**SA**
Info. content of dividends	**Good**	**Good**	**No**	**No**	**Bad**	**Bad**	**Good**	**Good**	**No**	**No**	**Bad**	**Bad**	**Good**	**Good**	**No**	**No**	**Bad**	**Bad**	**Good**	**Good**	**No**	**No**	**Bad**	**Bad**
Number of analysts	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**
STOCKS																								
Number of stocks	42	47	38	28	34	43	11	18	21	7	8	22	23	81	21	34	18	26	15	24	52	42	24	22
Number of event	63	57	65	45	50	52	12	19	38	9	8	22	27	93	38	47	18	28	15	27	130	84	28	27
Number of observations	63,000	57,000	65,000	45,000	50,000	52,000	12,000	19,000	38,000	9,000	8,000	22,000	27,000	93,000	38,000	47,000	18,000	28,000	15,000	27,000	130,000	84,000	28,000	27,000
Mean	0.001	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Median	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Maximum	0.292	0.231	0.217	0.429	0.292	0.202	0.439	0.468	0.349	0.276	0.460	0.468	0.375	0.395	0.189	0.381	0.216	0.324	0.200	0.468	0.405	0.291	0.405	0.468
Minimum	-0.247	-0.221	-0.257	-0.226	-0.227	-0.282	-0.281	-0.484	-0.334	-0.331	-0.270	-0.465	-0.306	-0.526	-0.327	-0.411	-0.352	-0.232	-0.311	-0.632	-0.310	-0.262	-0.310	-0.637
Std. Dev.	0.027	0.027	0.025	0.026	0.027	0.029	0.032	0.035	0.027	0.028	0.031	0.033	0.026	0.031	0.021	0.028	0.024	0.026	0.027	0.031	0.021	0.021	0.027	0.029
Skewness	0.140	0.386	0.059	0.519	0.156	0.387	0.634	-0.237	0.233	0.056	0.539	0.344	0.122	0.306	-0.280	0.400	-0.277	0.615	-0.445	-0.432	-0.070	0.175	-0.314	-1.097
Kurtosis	8.061	10.539	7.294	14.078	8.294	9.969	18.065	33.281	18.758	17.676	22.574	27.622	13.251	16.647	9.255	19.883	11.096	13.210	10.356	33.724	10.219	15.392	13.812	41.372
Jarque-Bera	68926	139389	51063	237217	59872	108881	116797	742071	402178	82553	130922	568409	120881	739010	63828	571755	50479	126099	35068	1086189	288639	549751	139862	1698401
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sum	43.510	26.921	53.903	35.788	34.752	38.258	-2.217	-5.573	-0.850	1.457	-3.093	-11.297	5.789	20.152	11.743	24.494	-3.326	2.165	5.272	4.557	32.840	19.417	-8.668	-3.747
Sum Sq. Dev.	46.675	42.832	40.794	29.925	36.413	44.212	12.883	23.128	29.071	7.316	7.825	24.985	18.366	90.912	16.758	36.577	10.346	19.940	11.156	27.276	59.491	36.173	21.059	23.102
INDEX																								
Mean	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
Median	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001
Maximum	0.121	0.121	0.121	0.117	0.121	0.121	0.252	0.252	0.252	0.252	0.252	0.252	0.061	0.061	0.061	0.061	0.061	0.061	0.068	0.068	0.068	0.068	0.068	0.068
Minimum	-0.197	-0.197	-0.197	-0.131	-0.197	-0.197	-0.207	-0.207	-0.207	-0.207	-0.207	-0.207	-0.083	-0.083	-0.083	-0.083	-0.083	-0.083	-0.076	-0.076	-0.076	-0.076	-0.076	-0.076
Std. Dev.	0.019	0.017	0.017	0.017	0.018	0.019	0.024	0.019	0.020	0.019	0.023	0.018	0.013	0.013	0.012	0.012	0.013	0.013	0.014	0.013	0.013	0.013	0.013	0.014
Skewness	-0.301	-0.374	-0.339	-0.300	-0.223	-0.239	-0.077	-0.241	-0.205	-0.183	-0.080	-0.318	-0.372	-0.403	-0.470	-0.426	-0.571	-0.435	-0.182	-0.146	-0.152	-0.153	-0.190	-0.167
Kurtosis	8.452	8.312	8.044	7.301	7.284	8.123	20.868	24.468	23.307	22.901	21.651	24.707	6.453	6.654	7.095	6.555	6.920	6.414	6.279	6.295	6.470	6.647	6.718	6.357
Jarque-Bera	80703	69853	71698	36132	39491	58619	163164	373077	667554	151838	118516	441822	14348	55462	28563	26738	12774	14801	6951	12583	67177	47923	16654	13084
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sum	37.660	29.203	43.024	27.458	30.280	32.903	1.825	1.861	7.407	2.191	2.217	0.330	4.939	23.498	9.200	21.650	0.270	8.102	8.688	13.646	55.992	38.353	13.596	12.066
Sum Sq. Dev.	22.470	16.219	19.307	13.258	17.078	19.049	6.819	6.686	15.909	3.385	4.454	7.235	4.989	16.387	5.772	7.121	3.293	5.124	2.811	4.740	23.267	13.489	4.862	5.429

Descriptive statistics of stock returns and index returns for each dividend group over the 1000 days event window is given in Table 5.3. Kurtosis (K) is a measure of whether the data are peaked or flat relative to a normal distribution. Skewness (S) is a measure of asymmetry of the probability distribution of a random variable about its mean. For a normally distributed variable skewness and kurtosis are expected to be 0 and 3, respectively. Table 5.3 shows that maximum and minimum daily stock returns in our dividend groups are very large. Consequently, our data set for each dividend group is leptokurtic ($K > 3$), i.e. has higher peaks and fat tails compared to a normal distribution. Note that leptokurtic distribution is quite common in financial return series since news shocks can cause extreme returns (Adalı 2006). It is worth noting that 1) most of these extreme price movements in our sample happened during the 2008 financial crisis; 2) extreme returns of stock with limited analyst coverage are larger than those with wide analyst coverage. Another interesting finding is that almost all dividend groups in Turkey, Russia and Poland are positively skewed, while those in South Africa are negatively skewed. Negative skewness of the South African bad news portfolio with limited analyst coverage is especially high. Figure 5.2 plots the stock market indices of the four countries covered in our study. While stock returns are mostly skewed to the right, index returns are skewed to the left. Lastly, kurtosis of MICEX and negative skewness of WIG are visibly higher than their peers.

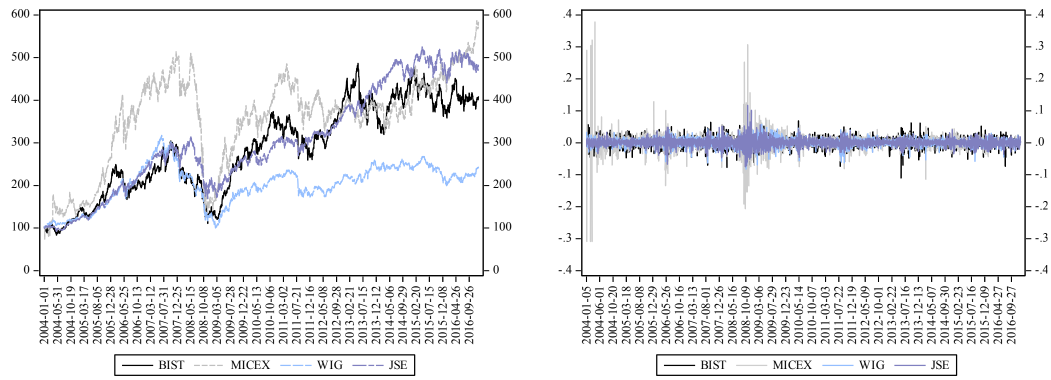

Figure 5.2: Closing prices (indexed to 100) and daily returns of EMEA stock market indices

Jarque-Bera test statistic is a goodness of fit measure of departure from normality. The null hypothesis is a joint hypothesis of skewness being zero and kurtosis being 3. Table 5.3 shows that the null hypothesis is rejected at the significance level of 1% for our entire dividend groups. This suggests that nonparametric tests are likely to yield more reliable results than parametric tests. Hence, this thesis uses two nonparametric tests besides the traditional t-test.

$$JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right] \tag{5.7}$$

JB stands for Jarque-Bera test statistic

n *stands for sample size*

5.5.2 Test of Stationary (Unit Root Test)

A time series is called stationary if its mean and variance are constant over time and the value of covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed (Gujarati 2004). Stationary of time series data is desired due to following reasons:

1. If two variables are non-stationary (follow stochastic processes) a regression of one on the other could have a high R^2 even if the two are totally unrelated. This phenomenon is called spurious regression.
2. If the variables in the regression are not stationary then the standard asymptotic analysis will not be valid. In other words, t-ratios (the estimate to its standard deviation) calculated would not follow a t-distribution and we could not validly undertake hypothesis testing about the regression parameters.

We have used the Augmented Dickey Fuller (ADF) test to check whether daily returns of individual stocks and daily index returns during the same time frame have unit roots.

$$\Delta R_{i,t} = \beta_1 + \beta_2 t + \delta_i R_{i,t-1} + \sum_{j=1}^{k} \alpha_j \Delta R_{t-j} + u_{i,t} \tag{5.8}$$

The null hypothesis is that $\delta = 0$; that is, there is a unit root – the time series is not stationary. ADF test are performed with Eviews 7.0, which by default uses Schwarz Information Criteria (SIC) to determine the lag length. Accordingly, results of the ADF test rejected H_o at the 1% significance level for all time series. Note that the above form of ADF test has a drift and a trend term. We have repeated the test by dropping these two terms and got the same results. Due to space constrains we only provide a summary of our results below.

Table 5.4: ADF test results

Country	TR	TR	TR	TR	TR	TR	RU	RU	RU	RU	RU	RU
Info. content of dividends	**Good**	**Good**	**No**	**No**	**Bad**	**Bad**	**Good**	**Good**	**No**	**No**	**Bad**	**Bad**
Number of analysts	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**
# of series	126	114	130	90	100	104	24	38	76	18	16	44
# Ho rejections a 1% significance	126	114	130	90	100	104	24	38	76	18	16	44
lag length used at ADF test												
# of series with zero lags	123	108	125	84	98	100	21	32	71	16	14	39
# of series with 1 lag	3	3	5	6	2	4	2	4	2	1	1	3
# of series with 2 lag	0	2	0	0	0	0	1	2	1	0	1	1
# of series with 3 lag	0	1	0	0	0	0	0	0	0	1	0	0
Country	**PLN**	**PLN**	**PLN**	**PLN**	**PLN**	**PLN**	**SA**	**SA**	**SA**	**SA**	**SA**	**SA**
Info. content of dividends	**Good**	**Good**	**No**	**No**	**Bad**	**Bad**	**Good**	**Good**	**No**	**No**	**Bad**	**Bad**
Number of analysts	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**	**>5**	**<6**
# of series	54	186	76	94	36	56	30	54	260	168	56	54
# Ho rejections a 1% significance	54	186	76	96	36	56	30	54	260	168	56	54
lag length used at ADF test												
# of series with zero lags	50	174	72	91	31	53	29	42	231	150	52	47
# of series with 1 lag	2	10	1	3	4	3	1	9	26	14	3	5
# of series with 2 lag	2	2	3	2	1	0	0	1	2	3	1	1
# of series with 3 lag	0	0	0	0	0	0	0	1	1	1	0	1

5.6 Model Selection

This study develops a hybrid model as an alternative to the market model. As we discuss in Appendix A, section A.3.3, the most common model used in event studies to forecast expected stock returns is the market model.

$$R_{i,t} = \alpha_{i,t} + \beta_i R_{m,t} + \varepsilon_{i,t} \tag{5.9}$$

In the market model, it is assumed that the error term is white noise, i.i.d. However, there is strong evidence that successive returns on individual stocks are correlated. MacKinlay and Lo (1988) developed the variance ratio test to test for random walk in returns, that is, returns are independently and identically distributed with constant mean and finite variance that is a linear function of the holding period. If a time series follows random walk process, the variance of q period returns should be q times as large as one period returns (Büyükşalvarcı and Abdigolu 2011). Using the variance ratio test, MacKinlay and Lo (1988) found that US market was not weak form efficient between 1962 and 1985. When it comes to variance ratio tests conducted on emerging market stocks: Büyükşalvarcı and Abdioğlu (2011) showed that Turkish stock market was not weak form efficient between years 1987 and 2011. Kapusuzoğlu (2013) also found ISE stock index weak form inefficient between the years 1996 and 2012 using unit root tests and daily closing prices. Tetik (2012) also found Turkish stock exchange weak form inefficient from 1988 to 2012 through serial correlation and variance ratio tests, while noting that the level of inefficiency decreased especially between 2009 and 2012.

Khrapko (2013) tested WIG20 and MICEX10 (indices consisting of top 20 and 10 most liquid stocks, respectively) for weak form efficiency using daily data between 2008 and 2011. Variance ratio tests showed that both indices were weak form inefficient, while Ljung-Box tests suggested that MICEX10 is efficient. Hansson (2010) showed that MICEX was weak form inefficient between 2005 and 2010 according to results from ADF and run tests. Suresh et al. (2013: 56) found emerging BRICS country indices, including MICEX and JSE, weak form inefficient using nonlinear panel unit root tests for the period between 2000 and 2010.

To capture the correlated structure of daily stock returns we use an ARMA(p,q) model. Accordingly, our extended market model takes the following form.

$$R_{i,t} = \alpha_{i,t} + \beta_i R_{m,t} + \sum_{j=1}^{p} \gamma_{i,j} R_{i,t-j} + \varepsilon_{i,t} + \sum_{k=1}^{q} \theta_{i,k} \varepsilon_{i,t-q} \tag{5.10}$$

We have limited the lag length to 2 and used the Akaike Information Criterion (AIC) to choose the appropriate lag length. AIC is a measure of the relative quality of a model for a given set of data (Gujarati 2004). Its basic concept is imposing a penalty for adding regressors to the model and is defined as:

$$AIC = \left(\frac{2k}{n}\right) + \ln\left(\frac{RSS}{n}\right) \tag{5.11}$$

k stands for number of regressors

RSS stands for sum of squared residuals

n stands for number of observations

Small values of the criterion are preferred. The criterion rewards good fits as represented by the term ln(RSS/n) and uses the term (2k/n) to penalize good fits gotten by means of excessively rich parameterizations. Lag order and mean equation selections can be found in the model selection tables given in Appendix B.

5.6.1 Residual Diagnostic

As previously discussed, most of the event study literature is based on a market model where residuals are assumed to be white noise (i.i.d.), i.e. serially uncorrelated with mean zero and constant variance σ^2. While the market model is quite simplistic and serial correlation of daily stock returns is quite common, we are surprised to see that almost none of the event studies performed in the emerging EMEA markets have performed diagnostic tests to check whether the simple market model is a good fit or not. Especially, heteroskedasticity of the error variance over time is rarely dealt with. However, Brown and Warner (1985) have noted that underestimating the variance of residuals may lead the test statistic to reject the null hypothesis of no statistically significant abnormal returns more frequently than it should. Schwert and Seigun

(1990) argue that the ability of reliably form statistical inferences can be seriously compromised by failing to consider the ARCH error structure.

In the following parts of this section we have conducted various diagnostic tests to check for serial correlation, heteroskedasticity (ARCH effects) and normality of residuals. For stocks with ARCH effects in residuals we have switched to GARCH family models, which we have described in detail in section 5.6.2.

5.6.1.1 Box-Pierce Q Test of Serial Correlation in Residuals

The Box-Pierce (Q) test is a type of statistical test of whether any of a group of autocorrelations of a time series is different from zero. Instead of testing randomness at each distinct lag, it tests the joint hypothesis that all the autocorrelations up to certain lags are simultaneously equal to zero. It is therefore a portmanteau test. Box and Pierce (1970: 1509) defined Q statistic as:

$$Q = n\sum_{k=1}^{m} \hat{\rho}_k^2 \sim \chi_m^2 \qquad (5.12)$$

$$\rho_k \sim N\left(0, \frac{1}{n}\right)$$

ρ_k stands for autocorrelation coefficient

n stands for sample size

m stands for the degree of freedom

Q statistic is often used as a test of whether time series are white noise. In large samples, it is approximately distributed as chi-square distribution with m degrees of freedom. If the computed Q exceeds the critical Q value from the chi-square distribution at the chosen level of significance, one can reject the null hypothesis that all the ρ_k are zero. At least some of them must be nonzero.

5.6.1.2 Test of Heteroskedasticity and ARCH Effect in Residuals

While the traditional time series models assume that the variance of residuals given the independent variable is constant over time (homoskedasticity), in reality residuals may increase as the value of the independent variable increases (heteroskedasticity).

Financial time series, such as stock prices, often exhibit volatility clustering, that is, periods in which their prices show wide swings for an extended time period followed by periods in which there is relative calm (Gujarati 2004). Hence, it is common to utilize autoregressive conditional heteroskedastic (ARCH) class of models for modelling time varying variances, since Engle's (1992) seminal work. The ARCH model requires presence of ARCH effects in residuals. The ARCH-LM test is used to identify any of those effects by testing the residuals from the preliminary Ordinary Least Squares (OLS), which regress the squared residuals on a constant and p lagged values of the squared residuals (Abu Khalaf 2012). Assume that the residuals of our extended market model shown in equation (5.10) have the following distribution:

$$\varepsilon_t \sim N[0, (\alpha_0 + \alpha_1 \varepsilon_{t-1}^2)] \tag{5.13}$$

$$\mu = 0$$

$$var(\varepsilon_t) = (\alpha_0 + \alpha_1 \varepsilon_{t-1}^2)$$

Accordingly, residuals are assumed to be normally distributed while the variances of residuals follow an ARCH(1) process. That is, the variance of ε_t is dependent on the squared residual at time t-1. Since the error variance can dependent on several lagged squared terms, we can write:

$$\varepsilon_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \cdots + \alpha_p \varepsilon_{t-p}^2 \tag{5.14}$$

Null hypothesis of the ARCH-LM test is that there is no autocorrelation in the error variance, i.e. $var(\varepsilon_t) = \alpha_0$ and there is no ARCH effect. Null hypothesis can be tested by computing nR^2, which follows the chi-square distribution with degrees of freedom equal to the number of autoregressive terms in the $var(\varepsilon_t)$ equation.

$$nR^2 \sim \chi_p^2 \tag{5.15}$$

We have applied the ARCH-LM test to the extended market models that we have selected for each security. Results of the test are summarized in Table 5.5, which shows that residuals of 902 models out of 1002 show ARCH effects. Accordingly, we have estimated ARCH family models for these events to account for conditional heteroskedasticity of the error term. The process followed in selecting the ARCH/GARCH family models is described in the next section.

Table 5.5: Summary of ARCH LM test results

	TURKEY						**RUSSIA**					
Info. content of dividends	Good	Good	No	No	Bad	Bad	Good	Good	No	No	Bad	Bad
Number of analysts	>5	<6	>5	<6	>5	<6	>5	<6	>5	<6	>5	<6
Number of events	63	57	65	45	50	52	12	19	38	9	8	22
Number of equations with ARCH effects	59	53	59	40	46	51	12	16	38	9	8	20
	POLAND						**SOUTH AFRICA**					
Info. content of dividends	Good	Good	No	No	Bad	Bad	Good	Good	No	No	Bad	Bad
Number of analysts	>5	<6	>5	<6	>5	<6	>5	<6	>5	<6	>5	<6
Number of events	27	93	38	47	18	28	15	27	130	84	28	27
Number of equations with ARCH effects	22	84	33	41	11	23	15	24	118	73	23	24

5.6.2 ARMA - ARCH/GARCH/EGARCH Models to Forecast Expected Returns

Volatility clustering has been extensively investigated in the finance literature. Engle (1982) proposed modelling volatility by a class of stochastic process models like the ARCH family of models. While ARCH family model have been widely used in finance literature, potential biases in test statistics caused by ignoring autoregressive heteroskedasticity present has rarely been dealt within the literature of event study methodology. In this study, we extend the simple market model used in the standard event study with an ARMA(p,q) term to capture correlated structure of stock returns and thin trading effects. Furthermore, we investigate for ARCH effect through an ARCH-LM test as described in the previous section. Accordingly, we have switched between ARCH, GARCH and EGARCH models in case squared residuals of the ARMA model were serially correlated. Selection criteria between ARCH family models is based on AIC and fulfilment of constrains.

5.6.2.1 ARCH Model

While traditional time series models assume variance of the error term to be constant over time, Engle (1982) argued that variance of the error term at time t may depend on the squared error term in previous time periods.

The ARMA (p,q) model we have described in equation (5.10) is usually described as the conditional mean equation and its residuals are assumed to be distributed normally with zero mean and variance $(\alpha_0 + \alpha_1 \varepsilon_{t-1}^2)$ as described in equation (5.13). Since the variance of ε_t is dependent on the squared residual at time t-1, the process is called ARCH(1). The conditional variance is shown as below:

$$h_t = var(\varepsilon_t) = \sigma_t^2 = V(\varepsilon_t^2 | I_{t-1}) = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 \tag{5.16}$$

I_{t-1} represents all information available at time t-1 and V represents the conditional variance of the error term. ARCH(1) model can be extended in to ARCH(p). To keep each conditional variance positive, the parameters are bounded below by zero.

$$h_t = var(\varepsilon_t) = \sigma_t^2 = \alpha_0 + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 \tag{5.17}$$

$$\alpha_0 \geq 0 \quad \alpha_i \geq 0 \text{ and } \sum_{i=1}^{p} \alpha_i < 1$$

Importance of the ARCH model is that it allows estimating the conditional variance of the error term, which allows us to estimate how the arrival of new information affects volatility.

5.6.2.2 GARCH Model

While ARCH model's convenience lies in its simplicity, it usually requires too many parameters to capture different variance patterns. In practice this may lead to violation of non-negativity of parameters (Kökçen 2010). ARCH model has been extended by Bollerslev (1986), in order to capture a large number of variance patterns without having to estimate too many parameters. The generalized autoregressive conditional heteroskedasticity model (GARCH(p,q)) can be defined as follows:

$$h_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_j h_{t-j} \tag{5.18}$$

$$\alpha_o > 0, \alpha_i \geq 0, \beta_j \geq 0, \text{ and } \sum_{i=1}^{p} \alpha_i + \sum_{j=1}^{q} \beta_j \leq 1$$

When dealing with GARCH models the assumption of stationarity of the time series is basic for the statistical analysis of the data. This implies constraints on the estimated parameters in the maximum likelihood-estimation. For GARCH model to be stationary sum of the parameters excluding the intercept, should be smaller than 1. In case parameters add up to 1, shocks to the conditional variance σ^2 are persistent. This version of the model is called Integrated GARCH (IGARCH) as there is a unit root in the conditional variance. Second restriction is none negativity of parameters to ensure positivity of conditional variance, which is a nonnegative process.

GARCH model essentially generalizes the purely autoregressive ARCH model to an autoregressive moving average model. The weights on the past squared residuals are assumed to decline geometrically at a rate to be estimated from the data. Intuitively the GARCH forecast variance can be considered as the weighted average of three different variance forecast: 1) constant variance that corresponds to the long-term average; 2) forecasts that was made in previous periods; 3) the new information that was not available when the forecasts were made. The weights on these three forecasts determine how fast the variance changes with new information and how fast it reverts to its long-run mean.

Parameters of the model are estimated using the maximum likelihood method. GARCH(1,1) is the most commonly used model to forecast volatility in practice. Hansen and Lunde (2001) made a comparison of 330 different volatility models using daily closing prices of IBM shares and concluded that the best models do not provide a significantly better forecast than the GARCH(1,1) model. Özden (2008) found that TGARCH(1,1) model as the best fit for ISE between 2000 and 2008, followed by EGARCH(1,1) and GARCH(1,1). Similarly, Batchelor and Orakcioglu (2002) used a GARCH(1,1) model in their event study where they investigated the effect of stock dividends on share prices in ISE. Kırmızıgül (2013) reported that ARMA(2,2) – GARCH(1,1) model as the best fit for ISE30 index between 2008 and 2010. De Jong et al. (1992) also reported that diagnostics tests show no need to incorporate additional lags to the simple GARCH(1,1) model for the Dutch stock market between 1984 and 1987.

While financial time series are often assumed to be normally distributed they tend to be leptokurtic (fat tailed). Table 5.3 on page 80 shows that Jarque-Bera test performed on daily stock and index returns in each dividend group resulted in rejection of normal distribution of returns. Moreover, residuals of our extended market model are not normally distributed as shown in Appendix B.

Although GARCH gives a specification for the conditional variance of the model's errors, the error distribution is not determined by this specification. There are three basic assumptions of the conditional error distribution: the Gaussian (normal) distribution; Student-t distribution; generalized error distribution (GED). While unconditional error distribution is assumed to be normal in GARCH, the unconditional error distribution has fatter tails than normal. Weiss (1986) showed that assuming normality while true distribution has fat tails renders consistent but inefficient estimates. On the other hand, using the t-distribution implies that the outliers are given smaller weights in the estimates and test statistics (De Jong et al. 1992). While estimating GARCH family models for the stocks in our sample, we have tried all three distributions and picked the best fit for each one.

5.6.2.3 EGARCH Model

An interesting feature of asset prices is that "bad" news seems to have more pronounced effect on volatility than "good" news. Empirical studies show that there is a tendency for changes in stock prices to be negatively correlated with changes in volatility that is often called as the leverage effect (Schmitt 1996).

The main drawback of symmetric GARCH models is that the conditional variance is unable to respond to asymmetrically to rises and falls in ε_t and such effects are believed to be important in the behaviour of stock returns. In the linear GARCH model the conditional variance is a function of past conditional variances and squared innovations; therefore, sign of returns cannot affect volatility (Ahmed and Suliman 2011).

To overcome the drawbacks of the standard GARCH model, Nelson (1991) developed the exponential GARCH model, which captures the asymmetric responses of the time-varying variance to shocks and, at the same time, ensures that variance is always positive. EGARCH model can be defined as

$$\ln(h_t) = \alpha_0 + \sum_{i=1}^{p} \gamma_i \frac{\varepsilon_{t-i}}{\sqrt{h_{t-i}}} + \sum_{i=1}^{p} \alpha_i \frac{|\varepsilon_{t-i}|}{\sqrt{h_{t-i}}} + \sum_{j=1}^{q} \beta_j \ln(h_{t-j}) \qquad (5.19)$$

The fact that EGARCH process is specified in terms of log-volatility implies that h_t is always positive and, consequently, there are no restrictions on the sign of the model parameters. Moreover, parameter γ_i makes an asymmetric response to shocks possible, i.e. the model can capture leverage effect. For "good news" $\left(\frac{\varepsilon_{t-i}}{\sqrt{h_{t-i}}} > 0\right)$ the impact of the innovation ε_{t-i} is $(\alpha_i + \gamma_i)\frac{\varepsilon_{t-i}}{h_{t-i}}$ and for "bad news"

$\left(\frac{\varepsilon_{t-i}}{\sqrt{h_{t-i}}} < 0\right)$ it is $(\alpha_i - \gamma_i)\frac{\varepsilon_{t-i}}{h_{t-i}}$. If $\gamma_i = 0$, positive and negative shocks would have the same impact on conditional volatility. To produce leverage effect γ_i must be negative (Schmitt 1996).

5.6.3 Model Selections for Each Stock in Our Sample

We have selected models for each stock in our sample following the model building procedure we have explained in section 5.6. A summary of the models fitting the stocks in each dividend group best is presented below.

Table 5.6: Summary model selections

	TURKEY						RUSSIA					
Info. content of dividends	Good	Good	No	No	Bad	Bad	Good	Good	No	No	Bad	Bad
Number of analysts	>5	<6	>5	<6	>5	<6	>5	<6	>5	<6	>5	<6
Number of events	63	57	65	45	50	52	12	19	38	9	8	22
Exclusions	22	16	23	16	13	12	1	4	13	2	1	6
Number of events (net)	41	41	42	29	37	40	11	15	25	7	7	16
Models												
MM	1	0	0	0	0	0	0	0	0	0	0	0
ARMA	0	1	0	3	1	0	0	0	0	0	0	0
ARMA -ARCH	0	0	0	2	1	0	0	0	0	1	0	0
ARMA - GARCH	9	9	24	6	13	4	5	6	6	1	1	5
ARMA - EGARCH	31	31	18	18	22	36	6	9	19	5	6	11
	POLAND						**SOUTH AFRICA**					
Info. content of dividends	Good	Good	No	No	Bad	Bad	Good	Good	No	No	Bad	Bad
Number of analysts	>5	<6	>5	<6	>5	<6	>5	<6	>5	<6	>5	<6
Number of events	27	93	38	47	18	28	15	27	130	84	28	27
Exclusions	2	26	7	8	5	7	2	12	39	20	4	5
Number of events (net)	25	67	31	39	13	21	13	15	91	64	24	22
Models												
MM	0	0	0	0	0	0	0	0	1	2	1	0
ARMA	1	0	2	2	2	2	0	0	2	2	0	1
ARMA -ARCH	0	0	1	0	0	1	1	0	3	0	0	0
ARMA - GARCH	12	19	12	18	7	4	4	7	32	23	9	7
ARMA - EGARCH	12	48	16	19	4	14	8	8	53	37	14	14

We have discussed the benefits of using ARMA and conditional heteroskedastic models instead of the simple market model in previous sections. Indeed, AIC showed that the market model is a better fit only for 74 events out of

1,002 in our gross sample. We present the improvements achieved in R^2 in below charts and draw the following conclusions:

1. Extending the market model with ARMA terms with 2 lags did not eliminate the autocorrelation problem ARCH effects in residuals in most cases. Hence, using GARCH family models was a necessity.
2. Both the hybrid models and the market model perform better for stocks with wide analyst coverage. We think that high market capitalization, free float and trading volume are the main drivers of attention from sell-side equity research analysts. Models may be suffering from thin trading effects in case of stocks with limited analyst coverage.
3. Having an ARMA term that smooth out possible thin trading effects, the hybrid model shows a better fit to stocks with limited analyst coverage.
4. The hybrid models work better in Turkey and Russia (Figure 5.3) [3].

Based on the residual diagnostic tests, we have excluded 266 events (from a total of 1002) from our sample due to poor fit of models. As previously described, non-normal distribution of residuals is quite common for time series of stock returns and we have tolerated rejection of normality through Jarque-Bera tests. However, persistent ARCH effects and autocorrelation in residuals resulted in exclusion of certain stocks. We have provided the parameters for each model in Appendix B. ARMA/EGARCH models make up an overwhelming 459 of the 873 models in the final sample.

3 Simple average of R^2 the hybrid models for all stocks in each dividend group

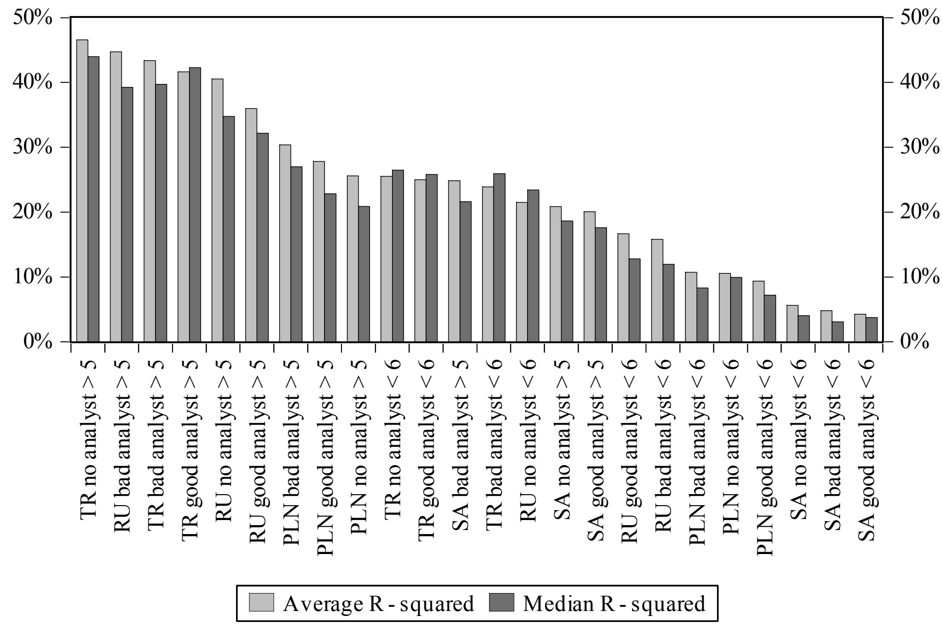

Figure 5.3: Average and median R^2 of the hybrid model for each dividend group

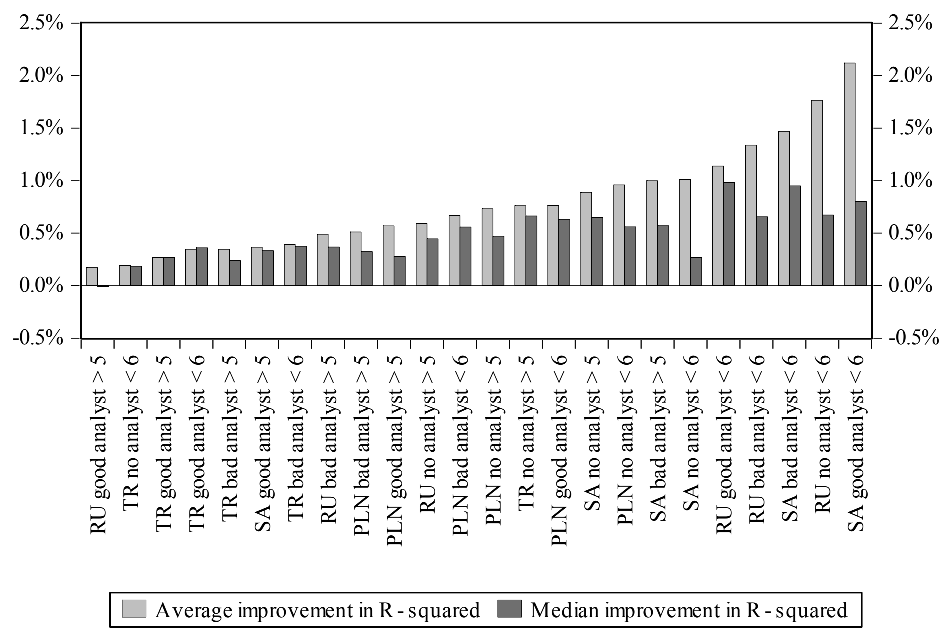

Figure 5.4: Difference between the R^2 of the hybrid model and the market model

5.7 Conclusion

This chapter described the model selection process. While an overwhelming portion of the event-study literature uses the simple market model, we have highlighted the poor fit of the model by estimating it for each of the 1002 events in our gross sample and applying regression diagnostics. To overcome serial correlation and ARCH effects, we have extended the simple market model with an ARMA (p,q) terms and switched to GARCH family models where appropriate.

We have forecasted expected returns for each stock in our final sample using these hybrid models. These expected returns are used to calculate and aggregate the abnormal returns for each dividend group as we describe in Appendix A, section A.3.4.1. These time series of abnormal returns are used in answering the research questions regarding information content of dividends and semi-strong form EMH in emerging EMEA stock markets in the following chapter. Finally, readers can find thorough discussion of the flow of our event study and parametric and nonparametric significance tests we have used in Appendix A.

CHAPTER 6

PRESENTATION OF EMPIRICAL RESULTS

6.1 Introduction

This section of the study presents the results that we obtained by applying the procedures described in the methodology section. We first present the results of our analysis on the information content of dividend announcements in the context of emerging EMEA stock markets. We then try to identify how long it takes for the new information to be fully incorporated into share prices. Thereby, we test the semi-strong form EMH and rank EMEA stock markets in terms of their speed of adjustment to new information. Lastly, we split our dividend groups into those with wide analyst coverage and those which limited analyst coverage. We repeat the information content and efficiency tests once again to see whether analyst have any impact on the dissemination of information and the efficiency of the market.

The remainder of the chapter consists of our research questions and answers. We provided cumulative abnormal return graphs for each research question for a representation of the share price reaction to the dividend announcements. The hypothesis for each research question is then tested using parametric and nonparametric tests that we have detailed in previous sections. Section 6.2 concludes the chapter.

6.1.1 Does the Information Content of the Dividends Hypothesis Hold for the Aggregate Emerging EMEA Stock Market?

We aggregated and averaged the abnormal returns of stocks in the emerging EMEA into three dividend groups and depicted them in Figure 6.1. Accordingly, none of the series showed a significant ACAR until the event date, implying that there is no information leakage issue at the aggregate emerging EMEA level. In the post-event window, the directions of the ACAR were supportive of the hypothesis. The bad news group had a 1.5% negative abnormal return in the [0; 1] window, supporting the information content of dividends hypothesis. However, the ACAR seems to have consolidated after day +1, which implies that the news is fully priced in by day +1. The good news group's 0.5% positive abnormal return on the event day also supports the information content of dividends hypothesis. Some consolidation in the ACAR after day +1 was also present. Lastly, the ACAR of the no news portfolios did not change materially on and after the event day.

All in all, emerging EMEA stocks show statistically significant reactions to good and bad dividend announcements in the anticipated directions. Hence, we reject H0 and H1 for both the good and bad news groups, but not for the no news group. Our results confirm the information content of dividends hypothesis at the aggregate emerging EMEA level.

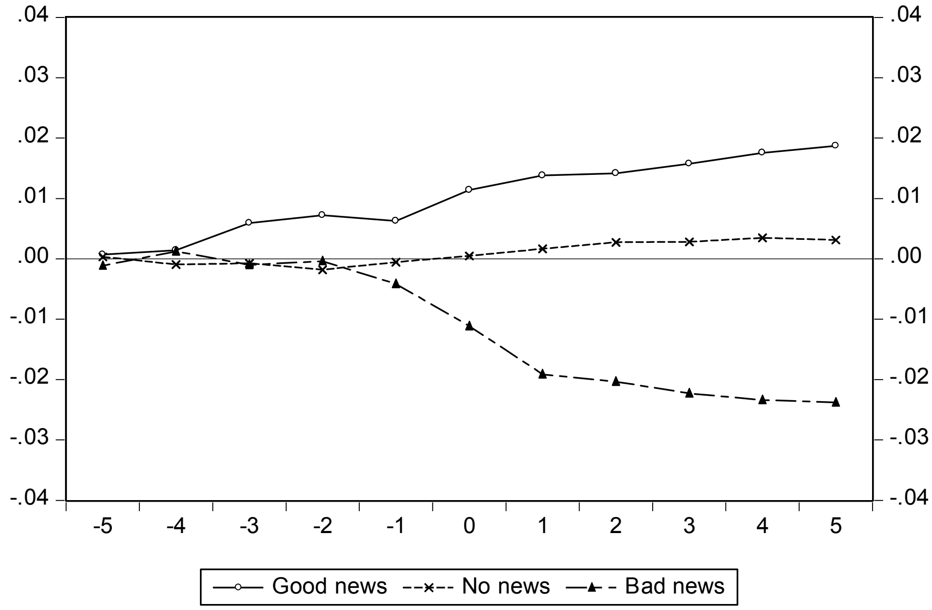

Figure 6.1: ACARs for the emerging EMEA stocks around dividend announcements

After charting the ACARs, we present the results of our statistical tests in Table 6.1. We summarize our finding below, noting the absence of any deep literature on the signalling hypothesis and market efficiency at the aggregated emerging EMEA level, to cross check our results.

In case of good news, the t-test and the rank test show that an abnormal return on the event day is positive and statistically significant at the 1% level (H_0 and H_1 rejected), which confirms the information content of dividend hypothesis. That said, the return is barely enough to cover the transaction costs (bid-ask spread, brokerage fees and commissions) of executing the trade. Furthermore, none of the ACARs are found to be anything but zero by at least two tests. Hence, we cannot reject H_2, i.e. buy and hold strategies do not work.

When it comes to the portfolio with no changes in the dividend payment versus the previous year (no news), none of the AARs and ACARs were found to be statistically significant by the test statistics, which supports the information content of dividends hypothesis.

Emerging EMEA stocks react negatively to bad news. First, we found no evidence of information leakage as none of the AARs and ACARs in the pre-event window [-5;-1] were anything but zero, according to at least two of the significance tests. Yet, all three tests found that the negative abnormal return on day 0 and the ACAR in the [0; 1] window were statistically significant at the 1% level. These results confirm the information content of dividend hypothesis (H_0 and H_1 rejected).

All three tests found the -2.4% ACAR in the event window [-5; 5] statistically significant at either the 1% or 5% level (H_2 rejected). However, a large portion of the price reaction took place before day 2 and the incremental return in the following days was barely enough to cover the transaction costs. Hence, we think that the aggregate EMEA market looks semi-strong form efficient. We will expand our discussion on market efficiency in the coming subsections.

Table 6.1: Significance test results for the emerging EMEA stocks in the event window

		Good news (N = 228)			No news (N = 328)			Bad news (N = 180)		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t test results										
-5	[-6;-5]	0.001	0.002	0.001	0.000	0.000	0.000	-0.001	-0.005*	-0.001
-4	[-5;-4]	0.001	0.001	0.001	-0.001	-0.001	-0.001	0.002	0.001	0.001
-3	[-4;-3]	0.004*	0.005*	0.006	0.000	-0.001	-0.001	-0.002	0.000	-0.001
-2	[-3;-2]	0.001	0.006*	0.007*	-0.001	-0.001	-0.002	0.001	-0.002	0.000
-1	[-2;-1]	-0.001	0.000	0.006	0.001	0.000	-0.001	-0.004*	-0.003	-0.004
0	**[-1;0]**	**0.005****	**0.004**	**0.011****	**0.001**	**0.002**	**0.000**	**-0.007****	**-0.011****	**-0.011***
1	[0;1]	0.002	0.008**	0.014**	0.001	0.002	0.002	-0.008**	-0.015**	-0.019**
2	[1;2]	0.000	0.003	0.014**	0.001	0.002	0.003	-0.001	-0.009**	-0.020**
3	[2;3]	0.002	0.002	0.016**	0.000	0.001	0.003	-0.002	-0.003	-0.022**
4	[3;4]	0.002	0.003	0.018**	0.001	0.001	0.003	-0.001	-0.003	-0.023**
5		0.001		0.019**	0.000		0.003	0.000		-0.024**
Sign test results										
-5	[-6;-5]	0.001	0.002	0.001	0.000	0.000	0.000	-0.001	-0.005	-0.001
-4	[-5;-4]	0.001	0.001	0.001	-0.001	-0.001	-0.001	0.002	0.001	0.001
-3	[-4;-3]	0.004	0.005	0.006	0.000	-0.001	-0.001	-0.002	0.000	-0.001
-2	[-3;-2]	0.001	0.006	0.007	-0.001	-0.001	-0.002	0.001	-0.002	0.000
-1	[-2;-1]	-0.001	0.000	0.006	0.001	0.000	-0.001	-0.004	-0.003	-0.004
0	**[-1;0]**	**0.005**	**0.004**	**0.011**	**0.001**	**0.002**	**0.000**	**-0.007****	**-0.011***	**-0.011**
1	[0;1]	0.002	0.008	0.014	0.001	0.002	0.002	-0.008	-0.015**	-0.019
2	[1;2]	0.000	0.003	0.014	0.001	0.002	0.003	-0.001	-0.009	-0.020
3	[2;3]	0.002	0.002	0.016	0.000	0.001	0.003	-0.002	-0.003	-0.022
4	[3;4]	0.002	0.003	0.018	0.001	0.001	0.003	-0.001	-0.003	-0.023*
5		0.001		0.019	0.000		0.003	0.000		-0.024*
Rank test results										
-5	[-6;-5]	0.001	0.002	0.001	0.000	0.000	0.000	-0.001	-0.005	-0.001
-4	[-5;-4]	0.001	0.001	0.001	-0.001	-0.001	-0.001	0.002	0.001	0.001
-3	[-4;-3]	0.004	0.005	0.006	0.000	-0.001	-0.001	-0.002	0.000	-0.001
-2	[-3;-2]	0.001	0.006	0.007	-0.001	-0.001	-0.002	0.001	-0.002	0.000
-1	[-2;-1]	-0.001	0.000	0.006	0.001	0.000	-0.001	-0.004	-0.003**	-0.004
0	**[-1;0]**	**0.005****	**0.004***	**0.011**	**0.001**	**0.002**	**0.000**	**-0.007****	**-0.011****	**-0.011**
1	[0;1]	0.002	0.008	0.014	0.001	0.002	0.002	-0.008**	-0.015**	-0.019
2	[1;2]	0.000	0.003	0.014	0.001	0.002	0.003	-0.001	-0.009	-0.020**
3	[2;3]	0.002	0.002	0.016	0.000	0.001	0.003	-0.002	-0.003	-0.022**
4	[3;4]	0.002	0.003	0.018	0.001	0.001	0.003	-0.001	-0.003	-0.023**
5		0.001		0.019	0.000		0.003	0.000		-0.024**

6.1.1.1 Do Stocks React More to Negative News Than to Positive News (Leverage Effect)?

In a nutshell, we found evidence supporting the signalling theory and information content of dividends hypothesis for the aggregate emerging EMEA stock markets. Our H_0 claiming no AAR on the event day was rejected both for the good and bad news portfolios. However, the price reaction to bad news on the event day was stronger. Furthermore, the bad news portfolio's ACAR continued to drift downwards after the event day and reached -1.5% in the [0; 1] window and -2.4% in the [-5; 5] window, both found statistically significant by all three tests. On the other hand, the [-5; 5] ACAR was 1.9% for the good news portfolio and was not found to be statistically significant by the nonparametric tests. Thus, we conclude that the information content of bad news is more relevant for stock prices than good news in the emerging EMEA. This supports the leverage effect hypothesis, which claims that changes in stock prices tend to be negatively correlated with changes in volatility. Figure 6.2 shows that the leverage effect is especially visible in the Polish and South African stock markets. We elaborate on this in the following sections.

Much of the research published on emerging EMEA markets' informational efficiency support our findings, such as Mateev (2011) who compared the Central Eastern Europe (CEE) markets' reaction to credit rating announcements, Korczak and Tavakkol (2004) who studied the price reactions of Polish stocks to earnings announcements, Dumitrescu et al. (2011) who examined the price reactions of Polish and Austrian stocks to earnings surprises and Altıok and Selçuk (2010) who found that Turkish stocks react more to dividend cuts than dividend hikes. A summary of this research can be found in the literature review section on page 205.

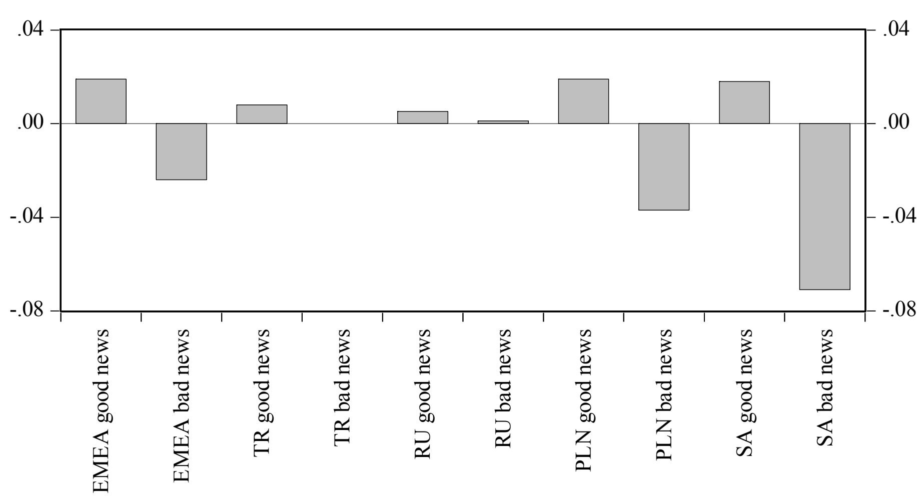

Figure 6.2: ACARs for the emerging EMEA stock markets in the [-5;5] window

6.1.1.2 Does the Information Content of Dividends Hypothesis Hold for Individual Emerging EMEA Stock Markets?

We expanded our test of informational efficiency to the individual country level. Figure 6.3 depicts the share price movements of each dividend cluster for each country, while Table 6.2 to Table 6.5 shows the results of the significance tests. Our findings are as follows:

Turkey: Turkish stocks' reaction to good news is in the anticipated direction, but it is statistically insignificant and yields no support to the information content of dividends hypothesis. None of the significance tests rejected H_0, H_1 or H_2. Stocks do not show any ARs on the event day if the dividends are kept stable.

In the case of bad news, t-test and nonparametric tests found the -1.2% ACAR in the [0; 1] window to be statistically significant, which supports the view that dividends disseminate valuable information to shareholders. Hence, we reject H_0. However, no drift in the ACAR is observed beyond this point and none of the tests found the [-5; 5] ACAR statistically significant. While the t-test found the 1.3% ACAR in the [-5; -1] window to be significant, it was not confirmed by the nonparametric tests. Hence, we cannot reject H_2.

Our results are in line with those of Kadıoğlu (2008), which suggests that only dividend decreases result in significant AARs in the post event period. Altıok and Selçuk (2010) found evidence showing that price action is in the anticipated direction for both dividend increases and decreases. Yet, their results were significant only at the 10% level. They found a -1% ACAR in the [-5; -1] window suggesting information leakage, which conflicts with our results. Kaderli and Baskaya (2014) found that the market reacts positively to both dividend increases and decreases on the event day. The ACAR in the pre-event window is positive for both samples, while there is a significant mean reversion to zero in the post-event period. Karaca (2007) found evidence supporting information content of dividends for Turkey. His results suggest information leakage in the [-6; 0] pre-event window with a +2.5% ACAR and no reaction in the [0; 5] post event window with a 0.2% ACAR.

Russia: Evidence on the information content of dividends from the Russian market is mixed. A graphical illustration of ACARs shows that the price reactions to good and bad news are both positive. Moreover, it shows that the price reaction to good news starts in the pre-event window hinting at a possible information leakage and/or ineffective regulation and supervision of the market by the authorities. However, these observations are not fully confirmed by the statistical tests.

For the good news portfolio, the t-test found the 2.7% ACAR in the [-5;-1] window statistically significant at 5%. Moreover, it found the 1.2% AAR on the event day and the 5.2% ACAR in the [-5; 5] window significant at 5%, meaning that the market found valuable and positive information in the dividends. The fact that ACARs continued to drift upwards after the event day shows that the market is inefficient. However, none of these findings are supported by nonparametric tests. Except for the 2.6% ACAR in the [-4; -3] window, which was found to be significant at 5% by the rank test, no other AAR or ACAR in the event window were found to be statistically significantly different than zero. Hence, we cannot reject H_0, H_1 and H_2 for the good news portfolio. That said, the discrepancy between the parametric and nonparametric test results may be due to the small sample size we have for Russia. We elaborate on the potential biases caused by the small sample size issue in the conclusion chapter of the dissertation.

We did not find any statistically significant AARs or ACARs for the bad news suggesting that dividend omissions are not regarded as valuable information by the Russian market. No significant AARs or ACARs are observed for the no news portfolio either. Thus, H_0, H_1 and H_2 are not rejected.

Research on the information content of dividends and semi-strong form market efficiency is quite limited in Russia and has mixed results. Both Berdnikova and Erogova (2014) and Teplova (2008) found an inverse relation between dividend payments and abnormal returns, i.e. dividend decreases leading to positive AARs and vice versa. Their results confirm the positive market reaction we found for dividend decreases in our sample. Yet, they conflict with our findings for dividend initiations. That said, note that Berdnikova and Erogova's (2014) sample is different than ours. While their bad (good) news portfolio consists of stocks with more (less) than a 5% decrease (increase) in dividends, our bad (good) news portfolio consists of stocks that omitted (initiated) dividend payments. Moreover, the Berdnikova and Erogova (2014) and Teplova (2008) samples were divided into quantiles depending on the change in dividend payments. The bottom and the top quantiles would be more comparable with our samples.

Mattev (2011) found evidence of information leakage in the Russian market. According to his results, credit rating downgrades had a significantly negative impact on stock market returns in the pre-event window and on the event day, but not in the post-event period. His results support our findings of information leakage in case of dividend initiations. Moreover, Seghal et al. (2012) found significant pre-event ACARs in case of merger announcements, while AARs do not persist in the post-event window. The evidence supports the information leakage hypothesis.

Poland: A graphical depiction of ACARs shows that Polish stocks react to good and bad news in the anticipated directions. A price reaction to bad news, however, is significantly stronger than a price reaction to good news, which demonstrates the presence of the leverage effect. Moreover, in case of bad news, ACARs continued to drift down after the announcement, which signals a potential violation of semi-strong form market efficiency.

Although stocks show a small positive reaction to good news on the event day and somewhat drift upwards in the coming days, the t-test and nonparametric tests did not find any of the AARs and ACARs statistically significant for the good news portfolio (H_0, H_1 and H_2 accepted). Hence, the market does not seem to find the information disseminated through dividend initiations to be valuable, which contradicts with the information content of dividends hypothesis.

In the case of bad news, the market showed almost no reaction on the event day. However, the -1% AAR on day -1 was found to be significant by the t-test and rank test at the 5% level, which suggests possible information leakage or good anticipation. Moreover, all three test statistics found the -3.7% ACAR in the [-5; 5] window to be significant. Hence, we reject H_1 and H_2. The information content of dividends hypothesis holds for the Polish market in case of bad news, according to our findings. However, the market does not seem semi-strong form efficient since the ACAR continued to drift downwards after the event day.

In line with the signalling theory we found no statistically significant AAR on the event day or ACAR in the [-5; 5] event window in the case of no news. The sign test found the 0.03% and 0.01% ACAR in the [0;1] and [1;2] windows to be significant, yet that was not confirmed by other tests. Hence, we accepted all three hypotheses.

We think that the mixed results of the Polish stocks on the information content of dividends and efficiency of the market have to do with the fact that most Polish companies do not have a clear dividend policy. Figure 4.6 on page 64 shows that meaningfully fewer companies in Poland pay dividends, which suggests that the importance attached to dividends is relatively low versus other emerging EMEA countries. Gurgul and Majdosz (2005) argue that the reluctance to change the dividends hypothesis does not apply to the Polish companies.

Our results confirm the findings of Dumitrescu et al. (2011) who argue that the reactions of shares to annual earnings announcements are statistically significant only in the case of bad news. Korczak and Tavakkol (2004) found that Polish stocks react to positive and negative news in the anticipated direction supporting the information content of dividends hypothesis. Yet, like ours, their results also suggest that the reaction to negative news is meaningfully higher than the reactions to positive news. Gurgul and Majdosz (2005) found that Polish stocks react positively to dividend announcements (regardless of the magnitude of the change) with a 0.8% AR on day 1, in contrast to our results. The findings of Slonski and Zawadzki (2012) conflict with our results as they found a +2.2% abnormal return on the event day in case of special dividend payments, suggesting that the market reacts positively to dividend increases.

South Africa: The importance of dividends is greater in South Africa than in any other emerging EMEA country. Both parametric and nonparametric tests found market reactions to dividend increases and decreases on the event day to be statistically significant in South Africa, while they did not find any significant reaction to dividend increases in other emerging EMEA countries. We think this outcome is meaningful considering that the number of companies listed on the JSE that are paying dividends is higher than in other emerging EMEA countries (Figure 4.6, page 64). Moreover, the dividend yield of the JSE is more lucrative than its peers (Figure 4.5, page 63). These two facts suggest that the reluctance to change the dividends hypothesis should apply to South African stocks.

Our research also shows that majority of South African stocks are owned by local (resident) investors (Figure 4.8, page 67) and the country's tax code favours dividend income (zero withholding tax) over capital gains for domestic institutional investors such as pension funds (Table 4.5, page 65). The difference between tax rates should be intensifying the price reaction to changes in dividend policy, which supports the tax effect (clientele) hypothesis. Given the positive reaction to good news, our results also support the bird in the hand theory, which suggests that investors prefer dividends to uncertain capital flows.

Similar to Poland, a graphical depiction of the ACAR demonstrates that the price reaction to bad news is much stronger than to good news. There is a +1.5% AAR on the day of the good news announcements at the 1% significance level, according to the t-test and the rank test. Hence, we can reject H_0 and H_1, i.e. the information content of dividends hypothesis holds. However, the price reaction consolidated after day 0 and ACARs are not found to be statistically significant by at least two tests. Hence, we cannot reject H_2, which implies that the market is semi-strong form efficient in the case of good news.

In the case of bad news, the price reaction is much more profound and starts in the pre-event window. All three tests found the -1.6% AAR on day -3 statistically significant at the 1% level. Moreover, the t-test and the rank test found the -3.4% ACAR in the [-5; -1] window at 1% to be significant, hinting at information leakage and/or the possible ineffectiveness in market supervision and regulation.

The information content of dividends hypothesis also holds for the South African market in the case of bad news. All three tests found the -2.0% AAR on the event day to be statistically significant at the 1% level. Moreover, the t-test and the rank test confirmed that the downwards drift of share prices continued on day 1 with a -1.5% AAR. Hence, we reject H_0 and H_1. On the other hand, the downwards drift of ACARs continued after the event day and reached a statistically significant -7.1% in the [-5; 5] window. The South African market seems inefficient in both semi-strong and strong forms.

In line with the informational efficiency hypothesis, shares do not have any significant abnormal returns if dividends are unchanged. A graphical depiction of abnormal returns in case of no change in dividends shows that the CAR in the event window is close to zero. There are some negative AARs in the pre-event window, which are found to be significant by the t-test, but they are not sufficient to cover the transaction costs. Moreover, the t-test results are not confirmed by parametric tests.

Our results conflict with those of Lentsoane (2011) who found that 49 dividend reduction announcements between 2004 and 2009 created no significant abnormal returns on the event day suggesting that dividend cuts do not disseminate valuable information. Murie (2014) found that ACARs are significantly different than zero in the [0; 1] event window for good news portfolios formed based on trading statement releases, which is in-line with our results. Moreover, it failed to find any significant AARs in the pre-event window, i.e. no information leakage, similar to our results. On the other hand, Murie (2014) did not find any significant ARs in the [0; 1] event window for bad news portfolios, which conflicts with our findings. The paper concluded that the market reaction to good news is greater than the reaction to bad news, while we found that the market reacts substantially more to bad news than to good news. Analysing 167 share repurchase announcements between 2003 and 2012, Punwasi (2013) found evidence supporting the signalling theory, in line with our results. Focusing on the global financial crisis in 2009, Mlonzi et al. (2011) found that the reaction to earnings announcements was statistically significant not on the event day, but on day 2.

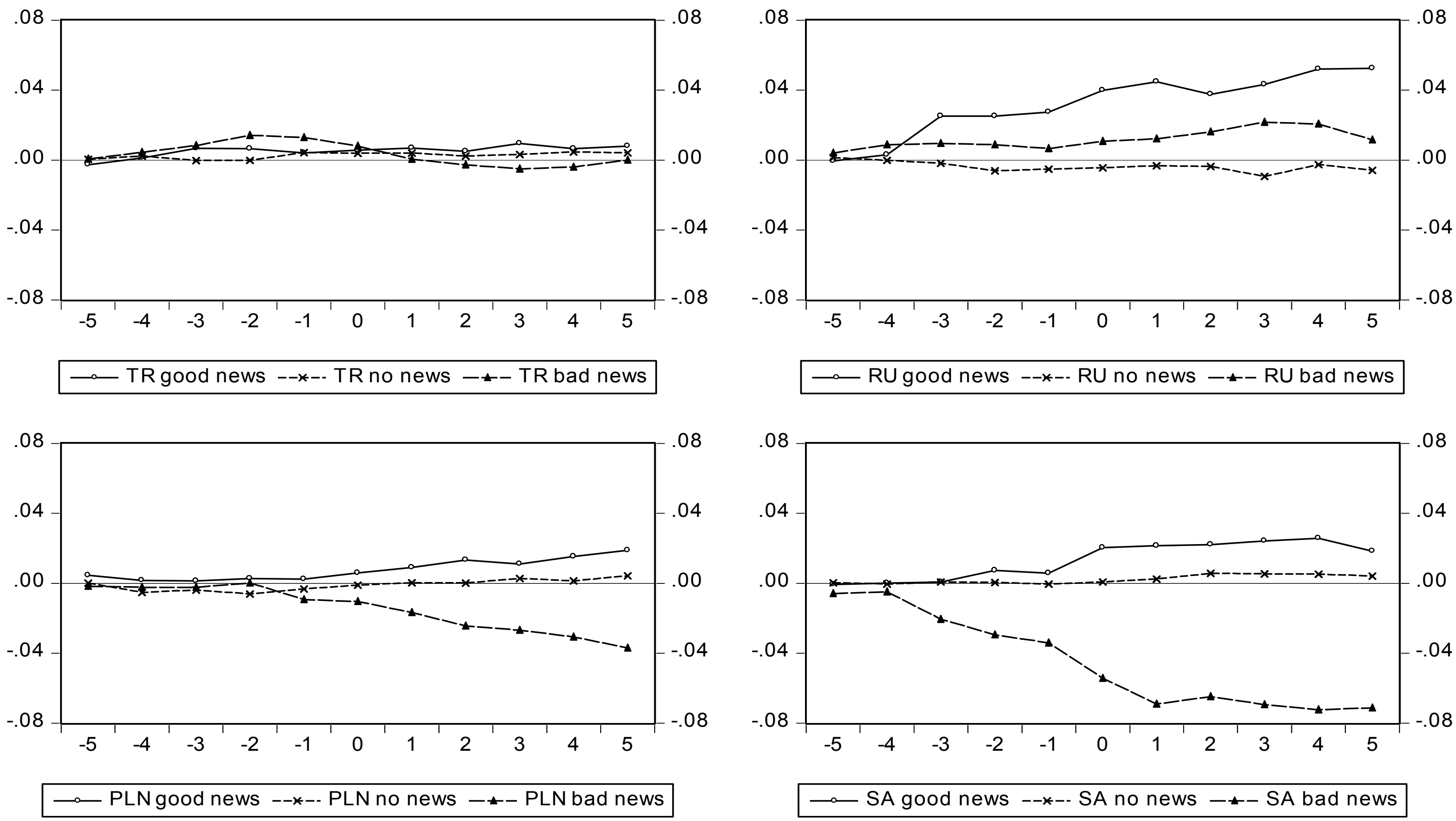

Figure 6.3: ACARs for the Turkish, Russian, Polish and South African stocks around dividend announcements

Table 6.2: Significance test results for the Turkish stocks in the event window

Event date	2 days window	Good news (N = 82) AR	Good news CAR (2 days event window)	Good news CAR (buy and hold)	No news (N = 71) AR	No news CAR (2 days event window)	No news CAR (buy and hold)	Bad news (N = 77) AR	Bad news CAR (2 days event window)	Bad news CAR (buy and hold)
t-test results										
-5	[-6;-5]	-0.003	-0.003	-0.003	0.000	-0.002	0.000	0.000	-0.008*	0.000
-4	[-5;-4]	0.004	0.001	0.001	0.002	0.002	0.002	0.004	0.004	0.004
-3	[-4;-3]	0.006*	0.009**	0.007	-0.003	-0.001	0.000	0.004	0.008*	0.008
-2	[-3;-2]	0.000	0.005	0.007	0.000	-0.002	0.000	0.006*	0.010**	0.014**
-1	[-2;-1]	-0.002	-0.003	0.004	0.005	0.005	0.004	-0.001	0.005	0.013*
0	**[-1;0]**	**0.001**	**-0.001**	**0.006**	**0.000**	**0.004**	**0.004**	**-0.005**	**-0.006**	**0.008**
1	[0;1]	0.001	0.003	0.007	0.000	0.000	0.004	-0.007**	-0.012**	0.000
2	[1;2]	-0.002	-0.001	0.005	-0.002	-0.002	0.002	-0.003	-0.011**	-0.003
3	[2;3]	0.004	0.003	0.010	0.001	-0.001	0.003	-0.002	-0.006	-0.005
4	[3;4]	-0.003	0.002	0.007	0.001	0.002	0.005	0.001	-0.001	-0.004
5		0.001		0.008	0.000		0.004	0.004		0.000
Sign test results										
-5	[-6;-5]	-0.003	-0.003	-0.003	0.000	-0.002	0.000	0.000	-0.008	0.000
-4	[-5;-4]	0.004	0.001	0.001	0.002	0.002	0.002	0.004	0.004	0.004
-3	[-4;-3]	0.006	0.009	0.007	-0.003	-0.001	0.000	0.004	0.008	0.008
-2	[-3;-2]	0.000	0.005	0.007	0.000	-0.002	0.000	0.006	0.010	0.014
-1	[-2;-1]	-0.002	-0.003	0.004	0.005	0.005	0.004	-0.001	0.005	0.013
0	**[-1;0]**	**0.001**	**-0.001**	**0.006**	**0.000**	**0.004**	**0.004**	**-0.005**	**-0.006**	**0.008**
1	[0;1]	0.001	0.003	0.007	0.000	0.000	0.004	-0.007	-0.012*	0.000
2	[1;2]	-0.002	-0.001	0.005	-0.002	-0.002	0.002	-0.003	-0.011	-0.003
3	[2;3]	0.004	0.003	0.010	0.001	-0.001	0.003	-0.002	-0.006	-0.005
4	[3;4]	-0.003	0.002	0.007	0.001	0.002	0.005	0.001	-0.001	-0.004
5		0.001		0.008	0.000		0.004	0.004		0.000
Rank test results										
-5	[-6;-5]	-0.003	-0.003	-0.003	0.000	-0.002	0.000	0.000	-0.008	0.000*
-4	[-5;-4]	0.004	0.001*	0.001	0.002	0.002	0.002	0.004	0.004	0.004
-3	[-4;-3]	0.006	0.009	0.007	-0.003	-0.001	0.000	0.004	0.008	0.008
-2	[-3;-2]	0.000	0.005	0.007	0.000	-0.002	0.000	0.006	0.010	0.014
-1	[-2;-1]	-0.002	-0.003	0.004	0.005*	0.005	0.004	-0.001	0.005	0.013
0	**[-1;0]**	**0.001**	**-0.001**	**0.006**	**0.000**	**0.004**	**0.004**	**-0.005***	**-0.006****	**0.008**
1	[0;1]	0.001	0.003	0.007	0.000	0.000	0.004	-0.007*	-0.012*	0.000
2	[1;2]	-0.002*	-0.001	0.005	-0.002	-0.002	0.002	-0.003	-0.011	-0.003
3	[2;3]	0.004	0.003	0.010	0.001	-0.001	0.003	-0.002	-0.006	-0.005
4	[3;4]	-0.003	0.002	0.007	0.001	0.002	0.005	0.001	-0.001	-0.004
5		0.001		0.008	0.000		0.004	0.004		0.000

Table 6.3: Significance test results for the Russian stocks in the event window

		Good news (N = 26)			**No news (N = 32)**			**Bad news (N = 23)**		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	0.000	0.000	0.000	0.001	0.003	0.001	0.004	0.003	0.004
-4	[-5;-4]	0.003	0.003	0.003	-0.002	0.000	-0.002	0.005	0.009	0.009
-3	[-4;-3]	0.022**	0.026**	0.025*	-0.002	-0.003	-0.002	0.001	0.006	0.009
-2	[-3;-2]	0.000	0.022*	0.025*	-0.004	-0.006	-0.004	-0.001	0.000	0.009
-1	[-2;-1]	0.002	0.002	0.027*	0.001	-0.003	0.001	-0.002	-0.003	0.006
0	**[-1;0]**	**0.012***	**0.015**	**0.040****	**0.001**	**0.002**	**0.001**	**0.004**	**0.002**	**0.011**
1	[0;1]	0.005	0.017*	0.045**	0.001	0.002	0.001	0.001	0.006	0.012
2	[1;2]	-0.007	-0.002	0.037*	0.000	0.001	0.000	0.004	0.005	0.016
3	[2;3]	0.006	-0.002	0.043*	-0.006	-0.006	-0.006	0.006	0.009	0.022
4	[3;4]	0.009	0.015	0.052**	0.007	0.001	0.007	-0.001	0.005	0.021
5		0.001		0.052*	-0.003		-0.003	-0.009		0.011
Sign test results										
-5	[-6;-5]	0.000	0.000	0.000	0.001	0.003	0.001	0.004	0.003	0.004
-4	[-5;-4]	0.003	0.003	0.003	-0.002	0.000	0.000	0.005	0.009	0.009
-3	[-4;-3]	0.022	0.026	0.025	-0.002	-0.003	-0.002	0.001	0.006	0.009
-2	[-3;-2]	0.000	0.022	0.025	-0.004	-0.006	-0.006	-0.001	0.000	0.009
-1	[-2;-1]	0.002	0.002	0.027	0.001	-0.003	-0.005	-0.002	-0.003	0.006
0	**[-1;0]**	**0.012**	**0.015**	**0.040**	**0.001**	**0.002**	**-0.005**	**0.004**	**0.002**	**0.011**
1	[0;1]	0.005	0.017	0.045	0.001	0.002	-0.003	0.001	0.006	0.012
2	[1;2]	-0.007	-0.002	0.037	0.000	0.001	-0.004	0.004	0.005	0.016
3	[2;3]	0.006	-0.002	0.043	-0.006	-0.006	-0.010	0.006	0.009	0.022
4	[3;4]	0.009	0.015	0.052	0.007	0.001	-0.003	-0.001	0.005	0.021
5		0.001		0.052	-0.003		-0.006	-0.009		0.011
Rank test results										
-5	[-6;-5]	0.000	0.000	0.000	0.001	0.003	0.001	0.004	0.003	0.004
-4	[-5;-4]	0.003	0.003	0.003	-0.002	0.000	0.000	0.005	0.009	0.009
-3	[-4;-3]	0.022	0.026*	0.025	-0.002	-0.003	-0.002	0.001	0.006	0.009
-2	[-3;-2]	0.000	0.022	0.025	-0.004	-0.006	-0.006	-0.001	0.000	0.009
-1	[-2;-1]	0.002	0.002	0.027	0.001	-0.003	-0.005	-0.002	-0.003	0.006
0	**[-1;0]**	**0.012**	**0.015**	**0.040**	**0.001**	**0.002**	**-0.005**	**0.004**	**0.002**	**0.011**
1	[0;1]	0.005	0.017	0.045	0.001	0.002	-0.003	0.001	0.006	0.012
2	[1;2]	-0.007	-0.002	0.037	0.000	0.001	-0.004	0.004	0.005	0.016
3	[2;3]	0.006	-0.002	0.043	-0.006*	-0.006	-0.010	0.006	0.009	0.022
4	[3;4]	0.009	0.015	0.052	0.007*	0.001	-0.003	-0.001	0.005	0.021
5		0.001		0.052	-0.003		-0.006	-0.009		0.011

Table 6.4: Significance test results for the Polish stocks in the event window

		Good news (N = 92)			**No news (N = 70)**			**Bad news (N = 34)**		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	0.005	0.009*	0.005	0.000	0.001	0.000	-0.002	-0.002	-0.002
-4	[-5;-4]	-0.003	0.002	0.002	-0.005*	-0.005	-0.005	-0.001	-0.002	-0.002
-3	[-4;-3]	0.000	-0.003	0.001	0.001	-0.004	-0.004	0.000	-0.001	-0.002
-2	[-3;-2]	0.001	0.001	0.003	-0.002	-0.001	-0.006	0.002	0.002	0.000
-1	[-2;-1]	0.000	0.001	0.002	0.003	0.001	-0.003	-0.010*	-0.007	-0.009
0	**[-1;0]**	**0.003**	**0.003**	**0.006**	**0.002**	**0.005**	**-0.001**	**-0.001**	**-0.011**	**-0.010**
1	[0;1]	0.003	0.007	0.009	0.001	0.003	0.000	-0.006	-0.007	-0.017
2	[1;2]	0.004	0.007	0.013	0.000	0.001	0.000	-0.008	-0.014*	-0.025*
3	[2;3]	-0.002	0.002	0.011	0.003	0.002	0.003	-0.002	-0.010	-0.027*
4	[3;4]	0.004	0.002	0.015	-0.001	0.001	0.001	-0.004	-0.006	-0.031*
5		0.004		0.019	0.003		0.004	-0.006		-0.037*
Sign test results										
-5	[-6;-5]	0.005	0.009	0.005	0.000	0.001	0.000	-0.002	-0.002	-0.002
-4	[-5;-4]	-0.003	0.002	0.002	-0.005	-0.005	-0.005	-0.001	-0.002	-0.002
-3	[-4;-3]	0.000	-0.003	0.001	0.001	-0.004	-0.004	0.000	-0.001	-0.002
-2	[-3;-2]	0.001	0.001	0.003	-0.002	-0.001	-0.006	0.002	0.002	0.000
-1	[-2;-1]	0.000	0.001	0.002	0.003	0.001	-0.003	-0.010	-0.007	-0.009
0	**[-1;0]**	**0.003**	**0.003**	**0.006**	**0.002**	**0.005**	**-0.001**	**-0.001**	**-0.011**	**-0.010**
1	[0;1]	0.003	0.007	0.009	0.001*	0.003*	0.000	-0.006	-0.007	-0.017
2	[1;2]	0.004	0.007	0.013	0.000	0.001**	0.000*	-0.008	-0.014	-0.025
3	[2;3]	-0.002	0.002	0.011	0.003	0.002	0.003	-0.002	-0.010	-0.027
4	[3;4]	0.004	0.002	0.015	-0.001	0.001	0.001	-0.004	-0.006	-0.031
5		0.004		0.019	0.003		0.004	-0.006		-0.037*
Rank test results										
-5	[-6;-5]	0.005	0.009	0.005	0.000	0.001	0.000	-0.002	-0.002	-0.002
-4	[-5;-4]	-0.003	0.002	0.002	-0.005	-0.005	-0.005	-0.001	-0.002	-0.002
-3	[-4;-3]	0.000	-0.003	0.001	0.001	-0.004	-0.004	0.000	-0.001	-0.002
-2	[-3;-2]	0.001	0.001	0.003	-0.002	-0.001	-0.006	0.002	0.002	0.000
-1	[-2;-1]	0.000	0.001	0.002	0.003	0.001	-0.003	-0.010*	-0.007	-0.009
0	**[-1;0]**	**0.003**	**0.003**	**0.006**	**0.002**	**0.005**	**-0.001**	**-0.001**	**-0.011**	**-0.010**
1	[0;1]	0.003	0.007	0.009	0.001	0.003	0.000	-0.006	-0.007*	-0.017
2	[1;2]	0.004	0.007	0.013	0.000	0.001	0.000	-0.008	-0.014	-0.025
3	[2;3]	-0.002	0.002	0.011	0.003	0.002	0.003	-0.002	-0.010	-0.027
4	[3;4]	0.004	0.002*	0.015	-0.001	0.001	0.001	-0.004	-0.006	-0.031*
5		0.004		0.019	0.003		0.004	-0.006		-0.037*

Table 6.5: Significance test results for the South African stocks in the event window

		Good news (N = 28)			No news (N = 155)			Bad news (N = 46)		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	-0.001	-0.002	-0.001	0.000	-0.001	0.000	-0.006	-0.007	-0.006
-4	[-5;-4]	0.001	0.000	0.000	-0.001	-0.001	-0.001	0.001	-0.005	-0.005
-3	[-4;-3]	0.001	0.001	0.001	0.001	0.001	0.001	-0.016**	-0.015*	-0.021**
-2	[-3;-2]	0.007	0.007	0.007	0.000	0.001	0.000	-0.009*	-0.025**	-0.030**
-1	[-2;-1]	-0.002	0.005	0.006	-0.001	-0.001	-0.001	-0.005	-0.013*	-0.034**
0	**[-1;0]**	**0.015****	0.013	**0.020**	**0.001**	**0.000**	**0.001**	**-0.020****	-0.025**	**-0.054****
1	[0;1]	0.001	0.016*	0.021	0.002	0.003	0.002	-0.015**	-0.035**	-0.069**
2	[1;2]	0.001	0.002	0.022	0.003*	0.005*	0.006	0.004	-0.010	-0.065**
3	[2;3]	0.002	0.003	0.024	0.000	0.003	0.005	-0.005	0.000	-0.069**
4	[3;4]	0.001	0.004	0.026	0.000	0.000	0.005	-0.003	-0.008	-0.072**
5		-0.007		0.018	-0.001		0.004	0.001		-0.071**
Sign test results										
-5	[-6;-5]	-0.001	-0.002	-0.001	0.000	-0.001	0.000	-0.006	-0.007	-0.006
-4	[-5;-4]	0.001	0.000	0.000	-0.001	-0.001	-0.001	0.001	-0.005	-0.005
-3	[-4;-3]	0.001	0.001	0.001	0.001	0.001	0.001	-0.016**	-0.015*	-0.021
-2	[-3;-2]	0.007*	0.007*	0.007	0.000	0.001	0.000	-0.009	-0.025**	-0.030*
-1	[-2;-1]	-0.002	0.005*	0.006	-0.001	-0.001	-0.001	-0.005	-0.013	-0.034
0	**[-1;0]**	**0.015**	**0.013***	**0.020***	**0.001**	**0.000**	**0.001**	**-0.020****	**-0.025***	**-0.054****
1	[0;1]	0.001	0.016	0.021*	0.002	0.003	0.002	-0.015	-0.035**	-0.069**
2	[1;2]	0.001	0.002	0.022	0.003	0.005	0.006	0.004	-0.010	-0.065*
3	[2;3]	0.002	0.003	0.024	0.000	0.003	0.005	-0.005	0.000	-0.069*
4	[3;4]	0.001	0.004	0.026	0.000	0.000	0.005	-0.003	-0.008	-0.072**
5		-0.007		0.018	-0.001		0.004	0.001		-0.071*
Rank test results										
-5	[-6;-5]	-0.001	-0.002	-0.001	0.000	-0.001	0.000	-0.006	-0.007	-0.006
-4	[-5;-4]	0.001	0.000	0.000	-0.001	-0.001	-0.001	0.001	-0.005	-0.005
-3	[-4;-3]	0.001	0.001	0.001	0.001	0.001	0.001	-0.016**	-0.015**	-0.021
-2	[-3;-2]	0.007	0.007	0.007	0.000	0.001	0.000	-0.009	-0.025	-0.030*
-1	[-2;-1]	-0.002	0.005*	0.006	-0.001	-0.001	-0.001	-0.005	-0.013**	-0.034**
0	**[-1;0]**	**0.015****	**0.013**	**0.020**	**0.001**	**0.000**	**0.001**	**-0.020****	**-0.025****	**-0.054****
1	[0;1]	0.001	0.016	0.021	0.002	0.003	0.002	-0.015*	-0.035	-0.069**
2	[1;2]	0.001	0.002	0.022	0.003	0.005	0.006	0.004	-0.010	-0.065**
3	[2;3]	0.002	0.003	0.024	0.000	0.003	0.005	-0.005	0.000	-0.069**
4	[3;4]	0.001	0.004	0.026	0.000	0.000	0.005	-0.003	-0.008	-0.072**
5		-0.007		0.018	-0.001		0.004	0.001		-0.071**

6.1.1.3 How Fast do Emerging EMEA Markets Price in the Information Disseminated with Dividend Announcements?

We have used the VaR method based on the ARMA and GARCH models to test the emerging EMEA markets' semi strong form efficiency and speed of adjustment to new information. VaR is commonly used among researchers and market participants to measure the maximum possible loss for an asset portfolio over a period of time within a fixed level of confidence (Demiralay and Ulusoy, 2014).

We used the VaR method to calculate the maximum possible AARs and ACARs for the dividend portfolios over the [0; 20] post event window at a 95% and

99% confidence basis, respectively, under the assumption of a normal distribution. As previously discussed, we used the market model with an ARMA(p,q) extension, where appropriate, to forecast expected stock returns. For the extended market model, where residuals have a white noise property, variance is assumed to be constant over time. In case of ARCH effects in residuals, we forecasted variance using the ARCH, GARCH or EGARCH models. For these stocks, the variance of residuals is time varying.

After forecasting one step ahead, out of sample variance for each stock and event, we calculated the portfolio variance for good and bad news portfolios. Event study methodology assumes no covariance between abnormal returns of different events since it aggregates events happening at different times, i.e. no clustering. Moreover, it assigns equal weights to events during the aggregation of returns and variances. Hence, portfolio variances are calculated as shown in Equation (A.7 on page 198.

We start with presenting our results at the aggregate EMEA level. Table 6.6 marks the exceptional days in the [0; 20] event window, where the AAR and ACAR exceed the VaR with "1". Our results show that the exception rate, defined as the number of AARs exceeding the VaR divided by the number of days in the event window, is 14% for the bad news portfolio versus 10% for the good news portfolio. Emerging EMEA markets look semi-strong form inefficient in both cases. In the case of good news the ACAR exceeds the VAR on the event day with the arrival of the news and remains above the limit for the entire post event window [0; 20]. In the case of bad news, the ACAR reverts below the limit only after day 13. Thus, we cannot reject the H_3 hypothesis. Finally, in the case of the no news portfolio, the ACAR remains within the VaR bands throughout the entire event window. Note that we have deliberately excluded the no news charts from this point onward due to space constrains.

We expanded our analysis to the individual country level and looked at comparative efficiencies. We started with good news portfolios. Figure 6.5 and Table 6.7 show that the ACARs for the Russian and South African markets exceed the VaR on day 0, i.e. both markets react in a timely fashion to good news. Yet, the ACAR for Russia continues to drift upwards after the event day, exceeding the +1% VaR. The ACAR reaches 9% in the [0;20] window, demonstrating an overreaction. Hence, we cannot reject the H_3 hypothesis and conclude that the Russian market is semi-strong form inefficient in case of good news. On the other hand, the ACAR reverts below the +1% VaR on day 1 and below the +5% VaR on day 4 in the case of South Africa. Hence, we reject H_3 at the 95% level, but not at the 99% level.

We found evidence of a slow adjustment to new information in Poland. The ACAR exceeds the 5% VaR on day 2 in Poland and remains above the +1% VaR until day 18 (H_3 accepted). The Polish market's lagged reaction still gives ample time to investors to buy the good news stock and make a maximum absolute abnormal return of 3.0%. A slow adjustment is also present in Turkey with the ACAR exceeding the +5% VaR on day 8. However, as suggested by Armitage (1995) and Gurgul et al. (2006), the longer the event window, the greater the chances of contaminating events in the same period, i.e. news other than the event under investigation which may affect the share price. Moreover, we have already shown using the three different test statistics in the previous section that the information content of dividends hypothesis does not hold in Turkey for the good news portfolios. Hence, the price reaction on day 8 may be due to contamination and we cannot reach a firm conclusion on the semi-strong form efficiency of the Turkish market. Lastly, even if there is any inefficiency in Turkey, it is less pronounced than in Russia and Poland since the ACAR does not exceed the +1% VaR in the entire post event window.

Figure 6.7 shows where the emerging EMEA markets stand relative to each other in terms of semi-strong form efficiency. To put it simply, all EMEA markets show some inefficiency when pricing new information. However, the violation of the EMH is more pronounced in Russia, where the [0; 20] ACAR reaches 9% and exceeds even the +1% VaR. The Polish market shows the second weakest performance in terms of semi-strong form efficiency. The ACAR exceeds the +5% VaR throughout the post event window and the +1% VaR until day 18. On the other hand, Turkey and South Africa look more efficient with ACARs remaining below the +1% VaR for the entire post event window. Thus, we conclude that Russia is the slowest market in pricing new information followed by Poland. Pricing happens substantially faster in South Africa. Lastly, it is not possible to reach a firm conclusion on Turkey.

We switch to bad news portfolios. As we have previously discussed, the information content of dividends hypothesis does not hold for Russia in the case of bad news. Hence, we are unable to test the EMH for this market. Our analysis shows that the ACARs do not exceed the VaR limits throughout the 21-day post event window, but this may be simply because dividend omissions are not regarded as valuable information. On the other hand, our evidence suggests that the semi-strong form EMH is violated at 5% level for all the remaining three markets since exceptional days in terms of ACARs are persistent (H_3 accepted). That said, EMH Is violated only in Poland and South Africa at 1% level, i.e. Turkey looks relatively more efficient than them. According to our findings, it takes the South African market 8 days and the Polish market 5 days to fully price in the new information.

Poland's case is a bit different than that of Turkey and South Africa. The first exceptional day where the AAR exceeds the -5% VaR is day 2 for the Polish bad news portfolio versus day 0 for the Turkish and South African portfolios. Although the exception rate is lower and significant ACARs die out sooner than in other countries, the Polish market's lagged reaction still gives ample time to investors to short the bad news stock and make a maximum absolute abnormal return of 2.8%. A 1.8% maximum absolute abnormal return can be achieved by shorting Turkish stocks, while shorting South African stocks with bad news can generate a 3.8% absolute abnormal return. That said, the reaction to the news starts on the event day for both markets making timing an important factor for a profitable investment strategy. South Africa overreacts to bad news with a -3.5% ACAR in the [0;1] window. Yet, a correction arrives in the following days and the [0,20] ACAR reaches +1.3%, demonstrating that buying the bad news stock after the initial negative reaction is a profitable investment strategy as well. In the case of Turkey, the market gives investors even less room to trade new information. The bad news portfolio reacts to the new information with a -1.2% ACAR in the [0;1] window and recovers to only -0.4% in the [0;20] window.

Figure 6.7 recaps our findings. Our results show that all emerging EMEA markets where the information content of dividend hypothesis holds are semi-strong form inefficient at the 95% confidence level. Pricing of good news continues throughout the 21-day post event window in case of Russia, even at the 99% confidence level. Polish market shows a lagged reaction to good news and continues to price it for 18 days at 1% significance. In the case of bad news, South Africa and

Poland are semi-strong form inefficient at 1% level. Since we could not prove the information content of dividend hypothesis for Turkey in the case of good news and for Russia in the case of bad news, we were not able to test the EMH for these markets.

The Polish market stands out as the most inefficient market within the emerging EMEA. First, the bad news portfolio's -1.0% AAR on day -1 suggests possible information leakage. Second, the price reaction continues after a 2-day hiatus, i.e. pricing takes place only very gradually and gives investors ample time to react. We also found that the Polish market reacts to good news in a lagged fashion as well. In the case of bad news, Turkey seems to be more efficient than Poland and South Africa, with ACAR peaking at a lower level and reverting below the VaR band sooner than others at 95% confidence level. To compare the level of efficiency of different countries, we have prepared a scorecard and ranked countries from 1 to 4 in terms of the speed of adjustment with the shortest response time receiving 4 points. Accordingly, Poland seems to be the most inefficient market, while Turkey seems to be the least inefficient one in the emerging EMEA.

Table 6.6: VaR versus AAR and ACAR for the emerging EMEA stocks

	AAR				ACAR			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	Good news (N = 228)	Bad news (N = 180)	Good news (N = 228)	Bad news (N = 180)	Good news (N = 228)	Bad news (N = 180)	Good news (N = 228)	Bad news (N = 180)
0	1	1	1	1	1	1	1	1
1		1		1	1	1	1	1
2					1	1	1	1
3					1	1	1	1
4					1	1	1	1
5					1	1	1	1
6					1	1	1	1
7					1	1	1	1
8					1	1	1	1
9					1	1	1	
10					1	1	1	
11					1	1	1	
12					1	1	1	
13					1	1	1	
14					1		1	
15					1		1	
16		1			1		1	
17	1		1		1		1	
18					1		1	
19					1		1	
20					1		1	

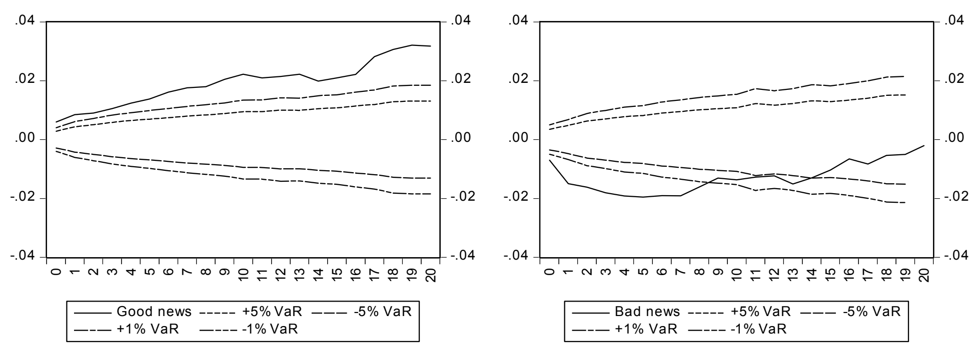

Figure 6.4: ACARs versus VaR for the emerging EMEA stocks

Table 6.7: VaR versus AAR and ACAR for individual countries - good news

	AAR								ACAR							
	Exceptions at 95% confidence level				Exceptions at 99% confidence level				Exceptions at 95% confidence level				Exceptions at 99% confidence level			
Event date	TR (N = 82)	RU (N = 26)	PLN (N = 92)	SA (N = 28)	TR	RU	PLN	SA	TR	RU	PLN	SA	TR	RU	PLN	SA
0		1		1		1		1		1		1		1		1
1										1		1		1		
2										1	1	1			1	
3	1									1		1				
4			1							1	1	1				
5										1	1				1	
6	1									1	1			1		
7										1	1			1	1	
8									1	1	1					
9									1	1	1			1		
10									1	1	1			1	1	
11									1	1	1			1		
12			1							1	1			1	1	
13										1	1			1	1	
14										1	1			1		
15										1	1			1		
16	1									1	1			1		
17	1		1				1		1	1	1			1	1	
18									1	1	1			1	1	
19		1							1	1	1			1		
20									1	1	1			1		

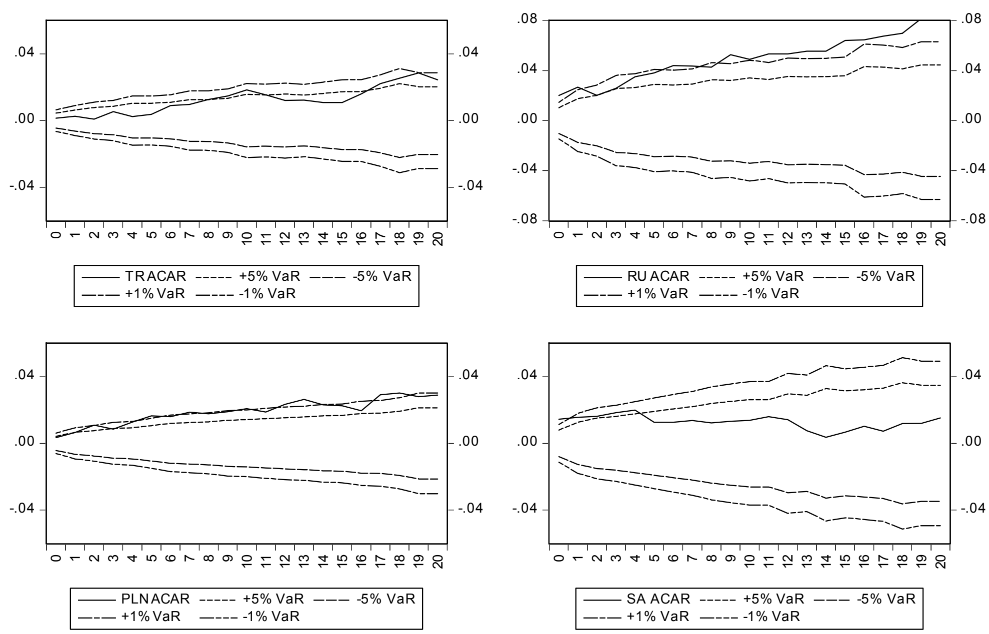

Figure 6.5: ACAR versus VaR for individual countries – good news

Table 6.8: VaR versus AAR and ACAR for individual countries - bad news

	AAR								ACAR							
	Exceptions at 95% confidence level				Exceptions at 99% confidence level				Exceptions at 95% confidence level				Exceptions at 99% confidence level			
Event date	TR (N = 77)	RU (N = 23)	PLN (N = 34)	SA (N = 46)	TR	RU	PLN	SA	TR	RU	PLN	SA	TR	RU	PLN	SA
0	1			1				1	1			1				1
1	1			1	1			1	1			1	1			1
2			1						1		1	1	1			1
3									1		1	1	1			1
4									1		1	1	1			1
5		1							1		1	1			1	1
6									1		1	1				1
7									1		1	1				1
8												1				1
9				1								1				
10												1				
11																
12																
13		1				1										
14																
15		1				1										
16																
17																
18				1				1								
19																
20				1												

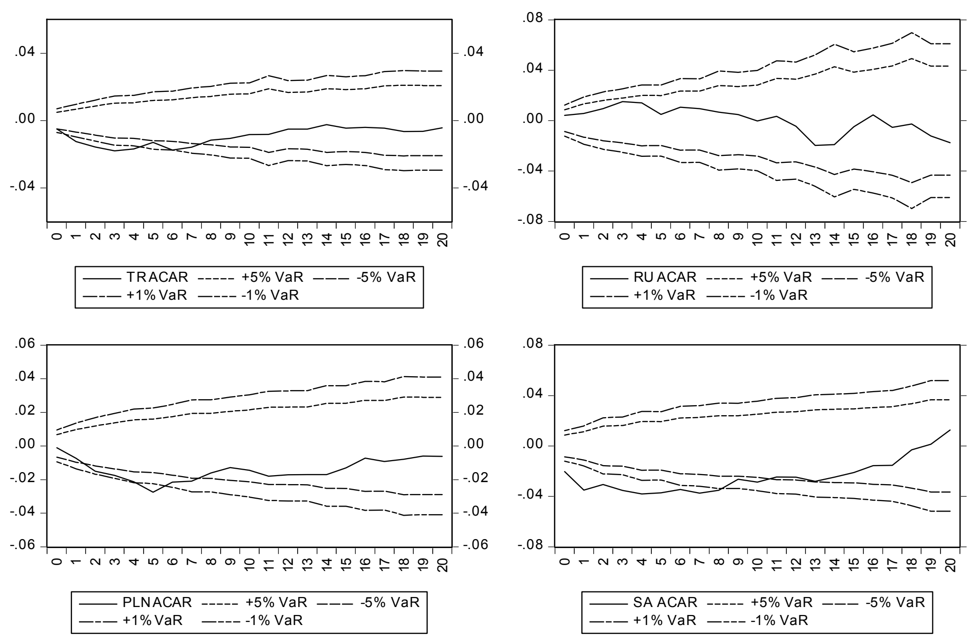

Figure 6.6: ACAR versus VaR for individual countries – bad news

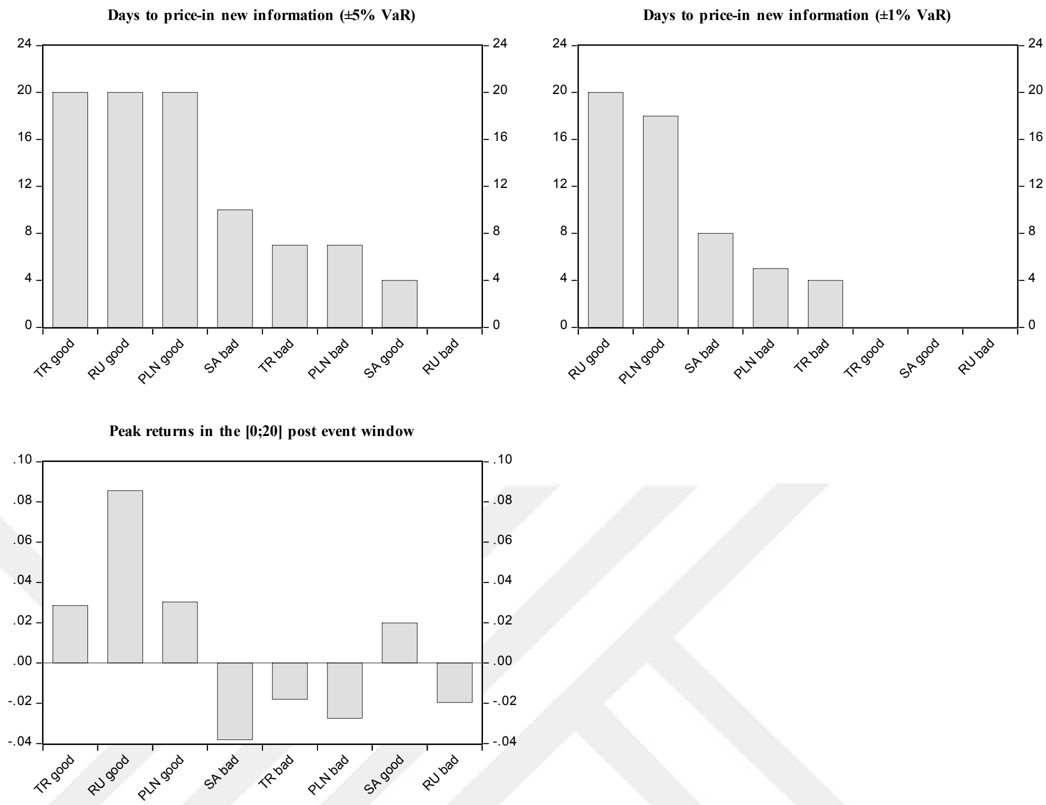

Figure 6.7: Speed of price adjustment and peak ACAR for individual countries

Table 6.9: Ranking of the EMEA markets in terms of speed of price adjustment

	Good news (a)	Bad news (b)	Total (a + b)
TR	3	3	6
RU	1	4	5
PLN	2	2	4
SA	4	1	5

6.1.2 Do Sell-side Equity Research Analysts Help the Dissemination of Information?

Lev (1988) argues that the acquisition and processing of information may not be economically feasible at low levels of investment, but could be profitable when the scale of investment activities is larger. In light of this, our second main research question tries to answer whether analysts with better skills and greater resources at hand can access or predict undisclosed information, while individual investors rely only on public information.

In our answer to our main research question 1, we concluded that the information content of dividend hypothesis holds at the aggregate emerging EMEA level. Stock prices show a statistically significant reaction in the anticipated directions in case of dividend initiations (good news) and omissions (bad news), while no significant reaction is present if dividends are unchanged (no news). In this section, we split the good, no and bad news portfolios into two sub groups based on the number of analysts covering the stocks. To illustrate, good news stocks covered by more than 5 analysts form one group, while the rest form another group. We then applied the three parametric (t-test) and nonparametric (sign and rank test) tests to AARs and ACARs.

According to Table 6.10, stocks with wide analyst coverage show a positive price reaction to dividend initiations. The t-test and the rank test found the 0.6% AAR on day 0 significant at 1% and 5%, respectively. Hence, we can reject H_0, i.e. the information content of dividends hypothesis holds. Yet, the return is too small to cover transaction costs and the AARs on the following days are nothing but zero. The portfolio generated an ACAR of 0.0% in the [-5; 5] event window. All in all, the pricing of new information seems to have happened swiftly and in a semi-strong form efficient manner.

On the other hand, our results show that the price adjustment happens only gradually without analysts input. Stocks with limited analyst coverage showed a 0.5% positive AAR to the dividend announcement on day 0, but were not found to be statistically significant by nonparametric tests. Yet, the portfolio generated a 3.1% ACAR in the [-5; 5], which was found to be statistically significant by all three tests.

Although we cannot reject H_0, we can reject H_1 and H_2. In other words, we found evidence of market inefficiency (slow pricing and overreaction) for stocks with limited analyst coverage.

All in all, our findings suggest that the information content of dividend hypothesis holds for the good news portfolio at the aggregate emerging EMEA level, regardless of analyst coverage. However, equity research analysts help with the faster dissemination of information.

When it comes to bad news portfolios, our results show that equity research analysts help with the faster dissemination of information at the aggregate emerging EMEA level. For stocks with wide analyst coverage, all tests found the day 0 and day 1 AARs of -1.0% and -0.9% to be statistically significant at the 1% level (H_0 rejected). The ACAR consolidated after day 1, but all three tests still found the -2.5% ACAR in the [-5; 5] event window to be significant. Still, we can reject H_1 and H_2. The results support the information content of dividend hypothesis. The hypothesis also holds for the bad news portfolio with limited analyst coverage, i.e. we rejected H_0, H_1 and H_2. However, the first statistically significant AAR for the bad news portfolio was on day 1 at -0.7%. Moreover, the ACAR continued to drift downwards after the announcements and reached -2.3% in the [-5; 5] event window, which was found to be significant by the t-test and the rank test, i.e. the price reaction came with a one-day lag in case of limited analyst coverage. This means that the market realizes the information disseminated through dividend omissions with a lag and prices the new information slowly without analysts' help.

All in all, our evidence suggests that the market realizes the information content of dividend announcements with or without the help of analysts. However, analysts do improve the efficiency of the market as they prevent it from overreacting in case of good news and enable it to price bad news sooner and faster. Hence, analysts have a role in the dissemination of information, according to our findings.

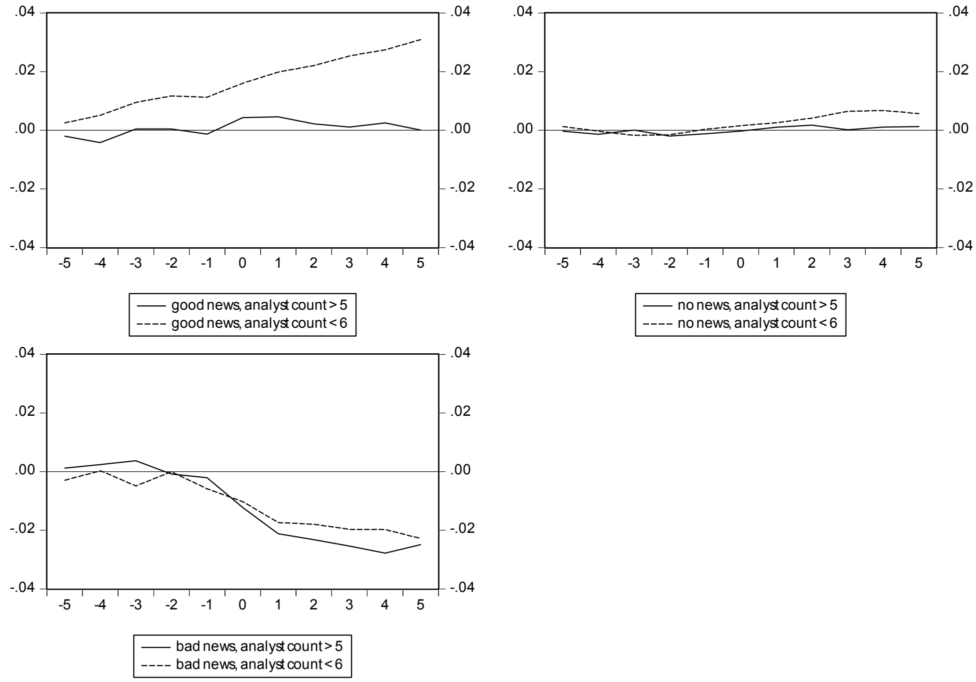

Figure 6.8: ACARs of emerging EMEA stocks with wide and limited analyst coverage around dividend announcements

Table 6.10: Significance test results for the emerging EMEA stocks with wide analyst coverage

		Good news (N = 90)			No news (N = 189)			Bad news (N = 81)		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	-0.002	0.000	-0.002	0.000	-0.002	0.000	0.001	-0.004	0.001
-4	[-5;-4]	-0.002	-0.004	-0.004	-0.001	-0.001	-0.001	0.001	0.002	0.002
-3	[-4;-3]	0.005*	0.002	0.000	0.001	0.000	0.000	0.001	0.003	0.004
-2	[-3;-2]	0.000	0.005	0.000	-0.002	-0.001	-0.002	-0.005	-0.003	-0.001
-1	[-2;-1]	-0.002	-0.002	-0.001	0.001	-0.001	-0.001	-0.001	-0.006	-0.002
0	**[-1;0]**	**0.006****	**0.004**	**0.004**	**0.001**	**0.002**	**0.000**	**-0.010****	**-0.011***	**-0.012**
1	[0;1]	0.000	0.006*	0.005	0.001	0.002	0.001	-0.009**	-0.019**	-0.021*
2	[1;2]	-0.002	-0.002	0.002	0.001	0.002	0.002	-0.002	-0.011*	-0.023*
3	[2;3]	-0.001	-0.003	0.001	-0.002	-0.001	0.000	-0.002	-0.004	-0.025**
4	[3;4]	0.001	0.000	0.002	0.001	-0.001	0.001	-0.002	-0.005	-0.028**
5		-0.002		0.000	0.000		0.001	0.003		-0.025*
Sign test results										
-5	[-6;-5]	-0.002	0.000	-0.002	0.000	-0.002	0.000	0.001	-0.004	0.001
-4	[-5;-4]	-0.002	-0.004	-0.004	-0.001	-0.001	-0.001	0.001	0.002	0.002
-3	[-4;-3]	0.005	0.002	0.000	0.001	0.000	0.000	0.001	0.003	0.004
-2	[-3;-2]	0.000	0.005	0.000	-0.002	-0.001	-0.002	-0.005	-0.003	-0.001
-1	[-2;-1]	-0.002*	-0.002	-0.001	0.001	-0.001	-0.001	-0.001	-0.006	-0.002
0	**[-1;0]**	**0.006**	**0.004**	**0.004**	**0.001**	**0.002**	**0.000**	**-0.010****	**-0.011**	**-0.012**
1	[0;1]	0.000	0.006	0.005	0.001	0.002	0.001	-0.009*	-0.019**	-0.021*
2	[1;2]	-0.002	-0.002	0.002	0.001	0.002	0.002	-0.002	-0.011	-0.023*
3	[2;3]	-0.001	-0.003	0.001*	-0.002	-0.001	0.000	-0.002	-0.004	-0.025*
4	[3;4]	0.001	0.000	0.002*	0.001	-0.001	0.001	-0.002	-0.005	-0.028*
5		-0.002		0.000*	0.000*		0.001	0.003		-0.025*
Rank test results										
-5	[-6;-5]	-0.002	0.000	-0.002	0.000	-0.002	0.000	0.001	-0.004	0.001*
-4	[-5;-4]	-0.002	-0.004	-0.004	-0.001	-0.001	-0.001	0.001	0.002	0.002
-3	[-4;-3]	0.005	0.002	0.000	0.001	0.000	0.000	0.001	0.003	0.004
-2	[-3;-2]	0.000	0.005	0.000**	-0.002	-0.001	-0.002*	-0.005	-0.003	-0.001
-1	[-2;-1]	-0.002	-0.002	-0.001	0.001	-0.001	-0.001	-0.001	-0.006*	-0.002**
0	**[-1;0]**	**0.006***	**0.004**	**0.004****	**0.001**	**0.002**	**0.000***	**-0.010****	**-0.011****	**-0.012**
1	[0;1]	0.000	0.006	0.005**	0.001	0.002	0.001	-0.009**	-0.019**	-0.021**
2	[1;2]	-0.002	-0.002	0.002	0.001	0.002	0.002	-0.002	-0.011	-0.023**
3	[2;3]	-0.001	-0.003	0.001**	-0.002	-0.001	0.000	-0.002	-0.004	-0.025**
4	[3;4]	0.001	0.000	0.002*	0.001	-0.001	0.001**	-0.002	-0.005	-0.028*
5		-0.002		0.000	0.000		0.001	0.003		-0.025**

Table 6.11: Significance test results for the emerging EMEA stocks with limited analyst coverage

		Good news (N = 138)			No news (N = 139)			Bad news (N = 99)		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	0.003	0.004	0.003	0.001	0.001	0.001	-0.003	-0.007	-0.003
-4	[-5;-4]	0.003	0.005	0.005	-0.002	0.000	0.000	0.003	0.000	0.000
-3	[-4;-3]	0.004	0.007*	0.010*	-0.001	-0.003	-0.002	-0.005	-0.002	-0.005
-2	[-3;-2]	0.002	0.007	0.012*	0.000	-0.001	-0.002	0.005	0.000	0.000
-1	[-2;-1]	0.000	0.002	0.011*	0.002	0.002	0.000	-0.006	-0.001	-0.006
0	**[-1;0]**	**0.005***	**0.004**	**0.016****	**0.001**	**0.003**	**0.002**	**-0.004**	**-0.010***	**-0.010**
1	[0;1]	0.004	0.009*	0.020**	0.001	0.002	0.003	-0.007*	-0.012**	-0.017*
2	[1;2]	0.002	0.006	0.022**	0.002	0.003	0.004	-0.001	-0.008	-0.018*
3	[2;3]	0.003	0.005	0.025**	0.002	0.004	0.006	-0.002	-0.002	-0.020*
4	[3;4]	0.002	0.005	0.027**	0.000	0.003	0.007	0.000	-0.002	-0.020*
5		0.003		0.031**	-0.001		0.006	-0.003		-0.023*
Sign test results										
-5	[-6;-5]	0.003	0.004	0.003	0.001	0.001	0.001	-0.003	-0.007	-0.003
-4	[-5;-4]	0.003	0.005	0.005	-0.002	0.000	0.000	0.003	0.000	0.000
-3	[-4;-3]	0.004	0.007	0.010	-0.001	-0.003	-0.002	-0.005	-0.002	-0.005
-2	[-3;-2]	0.002	0.007	0.012	0.000	-0.001	-0.002	0.005	0.000	0.000
-1	[-2;-1]	0.000	0.002	0.011	0.002	0.002*	0.000	-0.006	-0.001	-0.006
0	**[-1;0]**	**0.005**	**0.004***	**0.016***	**0.001**	**0.003**	**0.002**	**-0.004**	**-0.010**	**-0.010**
1	[0;1]	0.004	0.009	0.020*	0.001	0.002	0.003	-0.007	-0.012	-0.017
2	[1;2]	0.002	0.006	0.022*	0.002	0.003	0.004	-0.001	-0.008	-0.018
3	[2;3]	0.003	0.005	0.025*	0.002	0.004	0.006	-0.002	-0.002	-0.020
4	[3;4]	0.002	0.005	0.027*	0.000	0.003	0.007	0.000	-0.002	-0.020
5		0.003		0.031*	-0.001		0.006	-0.003		-0.023
Rank test results										
-5	[-6;-5]	0.003	0.004	0.003	0.001	0.001	0.001	-0.003	-0.007	-0.003
-4	[-5;-4]	0.003	0.005	0.005	-0.002	0.000	0.000	0.003	0.000	0.000
-3	[-4;-3]	0.004	0.007	0.010	-0.001	-0.003	-0.002	-0.005	-0.002	-0.005*
-2	[-3;-2]	0.002	0.007	0.012	0.000	-0.001*	-0.002	0.005	0.000	0.000*
-1	[-2;-1]	0.000	0.002	0.011	0.002	0.002	0.000**	-0.006	-0.001*	-0.006**
0	**[-1;0]**	**0.005**	**0.004***	**0.016**	**0.001**	**0.003**	**0.002****	**-0.004**	**-0.010****	**-0.010****
1	[0;1]	0.004	0.009	0.020**	0.001	0.002	0.003	-0.007*	-0.012	-0.017**
2	[1;2]	0.002	0.006	0.022*	0.002	0.003	0.004**	-0.001	-0.008	-0.018**
3	[2;3]	0.003	0.005	0.025	0.002	0.004	0.006	-0.002	-0.002	-0.020
4	[3;4]	0.002	0.005*	0.027*	0.000	0.003	0.007**	0.000	-0.002	-0.020**
5		0.003*		0.031*	-0.001		0.006	-0.003		-0.023*

6.1.2.1 Do Markets Price in New Information Faster with Analysts' Help?

We checked for the speed of adjustment to new information using the VaR method as we did in the previous research questions. Table 6.12 shows the exceptional days where the ACAR exceeds the 5% and 1% VaR, while Figure 6.9 provides a graphical illustration. Our results show that emerging EMEA markets look semi-strong form efficient in case of good news with wide analyst coverage since the ACAR exceeds the VaR only on the event day and day 1 (H_3 rejected). On the other hand, the good news portfolio with limited analyst coverage drifts upwards and remains above the 1% VaR for the entire post event period (H_3 accepted). The results indicate that the market overreacts to new information and prices it very slowly without analysts' help (H_4 rejected).

The ACAR of the bad news portfolio with wide analyst coverage exceeds the VaR on the arrival of the news and reverts back in the VaR band on the 9th day. The ACAR reaches -2.6% in the [0; 4] interval, but reverts to 0.4% by the [0; 20] window. In other words, analysts seem to be overreacting to bad news and buying the stocks after the initial reaction, which is a profitable strategy. The ACAR of bad news portfolio with limited analyst coverage exceeds the -5% VAR on day 1, which violates the semi-strong form EMH, i.e. a delayed reaction. However, the ACAR reverts back in the confidence interval after the 8th day. Moreover, the ACAR reaches -1.8% in the [0; 6] interval and it reverts to 0.7% by the [0; 20] window. Emerging EMEA markets look semi-strong form inefficient in both cases (H_3 accepted). But, they price in bad news somewhat faster without the help of analysts and do not overreact (H_4 accepted).

All in all, sell-side equity research analysts improve the efficiency of markets when there is good news. They also enable the market to realize bad news somewhat sooner. However, they cause inefficiencies since they overreact to bad news.

Table 6.12: VaR versus AAR and ACAR for the emerging EMEA stocks with wide and limited analyst coverage

	Exceptions at 95% confidence level				Exceptions at 99% confidence level			
	Good news		Bad news		Good news		Bad news	
Event date	analyst count > 5 (N = 90)	analyst count < 6 (N = 138)	analyst count > 5 (N = 81)	analyst count < 6 (N = 99)	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6
0	1	1	1		1	1	1	
1	1	1	1	1		1	1	1
2		1	1	1		1	1	
3		1	1	1		1	1	
4		1	1	1		1	1	
5		1	1	1		1	1	1
6		1	1	1		1	1	
7		1	1	1		1	1	
8		1	1	1		1		
9		1	1			1		
10		1				1		
11		1				1		
12		1	1			1		
13		1	1			1		
14		1				1		
15		1				1		
16		1				1		
17		1				1		
18		1				1		
19		1				1		
20		1				1		

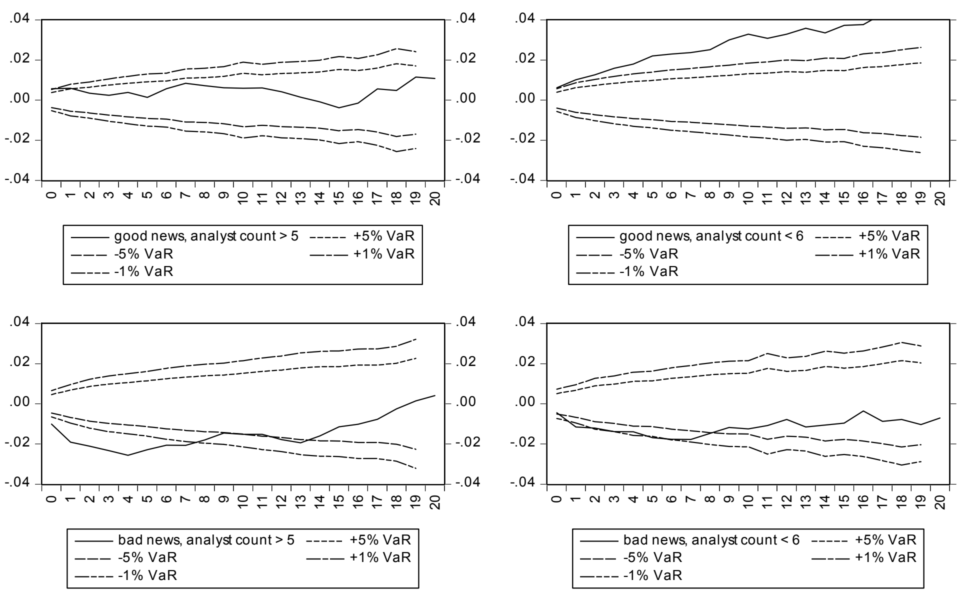

Figure 6.9: ACARs of emerging EMEA stocks with wide and limited analyst coverage

6.1.2.2 In which Emerging EMEA Markets do Analysts Improve the Dissemination of Information?

We expanded our test of the role of equity research analysts in the informational efficiency of emerging EMEA markets to the individual country level. Figure 6.11 illustrates the ACAR of good and bad news portfolios separated based on the number of analysts covering them in the [-5; 5] event window for each country.

Turkey: Turkish stocks' reaction to good news is statistically insignificant regardless of the number of analysts covering them. Stocks do not show any AARs on the event day. Parametric tests found a statistically significant -0.4% AAR on day 2 for stocks with limited analyst coverage, which is too low to build any firm conclusions on. Moreover, none of the tests found the ACAR in [-5; 5] window significant. The rank test found the 0.7% ACAR in the [-3; -2] window to be significant at 5% for stocks with wide analyst coverage, which hints to some good anticipation or information leakage. However, the results are not supported by the sign and the t-test. Hence, we cannot reject the H_0, H_1 and H_2 hypotheses. The information content of dividend hypothesis does not hold regardless of analyst coverage.

While the role of analysts in processing good news is trivial, they seem to be decreasing the volatility in the market in case of bad news. The bad news portfolio with wide analyst coverage shows an ACAR of -0.5% in the 2-day rolling window [0; 1], which is found to be significant at 5% by the nonparametric tests. Hence, we can reject H_0, i.e. dividends disseminate valuable information to shareholders. Note that no significant AAR or ACAR is observed before the event day. Moreover, no drift in the ACAR is observed beyond day 1 and the [-5; 5] ACAR is only -0.3%, which is not enough to cover the transaction costs of executing any trades. In case of limited analyst coverage, however, stocks show an AAR of 1.4% two days before the event, at 1% and 5% significances, respectively, according to the t-test and rank test. Moreover, the t-test found the 2.6% ACAR in the [-5; -2] window to be significant, although not supported by the nonparametric tests. Moreover, the market reacted to bad news with a statistically significant -1.2% AAR also a day after the announcements, according to the t-test and rank test. Furthermore, the ACAR drifted downwards from a significant 2.6% in [-5; -3] to an insignificant 0.2% in the [-5; 5] window. All in all, we reject the H_0 hypothesis on the back of the statistically significant AAR on day 1. The market also realizes a negative valuation signal embedded in dividend omissions without the help of analysts. However, the positive price reaction ahead of the dividend announcements implies that the market does poorly in anticipating the direction of dividend changes without the help of analysts, which creates greater volatility and potential inefficiencies.

To sum up, analysts improve the Turkish market's forecasting ability and thereby its efficiency in the event of bad news. However, their role in the dissemination of positive news is trivial.

Russia: Evidence from Russia is mixed and may be subject to a small sample bias. We discuss these limitations in detail in the next chapter. The price reaction to good news diverges significantly between stocks with wide and limited analyst coverage. We have not observed any significant AARs or ACARs in the entire event window in the portfolio with wide analyst coverage. Although there was a 0.7% AAR on the event day, none of the tests found it significant. Hence, we accept all H_0, H_1 and H_2 and conclude that the information content of dividend hypothesis does not hold for the good news portfolio with wide analyst coverage.

It is puzzling, however, to observe a starkly different picture when there is limited analyst coverage. First, the price reaction hints at possible information leakage and/or inefficient regulation and supervision or very good anticipation by the market. The t-test found the 3.6% AAR on day -3, the 4.4% ACAR in the [-4; -3] windows and the 4.6% ACAR in the [-5; -3] windows to be significant at 1%. The 4.4% ACAR in the [-4; -3] window was also found to be significant by the rank test. The portfolio went up 1.7% on the event day. That said, none of the statistical tests found this return significant. Although, the t-test found the 3.1% ACAR in the [0; 1] window significant at the 5% level, it was not confirmed by the parametric tests. Thus, we cannot reject H_0. However, the portfolio' ACAR continued to drift upwards after the event day and reached 10.1% in the [-5; 5] window, which was found to be significant by the t-test and sign test at the 1% level and by the rank test at the 5% level. Hence, we can reject H_1 and H_2. All in all, we found evidence in favour of the information content of dividend hypothesis for the good news portfolio with limited analyst coverage. However, we also found some strong evidence of market inefficiency (information leakage, slow pricing and overreaction).

Our results demonstrate that analysts improve the dissemination of information since the portfolio with limited analyst coverage violates the strong form and semi-strong form EMH. Yet again, the stark difference in the share price reactions requires a caveat. We believe that there may be couple of explanations for this phenomenon. First, the small size of our sample may be biasing our results for the portfolio with limited analyst coverage, although none of the stocks within the portfolio show a large volatility in daily returns, according to our observations. The second explanation is that close scrutiny by analysts may be forcing companies to adopt better corporate governance practices than others. The transparency of companies' managements may improve the level of anticipation and forecasting, therefore decreasing the agency cost for investors and the information embedded in dividend initiations. For the portfolio of stocks with limited analyst coverage, the opposite may hold.

The reaction of Russian stocks to bad news is statistically insignificant regardless of the number of analysts covering them. Stocks do not show any AARs on the event day. Parametric tests found a statistically significant 0.7% AAR on day-4 for stocks with limited analyst coverage, which is too low to build any firm conclusions on. Moreover, none of the tests found the ACAR in the [-5; 5] window to be significant. Hence, we cannot reject the H_0, H_1 and H_2 hypotheses. The information content of dividend hypothesis does not hold regardless of analyst coverage.

Poland: We have highlighted the Polish market as the most inefficient within the emerging EMEA in our previous research questions as it: 1) reacts to good news in a lagged fashion and 2) starts reacting to bad news before the event day (possible information leakage) and continues to drift downwards after the event. Splitting the dividend groups according to the level of analyst coverage does not change the picture too much as shown in the graphical depiction of ACARs in Figure 6.11

Although the good news portfolio with wide analyst coverage showed a small positive reaction on the event day, the t-test and parametric tests found none of the AARs in the event window to be statistically significant. Furthermore, none of the tests found the ACARs in the [-5;5] window to be significant either. Hence, we conclude that the information content of dividends hypothesis does not hold for good news stocks covered by a large number of analysts. Similarly, the good news portfolio with limited analyst coverage also showed a positive but statistically insignificant reaction on the event day. However, both parametric tests found the 0.7% AAR on day 5 to be significant at the 5% level. Furthermore, the ACARs continued to drift downwards after the event day and reached 2.5% in the [-5;5] window, which was found to be significant by the t-test at the 5% level, though not confirmed by parametric tests. The ACAR was only 0.2% for the good news portfolio with a large number of analysts in the same window and was not found statistically significant by any of the tests.

All in all, we found some weak evidence showing that the portfolio with limited analyst coverage finds the information disseminated through dividend initiations to be valuable, while the wide analyst coverage portfolio ignores it. This may be because investors assign higher agency costs to stocks that are not closely monitored by analysts and feel more comfortable with less free resources at management's discretion (free cash flow hypothesis).

In the case of bad news, the t-test and the rank test found the -1.3% AAR on day -1 to be statistically significant at the 5% level for the portfolio with limited analyst coverage, which suggests possible information leakage and/or inefficient regulation and supervision. This issue is not present for the portfolio with wide analyst coverage, which suggests that analyst coverage leads to more efficient dissemination of information. There were no statistically significant AARs on and after the event day for both portfolios. However, the ACARs of both portfolios drifted downwards after the event day and reached similar levels. For the wide analyst coverage portfolio, the ACAR reached -3.9% in the [-5;5] event window, which was found to be significant at the 5% level by the rank test, but not confirmed by the t-test and sign test. The -3.6% ACAR of the limited analyst portfolio in the [-5;5] window was not found to be significant by any of the tests. All in all, both portfolios demonstrated a slow pricing issue, but the evidence is too weak to draw any firm conclusions.

South Africa: We have shown in the previous sections that the information content of dividends hypothesis holds for South African stocks in case of both good and bad news. Dividing portfolios on the basis of the number of analysts covering them shows that the market correctly captures the information embedded in dividend initiations (good news) with the help of analysts. Moreover, wider analyst coverage seems to eliminate the information leakage and/or poor supervision problem and reduce the overreaction in case of dividend omissions (bad news).

In case of good news portfolios with wide analyst coverage, the t-test and rank test found the 2.2% AAR on the event day significant at 1%. Moreover, the t-test and sign test found the 2.6% ACAR in the [0;1] event window significant at 1%. Hence, we can reject H_0 and H_1, i.e. the information content of dividend hypothesis holds. The ACAR decreases to a statistically insignificant 0.3% in the [-5;5] window. On the other hand, for the portfolio with limited analyst coverage none of the tests found the 0.8% AAR on the event day to be significant. The sign test found the 3.2% [-5;5] ACAR to be significant at 5%, but it was not confirmed by the rank and t-test. The evidence in favour of the information content of dividend hypothesis is weak and we cannot reject H_0, H_1, H_2. The market seems to be pricing the news in a more timely and efficient manner with the help of analysts. In addition, it seems to be finding a more positive valuation signal embedded in dividend initiations of stocks with limited analyst coverage, which may be explained with the agency cost and free cash flow hypotheses.

In the case of bad news, all three tests found the -2.6% AAR on the event day to be significant at the 1% level for the portfolio with wide analyst coverage. The rank and t-test found the -2.0% AAR on day 1 to be significant as well. Recall that we do not consider significant price movements on day 1 as delayed reactions considering that dividend announcements might have been released after market hours which may cause the initial impact to be seen the next day. The ACAR of the portfolio reached -5.9% in the [-5;1] window and consolidated at this level for the rest of the event window, i.e. the [-5;5] ACAR was still -5.9%.

For the portfolio with limited analyst coverage, all three tests found the -2.8% AAR on day-3 to be significant at the 1% level. Moreover, the -5.8% ACAR in the [-5;-1] window was also found to be significant at the 1% level by the t-test and rank test as well. These results demonstrate potential information leakage and/or insufficient regulation and supervision problems. Without much help from analysts, the price movement happens to a large extent before the announcement day. While the t-test found the -1.4% AAR on day 0 to be significant at 5%, it was confirmed by the parametric tests. Yet, the ACAR continued to drift downwards after the announcement day and reached -8.5% in the [-5;5] window, which was found to be significant by the t-test and the rank test at the 1% level. This is substantially higher than the -5.9% ACAR for the portfolio with wide analyst coverage, which implies that the market overreacts to the news and prices in slower without analysts help.

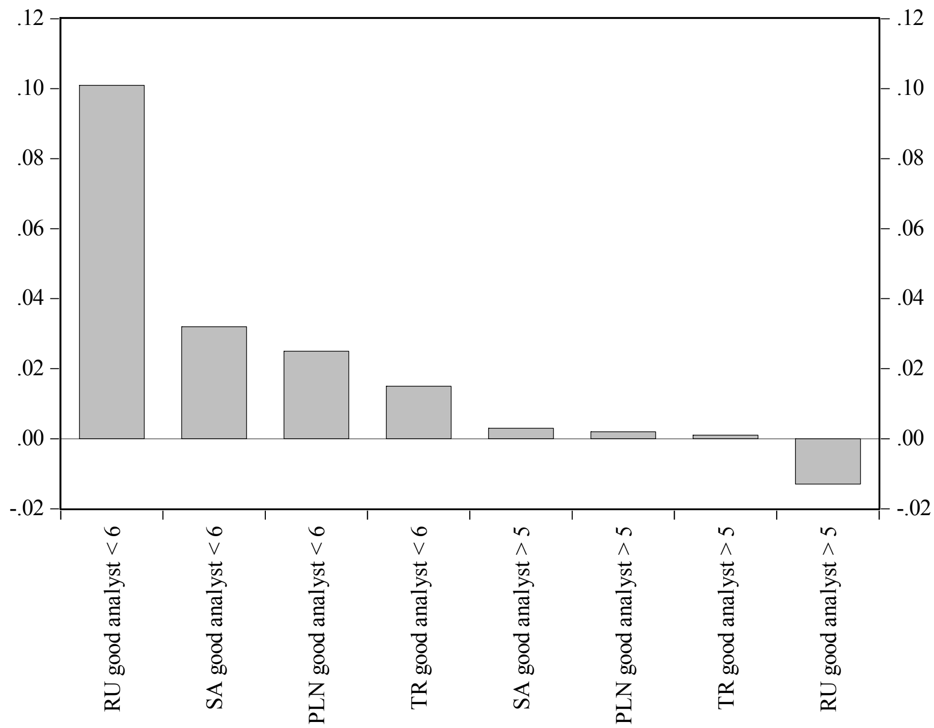

Figure 6.10: ACARs of good news stocks with wide and limited analyst coverage in [-5;5] window

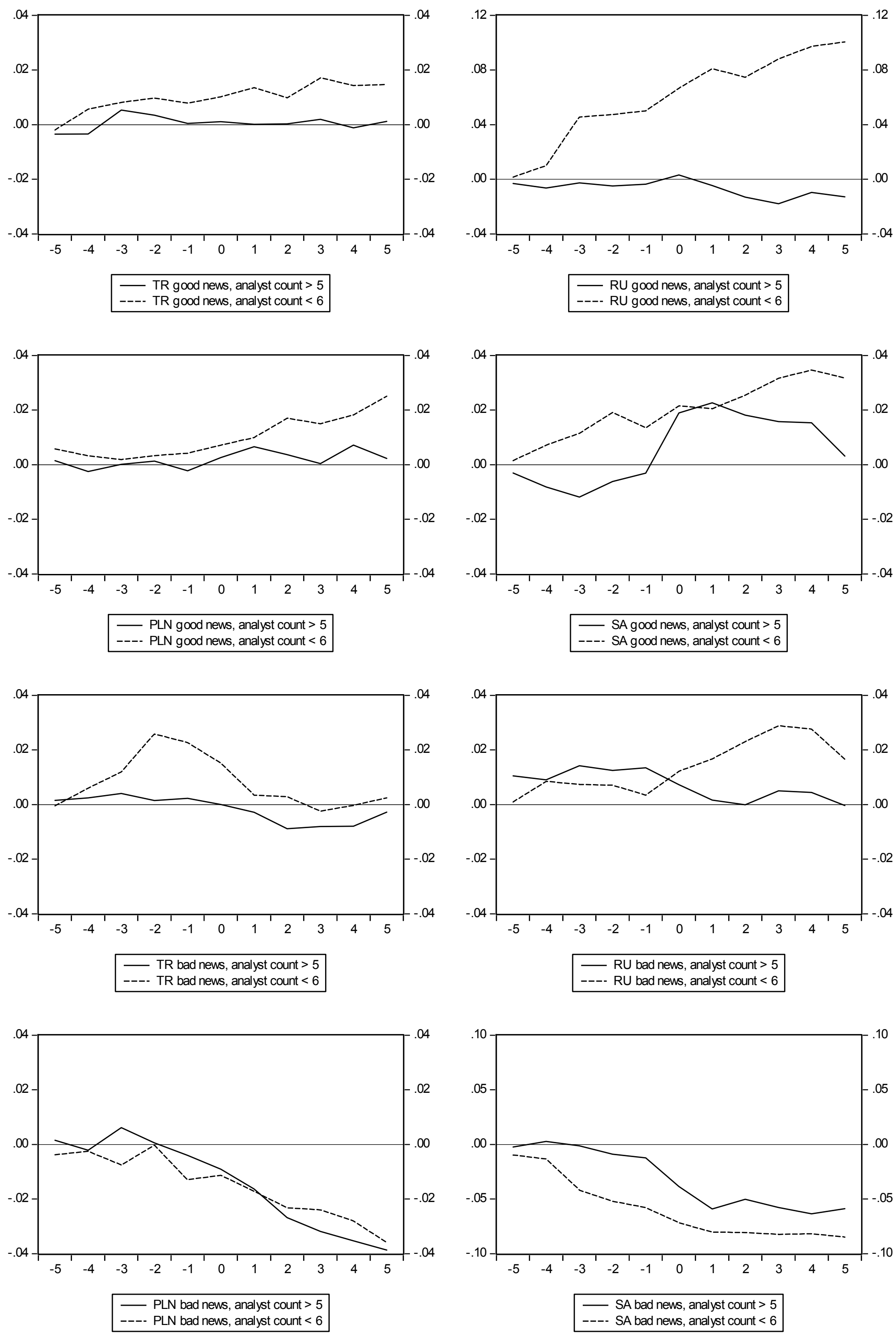

Figure 6.11: ACARs of the Turkish, Russian, Polish and South African stocks with wide and limited analyst coverage

Table 6.13: Significance test results for the Turkish stocks with wide analyst coverage

Event date	2 days window	Good news (N = 41) AR	Good news (N = 41) CAR (2 days event window)	Good news (N = 41) CAR (buy and hold)	No news (N = 42) AR	No news (N = 42) CAR (2 days event window)	No news (N = 42) CAR (buy and hold)	Bad news (N = 37) AR	Bad news (N = 37) CAR (2 days event window)	Bad news (N = 37) CAR (buy and hold)
t-test results										
-5	[-6;-5]	-0.003	-0.002	-0.003	-0.001	-0.005	-0.001	0.002	-0.006	0.002
-4	[-5;-4]	0.000	-0.003	-0.003	0.002	0.002	0.002	0.001	0.002	0.002
-3	[-4;-3]	0.009**	0.009	0.005	-0.001	0.002	0.001	0.002	0.003	0.004
-2	[-3;-2]	-0.002	0.007	0.003	-0.002	-0.003	-0.001	-0.003	-0.001	0.001
-1	[-2;-1]	-0.003	-0.005	0.000	0.003	0.001	0.002	0.001	-0.002	0.002
0	**[-1;0]**	**0.001**	**-0.002**	**0.001**	**0.000**	**0.004**	**0.002**	**-0.002**	**-0.001**	**0.000**
1	[0;1]	-0.001	0.000	0.000	0.000	0.000	0.002	-0.003	-0.005	-0.003
2	[1;2]	0.000	-0.001	0.000	0.002	0.002	0.004	-0.006	-0.009	-0.009
3	[2;3]	0.002	0.002	0.002	0.000	0.002	0.004	0.001	-0.005	-0.008
4	[3;4]	-0.003	-0.001	-0.001	0.000	-0.001	0.003	0.000	0.001	-0.008
5		0.002		0.001	0.001		0.004	0.005		-0.003
Sign test results										
-5	[-6;-5]	-0.003	-0.002	-0.003	-0.001	-0.005	-0.001	0.002	-0.006*	0.002
-4	[-5;-4]	0.000	-0.003	-0.003	0.002	0.002	0.002	0.001	0.002	0.002
-3	[-4;-3]	0.009	0.009	0.005	-0.001	0.002	0.001	0.002	0.003	0.004
-2	[-3;-2]	-0.002	0.007	0.003	-0.002	-0.003	-0.001	-0.003	-0.001	0.001
-1	[-2;-1]	-0.003	-0.005	0.000	0.003	0.001	0.002	0.001	-0.002	0.002
0	**[-1;0]**	**0.001**	**-0.002**	**0.001**	**0.000**	**0.004**	**0.002**	**-0.002**	**-0.001**	**0.000**
1	[0;1]	-0.001	0.000	0.000	0.000	0.000	0.002	-0.003	-0.005*	-0.003
2	[1;2]	0.000	-0.001	0.000	0.002	0.002	0.004	-0.006	-0.009*	-0.009
3	[2;3]	0.002	0.002	0.002	0.000	0.002	0.004	0.001	-0.005	-0.008
4	[3;4]	-0.003	-0.001	-0.001	0.000*	-0.001	0.003	0.000	0.001	-0.008
5		0.002		0.001	0.001		0.004	0.005		-0.003
Rank test results										
-5	[-6;-5]	-0.003	-0.002	-0.003	-0.001	-0.005	-0.001*	0.002	-0.006	0.002*
-4	[-5;-4]	0.000	-0.003	-0.003	0.002	0.002	0.002*	0.001	0.002	0.002
-3	[-4;-3]	0.009	0.009	0.005	-0.001	0.002	0.001	0.002	0.003	0.004
-2	[-3;-2]	-0.002	0.007*	0.003	-0.002	-0.003	-0.001	-0.003	-0.001	0.001
-1	[-2;-1]	-0.003	-0.005	0.000	0.003	0.001	0.002	0.001	-0.002	0.002
0	**[-1;0]**	**0.001**	**-0.002**	**0.001**	**0.000**	**0.004**	**0.002**	**-0.002**	**-0.001***	**0.000**
1	[0;1]	-0.001	0.000	0.000	0.000	0.000	0.002	-0.003	-0.005**	-0.003
2	[1;2]	0.000	-0.001	0.000	0.002	0.002	0.004	-0.006**	-0.009	-0.009
3	[2;3]	0.002	0.002	0.002	0.000	0.002	0.004	0.001	-0.005	-0.008*
4	[3;4]	-0.003	-0.001	-0.001	0.000	-0.001	0.003	0.000	0.001	-0.008*
5		0.002		0.001	0.001		0.004	0.005		-0.003*

Table 6.14: Significance test results for the Turkish stocks with limited analyst coverage

		Good news (N = 41)			**No news (N = 29)**			**Bad news (N = 40)**		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	-0.002	-0.003	-0.002	0.002	0.004	0.002	0.000	-0.011	0.000
-4	[-5;-4]	0.008*	0.006	0.006	0.001	0.003	0.003	0.006	0.006	0.006
-3	[-4;-3]	0.003	0.010	0.008	-0.005	-0.004	-0.002	0.006	0.012*	0.012
-2	[-3;-2]	0.002	0.004	0.010	0.003	-0.002	0.001	0.014**	0.020**	0.026**
-1	[-2;-1]	-0.002	0.000	0.008	0.006	0.010	0.008	-0.003	0.011	0.023*
0	**[-1;0]**	**0.002**	**0.000**	**0.010**	**-0.002**	**0.005**	**0.006**	**-0.008**	**-0.011**	**0.015**
1	[0;1]	0.003	0.006	0.013	0.001	-0.001	0.007	-0.012**	-0.019**	0.003
2	[1;2]	-0.004	0.000	0.010	-0.007	-0.006	0.000	-0.001	-0.012*	0.003
3	[2;3]	0.007	0.004	0.017	0.003	-0.004	0.002	-0.005	-0.006	-0.002
4	[3;4]	-0.003	0.004	0.014	0.004	0.007	0.006	0.002	-0.003	0.000
5		0.000		0.015	-0.003		0.004	0.003		0.002
Sign test results										
-5	[-6;-5]	-0.002	-0.003	-0.002	0.002	0.004	0.002	0.000	-0.011	0.000
-4	[-5;-4]	0.008	0.006	0.006	0.001	0.003	0.003	0.006	0.006	0.006
-3	[-4;-3]	0.003	0.010	0.008	-0.005	-0.004	-0.002	0.006	0.012	0.012
-2	[-3;-2]	0.002	0.004	0.010	0.003	-0.002	0.001	0.014	0.020	0.026
-1	[-2;-1]	-0.002	0.000	0.008	0.006	0.010	0.008	-0.003	0.011	0.023
0	**[-1;0]**	**0.002**	**0.000**	**0.010**	**-0.002**	**0.005**	**0.006**	**-0.008**	**-0.011**	**0.015**
1	[0;1]	0.003	0.006	0.013	0.001	-0.001	0.007	-0.012	-0.019	0.003
2	[1;2]	-0.004*	0.000	0.010	-0.007	-0.006	0.000	-0.001	-0.012	0.003
3	[2;3]	0.007	0.004	0.017	0.003	-0.004	0.002	-0.005	-0.006	-0.002
4	[3;4]	-0.003	0.004	0.014	0.004	0.007	0.006	0.002	-0.003	0.000
5		0.000		0.015	-0.003		0.004	0.003		0.002
Rank test results										
-5	[-6;-5]	-0.002	-0.003	-0.002	0.002	0.004	0.002	0.000	-0.011	0.000
-4	[-5;-4]	0.008	0.006	0.006	0.001	0.003	0.003	0.006	0.006	0.006
-3	[-4;-3]	0.003	0.010	0.008	-0.005	-0.004	-0.002	0.006	0.012*	0.012
-2	[-3;-2]	0.002	0.004	0.010	0.003	-0.002*	0.001	0.014*	0.020	0.026
-1	[-2;-1]	-0.002	0.000	0.008	0.006	0.010	0.008	-0.003	0.011	0.023
0	**[-1;0]**	**0.002**	**0.000**	**0.010**	**-0.002**	**0.005**	**0.006**	**-0.008**	**-0.011****	**0.015**
1	[0;1]	0.003	0.006	0.013	0.001	-0.001	0.007	-0.012**	-0.019	0.003
2	[1;2]	-0.004*	0.000	0.010	-0.007	-0.006	0.000	-0.001	-0.012	0.003
3	[2;3]	0.007	0.004	0.017	0.003	-0.004	0.002	-0.005	-0.006	-0.002
4	[3;4]	-0.003	0.004	0.014	0.004	0.007	0.006	0.002	-0.003	0.000
5		0.000		0.015	-0.003		0.004	0.003		0.002

Table 6.15: Significance test results for the Russian stocks with wide analyst coverage

		Good news (N = 11)			No news (N = 25)			Bad news (N = 7)		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	-0.003	-0.005	-0.003	0.002	0.002	0.002	0.011	0.009	0.011
-4	[-5;-4]	-0.003	-0.006	-0.006	-0.003	-0.001	-0.001	-0.001	0.009	0.009
-3	[-4;-3]	0.004	0.001	-0.003	-0.001	-0.004	-0.001	0.005	0.004	0.014
-2	[-3;-2]	-0.002	0.001	-0.005	-0.002	-0.003	-0.004	-0.002	0.003	0.012
-1	[-2;-1]	0.001	-0.001	-0.004	0.000	-0.002	-0.004	0.001	-0.001	0.013
0	**[-1;0]**	**0.007**	**0.008**	**0.003**	**0.002**	**0.001**	**-0.002**	**-0.006**	**-0.005**	**0.007**
1	[0;1]	-0.008	-0.001	-0.005	0.002	0.004	0.000	-0.006	-0.012	0.002
2	[1;2]	-0.008	-0.016	-0.013	0.000	0.002	0.000	-0.002	-0.007	0.000
3	[2;3]	-0.005	-0.013	-0.018	-0.005	-0.006	-0.005	0.005	0.003	0.005
4	[3;4]	0.008	0.003	-0.010	0.008*	0.003	0.003	-0.001	0.005	0.004
5		-0.003		-0.013	-0.004		-0.001	-0.005		0.000
Sign test results										
-5	[-6;-5]	-0.003	-0.005	-0.003	0.002	0.002	0.002	0.011	0.009	0.011
-4	[-5;-4]	-0.003	-0.006	-0.006	-0.003	-0.001	-0.001	-0.001	0.009	0.009
-3	[-4;-3]	0.004	0.001	-0.003	-0.001	-0.004	-0.001	0.005	0.004	0.014
-2	[-3;-2]	-0.002	0.001	-0.005	-0.002	-0.003	-0.004	-0.002	0.003	0.012
-1	[-2;-1]	0.001	-0.001	-0.004	0.000	-0.002	-0.004	0.001	-0.001	0.013
0	**[-1;0]**	**0.007**	**0.008**	**0.003**	**0.002**	**0.001**	**-0.002**	**-0.006**	**-0.005**	**0.007**
1	[0;1]	-0.008	-0.001	-0.005	0.002	0.004	0.000	-0.006	-0.012	0.002
2	[1;2]	-0.008	-0.016*	-0.013	0.000	0.002	0.000	-0.002	-0.007	0.000
3	[2;3]	-0.005	-0.013*	-0.018	-0.005	-0.006	-0.005	0.005	0.003	0.005
4	[3;4]	0.008	0.003	-0.010	0.008	0.003	0.003	-0.001	0.005	0.004
5		-0.003		-0.013	-0.004*		-0.001	-0.005		0.000
Rank test results										
-5	[-6;-5]	-0.003	-0.005	-0.003	0.002	0.002	0.002	0.011	0.009	0.011
-4	[-5;-4]	-0.003	-0.006	-0.006	-0.003	-0.001	-0.001	-0.001	0.009	0.009
-3	[-4;-3]	0.004	0.001	-0.003	-0.001	-0.004	-0.001	0.005	0.004	0.014
-2	[-3;-2]	-0.002	0.001	-0.005	-0.002	-0.003	-0.004	-0.002	0.003	0.012
-1	[-2;-1]	0.001	-0.001	-0.004	0.000	-0.002	-0.004	0.001	-0.001	0.013
0	**[-1;0]**	**0.007**	**0.008**	**0.003**	**0.002**	**0.001**	**-0.002**	**-0.006**	**-0.005**	**0.007**
1	[0;1]	-0.008	-0.001*	-0.005	0.002	0.004	0.000	-0.006	-0.012	0.002
2	[1;2]	-0.008	-0.016*	-0.013	0.000	0.002	0.000	-0.002	-0.007	0.000
3	[2;3]	-0.005	-0.013	-0.018	-0.005	-0.006	-0.005	0.005	0.003	0.005
4	[3;4]	0.008	0.003	-0.010	0.008*	0.003	0.003	-0.001	0.005	0.004
5		-0.003		-0.013	-0.004		-0.001	-0.005		0.000

Table 6.16: Significance test results for the Russian stocks with limited analyst coverage

		Good news (N = 15)			**No news (N = 7)**			**Bad news (N = 16)**		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	0.002	0.003	0.002	-0.002	0.003	-0.002	0.001	0.000	0.001
-4	[-5;-4]	0.008	0.010	0.010	0.003	0.001	0.001	0.007	0.008	0.008
-3	[-4;-3]	0.036**	0.044**	0.046**	-0.005	-0.002	-0.004	-0.001	0.006	0.007
-2	[-3;-2]	0.002	0.037**	0.047*	-0.012	-0.017	-0.016	0.000	-0.001	0.007
-1	[-2;-1]	0.003	0.005	0.050*	0.004	-0.007	-0.011	-0.004	-0.004	0.003
0	**[-1;0]**	**0.017**	**0.019**	**0.067****	**-0.002**	**0.003**	**-0.013**	**0.009**	**0.005**	**0.012**
1	[0;1]	0.014	0.031*	0.081**	-0.003	-0.004	-0.016	0.004	0.013	0.017
2	[1;2]	-0.006	0.008	0.075**	0.000	-0.003	-0.016	0.006	0.011	0.023
3	[2;3]	0.013	0.007	0.088**	-0.008	-0.009	-0.024	0.006	0.012	0.029
4	[3;4]	0.009	0.023	0.097**	0.001	-0.007	-0.023	-0.001	0.005	0.028
5		0.003		0.101**	0.000		-0.023	-0.011		0.016
Sign test results										
-5	[-6;-5]	0.002	0.003	0.002	-0.002	0.003	-0.002	0.001	0.000	0.001
-4	[-5;-4]	0.008	0.010	0.010	0.003	0.001	0.001	0.007*	0.008	0.008
-3	[-4;-3]	0.036	0.044	0.046	-0.005	-0.002	-0.004	-0.001	0.006	0.007
-2	[-3;-2]	0.002	0.037	0.047	-0.012	-0.017	-0.016	0.000	-0.001	0.007
-1	[-2;-1]	0.003	0.005*	0.050	0.004	-0.007	-0.011	-0.004	-0.004	0.003
0	**[-1;0]**	**0.017**	**0.019**	**0.067**	**-0.002**	**0.003**	**-0.013**	**0.009**	**0.005**	**0.012**
1	[0;1]	0.014	0.031	0.081	-0.003	-0.004	-0.016	0.004	0.013	0.017
2	[1;2]	-0.006	0.008	0.075	0.000	-0.003	-0.016	0.006	0.011	0.023
3	[2;3]	0.013	0.007	0.088*	-0.008	-0.009	-0.024	0.006	0.012	0.029
4	[3;4]	0.009	0.023	0.097*	0.001	-0.007	-0.023*	-0.001	0.005	0.028
5		0.003*		0.101**	0.000		-0.023	-0.011		0.016
Rank test results										
-5	[-6;-5]	0.002	0.003	0.002	-0.002	0.003	-0.002	0.001	0.000	0.001
-4	[-5;-4]	0.008	0.010	0.010	0.003	0.001	0.001	0.007*	0.008	0.008
-3	[-4;-3]	0.036	0.044*	0.046	-0.005	-0.002	-0.004	-0.001	0.006	0.007
-2	[-3;-2]	0.002	0.037	0.047	-0.012	-0.017	-0.016	0.000	-0.001	0.007
-1	[-2;-1]	0.003	0.005	0.050	0.004	-0.007	-0.011	-0.004	-0.004	0.003
0	**[-1;0]**	**0.017**	**0.019**	**0.067**	**-0.002**	**0.003**	**-0.013**	**0.009**	**0.005**	**0.012**
1	[0;1]	0.014	0.031	0.081	-0.003	-0.004	-0.016	0.004	0.013	0.017
2	[1;2]	-0.006	0.008	0.075*	0.000	-0.003	-0.016	0.006	0.011	0.023
3	[2;3]	0.013	0.007	0.088	-0.008	-0.009	-0.024	0.006	0.012	0.029
4	[3;4]	0.009	0.023*	0.097*	0.001	-0.007	-0.023	-0.001	0.005*	0.028
5		0.003		0.101*	0.000		-0.023	-0.011		0.016

Table 6.17: Significance test results for the Polish stocks with wide analyst coverage

		Good news (N = 25)			**No news (N = 31)**			**Bad news (N = 13)**		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	0.001	0.005	0.001	-0.002	0.001	-0.002	0.002	-0.001	0.002
-4	[-5;-4]	-0.004	-0.003	-0.003	-0.002	-0.004	-0.004	-0.004	-0.002	-0.002
-3	[-4;-3]	0.003	-0.001	0.000	0.002	-0.001	-0.002	0.008	0.005	0.006
-2	[-3;-2]	0.001	0.004	0.001	-0.001	0.000	-0.004	-0.006	0.003	0.001
-1	[-2;-1]	-0.004	-0.002	-0.002	0.004	0.003	0.000	-0.005	-0.010	-0.004
0	**[-1;0]**	**0.005**	**0.001**	**0.003**	**0.002**	**0.006**	**0.002**	**-0.005**	**-0.010**	**-0.009**
1	[0;1]	0.004	0.009	0.007	-0.001	0.001	0.001	-0.007	-0.012	-0.016
2	[1;2]	-0.003	0.001	0.004	0.001	0.000	0.002	-0.010	-0.018*	-0.027
3	[2;3]	-0.003	-0.006	0.000	0.000	0.001	0.002	-0.005	-0.016	-0.032
4	[3;4]	0.007	0.004	0.007	-0.002	-0.002	0.000	-0.004	-0.009	-0.035
5		-0.005		0.002	0.000		0.000	-0.003		-0.039
Sign test results										
-5	[-6;-5]	0.001	0.005	0.001	-0.002	0.001	-0.002	0.002	-0.001	0.002
-4	[-5;-4]	-0.004	-0.003	-0.003	-0.002	-0.004	-0.004	-0.004	-0.002	-0.002
-3	[-4;-3]	0.003	-0.001	0.000	0.002	-0.001	-0.002	0.008	0.005	0.006
-2	[-3;-2]	0.001	0.004	0.001	-0.001	0.000	-0.004	-0.006	0.003	0.001
-1	[-2;-1]	-0.004*	-0.002	-0.002	0.004	0.003	0.000	-0.005	-0.010	-0.004
0	**[-1;0]**	**0.005**	**0.001**	**0.003**	**0.002**	**0.006**	**0.002**	**-0.005**	**-0.010**	**-0.009**
1	[0;1]	0.004	0.009	0.007	-0.001	0.001	0.001	-0.007	-0.012	-0.016
2	[1;2]	-0.003	0.001	0.004	0.001	0.000	0.002	-0.010	-0.018	-0.027
3	[2;3]	-0.003	-0.006	0.000	0.000	0.001	0.002	-0.005	-0.016	-0.032
4	[3;4]	0.007	0.004	0.007	-0.002	-0.002	0.000	-0.004	-0.009	-0.035
5		-0.005		0.002	0.000		0.000	-0.003		-0.039
Rank test results										
-5	[-6;-5]	0.001	0.005	0.001	-0.002	0.001	-0.002	0.002	-0.001	0.002
-4	[-5;-4]	-0.004	-0.003	-0.003	-0.002	-0.004	-0.004	-0.004	-0.002	-0.002
-3	[-4;-3]	0.003	-0.001	0.000	0.002	-0.001	-0.002	0.008	0.005	0.006
-2	[-3;-2]	0.001	0.004	0.001	-0.001	0.000	-0.004	-0.006	0.003	0.001
-1	[-2;-1]	-0.004	-0.002	-0.002	0.004	0.003	0.000	-0.005	-0.010	-0.004
0	**[-1;0]**	**0.005**	**0.001**	**0.003**	**0.002**	**0.006**	**0.002**	**-0.005**	**-0.010**	**-0.009**
1	[0;1]	0.004	0.009	0.007	-0.001	0.001	0.001	-0.007	-0.012	-0.016
2	[1;2]	-0.003	0.001	0.004	0.001	0.000	0.002	-0.010	-0.018	-0.027
3	[2;3]	-0.003	-0.006	0.000	0.000	0.001	0.002	-0.005	-0.016	-0.032
4	[3;4]	0.007	0.004	0.007	-0.002	-0.002	0.000	-0.004	-0.009	-0.035*
5		-0.005		0.002	0.000		0.000	-0.003		-0.039*

Table 6.18: Significance test results for the Polish stocks with limited analyst coverage

		Good news (N = 67)			No news (N = 39)			Bad news (N = 21)		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	0.006	0.011*	0.006	0.001	0.002	0.001	-0.004	-0.003	-0.004
-4	[-5;-4]	-0.003	0.003	0.003	-0.008	-0.006	-0.006	0.001	-0.003	-0.003
-3	[-4;-3]	-0.001	-0.004	0.002	0.001	-0.006	-0.005	-0.005	-0.004	-0.008
-2	[-3;-2]	0.001	0.000	0.003	-0.003	-0.002	-0.008	0.007	0.002	0.000
-1	[-2;-1]	0.001	0.002	0.004	0.002	-0.001	-0.006	-0.013*	-0.005	-0.013
0	**[-1;0]**	**0.003**	**0.004**	**0.007**	**0.002**	**0.004**	**-0.004**	**0.002**	**-0.011**	**-0.011**
1	[0;1]	0.003	0.006	0.010	0.003	0.006	0.000	-0.006	-0.004	-0.017
2	[1;2]	0.007	0.010	0.017	-0.001	0.002	-0.001	-0.006	-0.012	-0.023
3	[2;3]	-0.002	0.005	0.015	0.005	0.004	0.003	-0.001	-0.007	-0.024
4	[3;4]	0.003	0.001	0.018	-0.001	0.004	0.002	-0.004	-0.005	-0.028
5		0.007		0.025*	0.005		0.008	-0.008		-0.036
Sign test results										
-5	[-6;-5]	0.006	0.011	0.006	0.001	0.002	0.001	-0.004	-0.003	-0.004
-4	[-5;-4]	-0.003	0.003	0.003	-0.008	-0.006	-0.006	0.001	-0.003	-0.003
-3	[-4;-3]	-0.001	-0.004	0.002	0.001	-0.006	-0.005	-0.005	-0.004	-0.008
-2	[-3;-2]	0.001	0.000	0.003	-0.003	-0.002	-0.008	0.007*	0.002	0.000
-1	[-2;-1]	0.001	0.002	0.004	0.002	-0.001	-0.006	-0.013	-0.005	-0.013
0	**[-1;0]**	**0.003**	**0.004**	**0.007**	**0.002**	**0.004**	**-0.004**	**0.002**	**-0.011**	**-0.011**
1	[0;1]	0.003	0.006	0.010	0.003*	0.006	0.000	-0.006	-0.004	-0.017
2	[1;2]	0.007	0.010	0.017	-0.001	0.002*	-0.001*	-0.006	-0.012	-0.023
3	[2;3]	-0.002	0.005	0.015	0.005	0.004	0.003*	-0.001	-0.007	-0.024
4	[3;4]	0.003	0.001	0.018	-0.001	0.004	0.002	-0.004	-0.005	-0.028
5		0.007*		0.025	0.005		0.008	-0.008		-0.036
Rank test results										
-5	[-6;-5]	0.006	0.011	0.006	0.001	0.002	0.001	-0.004	-0.003	-0.004
-4	[-5;-4]	-0.003	0.003	0.003	-0.008	-0.006	-0.006	0.001	-0.003	-0.003
-3	[-4;-3]	-0.001	-0.004	0.002	0.001	-0.006	-0.005	-0.005	-0.004	-0.008
-2	[-3;-2]	0.001	0.000	0.003	-0.003	-0.002	-0.008	0.007	0.002	0.000
-1	[-2;-1]	0.001	0.002	0.004	0.002	-0.001	-0.006	-0.013*	-0.005	-0.013
0	**[-1;0]**	**0.003**	**0.004**	**0.007**	**0.002**	**0.004**	**-0.004**	**0.002**	**-0.011**	**-0.011**
1	[0;1]	0.003	0.006	0.010	0.003	0.006	0.000	-0.006	-0.004	-0.017
2	[1;2]	0.007*	0.010	0.017	-0.001	0.002	-0.001	-0.006	-0.012	-0.023
3	[2;3]	-0.002	0.005	0.015	0.005	0.004	0.003	-0.001	-0.007	-0.024
4	[3;4]	0.003	0.001*	0.018	-0.001	0.004	0.002	-0.004	-0.005	-0.028
5		0.007*		0.025	0.005		0.008	-0.008		-0.036

Table 6.19: Significance test results for the South African stocks with wide analyst coverage

		Good news (N = 13)			**No news (N = 91)**			**Bad news (N = 24)**		
Event date	2 days window	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)	AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	-0.003	-0.002	-0.003	0.000	-0.002	0.000	-0.002	-0.006	-0.002
-4	[-5;-4]	-0.005	-0.008	-0.008	-0.002	-0.002	-0.002	0.005	0.003	0.003
-3	[-4;-3]	-0.004	-0.009	-0.012	0.003	0.001	0.001	-0.004	0.001	-0.001
-2	[-3;-2]	0.006	0.002	-0.006	-0.002	0.001	-0.001	-0.008	-0.012	-0.009
-1	[-2;-1]	0.003	0.009	-0.003	-0.001	-0.003	-0.002	-0.003	-0.011	-0.012
0	**[-1;0]**	**0.022****	**0.025***	**0.019**	**0.001**	**-0.001**	**-0.002**	**-0.026****	**-0.030****	**-0.038****
1	[0;1]	0.004	0.026*	0.023	0.003	0.003	0.001	-0.020**	-0.047**	-0.059**
2	[1;2]	-0.005	-0.001	0.018	0.000	0.003	0.001	0.009	-0.012	-0.050**
3	[2;3]	-0.002	-0.007	0.016	-0.002	-0.001	-0.001	-0.007	0.001	-0.058**
4	[3;4]	0.000	-0.003	0.015	0.000	-0.001	0.000	-0.006	-0.013	-0.064**
5		-0.012		0.003	0.001		0.001	0.005		-0.059**
Sign test results										
-5	[-6;-5]	-0.003	-0.002	-0.003	0.000	-0.002	0.000	-0.002	-0.006	-0.002
-4	[-5;-4]	-0.005	-0.008	-0.008	-0.002	-0.002	-0.002	0.005	0.003	0.003
-3	[-4;-3]	-0.004	-0.009	-0.012	0.003*	0.001	0.001	-0.004	0.001	-0.001
-2	[-3;-2]	0.006	0.002	-0.006	-0.002	0.001	-0.001	-0.008	-0.012*	-0.009
-1	[-2;-1]	0.003	0.009	-0.003	-0.001	-0.003	-0.002	-0.003	-0.011	-0.012
0	**[-1;0]**	**0.022**	**0.025***	**0.019**	**0.001**	**-0.001**	**-0.002**	**-0.026****	**-0.030**	**-0.038***
1	[0;1]	0.004	0.026*	0.023	0.003	0.003	0.001	-0.020	-0.047**	-0.059*
2	[1;2]	-0.005	-0.001	0.018	0.000	0.003	0.001	0.009	-0.012	-0.050
3	[2;3]	-0.002	-0.007	0.016	-0.002	-0.001	-0.001	-0.007	0.001	-0.058*
4	[3;4]	0.000	-0.003	0.015	0.000	-0.001	0.000	-0.006	-0.013	-0.064*
5		-0.012		0.003	0.001		0.001	0.005		-0.059
Rank test results										
-5	[-6;-5]	-0.003	-0.002	-0.003	0.000	-0.002	0.000	-0.002	-0.006	-0.002
-4	[-5;-4]	-0.005	-0.008	-0.008	-0.002	-0.002	-0.002	0.005	0.003	0.003
-3	[-4;-3]	-0.004	-0.009	-0.012	0.003	0.001	0.001	-0.004	0.001*	-0.001
-2	[-3;-2]	0.006	0.002	-0.006	-0.002	0.001	-0.001	-0.008	-0.012	-0.009
-1	[-2;-1]	0.003	0.009*	-0.003	-0.001	-0.003	-0.002	-0.003	-0.011**	-0.012
0	**[-1;0]**	**0.022****	**0.025***	**0.019**	**0.001**	**-0.001**	**-0.002**	**-0.026****	**-0.030****	**-0.038***
1	[0;1]	0.004	0.026	0.023	0.003	0.003	0.001	-0.020*	-0.047	-0.059**
2	[1;2]	-0.005	-0.001	0.018	0.000	0.003	0.001	0.009	-0.012	-0.050**
3	[2;3]	-0.002	-0.007	0.016	-0.002	-0.001	-0.001	-0.007	0.001	-0.058**
4	[3;4]	0.000	-0.003	0.015	0.000	-0.001	0.000	-0.006	-0.013	-0.064**
5		-0.012*		0.003	0.001		0.001	0.005		-0.059**

Table 6.20: Significance test results for the South African stocks with limited analyst coverage

Event date	2 days window	Good news (N = 15) AR	CAR (2 days event window)	CAR (buy and hold)	No news (N = 64) AR	CAR (2 days event window)	CAR (buy and hold)	Bad news (N = 22) AR	CAR (2 days event window)	CAR (buy and hold)
t-test results										
-5	[-6;-5]	0.001	-0.001	0.001	0.001	0.000	0.001	-0.010	-0.008	-0.010
-4	[-5;-4]	0.006	0.007	0.007	0.000	0.002	0.002	-0.004	-0.014	-0.014
-3	[-4;-3]	0.004	0.010	0.011	-0.001	-0.001	0.001	-0.028**	-0.032**	-0.042**
-2	[-3;-2]	0.008	0.012	0.019	0.002	0.001	0.003	-0.010	-0.038**	-0.052**
-1	[-2;-1]	-0.006	0.002	0.013	-0.001	0.001	0.002	-0.006	-0.016	-0.058**
0	**[-1;0]**	**0.008**	**0.002**	**0.022**	**0.002**	**0.002**	**0.004**	**-0.014***	**-0.020***	**-0.072****
1	[0;1]	-0.001	0.007	0.020	0.000	0.003	0.005	-0.008	-0.022*	-0.080**
2	[1;2]	0.005	0.004	0.025	0.007**	0.007*	0.012	0.000	-0.009	-0.081**
3	[2;3]	0.006	0.011	0.032	0.002	0.009*	0.014	-0.002	-0.002	-0.082**
4	[3;4]	0.003	0.009	0.035	-0.001	0.001	0.013	0.000	-0.001	-0.082**
5		-0.003		0.032	-0.004		0.009	-0.003		-0.085**
Sign test results										
-5	[-6;-5]	0.001	-0.001	0.001	0.001	0.000	0.001	-0.010	-0.008	-0.010
-4	[-5;-4]	0.006	0.007	0.007	0.000	0.002	0.002	-0.004	-0.014	-0.014
-3	[-4;-3]	0.004	0.010	0.011	-0.001	-0.001	0.001	-0.028**	-0.032*	-0.042*
-2	[-3;-2]	0.008*	0.012**	0.019*	0.002	0.001	0.003	-0.010	-0.038*	-0.052
-1	[-2;-1]	-0.006	0.002*	0.013**	-0.001	0.001	0.002	-0.006	-0.016	-0.058
0	**[-1;0]**	**0.008**	**0.002**	**0.022****	**0.002**	**0.002**	**0.004**	**-0.014**	**-0.020**	**-0.072***
1	[0;1]	-0.001	0.007	0.020*	0.000	0.003	0.005	-0.008	-0.022	-0.080*
2	[1;2]	0.005	0.004	0.025*	0.007	0.007	0.012	0.000	-0.009	-0.081
3	[2;3]	0.006	0.011	0.032*	0.002	0.009	0.014	-0.002	-0.002	-0.082
4	[3;4]	0.003	0.009	0.035*	-0.001	0.001	0.013	0.000	-0.001	-0.082
5		-0.003		0.032*	-0.004		0.009	-0.003		-0.085
Rank test results										
-5	[-6;-5]	0.001	-0.001	0.001	0.001	0.000	0.001	-0.010	-0.008	-0.010
-4	[-5;-4]	0.006	0.007	0.007	0.000	0.002	0.002	-0.004	-0.014**	-0.014
-3	[-4;-3]	0.004	0.010	0.011	-0.001	-0.001	0.001	-0.028**	-0.032**	-0.042
-2	[-3;-2]	0.008	0.012	0.019	0.002	0.001	0.003	-0.010	-0.038	-0.052*
-1	[-2;-1]	-0.006	0.002	0.013	-0.001	0.001	0.002	-0.006	-0.016	-0.058**
0	**[-1;0]**	**0.008**	**0.002**	**0.022**	**0.002**	**0.002**	**0.004**	**-0.014**	**-0.020**	**-0.072****
1	[0;1]	-0.001	0.007	0.020	0.000	0.003	0.005	-0.008	-0.022	-0.080**
2	[1;2]	0.005	0.004	0.025	0.007	0.007	0.012	0.000	-0.009	-0.081**
3	[2;3]	0.006	0.011	0.032	0.002	0.009	0.014	-0.002	-0.002	-0.082**
4	[3;4]	0.003	0.009	0.035	-0.001	0.001	0.013	0.000	-0.001	-0.082**
5		-0.003		0.032	-0.004*		0.009	-0.003		-0.085**

6.1.2.3 Which Emerging EMEA Markets Price in New Information Faster with the Help of Analysts?

In previous sections we concluded that sell-side equity research analysts improve the efficiency of the emerging EMEA market at the aggregate level in case of good news, but hinder it in the case of bad news by overreacting. Expanding the investigation of price reactions in the post event window to the individual country level improves our understanding of this phenomenon.

Looking at the VaR graphs for good news portfolios, we see that all four markets efficiently price new information in case of wide analyst coverage. On the other hand, the price reaction start earliest on day 2 in the same markets in case of limited analyst coverage. The ACAR exceeds the +1% VaR band in Poland and Russia in case of limited analyst coverage. The South African market seems to be the only exception in the emerging EMEA, where the portfolio with wider analyst coverage seems price in the news somewhat less efficiently than the portfolio with limited analyst coverage, at first glance. The ACAR of the wide analyst coverage portfolio remains above the +5% VaR for the first three days (two days above +1% VaR), while that of the other portfolio remains constantly within the VaR bands. While the mean reversion after only two days still suggests that the semi-strong form EMH holds in case of wide analyst coverage, it is also important to note that our results from our earlier research questions show that the price reaction starts on day -1 in case of limited analyst coverage. Hence, the analyst coverage should still be viewed as improving the efficiency, in our view.

We believe that the improvement in market efficiency with the help of analysts may be because they improve the dissemination of information and lower the agency cost for investors. Investors may be assigning higher agency costs to firms that are not covered by analysts. Hence, a dividend initiation by these firms means a greater drop in the agency cost and leads to a stronger price reaction by the market. Another explanation may be the bird in the hand theory. Having large resources and following the firms and sectors closely, analysts may be feeling more certain about the future cash flows of firms rather than individual investors.

In the case of bad news, wider analyst coverage seems to improve the efficiency of the Turkish and Russian stock markets. On the other hand, the Polish and South African markets seem semi-strong form inefficient regardless of the level of analyst coverage. ACARs revert above the -5% VaR earliest after day 5 in the two markets. Moreover, stocks with wide analyst coverage seem to be overreacting to bad news in both markets with higher peak ACARs and slower reversions within the VaR bands. Yet again, our tests in the previous sections revealed the presence of possible information leakages in the South African and Polish markets in case of limited analyst coverage. While the former shows a -3.8% ACAR in the [-5;-1] event window, the latter shows a -1.3% AAR on day -1. Although it takes longer for stocks with wide analyst coverage to price in bad news, this is mainly because markets are not strong form efficient in case of limited analyst coverage.

Turkey: Our VaR analysis shows that both good and bad news portfolios with wide analyst coverage did not exceed the +5% VaR level in the [0; 20] event windows. The market looks semi-strong form efficient in both cases. On the other hand, the good news portfolio with limited analyst coverage exceeds the +5% VaR first on day 8. Such a late reaction may be due to contamination in the event window. Furthermore, ACAR does not exceed the +1% VaR. Thus, we cannot reach a firm decision about the semi-strong form efficiency of the Turkish market in case of limited analyst coverage. In case of bad news, the ACAR reverts back to the -5% VaR band on day 7 (-1% VaR on day 4) for the portfolio with limited analyst coverage. Hence, we accept H_3. The portfolio with wide analyst coverage remains within VaR bands (H_4 rejected). All in all, the Turkish market realizes the negative valuation signal embedded in dividend omissions, but does not price the news in a time efficient manner without the help of analysts, which violates the semi-strong form EMH.

Russia: In previous sections we have shown that the information content of dividend hypothesis does not hold for good and bad news portfolios with wide analyst coverage in the Russian market. Indeed, our VaR study shows that the ACARs for the good and bad news portfolios with wide analyst coverage do not exceed the VaR bands throughout the event window. On the other hand, the ACAR for the good news portfolio with limited analyst coverage exceeds the +5% VaR on day 1 and keeps on increasing for the entire period. Hence, we accept H_3, reject H_4 and conclude that the market is semi-strong form inefficient. There is a delayed price reaction present in case of bad news with limited analyst coverage as well. However, it is not in the anticipated direction. The ACAR exceeds the +5% VaR on day 3 and swiftly reverts to below the band. Furthermore, there is no breach of +1% VaR. We can accept H_3 and reject H_4. Yet, the evidence is somewhat weaker compared with that for the good news portfolio. All in all, we conclude that analyst coverage improves the efficiency of the market in both cases. In our view, this may be because analyst coverage decreases agency costs and makes future cash flows of a firm more predictable for investors. Hence, the importance of dividends as a signalling tool may be greater for investors of stocks with limited analyst coverage, which may lead to significant price reactions in the post event window.

Poland: We have found evidence suggesting that the information content of dividend hypothesis does not hold for the good news portfolio with wide analyst coverage in the Polish market. Indeed, the ACAR remains within the VaR bands throughout the event window. However, the information content hypothesis holds in case of limited analyst coverage and our VaR study found that the market reacts to the new information with a delay giving investors time to position. The ACAR exceeds the +5% VaR on day 2 and keeps on increasing during the entire event window (we accept H_3 and reject H_4). Analyst coverage improves the semi-strong form efficiency of the Polish market in the case of good news.

In the case of bad news, the ACAR of the portfolio with wide analyst coverage exceeds the -5% VaR on day 3 and reverts back in the band on day 7 (-1% VaR on day 5). The market gives investors plenty of time to position for the bad news after the announcement, which is a violation of the semi-strong form EMH (H_3 accepted). The portfolio with limited analyst coverage, on the other hand, exceeds -5% only on day 5 and remains above the -1% VaR. We can still accept H_3, but the evidence is weaker compared with that for the portfolio with wide analyst coverage. That said, we have found in our previous research questions that the Polish market reacts to bad news a day before the announcement in the case of limited analyst coverage, which hints at possible information leakage and/or inefficient regulation and supervision problems. As a result, reaction to new information in the post event window is less profound since the market is strong form inefficient. Hence, we refrain from adopting a firm view on the relative efficiency of the portfolios with wide and limited analyst coverage.

South Africa: Evaluating the role of analysts in the speed of price adjustments in the post event window is difficult since the portfolios with limited analyst coverage tend to start reacting to new information before the announcement day. The presence of possible information leakage holds us back from reaching a firm conclusion.

Our VaR analysis reveals that the good news portfolio with wide analyst coverage exceeds the +5% VaR with the dividend announcements and reverts back in the band on day 4 (+1% VaR on day 1). Hence, we accept H_3, but with weak evidence. The other good news portfolio remains within the VaR bands throughout the [0; 20] post event window. However, it is worth noting that we have found some weak evidence of information leakage in the pre-event window. The portfolio with limited analyst coverage had a 1.3% ACAR in the [-5;-1] window, which was found to be statistically significant by the sign test at the 1% level. That said, this was not confirmed by other test statistics.

In the case of bad news, the portfolio with wide analyst coverage exceeds the -5% VaR on day 0 and reverts back in the band on day 9, while the portfolio with limited analyst coverage reverts below the -5% VaR after day 1. Hence, we accept H_3 for the former, but reject it for the latter. However, we have found evidence of information leakage in the pre-event window for the bad news portfolio covered by limited analysts. The portfolio has a -5.8% ACAR in the [-5; -1] window which is found to be statistically at the 1% level by the t-test and rank test. This may be the reason for the relatively muted reaction in the post event period.

All in all, equity research analysts do not help the market in efficiently pricing the new information. However, it is difficult to evaluate whether the market prices the news in a more efficient way with less help from analysts since it does not seem strong for efficient to begin with.

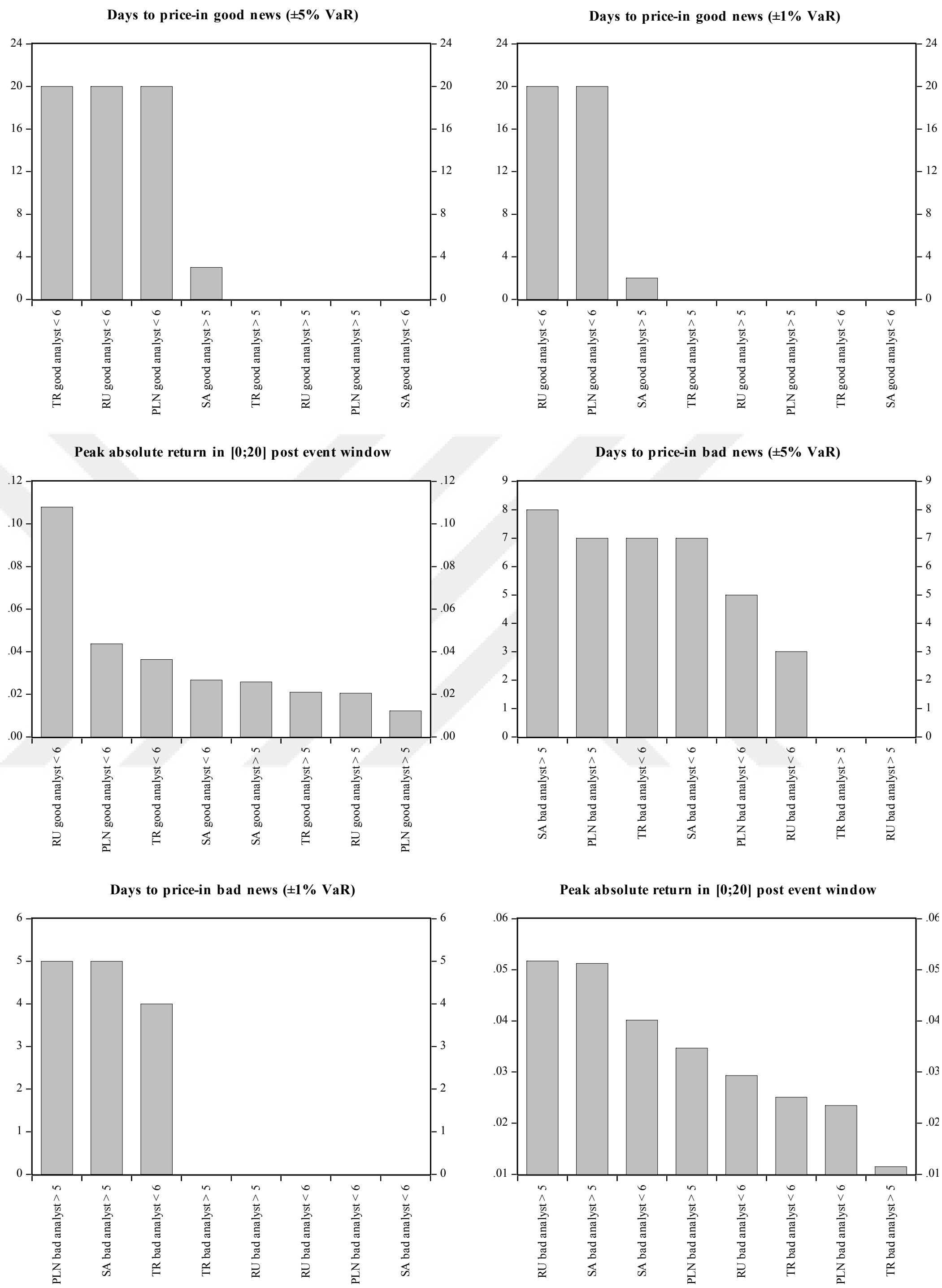

Figure 6.12: Speed of adjustment and peak ACAR for Turkish, Russian, Polish and South African stocks with wide and limited analyst coverage

Table 6.21: VaR versus AAR and ACAR for the Turkish good news portfolio

	AAR				ACAR			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	analyst count > 5 (N = 41)	analyst count < 6 (N = 41)	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6
0								
1								
2								
3		1						
4								
5								
6	1		1					
7								
8		1						
9		1				1		
10						1		
11								
12								
13								
14								
15								
16	1							
17	1					1		
18						1		
19	1					1		
20						1		

Table 6.22: VaR vs. AAR and ACAR for the Turkish bad news portfolio

	AAR				ACAR			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	analyst count > 5 (N = 37)	analyst count < 6 (N = 40)	analyst count > 5	analyst count <	analyst count > 5	analyst count < 6	analyst count >	analyst count < 6
0		**1**				**1**		
1		1		1		1		1
2						1		1
3						1		1
4						1		1
5						1		
6	1					1		
7						1		
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Table 6.23: VaR versus AAR and ACAR for the Russian good news portfolio

	AAR				**ACAR**			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	analyst count > 5 (N = 11)	analyst count < 6 (N = 15)	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6
0								
1						1		
2								
3								
4						1		
5						1		
6						1		
7						1		
8								
9						1		
10						1		
11						1		
12	1					1		
13						1		
14						1		
15		1				1		1
16						1		
17						1		
18						1		
19	1					1		1
20						1		1

Table 6.24: VaR versus AAR and ACAR for the Russian bad news portfolio

	AAR				**ACAR**			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	analyst count > 5 (N = 7)	analyst count < 6 (N = 16)	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6
0								
1								
2								
3						1		
4								
5		1						
6								
7								
8								
9								
10		1						
11								
12	1		1					
13		1						
14								
15		1		1				
16		1						
17		1						
18								
19		1						
20								

Table 6.25: VaR versus AAR and ACAR for the Polish good news portfolio

	AAR				ACAR			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	analyst count > 5 (N = 25)	analyst count < 6 (N = 67)	analyst count > 5 (N = 25)	analyst count < 6 (N = 67)	analyst count > 5 (N = 25)	analyst count < 6 (N = 67)	analyst count > 5 (N = 25)	analyst count < 6 (N = 67)
0								
1								
2		1				1		
3								
4	1					1		
5		1				1		1
6						1		
7						1		1
8						1		
9						1		1
10						1		1
11						1		
12		1				1		1
13		1				1		1
14						1		1
15						1		1
16						1		
17	1	1	1	1		1		1
18						1		1
19						1		1
20						1		1

Table 6.26: VaR versus AAR and ACAR for the Polish bad news portfolio

	AAR				ACAR			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	analyst count > 5 (N = 13)	analyst count < 6 (N = 21)	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6
0								
1								
2	1				1			
3					1			
4					1			
5					1	1	1	
6					1			
7					1			
8	1							
9								
10								
11								
12								
13								
14								
15	1		1					
16								
17								
18								
19								
20								

Table 6.27: VaR versus AAR and ACAR for the South African good news portfolio

	AAR				ACAR			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	analyst count > 5 (N = 13)	analyst count < 6 (N = 15)	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6
0	**1**		1		**1**		1	
1					1		1	
2					1			
3					1			
4								
5	1							
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Table 6.28: VaR versus AAR and ACAR for the South African bad news portfolio

	AAR				ACAR			
	Exceptions at 95% confidence level		**Exceptions at 99% confidence level**		**Exceptions at 95% confidence level**		**Exceptions at 99% confidence level**	
Event date	analyst count > 5 (N = 24)	analyst count < 6 (N = 22)	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6	analyst count > 5	analyst count < 6
0	**1**		1		**1**		1	
1	1		1		1	1	1	
2					1		1	
3					1		1	
4					1		1	
5					1		1	
6	1				1			
7					1	1		
8					1			
9								
10								
11								
12								
13								
14								
15								
16								
17								
18	1		1					
19								
20								

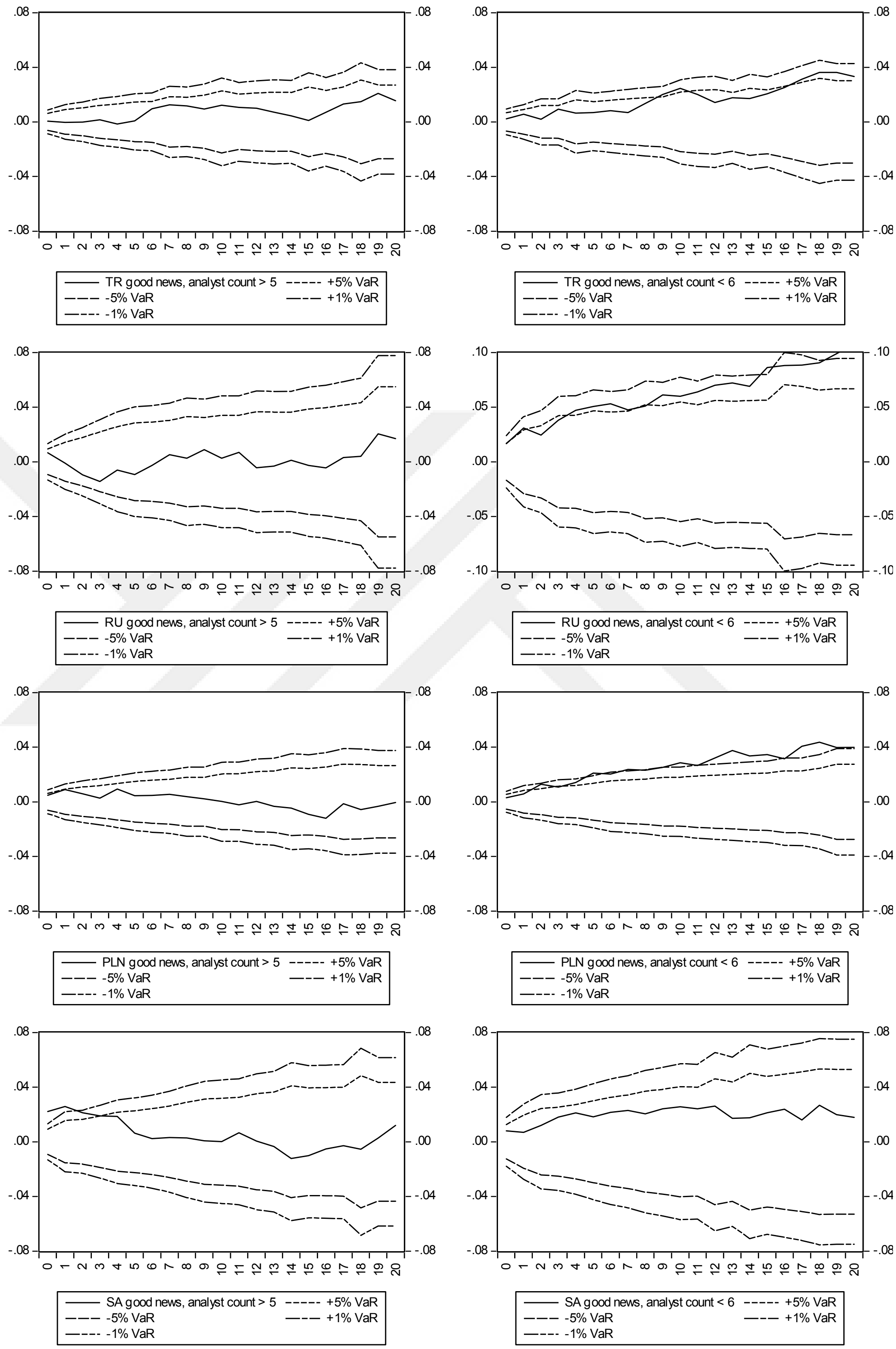

Figure 6.13: ACARs versus VaR for the Turkish, Russian, Polish and South African good news stocks with wide and limited analyst coverage

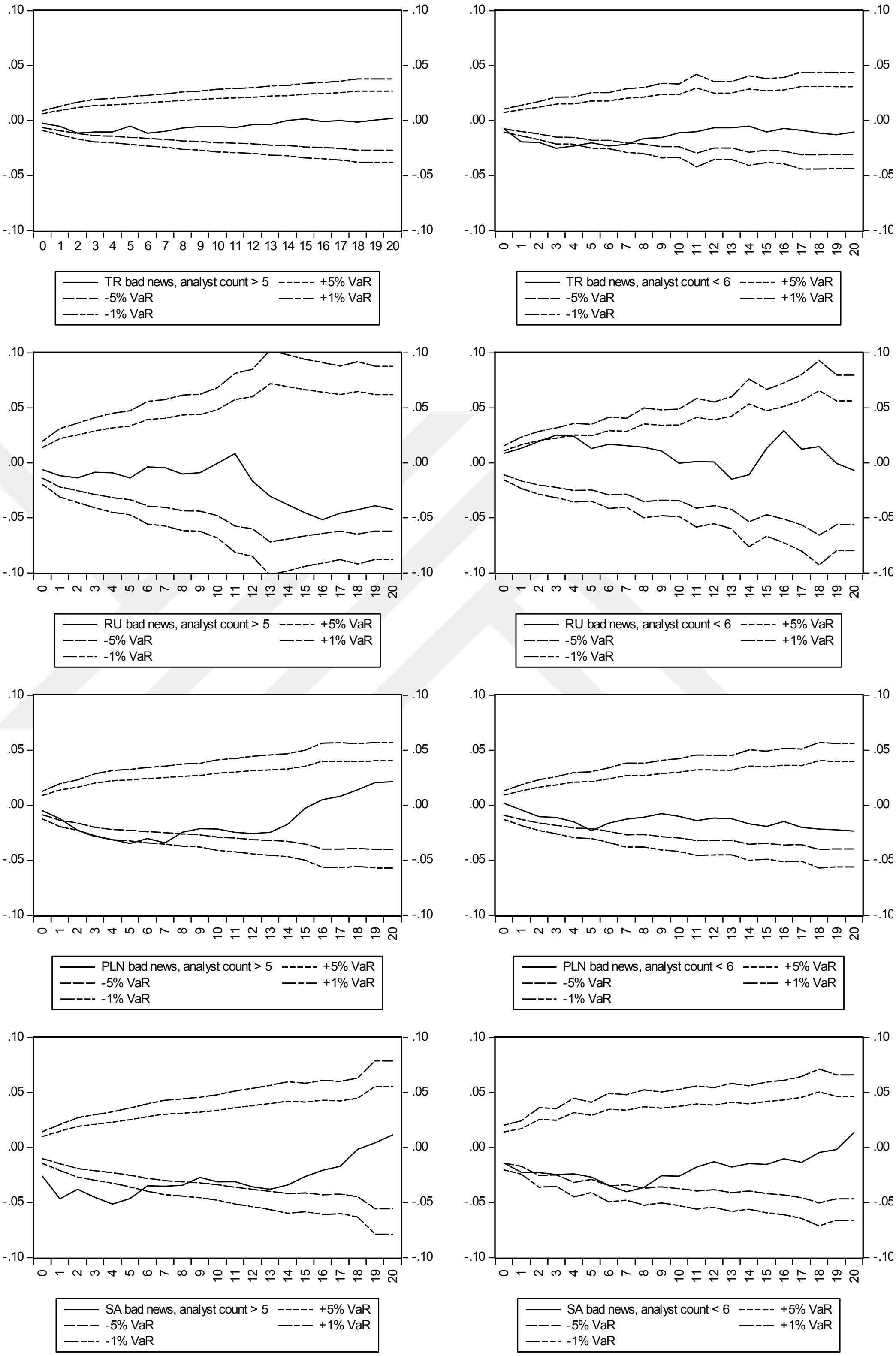

Figure 6.14: ACARs versus VaR for the Turkish, Russian, Polish and South African bad news stocks with wide and limited analyst coverage

6.2 Conclusion

We expounded our empirical findings in this chapter. We summarize the general findings of the study, discuss its limitations and make recommendations for future research to build on the findings of this current study, in the following chapter.

CHAPTER 7

CONCLUSIONS AND RECCOMMENDATIONS

7.1 Introduction

This chapter summarizes the findings and conclusions of the empirical research presented thus far. Section 7.2 delivers this summary and compares our results with the findings of the published research cited in the previous chapters. Section 7.4 discusses the limitations of the study, while section 7.5 concludes by making suggestions for future research.

7.2 Conclusions and Implications of the Study

The main emphasis of this study has been on the testing of the semi-strong form EMH in emerging EMEA stock markets, individually and as a whole. In order to accomplish this objective we tested several hypotheses. First, we investigated the information content of dividends hypothesis by examining the share price movements around the cash dividend announcement day. Second, we investigated how fast the new information embedded into dividend announcements is priced in by these markets and ranked them accordingly. Lastly, we investigated whether equity research analysts help the market in understanding the information embedded in dividend announcements and price it in a more efficient manner.

To sum up, we found evidence supporting the information content of dividend hypothesis for emerging EMEA markets. Stronger price reaction to dividend omissions than to dividend initiations proves the presence of leverage effect. Furthermore, we found that the semi-strong form EMH was violated for all four markets. Poland stands out as the most inefficient market within emerging EMEA when pricing new information, while Turkey seems to be the most efficient. We found evidence of information leakage and/or inefficient regulation and supervision in Russia, Poland and South Africa in case of stocks with limited analyst coverage. Our results show that analysts play an important role in the dissemination of information in the market and decrease the agency costs for investors, especially in case of dividend initiations. However, they also cause slow pricing and overreaction to new information, thereby weakening the efficiency of the Polish and South African markets in case of dividend omissions. The following subsections summarize our results.

7.2.1 Conclusions Regarding the Information Content of Dividends Hypothesis

As in the standard event study framework, we classified the dividend announcements into three groups: good news, bad news and no news. Initially we tested the information content of dividends hypothesis at the aggregate emerging EMEA level. According to our results, emerging EMEA markets showed statistically significant reactions in the anticipated directions to both dividend initiations (good news) and omissions (bad news) in the 11-day event window between 2005 and 2016, which confirms the information content of dividends hypothesis. No price reaction was observed for the no news portfolio in line with the hypothesis. While the good news portfolio showed a meagre AAR of 0.5% on the event day, the bad news portfolio's reaction was much more profound with a -1.5% ACAR in the [0;1] window and the post announcement drift that brought the [-5;5] ACAR to -2.4% were both statistically significant at 1%. These results also demonstrate that the market assigns a greater importance to bad news than good news and prove the existence of the leverage effect at the aggregate emerging EMEA level.

As a second step, we tested the hypothesis at the country level and found evidence that the information content of dividend hypothesis holds only in South Africa in the case of good news, but holds in Turkey, Poland and South Africa in the case of bad news. Results from Russia were mixed as the pricing of good news took place before the event day. Even though there was a strong positive reaction in the [-5;5] window, it was not confirmed by all statistical tests. Turkey and Poland did not have any significant AARs or ACARs in the case of good news, while Russia did not show any reactions to bad news. Furthermore, no significant share price movements were observed for the no news portfolios in the 11-day event windows, consistent with the hypothesis.

A key finding of our study is the prevalence of information leakage and/or ineffective regulation and supervision in the emerging EMEA markets. According to our results, the Russian market showed a significant positive reaction to dividend initiations three days ahead of the announcement. The Polish and South African markets started to show significant negative reactions to dividend omissions three days and one day ahead of the announcement, respectively, implying that these markets are not strong form efficient. Furthermore, ACARs continued to drift downwards after the event day, implying that the news is priced often gradually and/or is exaggerated. In contrast to these two markets, Turkey showed an initial reaction after the announcement in the [0;1] window with no post announcement drift.

Finally, the price reaction to dividend announcements was substantially higher in South Africa than in the other countries, which demonstrates the greater importance assigned to such corporate actions in the market. We consider this to be due to the fact that South African tax code favours dividend income over capital gains for local institutional investors, such as pension funds, that own majority of the free float of listed stocks. This is also consistent with the fact that the share of listed firms paying dividends in the exchange and the dividend yield is higher for South Africa than for the other countries.

Existing literature on dividends in Turkey largely supports the signalling theory. Our finding that the market only reacts to bad news confirms the results of Kadıoğlu (2007). Yet, we conflict with Altıok and Selçuk (2010) who found that dividend increases cause statistically significant price reactions in the anticipated directions, too. Findings of Karaca (2007) support the signalling theory, but he also found evidence of information leakage before the announcement day, which conflicts with our results. Previous studies on information content of dividends in Russia support our findings. Berdnikova and Erogova (2014) and Teplova (2008) confirm the positive market reaction we found to dividend omissions. Mattev (2011) and Seghal et. al (2011) found information leakage in the pre-event window. In Poland, Dumitrescu et. al (2011) and Korczak and Tavakkol (2004) found that the price reaction to bad news is greater than the reaction to good news, in-line with our results. We have the biggest difference with existing literature in South Africa. Lentsoane (2011) and Murie (2014) found that the SA market does not show any reaction to bad news (dividend reductions and negative trading statements). Moreover, they did not report any information leakage problem.

7.2.2 Conclusions Regarding the Semi-Strong form EMH

In order to test the semi-strong form EMH of emerging EMEA markets, we investigated the speed of adjustment of share prices to dividend announcements. To do so, we checked whether the ACAR for the portfolio exceeds the VaR band and how long that violation persists. We first conducted the test at the aggregate emerging EMEA level and then expanded it to the country level.

Our evidence suggests that the emerging EMEA markets are aggregate semi-strong form inefficient in the case of good and bad news. The ACAR exceeds the +1% VaR band on the event day in the case of good news and keeps on rising during the entire event window. On the other hand, we found that the emerging EMEA markets overreact to bad news in the first two days with a -1.5% ACAR in the [0;1] window at a 1% significance level versus 0.9% ACAR for goods news. The ACAR remains below the -1% VaR in the first 8 days succeeding the announcement followed by a sharp mean reversion. Hence, buying the bad news stocks after the announcements is a profitable investment strategy which tells us that the market is not semi-strong form efficient.

We then tested the hypothesis at the country level. Overall, we found evidence that all emerging EMEA markets are somewhat inefficient when pricing good news. However, the violation is more pronounced in Russia followed by Poland. The ACAR in the [0;20] post event window reaches 8.6%. Note that while the information content of dividends hypothesis does not hold for good news in Poland in a short event window [-5;5], a longer window [0;20] reveals that the price reaction comes with a lag and is significant. South Africa prices in good news fastest in the emerging EMEA and is semi-strong efficient if the confidence level is raised from 95% to 99%. Lastly, Turkey looks efficient at 99% confidence level, too.

All emerging EMEA countries except Russia violate the semi-strong form EMH in the case of bad news at 5% significance level. In Russia's case the information content hypothesis does not hold and we are unable to test the EMH. South Africa appears to be the least efficient market in pricing bad news. The market first overreacts with a -3.5% ACAR in the [0;1] window followed by a strong correction that allows investors to develop profitable buy and hold strategies. It takes South Africa 10 days to price new information at the 95% confidence level versus 7 days for both Turkey and Poland. That said, Poland looks less efficient than Turkey since the initial reaction happens with a 2-day lag giving investors ample time to position (similar to what happens with good news). Furthermore, the peak ACAR of the market is somewhat higher than that of Turkey. Finally, Turkey is efficient at 1% level, while Poland is not. All in all, our results suggest that South Africa is the most inefficient market in pricing bad news, followed by Poland and Turkey, respectively (Figure 6.7, page 126).

Lastly, we ranked the four emerging EMEA in terms of speed of price adjustment to new information based on the findings for good and bad news portfolios. Accordingly, Poland seems to be the most inefficient market, while Turkey seems to be the most efficient one in the emerging EMEA (Table 6.9, page 126).

7.2.3 Conclusions Regarding the Role of Analysts' in the Dissemination of Information

We found evidence suggesting that equity research analysts help with the faster and more efficient dissemination of information at the aggregate emerging EMEA level. Stocks with wide analyst coverage do not suffer the slow pricing and overreaction issues that those with limited analyst coverage do in the event of good news. Moreover, stocks with wider analyst coverage react to the new information on the event day, while those with limited coverage react with a one-day lag when there is bad news.

Expanding our research to the individual country level, we saw that wider analyst coverage improves the efficiency of the Polish and Russian markets significantly in case of good news. This may be because investors assign lower agency costs to firms that are closely monitored by analysts. Dividend initiations by firms with limited analyst coverage mean a significant drop in agency costs and increase the visibility of future cash flows, thereby causing the market to overreact. A similar picture is there for the Turkish market, but with less significance. Finally, analysts' role in disseminating good news in South Africa seems trivial.

Our study revealed that wider analyst coverage eliminates the information leakage and/or inefficient supervision and regulation problems seen in the pre-event window of the bad news portfolios in Poland and South Africa and good news portfolio in Russia. The Turkish market's positive reaction to bad news before the event day in case of limited analyst coverage implies that analysts improve the anticipation (forecasting). All in all, we concluded that wider analyst coverage leads to a more efficient dissemination of information, which in turn leads to lower price volatility in the emerging EMEA market, especially in the case of bad news.

Recall that we found all four countries semi-strong form inefficient at the 5% level for good news. Splitting the portfolios based on the density of the analyst coverage starkly highlights their importance. Semi-strong form EMH holds for stocks with wide analyst coverage in Turkey, Russia and Poland, but not in the case of limited analyst coverage. South Africa is the only market where semi-strong form EMH is not violated for the portfolio with limited analyst coverage.

In the case of bad news, analyst coverage makes a difference in Turkey, where the portfolio covered by analysts prices the new information efficiently, while the other portfolio is inefficient. We cannot test the semi-strong form EMH in Russia since the information content of dividends hypothesis does not hold regardless of analyst coverage. In Poland and South Africa, however, the picture is not as straightforward. In both markets the portfolios with limited analyst coverage behave semi-strong form efficient at the 99% confidence level, while those with wider coverage do not. Stocks with wider coverage show stronger reactions to bad news and price adjustments take longer. These surprising results may be due to a couple of reasons. Firms that are closely covered by analysts and consequently by the investment community may be forced to implement better corporate governance practices than firms with limited analyst coverage. Note that we previously demonstrated the existence of possible information leakage problems in both markets in the case of limited analyst coverage. Hence, the muted price reaction in the post event window is simply because markets price the information to a large extent before the announcement. Since both markets look strong form inefficient to begin with, we cannot say that wider analyst coverage undermines the semi-strong form efficiency of the market on a relative basis. An explanation for the poor efficiency of the portfolios with wide analyst coverage may be the low daily trading volumes of these portfolios, in our view. Note that the foreign ownership in the free float is high in EMEA markets and foreign institutional investors often rely on analysts' research in their investment decisions. Negative comments from analysts may cause foreign institutional investors to lose their appetite, thereby causing shares with limited trading volumes to overreact.

7.3 Implications of the Conclusions for Shareholders and Stakeholders

The findings of this research are of great importance for academics, investors, regulators and the investment banking sector, in our view.

Market efficiency can be augmented if factors that lead to it are improved. In this regard, our findings provide an assessment of the current state of informational efficiency in emerging EMEA markets to the regulators of capital markets and company managers, thereby highlighting the areas for improvement. Specifically, the possible information leakage problem we have found in Russia, Poland and South Africa calls for improved regulation and supervision.

For academia this study expands the limited evidence on the information content of dividend hypothesis and semi-strong form efficiency in the emerging EMEA with regards to cash dividend announcements. It fills the existing gap in the literature since it is one of the first studies to provide a cross country comparison of the speed of adjustment to new information and the role of analysts in the dissemination of information in emerging EMEA markets. Moreover, it highlights the misspecification of the widely used simple market model and provides the ARMA – ARCH/GARCH/EGARCH model as an alternative.

The results of this study are also important for investors as they highlight the informational inefficiencies, i.e. slow adjustments or overreactions to new information, which can be used by investors to design profitable trading strategies in emerging EMEA markets.

For investment banks the study provides evidence that the analysts they employ play an important role in the dissemination of information in almost all emerging EMEA markets. On the other hand, analysts seemingly cause an overreaction to negative news in most markets. In our view, the overreaction and inefficiency in the emerging EMEA markets may be a signal to the regulators to improve the liquidity conditions.

Finally, the study has strong implications for global fund managers. The results suggest that they should pay attention to dividend announcements especially in Russia and South Africa as such information creates significantly higher volatility in these markets which can be used to develop profitable trading strategies.

7.4 Limitations of the Study

This dissertation attempted to address a number of issues relating to four emerging EMEA stock markets. In particular, it examined: 1) the information content of dividends hypothesis; 2) the speed of price adjustments to changes in corporate dividend policy, hence semi-strong form EMH and 3) the role of equity research analysts in the dissemination of public information. While we made every attempt to deliver a comprehensive and thorough analysis of the issues, some limitations remain.

The major drawback of the study is the limited size of the sample. Although we reviewed 1,002 events, after eliminating the ones which fit poorly into our model and allocating the remaining ones into country and dividend groups, the final sample of good and bad news cases per country was only 25 to 30 events as shown in Table 5.1, page 75. Furthermore, when we split the country based dividend groups according to the number of analysts covering them, the final sample sizes dropped to as low as 7 as shown in Table 5.6, page 95.

Brown and Warner's (1985) simulations show that the cross-sectional mean abnormal return converges to normality for sample sizes of 50 and above, although abnormal returns for individual securities are highly non-normal. In any case, we used both parametric and nonparametric tests for hypothesis testing. Hence, the non-normality of abnormal returns due to small sample size was not a major concern. Moreover, our sample sizes for country level research are close to Brown and Warner's sample size threshold. However, the sample sizes for the research regarding the role of analysts in the dissemination of information and market efficiency is too small in many cases to draw firm conclusions. Hence, we believe that our results regarding the role of analysts presented in Chapter 6 need to be confirmed with larger sample sizes. This can be achieved through extending the timeframe of the study as new data becomes available in the future.

Studies of semi-strong form EMH commonly use earnings or dividend announcements as a source of new information which has implications on the share price. However, dates of dividend and earnings announcements may be close to each other. Some of the empirical research on information content of dividends tries to avoid this joint announcement problem by excluding stocks with earnings announcements in the event window from the sample. The rationale behind this is that there is a corroborative relationship between earnings and dividend announcements and the abnormal return performance may be distorted if the two announcements are not separated. In our study, however, we have not screened our sample for such criteria, which may have biased our findings. There are two main reasons why we have not applied such criteria and why we feel that our results would not change materially even if we were able to do so. First, in the four emerging EMEA countries we investigated the corporate practice is to announce full year earnings and final cash dividends jointly. Applying such criteria would diminish our sample size dramatically, which is already on the low side as discussed above. Second, there is ample research and empirical evidence suggesting that dividends contain information beyond earnings. Hence, the information content of dividend surprises should not be affected by the announcement pattern of earnings and dividends, and there should not be any interaction between the two types of signals released together (Chang and Chen 1991). Flagship papers written on the relevance of dividends were already reviewed in this dissertation in section 3.2.2, page 26. Finally, this dissertation mainly focuses on dividend initiations and omissions as events. Considering the reluctance of managers in changing the dividend policies of their firms, such profound changes with implications on the long-term capital structures of their firms, should have greater long-term implications on share price than a miss or beat in quarterly earnings. Note that listed firms announce their earnings on a quarterly basis in Turkey, Russia and Poland, while they announce dividends once a year. Hence, the first nine months of results should give the market a good idea as to how the rest of the year will look, while no such strong hint is available for the changes in dividend policy. The situation with the South African market is, however, different since both dividends and earnings are announced semi-annually. Thus, the separation of earnings and dividend announcements might have been useful for the empirical tests for that particular market.

Finding the correct event date is of curial importance for a reliable test of a hypothesis using the event study methodology (Dodd 1980). According to Park (2004), researchers conducting multi country event studies may experience difficulties in finding accurate announcement dates due to language barriers and different institutional environments. We tried to overcome such problems by using the Bloomberg database, which provides a complete list of corporate actions and daily closing prices for stocks listed in emerging EMEA stock exchanges. However, relying on a single data provider means that the accuracy of our findings is limited by the accuracy of the database. Başdaş (2013) reported for instance that the stock prices reported by Matriks[4], one of the domestic information distributers of the BIST, and DataStream[5] may not always match. Needless to say that the inaccuracy of the data would diminish the reliability of the test results. A solution to this problem would be using the dataset provided by the local exchanges. However, this was not possible for us due to language barriers. Hence, our results need confirmation using data from other data providers.

We favour Jensen's (1978) relaxed version of the EMH that takes into account the costs of getting prices to reflect new information (transaction costs such as brokerage fees, commissions, taxes etc.) over Fama's (1965) more stronger version. In fact, in Chapter 6, where we present our empirical results, we argued that cases where ACARs are statistically significant, but too low to cover the transaction costs attached, should not be treated as violations of semi-strong form EMH. In other words, without taking transaction costs into account the abnormal returns available to investors might be overstated. That said, this dissertation makes no effort to exactly

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[4] Matriks Bilgi Dağıtım Hizmetleri A.S. ("Matriks") was founded in 2003. Its main scope of activity is to offer instantaneously data generated in the financial markets of both Turkey and the world and the news and remarks related to such markets to the customers with the possibility of analysis and to develop interactive applications intended for such markets (Matriks).

[5] DataStream is an online database providing current and historical US and international stock index data, exchange rates, interest rates, warrant and commodity data, economic data, bonds, equities and company accounts (IMD).

calculate the transaction costs and factor them into the expected return calculations. This might have affected the accuracy of our test results. We think that a detailed analysis of transaction costs in these four countries and how they have changed over the period of the study are important issues to research on their own.

7.5 Suggestions for Future Research

Future studies conducted in the context of emerging EMEA stock markets can be directed towards the following, in our view.

First, the limited sample size of this study diminishes its accuracy and requires certain conclusions to be reaffirmed with a larger data set. For instance, our sample size for bad news events with wide analyst coverage in Russia is only 7. Hence, future work might re-examine the issues addressed in this thesis using a relatively more comprehensive data set including more recent share price data.

Second, the focus of our study was on the share price reaction to final cash dividends. We left interim and special cash dividends out, which are less frequent but still important types of corporate actions. Future research may focus on these, which would be especially relevant for the South African market where interim dividends are quite common.

Third, this study demonstrates evidence supporting the information content of dividends hypothesis for all emerging EMEA markets. However, it essentially only focuses on the price reaction of stocks in a fairly short event window. It may be worthwhile to examine whether the profitability of the firms actually changed in the direction anticipated by the information content of dividends hypothesis in later years of dividend initiation and omissions. Such a study has been undertaken by

Dumitrescu et al. (2011) for Poland and Austria and by Haddon (2014) in South Africa, but is absent for the other emerging EMEA countries.

Fourth, this study found evidence of information leakage in Russia, Poland and South Africa. It can therefore be argued that market efficiency in its strong form is not observed in these markets. Future studies may be directed towards strong form EMH tests in the emerging EMEA to understand which individual agents have access to private information.

Fifth, we investigated the importance of analysts for capital markets and documented that they improve the dissemination of information. Interesting follow-up research to better understand their role in the market may be to examine whether they possess any private information or whether they are better forecasters than individual investors. Therefore, price reactions to analyst recommendations and earnings forecast changes in the emerging EMEA offers an interesting area for future research, in our view.

Sixth, like all event studies, this study also suffers from the joint hypothesis problem, meaning that all tests are simultaneously tests of both the model and market efficiency. In this research, we used a hybrid market model. However, our results need confirmation with alternative models. Two alternative models came to the forefront while we were trying to decide which price formation model to use; the multifactor model and the market model with exceptional days. We discussed the advantages and disadvantages of these models in the appendix section. In our view, considering these alternative models for future research may be worthwhile.

Seventh, we intended to check the evolution of emerging EMEA markets' semi strong form efficiency through time. Our aim was to examine whether or not the bull and bear markets in certain years have biased our findings. For this purpose we tried to re-run the empirical study after reclassifying each dividend group by year. Unfortunately, due to our limited sample size there were only a few observations in the sub groups, which would severely undermine the reliability of the analysis. This issue may be addressed in later research by relaxing the criteria for dividend changes, so that the sample size increases.

Eight, the study of dividends' impact on share prices can be extended by testing the relationship between share prices and dividend yields. In this thesis, we have focused on nominal dividends. In case of dividend omissions, we put events where firms cut their dividend yields from 5% to 0% and events where firms cut their dividend yields from 0.1% to 0% in the same group. As a result, a market may appear as more efficient than another in case of bad news, if the former suffers from a lower drop in dividend yield (shock) than the latter. Hence, replicating our study by taking into account the changes in dividend yields is advisable.

Finally, we think that trying to explain the reaction to the dividend announcements while hypothesizing on the behavioural aspects of market participants would be a valuable contribution to the current literature.

7.6 Concluding Conclusion

This chapter concludes the discussion of the empirical results presented in this dissertation. The subsequent parts of the document consists of three appendices where we discuss the design and statistical properties of the event study methodology we have used for our empirical study, provide full list of constituents of our dividend sample, results of residual diagnostics, model selections, etc., evaluation of two alternative models we have considered while we were choosing an expected return model for our study.

APPENDIX A

EVENT STUDY METHODOLOGY

A.1 Introduction

This section is designed as an appendix to chapter 5 of the dissertation. It examines the design and statistical properties of event study methods, which we have employed in our empirical study. The appendix is structured as follows: Section A.2 briefly describes what an event and event study is and then reviews the event study literature. Section A.3 explains the general flow of an event study. The appendix relates to the dissertation as we have used the flow described is Section A.3 as a blueprint for our study.

A.2 Event Study Literature

Event study methodology attracted significant interest since its introduction in late 1960s and became the standard method for measuring security price reaction to some announcement or event. Delattre (2007) defines an event as information which is made public in the market and which may affect the value of one or several firms at the same time. It may be general or specific, periodical or occasional, exogenous or decided by the firm managers. Event studies have been used for two major reasons:

1. to test null hypothesis that the market efficiently incorporates information. Systematically non-zero abnormal returns that persist after a particular type of corporate event are inconsistent with market efficiency (Brown and Warner 1980);

2. to examine the impact of some events on the wealth of the firm's shareholders (Binder 1998).

Mushidzhi and Ward (2004: 20) describe event studies as a method *"to determine if there is a statistical difference between actual stock returns and expected returns – abnormal returns - surrounding an event"*. Event studies have been applied to variety of firm specific and economy wide events such as mergers and acquisitions, earnings announcements, dividend announcements, key management change announcements and macro-economic data releases. Furthermore, they are used in the field of law to measure the impact of changes in the regulatory environment on the value of a firm or to assess damages in legal liability cases (Campbell et al. 1996).

A vast and mature literature exists for event studies. MacKinlay (1997) mentions James Dolley's (1933) paper as the first published study in the field, where he examined price effect of stock splits. Current form of event studies is reached through various enhancements in methodology including the removal of general stock price movements and separating out confounding events. Seminal papers of Ball and Brown (1968), Beaver (1968) and Fama et al. (1969) established the foundations of event study method and increased its popularity.

Ball and Brown (1968) examined the information content of annual earnings announcements using a sample of 261 US firms over the 1957 and 1965 period. The authors classified firms with higher than expected earnings in to "good news" and firms with lower than expected earnings in to "bad news" portfolios. Abnormal share returns for each stock within the portfolio was calculated using a CAPM based market model and then cumulated. Results showed that "good news" firms exhibited abnormally high returns, while "bad news" firms showed abnormally low returns. However, 85%-90% of the new information conveyed by earnings announcements were captured by the market before the release, i.e. annual earnings announcements are not timely sources of information. However, share prices continued to drift in the same direction for the next two months, which contradicts with the efficient market hypothesis.

Fama et al. (1969) studied the information effect of the stock splits on the behaviour of securities. In doing so, they have also tested the speed of adjustment of prices to new information to infer market efficiency. Their results were supportive of market efficiency since market appeared to have anticipated the information and most of the price adjustment is done before the event is revealed to the market. When news is released, the remaining price adjustment takes place rapidly and accurately.

Following the seminal paper of Fama et al. (1969), researchers developed several modifications in following years that relate to complications arising from the statistical assumptions used. Brown and Warner (1980, 1985), Dyckman et al. (1984), Campbell and Wesley (1993), Cowan and Sergeant (1996), Barber and Lyon (1997), Khotari and Warner (1997), Brav (2000) assessed the specification and power of test statistics using daily stock returns. Normality of abnormal returns was a key assumption underlying the use of parametric test statistics in event study method. Brown and Warner (1985) studied the effect of non-normality in daily returns on significance tests' performance using samples of randomly selected securities and reported that the common parametric t-test used in event studies is well specified even under non-normality. On the other hand, Maynes and Rumsey (1993) found that parametric tests perform poorly with thinly traded samples. Corrado (1989) and Cowan (1992) introduced nonparametric tests of significance. Corrado and Zivney (1992) demonstrated that nonparametric tests are often more powerful than parametric tests.

Countless applications of event studies have been published since its foundation. According to Khotari and Warner (2006), between 1974 and 2000, some 565 papers in leading finance journals contained an event study. Since many academic and practitioner-oriented journals are excluded, these figures provide a lower bound on the size of the literature. In a more recent study, Başdaş and Oran (2014) counted 75 studies published only in Turkey between 1997 and 2013. The topic is so broad that covering all aspects is almost impossible. Comprehensive reviews of event study methodology can be found in Peterson (1989), Henderson (1990), Armitage (1995), MacKinlay (1997), McWilliams and Siegel (1997), Binder (1998), McWilliams and McWilliams (2000), Lamdin (2001), Serra (2002), Khotari and Warner (2006), Cichello and Lamdin (2006), Johnston (2007), Corrado (2010).

Event study papers can be classified as methodology papers and market efficiency tests. We review the procedure for a standard event study below. Studies concerned with informational content of dividend announcements and market efficiency in emerging and developed markets are review in later sections of this chapter.

A.3 Flow of a General Event Study

In this part, we describe the standard flow of an event study, which we have used as a guideline in our analysis. While there is no unique structure to perform an event study, MacKinlay (1997) provides a neat template consisting of several steps which we expand below.

A.3.1 Selection of the Event and the Event Date

Event studies have been mostly concerned with stock price performances around event dates (Brown and Warner 1985). Hence, first step is to determine the type of (firm-specific) event (e.g. stock splits, mergers and acquisitions, dividend announcements, earnings announcements, etc.) and then to make a list of companies that went through such event. Selecting an event in a multi country study requires more caution due to different characteristics of stock exchanges (Park 2004). Hence it is crucial that the events are comparable. Dodd (1980) says that the correct event date to conduct a more relevant and reliable test of the information content in the context of event studies is the first official announcement. Hence, it is more appropriate to choose first trading day on which the event became public information (e.g. initial announcement of dividend payment or on-going merger negotiations) than the date when the event is realized (e.g. ex-dividend date). Brown and Warner (1980) showed that the power of the test significantly decreases if the event date is not correctly specified. Next step is to select the stocks to include in the sample based on certain selection criteria such as market capitalization, trading volume, availability of data. Lastly, stock prices before and after the event date should be collected for each company.

A.3.2 Determining the Event Window and Estimation Period

MacKinlay (1997) defined the event window as the period that we are interested in when calculating the abnormal returns in the event study process. An event window of one day, i.e. day “0”, only includes the event day itself. Yet, in many studies event window is often expanded to multiple days symmetrically surrounding the event date, e.g. -5 through +5. Different empirical investigations have used different ranges of days as windows when calculating the abnormal returns. Armitage (1995) highlights the possibility of having coinciding events in the event window, i.e. news other than the event under investigation which may affect the share price. Hence, the accuracy of the results should be healthier with shorter event windows, in our view. Oler et al. (2007) reported that 76% of the 62 event studies published in major academic journals had a post-event window length of 5 days. In a thorough survey of event studies published in Turkey, Başdaş and Oran (2014) showed that event windows rarely go beyond 31 days.

Next step is to define an estimation window, which comprise of days prior to the event date, to be used in calculating the parameters of our selected normal return generating process (model). Park (2004) and Armitage (1995) showed that results (e.g., the predicted return on the event date) are not sensitive to varying estimation window lengths as long as the window lengths exceed 100 days.

A.3.3 Measuring the Abnormal Returns

Evaluating the impact of an event on the shareholders' wealth requires us to measure the "abnormal return". According to MacKinlay (1997: 15), *"abnormal return is the actual ex-post return of the security over the event window minus the normal return of the firm over the event window"*. Brown and Warner (1980: 205) defines abnormal returns as *"the extent to which security returns were different from those which would have been appropriate, given the model determining equilibrium expected returns* (normal returns)". The normal return is defined as the expected return without conditioning on the event taking place. Hence, the abnormal return is a direct measure of the unexpected change in security holder's wealth associated with the event (Khotari and Warner 2006). The abnormal return for the firm i on the event day t is:

$$AR_{i,t} = R_{i,t} - E\left(R_{i,t} \middle| X_t\right) \tag{A.1}$$

$AR_{i,t}$ stands for abnormal return

$R_{i,t}$ stands for actual return

$E(R_{i,t} \mid X_t)$ stands for normal (expected) return

Power of an event study significantly depends on the accuracy of estimating the expected return of securities, so that abnormal returns are detected correctly. Hence, results of the significance tests are subject to joint-hypothesis problem (Fama 1991), meaning that all test are simultaneously a test of both the model and market efficiency.

The literature is dominated by linear models for expected returns, which can be grouped as statistical and economic models. We have provided brief descriptions of these models in Table A.1. An extended list of the models used in event studies can be found in Başdaş (2013: 11).

It is common to use several models of expected returns and compare them (Brown and Warner 1985, Campbell et al. 2009). However, a vast majority of the papers use either the market model or the market adjusted returns, since more sophisticated models fail to meaningfully increase R^2 and reduce the variance of abnormal returns. Cable and Holland (1999) compared several generic linear models and concluded that: 1) regression based models perform better; 2) market model generally outperforms CAPM. MacKinlay (1997) says that the use of the CAPM in event studies has almost stopped since deviations from it have been discovered. Our literature review and Başdaş (2013) confirm his claim. Our review of recent empirical research on price reaction of emerging EMEA stocks to corporate action announcements shows that 17 out of 28 papers have implemented the market model, while 9 papers used the market adjusted returns. Only 2 papers used CAPM. Başdaş's (2013) comprehensive review of event studies performed in Turkey yields that 32 out of 75 studies used only market adjusted returns, while 27 studies applied the market model.

Table A.1: Selected of models for measuring the expected returns (Başdaş 2013: 11)

	Model	Definition
1	Mean adjusted returns (MAR)	Expected return is defined as the average return of the estimation period. Any deviation from the mean is considered as an abnormal return. It is the simplest of linear models used. Yet, the error term (AR) has greater variance than other models since the variation in market returns is not removed.
2	Market adjusted returns (Index Model)	The model assumes all shares to have a beta of 1. Returns different than that of the index are considered as abnormal returns.
3	Market and risk adjusted models	This approach assumes that as eliminating the market's impact on actual returns of a share, the risk factor of the firm should also be incorporated.
3.1.	Market model $R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$	Different than the index model, now returns are adjusted for the risk factor of that share when finding the expected returns.
3.2.	Capital asset pricing model (CAPM) (Sharpe - Lintner) $R_{i,t} = R_{f,t} + \beta_i (R_{m,t} - R_{f,t}) + \varepsilon_{i,t}$	Compared with the simple market model, now the excess returns over risk free rate are used.

Table A.1: (continued)

Model	Definition
3.3. Zero beta CAPM (Black) $R_{i,t} = R_{z,t} + \beta_i(R_{m,t} - R_{z,t}) + \varepsilon_{i,t}$	Black (1972) showed that investors can use a zero beta portfolio instead of a risk free rate, i.e. a portfolio of risky assets with zero covariance with the market portfolio.
3.4. Arbitrage pricing theory (APT) (Ross) $R_i = R_f + \beta_1 F_1 + \beta_2 F_2 + \cdots + \varepsilon_i$	APT is an asset pricing theory where in absence of asymptotic arbitrage the expected return of a given asset is determined by its covariance with multiple factors (F).
3.5. Fama-French Three Factor Model $R_{i,t} - R_{f,t} = \alpha_i + \beta_i(R_{m,t} - R_{f,t}) + {} + \gamma_p SMB + \delta_p HML + \varepsilon_{p,t}$	Fama and French (1992) observed that two classes of stocks tend to do better than the market as whole: 1) small caps; 2) stocks with low price / book ratios. They then added two factors to CAPM to reflect a portfolio's exposure to these two classes. SMB is the difference in the returns of small and big firms, and HML is the difference in the returns of high and low book-to-market value firms.
3.6. Fama-Macbeth model $R_{i,t} = \alpha_{1,t} + \alpha_{2,t}\beta_{i,t} + \varepsilon_{i,t}$	This model is based on the cross-sectional regressions of returns. Starting with shares of different betas, Fama and Macbeth (1973) regress the returns of each month against the beta of that share. After obtaining α, cross-sectional coefficients, from the specified estimation period, estimates are aggregated at time dimension.
3.7. Control portfolio	This method forms the sample securities into a portfolio with an estimated β of 1. Regardless of the risk level of each sample security, the portfolio thus formed should have the same risk as the market portfolio. Those securities comprising the market portfolio become a "control portfolio in the sense that the market portfolio has the same risk level as the sample securities, but is not experiencing the "event" under study. The performance measure for day "0" is the difference between the return on a portfolio of sample securities and the average return on the market portfolio on the day the sample securities experience events.

A.3.4 Design of the Testing Framework for the Abnormal Returns

The following subsections address the design of the testing framework for the abnormal returns.

A.3.4.1 Aggregating Abnormal Returns

Following the selection of the expected return model, estimation of parameters and calculation of abnormal returns, the next step is aggregation across securities and across time to draw overall inferences for the event of interest. Khotari and Warner (2006) say that the focus is always on the mean rather than the entire distribution of abnormal returns. Typically, the null hypothesis to be tested is whether the mean abnormal return at time t is equal to zero. We have calculated the cross-sectional mean abnormal return for any day t for each of our dividend group as follows:

$$\overline{AR}_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t} \qquad \text{(A.2)}$$

$$\mathrm{var}(\overline{AR}_t) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma^2_{\epsilon_i}$$

N stands for number of events

However, for testing the market efficiency, hypothesis testing has to be extended to periods around the event since 1) the event may be partially anticipated, i.e. some abnormal return behaviour may be present in pre-event period; 2) post-event returns have to be examined to judge the speed of adjustment to the information revealed on the event date. Hence, we have aggregated the time series of cross-sectional average abnormal returns for any interval in the event window as follows:

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} \overline{AR}_t \tag{A.3}$$

$$var(CAR(t_1, t_2)) = \sum_{t=t_1}^{t_2} var(\overline{AR}_t) = \frac{1}{N^2} \sum_{i=1}^{N} \sigma_i^2 (t_1, t_2)$$

$$CAR(t_1, t_2) \sim N[0, var(CAR(t_1, t_2))]$$

A.3.4.2 Test Statistics

Test statistics for performance measures, such as CAR, are computed and compared to their assumed distributions under the null hypothesis that mean abnormal performance equals to zero. Two main types of test have been used for event studies in the literature; parametric and nonparametric tests. The main difference between them is that the first one assumes that abnormal returns are normally distributed, while the latter does not make an assumption on the distribution of returns.

Brown and Warner (1985) argued that non-normality of daily returns has no obvious effect on event study methodology, since the cross-sectional mean abnormal return converges to normality as the number of sample securities increases. Hence, standard parametric test are well specified. However, numerous studies, including Bartholdy et al (2005), found that distribution of daily abnormal returns are fat tailed and skewed to the right. The effect of this bias is that the parametric tests are likely to reject the null hypothesis too often, i.e. they find a significant effect from an event when there is none. Moreover, Brown and Warner's argument about the sample size implies that parametric models are not well specified for small sample sizes. Bartholdy et al. show that the power of a test declines considerably for small portfolios.

According to Campbell et al. (2009), return distribution in non-US countries is severely non-normal and that nonparametric tests, especially the generalized sign and rank tests, are better specified than commonly used parametric tests. However, parametric tests are more commonly used in event studies than nonparametric tests. According to Campbell et al (2009), 16 out of 18 event studies with non-US multi-country samples used at least one parametric test, while only 7 of them used nonparametric tests. Yet, authors suggest that parametric and nonparametric test should be used at the same time. MacKinlay (1997) supports that nonparametric tests should be used in conjunction with parametric tests to check for robustness of the results. Bartholdy et al. (2005) found that nonparametric tests tend to be more reliable than parametric test for small stock exchanges with thinly traded stocks and high degree in non-normality in returns. However, since no individual test appears to be significantly superior to other tests, for all portfolio sizes and trading frequencies, they recommended calculating the whole battery of test statistics. Cowan (1992) suggests nonparametric sign tests are useful to verify that the parametric findings do not result from outliers.

Başdaş's (2013) through review of event studies published in Turkey shows that majority of the studies use parametric tests. Our review of recent event studies published on price reaction of emerging EMEA stocks to corporate action announcements illustrates that only 5 studies out of 30 used nonparametric tests besides parametric tests.

A.3.4.3 Parametric Tests

Parametric tests are applied when the assumption is that the returns are normally distributed. Lyon et.al. (1999) stated that *"The central limit theorem guarantees that the distribution of the mean abnormal return measure converges to normality as the number of firms is independent and identically distributed drawings from a finite variance distribution"*. In other words, for relatively large samples the t-statistic should be well specified. The aim of applying the t-test is to check if the abnormal returns of the companies in the days before and after the event day differ significantly from zero. Thus, the null hypothesis that the share prices do not react to the dividend announcements can be tested by calculating the test statistic. In this research, we have focused on the most commonly used parametric test, but several alternatives and extensions exist.

A.3.4.3.1 The Time-Series Standard Deviation Test (t-test)

A standard test statistic, to test the null hypothesis that CAR in the event period equals zero, can be derived by dividing the CAR by an estimate of its standard deviation (Khotari and Warner 2006). Brown and Warner (1985) define this test as Crude Dependency Adjustment test, while Campbell et al. (2009) define it as portfolio time series standard deviation test. The test statistic for any event day t is calculated as:

$$\frac{CAR(t_1, t_2)}{var\big(CAR(t_1, t_2)\big)^{\frac{1}{2}}} \sim N(0,1) \qquad \text{(A.4)}$$

N stands for number of events

Assuming that abnormal returns are i.i.d. and normal, the test statistic is distributed Student-t under the null hypothesis. In case, the N and the length of the estimation period are sufficiently high, the test statistic gets unit normal. Brown and Warner (1985) referred to the test as crude dependency adjustment since the test is able to correct for cross sectional dependency among stock returns by using the security-specific excess returns.

A.3.4.3.2 Value at Risk (VaR) Approach

Value at risk (VaR) determines the maximum loss an asset or portfolio can generate over a certain holding period, with a pre-determined likelihood level (Cabedo and Moya, 2003). Contrary to the risk measures like variance, which uses both sides of the lower and upper quantiles of the distribution to calculate risk of a position, VaR is a risk measure which takes only the lower quantile of the distribution in to account (Zeytun, 2012). Thus, if the VaR on an asset is USD100 at one day, 95% confidence level, there is only a 5% chance that the value of the asset will drop more than USD100 over any given day. Because of its intuitive explanation, the concept of VaR is widely used in the financial industry.

Under continues loss distribution D and loss L follows loss distribution D, with mean equal to μ and variance equal to σ^2, the loss can be expressed as $L \sim D(\mu, \sigma)$.

$$Pr(L > VaR_{\alpha}(L)) = \Pr\left(\frac{L-\mu}{\sigma} > \frac{VaR_{\alpha}(L)-\mu}{\sigma}\right) = \tag{A.5}$$

$$= Pr\left(l > \frac{VaR_{\alpha}(L)-\mu}{\sigma}\right) = 1 - Pr\left(l \leq \frac{VaR_{\alpha}(L)-\mu}{\sigma}\right) = 1-\alpha$$

$$l_{\alpha} = \frac{VaR_{\alpha}(L)-\mu}{\sigma}$$

$$VaR_{\alpha}(L) = \mu + \sigma l_{\alpha}$$

In the above formula, l denotes the standardized stochastic variable L, and l_α denotes the α-quantile of the loss distribution. The above equation can be expressed as $VaR_\alpha(L) = \sigma\, l_\alpha$ if we exclude the mean. Indeed, assuming that the residuals of our expected return models are i.i.d. we can assume that μ is zero.

VaR for a time period with a different length from that used to estimate the standard deviation is calculated by multiplying the standard deviation with the square root of time.

$$VaR_{\alpha}(L) = \sigma l_{\alpha}\sqrt{T} \tag{A.6}$$

An undesirable property of VaR is that it assumes returns to be normally distributed. Yet, there is substantial evidence that returns are not normally distributed and that not only are outliers more common in reality but that they are much larger than expected, given the normal distribution. Indeed, none of our dividend portfolios that we created have normally distributed returns (Table 5.3, page 80) as indicated by the Jarque-Berra test statistic. Moreover, tests statistics of our expected return models for individual securities show that residuals are not normally distributed (Appendix B).

Table A.2: VaR calculation methods – Li et al. (2012: 2)

	Parametric		Nonparametric
	Normal	Non-normal	
Identically and independently distributed	Variance - covariance method & Equally weighted moving average method		Historical simulation
Time dependence	Exponentially weighted moving average method & GARCH	Exponentially weighted moving average method & GARCH	

There are several approaches to estimate VaR, some of which we show in above table. In this note we have used the variance – covariance and GARCH methods. The variance-covariance method is the simplest method to calculate VaR. This method usually calculates VaR by assuming that asset returns are normally distributed. Historical data is used to calculate mean, standard deviation and correlation of assets. Due to white noise property of returns, variance is assumed to remain constant throughout the time. The linearity assumption of the variance-covariance method is a drawback. There is substantial empirical evidence showing that volatility varies over time. Hence, GARCH family models, which explain the volatility clustering phenomenon, are frequently used. The daily volatility calculated using GARCH models is a weighted average of past squared returns, just as in the constant volatility case. The difference is that constant volatility method weighs past squared returns equally while GARCH weights recent squared returns more heavily than distant returns (Hopper, 1996).

VaR models have been used extensively to determine extreme price movements in FX and commodities. Hopper (1996) argues that GARCH models work better for currencies than for stocks. One of the landmark papers in the field is Cabedo and Moya (2003)'s research where they provided an estimation for the maximum oil price change associated with a likelihood level using VaR, which can be used for designing risk management strategies. Authors test several methods to calculate VaR; historical simulation (HS), HS with ARMA (HSAF), GARCH model; and found the HSAF approach as the most efficient one. Altazlı (2014) used an ARMA(1,1) – GARCH(1,1) model to calculate one step ahead in sample VaR for BIST30 stocks. Demiralay and Ulusoy (2014) used FIGARCH, FIAPARCH and HYGARCH models to make VaR predictions for four precious metals (gold, silver, platinum and palladium).

Yet, VaR methods usage in event study literature is quite limited versus the parametric t-test, Patell t-test and nonparametric sign, rank and run tests. We have encountered studies using VaR for testing weak form efficiency but not for semi-strong form efficiency. VaR models are intuitively compelling since extremes are endogenously derived from actual price movements. Days on which price movements exceed the VaR in both directions are called as “exceptional days”. These exceptional days allow us to investigate whether external factors such as arrival of new information cause significant price movements. Thus, VaR method enables us to test market efficiency and stocks’ speed of adjustment to new information. Indeed, to our knowledge there is no event study in emerging EMEA that has used the VaR method. Thus, our thesis will be expanding the literature.

For our empirical study on market efficiency in emerging EMEA countries, we have first extended the frequently used simple market model by adding ARMA (p,q) terms and then conducted various diagnostic tests to check for serial uncorrelatedness, heteroskedasticity (ARCH effects) and normality of residuals. For stocks with ARCH effects in residuals we have switched to GARCH family models, which we have described in detail in section 5.6.2. We have used these models to forecast out-of-sample VaRs starting from day 0 to day 20. The out of sample VaR is one step ahead forecasted, which means that the VaR of day t+1 is computed conditional on the available information on day t.

For ARMA models variance is assumed to be constant over time. For ARMA - ARCH/GARCH/EGARCH models it is time varying. In the classic usage of VaR method for determining exceptional days by comparing the actual asset returns with the VaR. Yet, event studies care for abnormal returns rather than nominal returns. Hence, we have calculated the VaR for abnormal returns, where we have used the variance of residuals of our ARMA and ARMA – ARCH/GARCH/EGARCH models in VaR calculations.

Figure A.1 shows the relationship between the daily abnormal return and VaR for an ARMA model, while Figure A.2 does the same for an ARMA – GARCH family model. Table 5.6 on page 95 shows the number of events in our dividend portfolios. We have so far explained the calculation of the daily VaR for a single asset. VaR of a portfolio requires aggregation. In-line with the modern portfolio theory of Markowitz, portfolio standard deviations are calculated by taking into account the correlation between different assets. Yet, we apply the VaR approach for an event study and event studies commonly set the covariance term of the variance estimator to zero assuming that the event window of the N events do not overlap.

$$\sigma_p^2 = \sum_{i=1}^{N} w_i^2 \sigma_i^2 + \sum_{i=1}^{N} \sum_{j=1, j \neq i}^{N} w_i w_j \sigma_{i,j} \tag{A.7}$$

$$Portfolio\ VaR = VaR_p = \alpha \sigma_p W$$

W stands for initial portfolio value

This is, however, just a cross sectional aggregation of daily VaRs for the events in the dividend portfolios. Event studies evaluate the behaviour of average cumulative abnormal returns besides average abnormal returns. Thus, we calculate the cumulative VaR of the portfolio by doing time aggregation of variance of cumulative abnormal returns. This way we can determine where the ACAR breaches the VaR in the post event window. This is quite important since exceptional cumulative abnormal returns may trigger stop-losses for portfolio managers.

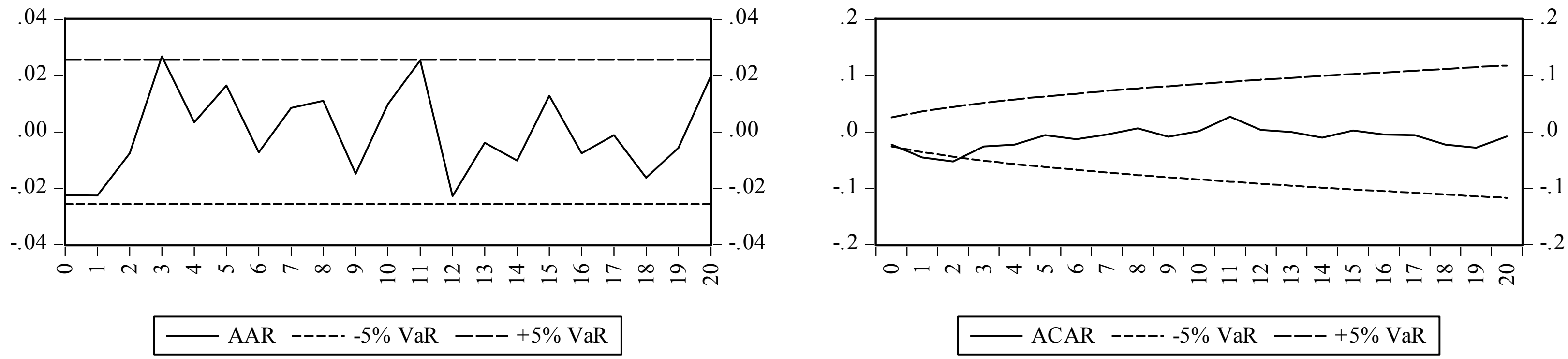

Figure A.1: VaR versus AAR and ACAR for an ARMA(0,1) model -- (TKFEN TR bad news analyst count > 5)

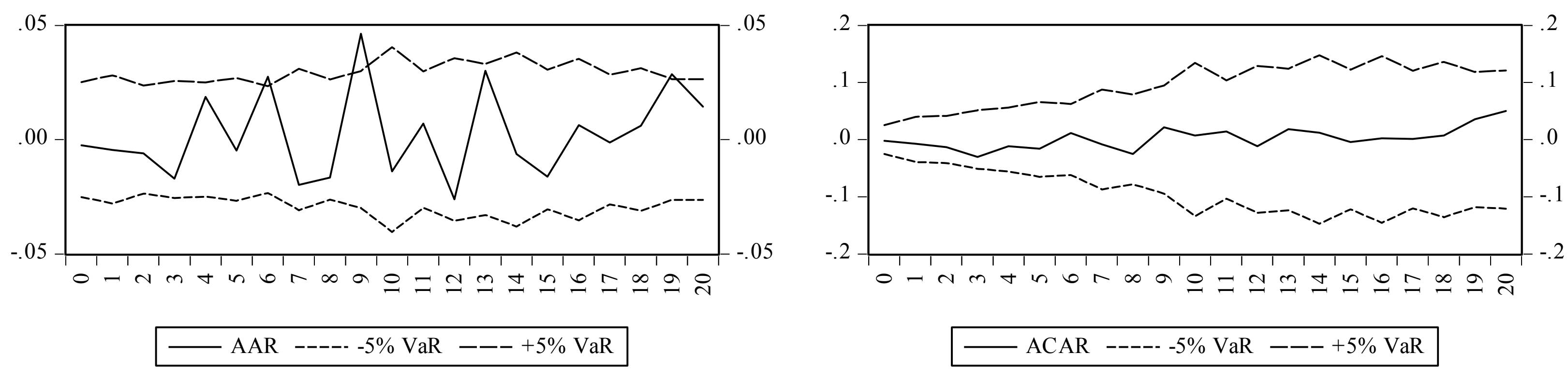

Figure A.2: VaR versus AAR and ACAR for an ARMA(2,1) – GARCH(1,2) model – (SNGS RU good news analyst count > 5)

A.3.4.4 Nonparametric Tests

Nonparametric tests are free of specific assumptions concerning the distribution of returns. Most commonly used nonparametric tests used in the literature are sign test and rank test (MacKinlay 1997).

A.3.4.4.1 Generalized Sign Test

The generalized sign test is first introduced in an event study by McConnell and Muscarella (1985) to evaluate price reactions of stocks to capex announcements. It compares the proportion of positive abnormal returns around an event (event window) to the proportion from a period unaffected by the event (estimation window), which enables the test to take account of possible asymmetric return distributions under the null hypothesis (Cowan 1992). The null hypothesis is that the proportion of positive returns in total is the same for both the event and the estimation windows. The test parameter is formulated as:

$$\hat{p} = \frac{1}{N}\sum_{i=1}^{N}\frac{1}{M_i}\sum_{t=T_0}^{T_1} S_{i,t} \qquad (A.8)$$

$$S_{i,t} = \begin{cases} 1 \ if \ AR_{i,t} > 0 \\ 0 \ otherwise \end{cases}$$

N stands for number of events

M stands for number of non-missing returns in the estimation period

The test statistic uses the normal approximation of a binomial distribution with parameter p.

$$Z_G = \frac{w - N\hat{p}}{\left[N\hat{p}\left(1 - \hat{p}\right)\right]^{\frac{1}{2}}} \tag{A.9}$$

w stands for number of stocks in the event window for which the ACAR is positive

A.3.4.4.2 Generalized Rank Test (Corrado's Rank Test)

A nonparametric rank test has been introduced by Corrado (1989) for a one day event window. Corrado's rank test transforms each security's time series of abnormal returns into their respective ranks. The test statistic for the null hypothesis of no abnormal return on event day zero is:

$$t_{rank} = \frac{\frac{1}{N}\sum_{i=1}^{N}\left(k_{i,0} - \bar{k}\right)}{s_k} \tag{A.10}$$

$k_{i,0}$ *stands for the rank of the security i's day zero abnormal return in the security's combined estimation and event period time series.*

$\bar{k}$ *stands for the expected rank, i.e. one half plus the number of observed returns*

$$s_k = \left\{\frac{1}{T_2 - T_0}\sum_{t=T_0}^{T_2}\left[\frac{1}{N}\sum_{i=1}^{N}\left(k_{i,t} - \bar{k}\right)\right]^2\right\}^{\frac{1}{2}}$$

Note that covariance term of the variance estimator is set to zero assuming that the event windows of the N events do not overlap, i.e. it is assumed that there is no clustering. Event-time clustering would bias the estimated standard deviation estimate downward and the test statistic upwards.

A.4 Event Studies of Corporate Announcements and Market Efficiency in the Emerging EMEA

Event studies have been frequently used to test semi-strong form efficiency and information signalling hypothesis in the emerging EMEA stock markets. However, only a few number of these studies used changes in dividend policy as a signal. Moreover, we have not encountered any cross-country comparison of semi-strong form efficiency and market reaction to dividend announcements. Thus, the literature on the information content of dividends hypothesis seems incomplete and needs to be extended for the emerging EMEA, in our view.

Table A.3 and Table A.4 present a review of selected studies in the developed markets and in the emerging EMEA that test the semi-strong form efficiency and the signalling hypothesis. While building the review, we have first focused on papers testing the informational content of dividends. We have then broadened our sample with earnings announcements, M&A announcements, sovereign credit rating changes, share buy-back announcements, trading statement releases and mandatory offers. Lastly, we have deliberately picked papers written after 2004, mostly after 2010, so that they relate to the time period of our study, namely 2005-2016. Results of the present studies on the emerging EMEA stock markets' reaction to corporate announcements are compared with our findings in chapter 6 and chapter 7.

Our review shows that 9 out of 11 event studies in the developed markets and 17 out of 28 event studies in the emerging EMEA used the market model in calculating abnormal returns. This confirms Gurgul's (2012) statement that the market model is the prevailing method used in the literature. Moreover, all 11 event studies in the developed markets and 19 out of 28 event studies in the emerging

EMEA, that we have reviewed, used only the t-test for significance testing, while others used a nonparametric test or both. This is in-line with the observation made by Campbell et al. (2009) for non-US multi-country event studies. Most studies used a 100 days estimation window, with only a few using a longer timeframe. Length of event windows used, on the other hand, are quite diverse, varying between [-60; +60] and [-1; +1]. Moreover, many studies used multiple event windows to check for ACARs.

Results of the market efficiency studies on the developed markets are generally supportive of the hypothesis. 7 out of the 9 papers we have reviewed found the US and European markets semi-strong form efficient, even in case of M&A announcements which are usually considered as bigger valuation signals than many other corporate actions, e.g. dividends. On the other hand, evidence on the semi-strong form efficiency of the emerging EMEA markets is mixed. Only 11 out of 24 papers reviewed found that the EMH holds in the emerging EMEA. Results from the Turkish and Polish markets are particularly striking. 8 out of 9 studies on the Turkish market found it inefficient, while 5 out of 7 studies found the Polish market efficient. These results are starkly different that the empirical findings of our research. As discussed in previous parts of this thesis, we found all four emerging EMEA market semi-strong form inefficient. However, within the four, Turkey stands out as the most efficient, while Poland stands out as the least efficient.

All in all, the literature points out a stark difference between the level of market efficiency in the developed and emerging stock markets. This may be related to, but not limited to, higher trading liquidity, more effective regulation and supervision by the market authorities, higher corporate governance standards adopted and availability of more data in the developed markets than in the emerging markets.

Table A.3: Summary of event studies on market efficiency and signalling hypothesis in the developed markets

	Author(s)	Countries	Source of information / sample size	Time period	Event / estimation window (days)	Model	Tests used	Key findings
1	Vazakidis and Athianos (2010)	Greece	60 dividend announcements	2004-2008	multiple event windows [-20; +20] being the widest / estimation window is not disclosed	Market adjusted returns	t-test	Results reject the MM's dividend irrelevance hypothesis. AARs are positive in the pre-event window and negative in the post-event window.
2	Timmermans (2011)	US	423 dividend announcements	2005-2010	[-15; 15] / [-266; -16]	Market model	t-test	No statistically significant AAR and ACAR are found in the event window. Hence, dividend irrelevance hypothesis holds for the US market. Some negative drift, though not significant, was found in the ACARs after the announcements day. According to the authors this may be some weak evidence in favour of the tax effect hypothesis.
3	Laabs and Bacon (2013)	US	15 dividend increase announcements	2008 - 2012	[-30; 30] / [-180; -31]	Market model	t-test	Authors provide evidence supporting the positive signal associated with the sample of increased dividend announcements examined. Results of the study support the semi-strong form EMH.
4	Gurgul et al. (2006)	Germany	140 dividend increase and 31 dividend decrease announcements	1992 - 2004	[-2; 2] / [-53; -3]	GARCH(1/1)	t-test	Information content of dividends hypothesis holds, i.e. there are statistically significant reactions in anticipated directions in case of dividend increases and decreases on the event day. Price reaction in case of dividend decreases is greater than in case of dividend increases, supporting the leverage effect hypothesis. Market reaction in the two days succeeding the announcement is statistically insignificant, which supports the semi-strong form EMH.
5	Tucker et al. (2003)	UK	regular and special dividend announcements	1992 - 2002	[-5; 5] / [-56; -6]	Market model	t-test	Regular dividend and special dividend news give rise to positive abnormal returns. However, neither is found significant. Information content of dividends hypothesis does not hold.
6	Liu (2013)	US	148 dividend increase announcements from 40 firms	2006 - 2013	[-1;1], [-5;5], [-10; 10], [-30; 30] / [-80; 29]	Market model	t-test	Author concludes that the information content of dividend hypothesis holds for the US market and the new information is priced in a semi-strong form efficient manner.
7	Esch (2010)	9 European markets: Netherlands, UK, France, Italy, Spain, Sweden, Finland, Germany, Switzerland	149 M&A announcements	2000 - 2010	[-30; 30], [-1; 1], [-10; 1], [1; 5], [1; 30] / [-180; -30]	Market model	t-test	Target companies' shares show significant positive reaction to M&A announcements on the event day. Information leakage in the [-10; 1] window is found only in the UK. Statistically significant ACARs are found in the post announcement window in France and Spain, which violates the semi-strong form EMH.
8	Elad and Bongbee (2017)	UK	51 M&A announcements	2012 - 2013	[-5; 5] / [-100; -10]	Market model	t-test	The study finds that AARs on the five days succeeding the M&A announcement are statistically significant at 5% level, which is a violation of the semi-strong form EMH.
9	Cheung (2014)	Europe	74 target banks	2004 - 2013	[-10; 10], [-5; 5], [-3; 3], [-1; 1] / [-110; -11]	Market model	t-test	Price reaction to M&A announcements is statistically significantly positive for target companies. However, ACAR sharply mean reverts after day 1 and shows no drift after wards, which confirms the semi-strong form EMH for the European markets.
10	Kaldekerken (2015)	Europe: Germany, France, Italy, Spain, Netherlands, Belgium, Ireland	120 share buyback announcements	2004 - 2014	[-; 5] / [-125; -6]	Market model	t-test	The study finds statistically significant positive reaction to share buyback announcements on the event day. Yet, none of the AARs before and after the event day are found to be significant. Hence, results suggest that the semi-strong form EMH holds in Europe. Authors divided their sample into to two sub-periods: 2004-2008, i.e. before the financial crisis and 2009-2014 the period of the financial crisis. Yet, results were very similar and their conclusion did not change.
11	Blackburn and Bacon	US	10 positive earnings surprises	2011 - 2012	[-30; 30] / [-180; -31]	Market model	t-test	The paper finds statistically significant positive reactions to positive earnings announcements up to 29 days prior to the announcements, which implies information leakage of good anticipation. On the other hand, ACAR consolidates after the announcement day. Hence, the market is semi-strong form efficient.

Table A.4: Summary of event studies on market efficiency and signalling hypothesis in the emerging EMEA

	Author(s)	Countries	Source of information / sample size	Time period	Event / estimation window (days)	Model	Tests used	Key findings
1	Berdnikova and Rogova (2014)	Russia	115 dividend announcements	2009-2013	[-5 ; +5] / [-125 ; -6]	Market model	Generalized rank test	Dividend increases (> 5% YoY) result in negative ACAR, while decreases (< -5%) result in positive ACAR in the post-event period. No significant price reaction was observed in case of stable dividends. Authors conclude that Russia is seen as a growth market and dividend increases imply lack of future profitable growth opportunities and loss of future shareholders' return.
2	Sehgal et al. (2012)	BRICKS countries (Brazil, Russia, India, China, South Korea, South Africa)	214 merger announcements	2005-2009	[-20 ; +20] / [-120 ; -21]	Market model	t-test	Significant ACAR in pre-event window for South Africa, Russia, India, China, Brazil and South Korea imply information leakage. Reversal of the returns in post-event window for India, China, South Korea and South Africa support the overreaction hypothesis. Brazil and Russia are semi-strong form efficient in the post-event period, while others are not.
3	Godlewski et al. (2010)	Russia	55 debt agreement announcements	2004-2008	[-2; +2] / [-100; -10]	Market model (average R^2 of only 15%)	t-test	Russian stocks react negatively to external debt agreements (bonds and loans), indicating moral hazard behaviour of shareholders at the expense of debt holders. The portfolio generates a negative ACAR of 5% in an event window of 5 days surrounding the announcement, which yields that the market is not semi-strong form efficient.
4	Mateev (2011)	Russia, Bulgaria, Latvia, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia	260 sovereign credit rating changes (197 upgrades, 63 downgrades)	1998-2007	multiple event windows [-20; +20] being the widest / [-120; -21]	Market model	t-test	AARs for rating upgrades are statistically insignificant except for the announcement day. On the other hand, rating downgrades have significant negative impact on stock returns in the pre-event window and on the event day, but not in the post-event period. Results suggest that information leaks ahead of the announcement, i.e. emerging markets are strong-form inefficient. Yet, AARs in the post-announcement period support the semi-strong form EMH.
5	Bulatova (2015)	Russia	114 dividend announcements	2010 - 2014	n.a.	n.a.	n.a.	Dividends, that are more than ±5% different than equity analysts' expectations, are classified into "good news" and "bad news" portfolios. Evidence shows that Russian market reacts negatively to both good and bad dividend surprises. Author suggests that investors are suspicious about aggressive dividend changes due to corporate governance issues in the Russian market.
6	Gurgul and Majdosz (2005)	Poland	45 dividend announcements and 20 share buy-back announcements	2000 - 2004	[-2; +2] / [-52; -3]	Market model	t-test, Corrado rank test, bootstrapping	The paper considers declaration of dividend payments (regardless of the magnitude of the change) as a positive sign, since Polish companies do not have clearly defined dividend policies. Thus, the reluctance to change dividends theory does not apply in the Polish market Dividend announcements lead to 0.8% abnormal return on day +1, confirming information content of dividends. The paper focuses on AAR but not on ACAR.
7	Korczak and Tavakkol (2004)	Poland	124 earnings announcements	2000 - 2002	[-30; -6], [-5;-1], [0;1], [0;5], [6;30] / [-150; -31]	Market model	t-test	The paper investigates whether price reactions surrounding the earnings announcements are correlated with the level of institutional investors' ownership in the stocks. Evidence shows that greater institutional ownership reduces the magnitude of the positive market reaction to positive earnings surprises; implying that institutional investors have better access to information than individual investors. In case of earnings misses, price reaction is negative regardless of ownership. Market looks efficient in case of positive news but inefficient in case of negative news with ACAR of -2.5% between days 0 and 5.

Table A.4: (continued)

	Author(s)	Countries	Source of information / sample size	Time period	Event / estimation window (days)	Model	Tests used	Key findings
8	Dumitrescu et al. (2011)	Poland and Austria	344 and 228 earnings announcements for Austrian and Polish stocks, respectively	2005 - 2010	[-30; 30], [-20;-20], [-10;10] / [-281; -31]	Market model	t-test	The Polish market prices the earnings surprises sluggishly, while the Austrian market does not show any reaction. Authors conclude that the Polish market is inefficient and the Austria market is efficient. That said, on a 21 days event window their results reject the null hypothesis of market efficiency for the bad news portfolio but not for the good news portfolio in Poland.
9	Stasiulis (2011)	Bulgaria, Czech Republic, Hungary, Estonia, Latvia, Lithuania, Poland, Romania, Slovenia	3144 quarterly earnings announcements, 2030 of which are from Poland	2004 - 2008	[-5; +5] / [-55; -5]	Market model	t-test, Patell's t-test, generalized sign test	Semi-strong form EMH is accepted Poland, Hungary, Lithuania, Romania, Bulgaria, Czech Republic and Estonia; rejected in Slovenia and Latvia.
10	Slonski and Zawadzki (2012)	Poland	21 special dividend announcements, 206 unchanged dividends	2006 - 2010	[-5; +5] / estimation period not disclosed	Market model	t-test, bootstrapping	The paper examines whether special (unexpected) dividends convey positive information and, if they do, how fast the market prices the new information. Authors conclude that special dividends convey positive information as their announcement results in 2.2% positive AAR on day 0 at 1% significance. Yet, AARs on other days are not statistically significant, implying that the Polish market is semi-strong form efficient.
11	Perepeczo (2014)	Poland	113 and 170 initial dividend payments for mean adjusted model and market adjusted model, respectively.	1992 - 2011	[-60; +60] / [-55; -5]	Mean adjusted model and market adjusted model	t-test	The study finds 8.9% statistically significant abnormal return in the [-60; +60] event window using the mean adjusted model, but fails to confirm the results with the market adjusted model. Moreover, it fails to find any significant AAR on the event day or any significant ACAR in the 29 days surrounding the event.
12	Okon (2012)	Poland	54 mandatory offers	2007 - 2009	[-10; +10]	Market model	t-test, Corrado rank test	ACAR begins to grow steadily in the third session prior to the announcement, which may be due to good anticipation and/or insider trading. No post-announcement drift is observed, which implies that the Polish market is semi-strong form efficient.
13	Babiarz (2013)	Poland	33 dividend initiation announcements	2003 - 2009	multiple event windows [-20; +20] being the widest / [-120; -21]	Market model	t-test	ACAR surrounding dividend initiation announcements are significantly negative for all time intervals. Although results contradict with many other studies, they still support the information content hypothesis since more than 50% of the sampled companies have their ROE and ROA decrease in the year succeeding the dividend initiation.
14	Szomko (2015)	Poland	32 dividend initiation announcements	1997 - 2010	[-1; +1] / [-125; -2]	Market model	t-test	The study uses the AGM approval as the event date rather than the BoD's dividend proposal. Author finds 2.44% positive ACAR in case of dividend initiations. Most of the reaction happens in the [-1;0] interval. No significant post announcement drift is observed. The Polish market looks efficient.
15	Altıok and Selçuk (2010)	Turkey	184 dividend change announcements	2005 - 2008	[-1; +1] / [-360; -6]	Market model	t-test	Authors conclude that market reacts positively (negatively) to dividend increases (decreases) and does not react when dividends are unchanged, consistent with the signalling hypothesis. However, results are only significant at 10% level in the [-1; 1] event window. In case of dividend decreases there is -1% ACAR in the [-5;-1] window, significant at 1%, implying accurate predictions and/or information leakage. No abnormal returns are present in the post-announcement window up to the 5th day, suggesting an efficient market.

Table A.4: (continued)

	Author(s)	Countries	Source of information / sample size	Time period	Event / estimation window (days)	Model	Tests used	Key findings
16	Günalp et al. (2010)	Turkey	429 dividend announcements	2003 - 2009	[-5; -1], [-2; -1], 0, [0; 1], [0; 2], [0; 4], [0; 10], [0; 15] / estimation period not disclosed	Market adjusted returns	Regression analysis with ACAR	The paper found an inverse relationship between dividend per share and abnormal returns after the announcements, which supports the tax effect hypothesis. According to the authors, regulations successfully prevent information leakage prior to the event date (no significant AAR in pre-event window). Yet, price adjustment to new information starts on the event day and continues for 15 days, i.e. the market is inefficient.
17	Yılmaz and Gülay (2006)	Turkey	602 dividend payments	1995 - 2003	[-10; +10] / estimation period not disclosed	Market adjusted returns	t-test	The study defines payment day instead of the announcement day as the day of the event. Findings indicate that prices start to rise a few sessions before cash dividend payments. They fell less than the dividends paid per share on the ex-div day. But, they decrease in the following sessions. Hence, profitable trading opportunities exist around the dividend payment day, which contradicts with the semi-strong form EMH.
18	Kadıoğlu (2008)	Turkey	330 dividend announcements	2003 - 2007	[-5; +15] / estimation period not disclosed	Market adjusted returns	t-test	Authors find no significant AAR in the pre-event window (no information leakage). Dividend decreases result in significant positive AAR in the post-event period. Price adjustment takes 15 days, while the most significant price adjustment takes place in the first three days. Results support the tax effect hypothesis and exhibit a violation of semi-strong form EMH.
19	Hekimoğlu and Tanyeri (2011)	Turkey	125 merger announcements	1991 - 2009	[-30; +30] / [-282; -31]	Market model	CDA	This study reveals that targets of mergers and partial sales realize significant ACAR of 9% and 2%, respectively, in the 3-day event window surrounding announcements. Positive price reaction starts a day before the announcements, suggesting some leakage. Price reaction continues on day 1 and 2 suggesting some in efficiency of the market.
20	Uludağ and Gülbudak (2011)	Turkey	37 merger announcements	1997 - 2006	5 days and 12 months befor and after the merger	Market adjusted returns	t-test	The study shows that M&A activity picked up especial after the 2001 banking crisis. Prices increase before the merger announcement and decrease with the merger announcement and during post-merger period.
21	Kaderli and Başkaya (2014)	Turkey	39 dividend announcements	2009 - 2010	[-5; +5], [-20; +20] / estimation period not disclosed	Market model	no significance test applied	In case of dividend increases, the sample reacts with 0.7% AAR on the event day. Yet, the positive reaction is followed by a mean reversion; ACAR in the [-5; 5] window is 0%. On the other hand, the study finds positive price reactions to dividend cut announcements, too. This positive reaction is followed by mean reversion and the ACAR in [-5; 5] is again 0%. Authors conclude that Turkish market is semi-strong form inefficient given the gradual pricing of new information in the post-event window. Moreover, they suggest that ACAR for dividend cuts is greater than for dividend increases in the post event window (leverage effect).
22	Karaca (2007)	Turkey	12831 dividend announcements	2000 - 2005	[-60; 30] / estimation period not disclosed	Market model	t-test	Market reacts positively to cash dividend announcements. Author finds +2.7% ACAR in the 28 days following the dividend announcement at 1% significance. There is also some mean reversion apparent after the dividend payment day. Results suggest that the market is not semi-strong form efficient.
23	Kadıoğlu et al. (2015)	Turkey	902 dividend announcements	2003 - 2015	multiple event windows [-10; +30] being the widest / estimation period not disclosed	Market adjusted returns	t-test	Authors find that the market reacts negatively to cash dividend announcements, which supports the tax effect hypothesis. No distinction between dividend increases and decreases are made. Results also suggest that there is no information leakage in the pre-event window. It takes the market 12 days to price the news after the announcement, i.e. the market is semi-strong form inefficient.

Table A.4: (continued)

	Author(s)	Countries	Source of information / sample size	Time period	Event / estimation window (days)	Model	Tests used	Key findings
24	Rono (2013)	South Africa and Kenya	261 earnings announcements	2005 - 2011	6 months following the earnings announcement / estimation period not disclosed	Market adjusted returns	t-test	Unlike others, this study uses monthly data instead of daily data. The results show that AAR for JSE is positive and significant on the month of earnings announcement, but not on the following months. NSE, on the other hand, recorded negative and significant AAR on the second month, too. The study concludes that JSE is informationally more efficient than NSE.
25	Lentsoane (2011)	South Africa	44 dividend reduction announcements	2004 - 2009	[-10; +10] and 3 days rolling ACAR windows / [-41; -141]	Market adjusted returns, market model and buy and hold abnormal returns	parametric and non-parametric test	Results of the analysis show that the market reaction to dividend reductions is significant in the pre-event window; i.e. possible information leakage, and not on the event day. The statistically insignificant AAR in the post-event period suggests that the market is semi-strong form efficient.
26	Murie (2014)	South Africa	58 trading statement releases	2010 - 2013	[-60; -1], [-3; 3], [3; 60] / [-120; - 61]	Market adjusted returns	t-test	The study finds that trading statements convey information, i.e. good and bad news portfolios show statistically significant returns in the predicted directions, with the reaction to good news being greater than the reaction to bad news. Although most of the price reaction happens in the pre-event window, implying leakage or good forecasting, shares do not adjust instantaneously to new information in the post-event window, especially in the case of good news, which violates the semi-strong form EMH.
27	Mlonzi et al. (2011)	South Africa	34 earnings announcements	2009	[-10; +5] / [-360; -6]	CAPM	t-test	The study does not differentiate between good and bad earnings surprises. Since JSE was in a bear market during the global financial crisis, reaction to earnings announcements was negative on the average. In the [-2; +2] event window, the only statistically significant reaction was on day 2, implying that the market is inefficient. A longer [-10; 5] event window reveals information leakage in the pre-event window and slow reaction in the post-event window.
28	Punwasi (2013)	South Africa	167 share repurchase announcements	2003 - 2012	[-20; +20] / [-360; -6]	CAPM	t-test	Author claims that results are consistent with the signalling theory, i.e. share repurchase announcements are associated with positive returns. Yet, no statistically significant ACAR is observed in the pre-event [-21; -1] and post event windows [0; 20] for any of the years.

APPENDIX B

MODELS SELECTIONS FOR EACH EVENT

B.1 Introduction

This section is designed as an appendix to chapter 5. It mainly consists of detailed versions of the summary tables we have provided in Chapter 5, such as the full list of constituents of each dividend group, dates of the events, number of analysts covering that particular stock on the event day, model selections for each event and results of residual diagnostics.

Table B.1: Sample constituents - Turkey - analyst count > 5

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
1	YKBNK	Yapi Ve Kredi Bankasi	1.4.2013	34	GARAN	Turkiye Garanti Bankasi	8.3.2012	33	TCELL	Turkcell iletisim Hizmet As	28.3.2011	36
2	GARAN	Turkiye Garanti Bankasi	6.8.2009	33	GARAN	Turkiye Garanti Bankasi	7.3.2013	33	GARAN	Turkiye Garanti Bankasi	12.3.2008	33
3	MGROS	Migros Ticaret A.S	19.3.2007	29	TUPRS	Tupras-Turkiye Petrol Rafine	14.4.2006	33	THYAO	Turk Hava Yollari Ao	6.4.2010	29
4	MGROS	Migros Ticaret A.S	10.7.2009	29	TUPRS	Tupras-Turkiye Petrol Rafine	10.3.2010	33	ARCLK	Arcelik As	13.3.2009	27
5	THYAO	Turk Hava Yollari Ao	15.3.2013	29	TUPRS	Tupras-Turkiye Petrol Rafine	11.3.2013	33	EREGL	Eregli Demir Ve Celik Fabrik	30.3.2009	26
6	ARCLK	Arcelik As	7.4.2005	27	AKBNK	Akbank T.A.S.	29.2.2008	32	TKFEN	Tekfen Holding As	6.3.2014	26
7	ARCLK	Arcelik As	24.2.2010	27	VAKBN	Turkiye Vakiflar Bankasi T-D	3.3.2014	32	SISE	Turk Sise Ve Cam Fabrikalari	10.4.2008	21
8	EREGL	Eregli Demir Ve Celik Fabrik	14.3.2011	26	FROTO	Ford Otomotiv Sanayi As	15.9.2008	29	DOAS	Dogus Otomotiv Servis Ve Tic	9.4.2009	21
9	KCHOL	Koc Holding As	26.3.2010	22	FROTO	Ford Otomotiv Sanayi As	26.9.2012	29	SISE	Turk Sise Ve Cam Fabrikalari	14.4.2006	21
10	TRKCM	Trakya Cam Sanayii As	22.3.2011	22	TOASO	Tofas Turk Otomobil Fabrika	5.4.2007	28	ANACM	Anadolu Cam Sanayii As	9.4.2008	19
11	DOAS	Dogus Otomotiv Servis Ve Tic	9.3.2012	21	TOASO	Tofas Turk Otomobil Fabrika	8.3.2012	28	KRDMD	Kardemir Karabuk Demir-Cl D	23.5.2013	18
12	SISE	Turk Sise Ve Cam Fabrikalari	25.3.2011	21	ARCLK	Arcelik As	28.3.2007	27	AYGAZ	Aygaz As	7.4.2006	17
13	KRDMD	Kardemir Karabuk Demir-Cl D	27.3.2012	18	CCOLA	Coca-Cola icecek As	11.3.2014	26	AYGAZ	Aygaz As	7.4.2008	17
14	AKENR	Akenerji Elektrik Uretim As	10.4.2009	17	ENKAI	Enka insaat Ve Sanayi As	8.8.2014	26	AKENR	Akenerji Elektrik Uretim As	6.5.2010	17
15	AYGAZ	Aygaz As	5.4.2007	17	SAHOL	Haci Omer Sabanci Holding	18.4.2008	25	ISGYO	Is Gayrimenkul Yatirim Ortak	1.3.2007	15
16	AYGAZ	Aygaz As	23.3.2009	17	SAHOL	Haci Omer Sabanci Holding	7.3.2014	25	AKGRT	Aksigorta	11.3.2011	12
17	ASELS	Aselsan Elektronik Sanayi	11.3.2005	15	AEFES	Anadolu Efes Biracilik Ve	12.4.2012	23	GUBRF	Gubre Fabrikalari Tas	15.3.2006	11
18	ISGYO	Is Gayrimenkul Yatirim Ortak	25.3.2005	15	AEFES	Anadolu Efes Biracilik Ve	27.3.2013	23	DOHOL	Dogan Sirketler Grubu Hldgs	11.5.2007	11
19	ISGYO	Is Gayrimenkul Yatirim Ortak	29.2.2008	15	AKCNS	Akcansa Cimento	7.3.2008	21	DOHOL	Dogan Sirketler Grubu Hldgs	29.4.2008	11
20	DOHOL	Dogan Sirketler Grubu Hldgs	15.9.2009	11	SISE	Turk Sise Ve Cam Fabrikalari	6.3.2014	21	GUBRF	Gubre Fabrikalari Tas	25.3.2009	11
21	GUBRF	Gubre Fabrikalari Tas	11.3.2014	11	CIMSA	Cimsa Cimento Sanayi Ve Tic	13.4.2006	20	ANSGR	Anadolu Anonim Turk Sigorta	10.3.2005	10
22	ALARK	Alarko Holding	24.4.2006	10	TTRAK	Turk Traktor Ve Ziraat Makin	22.2.2013	18	ALARK	Alarko Holding	22.4.2005	10
23	ANSGR	Anadolu Anonim Turk Sigorta	14.3.2006	10	AYGAZ	Aygaz As	30.3.2005	17	SODA	Soda Sanayii	3.4.2008	10
24	SODA	Soda Sanayii	31.3.2006	10	TSKB	Turkiye Sinai Kalkinma Bank	28.2.2014	17	SODA	Soda Sanayii	26.4.2012	10
25	SODA	Soda Sanayii	21.3.2011	10	ANHYT	Anadolu Hayat Emeklilik	1.3.2013	15	BAGFS	Bagfas Bandirma Gubre Fabrik	26.2.2010	8
26	SODA	Soda Sanayii	6.5.2013	10	ISGYO	Is Gayrimenkul Yatirim Ortak	30.3.2009	15	CLEBI	Celebi Hava Servisi	26.4.2005	7
27	BAGFS	Bagfas Bandirma Gubre Fabrik	14.3.2005	8	ISGYO	Is Gayrimenkul Yatirim Ortak	26.2.2010	15	PRKME	Park Elektrik Uretim Madenci	12.3.2008	7
28	BAGFS	Bagfas Bandirma Gubre Fabrik	25.2.2011	8	ISGYO	Is Gayrimenkul Yatirim Ortak	23.2.2011	15	AKSA	Aksa Akrilik Kimya Sanayii	14.4.2008	7
29	BRISA	Brisa Bridgestone Sabanci	24.2.2005	8	ISGYO	Is Gayrimenkul Yatirim Ortak	4.3.2013	15	CLEBI	Celebi Hava Servisi	16.5.2012	7
30	AKSA	Aksa Akrilik Kimya Sanayii	6.4.2010	7	SNGYO	Sinpas Gayrimenkul Yatirim O	14.5.2012	15	HURGZ	Hurriyet Gazetecilik Ve Matb	18.4.2007	6
31	CLEBI	Celebi Hava Servisi	7.4.2006	7	SNGYO	Sinpas Gayrimenkul Yatirim O	15.4.2013	15	ASYAB	Asya Katilim Bankasi As	24.2.2011	6
32	CLEBI	Celebi Hava Servisi	2.5.2013	7	KOZAL	Koza Altin isletmeleri As	6.3.2014	11	SKBNK	Sekerbank	28.2.2012	6
33	PRKME	Park Elektrik Uretim Madenci	21.3.2007	7	SELEC	Selcuk Ecza Deposu Ticaret V	19.4.2013	10	YKBNK	Yapi Ve Kredi Bankasi	10.3.2016	21
34	ASYAB	Asya Katilim Bankasi As	8.3.2013	6	OTKAR	Otokar Otomotiv Ve Savunma	17.3.2008	8	TCELL	Turkcell iletisim Hizmet As	23.3.2016	36

Table B.1: (continued)

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
35	BANVT	Banvit Bandirma Vitaminli Ye	8.4.2008	6	TRCAS	Turcas Petrol A.S.	6.5.2013	8	PETKM	Petkim Petrokimya Holding As	9.3.2015	18
36	SKBNK	Sekerbank	29.4.2008	6	AKSA	Aksa Akrilik Kimya Sanayii	22.4.2011	7	ANSGR	Anadolu Anonim Turk Sigorta	29.2.2016	10
37	TKFEN	Tekfen Holding As	9.3.2015	26	SKBNK	Sekerbank	3.3.2011	6	BAGFS	Bagfas Bandirma Gubre Fabrik	22.2.2016	8
38	BOLUC	Bolu Cimento Sanayii As	20.2.2015	10	YKBNK	Yapi Ve Kredi Bankasi	25.3.2015	21				
39	TATGD	Tat Gida Sanayi As	26.2.2016	9	VAKBN	Turkiye Vakiflar Bankasi T-D	4.3.2016	32				
40	ANSGR	Anadolu Anonim Turk Sigorta	11.3.2015	10	VAKBN	Turkiye Vakiflar Bankasi T-D	2.3.2015	32				
41	BAGFS	Bagfas Bandirma Gubre Fabrik	26.3.2015	8	AKBNK	Akbank T.A.S.	25.2.2016	32				
42					ISGYO	Is Gayrimenkul Yatirim Ortak	25.2.2016	15				

Table B.2: Sample constituents - Turkey - analyst count < 6

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
1	GLYHO	Global Yatirim Holding As	9.4.2013	4	ECILC	Eis Eczacibasi ilac Ve Sinai	13.4.2011	3	IPEKE	Ipek Dogal Enerji Kaynaklari	21.6.2005	5
2	VESBE	Vestel Beyaz Esya Sanayi Ve	27.3.2014	4	ECILC	Eis Eczacibasi ilac Ve Sinai	15.5.2013	3	AYEN	Ayen Enerji As	13.4.2011	5
3	ALGYO	Alarko Gayrimenkul Yatirim	16.3.2007	3	PETUN	Pinar Entegre Et Ve Un Sanay	14.5.2012	3	VESBE	Vestel Beyaz Esya Sanayi Ve	18.5.2012	4
4	ALGYO	Alarko Gayrimenkul Yatirim	7.3.2011	3	YAZIC	Yazicilar Holding As-A	10.4.2009	3	ALGYO	Alarko Gayrimenkul Yatirim	4.3.2005	3
5	ECILC	Eis Eczacibasi Ilac Ve Sinai	29.4.2008	3	YAZIC	Yazicilar Holding As-A	6.4.2010	3	SASA	Sasa Polyester Sanayi	28.3.2005	3
6	NTHOL	Net Holding As	6.5.2013	3	YAZIC	Yazicilar Holding As-A	26.4.2012	3	ECILC	Eis Eczacibasi ilac Ve Sinai	3.4.2006	3
7	TEBNK	Turk Ekonomi Bankasi	1.10.2010	3	YAZIC	Yazicilar Holding As-A	28.3.2013	3	ALGYO	Alarko Gayrimenkul Yatirim	30.3.2009	3
8	EGSER	Ege Seramik Sanayi Ve Ticare	12.4.2011	2	ADNAC	Adana Cimento-C	22.2.2011	1	MUTLU	Mutlu Aku	15.3.2007	2
9	IZMDC	Izmir Demir Celik Sanayi As	10.4.2008	2	ALKIM	Alkim Alkali Kimya A.S	15.3.2006	1	GUSGR	Gunes Sigorta	2.3.2009	2
10	ASUZU	Anadolu Isuzu Otomotiv San-C	18.3.2005	1	ALKIM	Alkim Alkali Kimya A.S	13.3.2008	1	AFYON	Afyon Cimento	26.4.2005	1
11	ASUZU	Anadolu Isuzu Otomotiv San-C	28.3.2012	1	ASUZU	Anadolu isuzu Otomotiv San-C	18.4.2006	1	MRSHL	Marshall Boya Ve Vernik	23.5.2005	1
12	BRSAN	Borusan Mannesmann Boru Sana	13.3.2012	1	ECZYT	Eczacibasi Yatirim Holding	14.5.2007	1	KIPA	Tesco Kipa Kitle Pazarlama	2.5.2006	1
13	DGZTE	Dogan Gazetecilik As	9.4.2013	1	ECZYT	Eczacibasi Yatirim Holding	2.5.2008	1	DEVA	Deva Holding As	18.4.2007	1
14	EGEEN	Ege Endustri Ve Ticaret As	21.3.2007	1	ECZYT	Eczacibasi Yatirim Holding	22.4.2013	1	GOODY	Goodyear Lastikleri Turk As	25.3.2010	1
15	EGEEN	Ege Endustri Ve Ticaret As	23.3.2011	1	EGEEN	Ege Endustri Ve Ticaret As	8.3.2013	1	BRSAN	Borusan Mannesmann Boru Sana	5.8.2011	1
16	EGGUB	Ege Gubre Sanayii As	26.3.2013	1	GOLTS	Goltas Goller Bolgesi Ciment	18.4.2007	1	FENER	Fenerbahce Futbol As	17.8.2011	1
17	FENER	Fenerbahce Futbol As	28.8.2012	1	GOLTS	Goltas Goller Bolgesi Ciment	13.4.2009	1	AFYON	Afyon Cimento	7.5.2012	1
18	GOODY	Goodyear Lastikleri Turk As	18.5.2009	1	GOLTS	Goltas Goller Bolgesi Ciment	8.4.2011	1	NTTUR	Net Turizm Ticaret Ve Sanayi	8.6.2012	1
19	GOODY	Goodyear Lastikleri Turk As	26.4.2011	1	GSRAY	Galatasaray Sportif Sinai	25.11.2008	1	YKSGR	Yapi Kredi Sigorta As	26.2.2013	1
20	MRSHL	Marshall Boya Ve Vernik	29.5.2006	1	GSRAY	Galatasaray Sportif Sinai	13.5.2009	1	ASUZU	Anadolu isuzu Otomotiv San-C	12.4.2013	1
21	NTTUR	Net Turizm Ticaret Ve Sanayi	6.5.2011	1	TIRE	Mondi Tire Kutsan Kagit Ve	10.4.2006	1	FENER	Fenerbahce Futbol As	3.10.2013	1
22	PTOFS	Omv Petrol Ofisi As-A Sh	3.4.2006	1	YKSGR	Yapi Kredi Sigorta As	16.3.2009	1	EGGUB	Ege Gubre Sanayii As	20.2.2014	1
23	SAFGY	Saf Gayrimenkul Yatirim Orta	21.8.2014	1	ALARK	Alarko Holding	13.5.2015	0	EGEEN	Ege Endustri Ve Ticaret As	17.3.2010	1
24	TSPOR	Trabzonspor Sportif Yatirim	11.10.2012	1	EGSER	Ege Seramik Sanayi Ve Ticare	5.5.2015	0	EGGUB	Ege Gubre Sanayii As	29.3.2012	1
25	YKSGR	Yapi Kredi Sigorta As	8.3.2007	1	KOZAL	Koza Altin isletmeleri As	27.2.2015	5	MRSHL	Marshall Boya Ve Vernik	13.5.2011	1
26	LOGO	Logo Yazilim Sanayi Ve Ticar	21.3.2012	0	AKMGY	Akmerkez Gayrimenkul Yatirim	12.5.2015	0	NETAS	Netas Telekomunikasyon As	30.4.2014	1
27	KORDS	Kordsa Global Endustriyel ip	15.5.2015	4	BFREN	Bosch Fren Sistemleri	4.3.2016	0	SAFGY	Saf Gayrimenkul Yatirim Orta	4.7.2013	1
28	DGATE	Datagate Bilgisayar Malzemel	4.4.2016	2	ISYAT	Is Yatirim Ortakligi Anomim	19.2.2015	0	TIRE	Mondi Tire Kutsan Kagit Ve	18.4.2008	1
29	ANELE	Anel Elektrik Proje Taahhut	28.5.2015	1	KUTPO	Kutahya Porselen Sanayi As	31.3.2015	0	TUDDF	Turk Demir Dokum Fabrikalari	23.3.2007	0
30	GLYHO	Global Yatirim Holding As	16.5.2016	1					KORDS	Kordsa Global Endustriyel ip	27.4.2007	0
31	BAKAB	Bak Ambalaj	17.6.2015	0					AGYO	Atakule Gayrimenkul Yatirim	11.3.2008	0
32	BFREN	Bosch Fren Sistemleri	3.3.2015	0					LOGO	Logo Yazilim Sanayi Ve Ticar	28.4.2009	0
33	COMDO	Componenta Ticaret Ve San	8.4.2015	0					HEKTS	Hektas Ticaret T.A.S	11.6.2009	0

Table B.2: (continued)

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
34	ECBYO	Eczacibasi Yatirim Ortakligi	19.3.2015	0					USAS	Usas Yatirimal Holding As	14.4.2010	0
35	ERBOS	Erbosan Erciyas Boru	11.3.2015	0					LOGO	Logo Yazilim Sanayi Ve Ticar	24.6.2013	0
36	GSDHO	Gsd Holding As	29.5.2015	0					TSPOR	Trabzonspor Sportif Yatirim	21.10.2014	1
37	KENT	Kent Gida Maddeleri Sanayii	22.12.2015	0					BSOKE	Batisoke	26.4.2016	0
38	KLMSN	Klimasan Klima Sanayi Ve Tic	5.5.2016	0					ECBYO	Eczacibasi Yatirim Ortakligi	26.4.2016	0
39	NIBAS	Nigbas Nigde Beton San Ve Ti	18.4.2016	0					ISGSY	Is Girisim Sermayesi Yatirim	16.2.2016	0
40	PRKAB	Turk Prysmian Kablo Ve Siste	1.3.2016	0					PRKAB	Turk Prysmian Kablo Ve Siste	3.3.2015	0
41	SILVR	Silverline Endustri Ve Ticar	27.3.2015	0								

Table B.3: Sample constituents - Russia - analyst count > 5

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
1	RTKM	Rostelecom Pjsc	27.4.2012	18	RTKM	Rostelecom Pjsc	15.4.2009	21	RTKM	Rostelecom Pjsc	17.5.2011	21
2	FEES	Federal Grid Co Unified Ener	5.5.2011	18	BSPB	Bank St Petersburg Pjsc	26.3.2013	20	SNGS	Surgutneftegas Ojsc	28.4.2009	17
3	EONR	E.On Russia Jsc	22.5.2014	18	BSPB	Bank St Petersburg Pjsc	22.4.2014	20	SNGSP	Surgutneftegas-Preference	28.4.2009	16
4	SNGS	Surgutneftegas Ojsc	4.5.2012	17	VZRZ	Bank Vozrozhdenie Pjsc	14.5.2012	19	OGKB	Ogk-2 Pjsc	16.4.2013	13
5	MSNG	Mosenergo Pjsc	17.5.2011	16	VZRZ	Bank Vozrozhdenie Pjsc	8.5.2013	19	MTLR	Mechel Pjsc	30.4.2013	7
6	SVAV	Sollers Pjsc	17.5.2010	13	VZRZ	Bank Vozrozhdenie Pjsc	25.4.2014	19	AFLT	Aeroflot Pjsc	2.3.2015	13
7	CHMF	Severstal Pjsc	5.5.2010	12	EONR	E.On Russia Jsc	12.5.2014	18	ENRU	Enel Russia Pjsc	10.3.2016	6
8	CHMF	Severstal Pjsc	27.7.2005	12	TATN	Tatneft Pjsc	28.4.2014	17				
9	KMAZ	Kamaz Pjsc	21.4.2010	9	MSNG	Mosenergo Pjsc	15.5.2009	16				
10	MRKY	Mrsk Yuga Pjsc	11.4.2013	6	SIBN	Gazprom Neft Pjsc	21.5.2007	16				
11	LSNG	Lenenergo Pjsc	5.7.2011	6	SIBN	Gazprom Neft Pjsc	14.5.2009	16				
12					SVAV	Sollers Pjsc	23.4.2014	13				
13					MTSS	Mobile Telesystems Pjsc	1.9.2009	11				
14					NLMK	Novolipetsk Steel Pjsc	7.4.2014	11				
15					URKA	Uralkali Pjsc	19.4.2013	9				
16					GMKN	Mmc Norilsk Nickel Pjsc	16.4.2014	8				
17					MTLR	Mechel Pjsc	16.5.2013	7				
18					NMTP	Novorossiysk Commercial Sea	28.4.2014	7				
19					NMTP	Novorossiysk Commercial Sea	15.5.2012	7				
20					RTKM	Rostelecom Pjsc	15.5.2015	21				
21					SNGS	Surgutneftegas Ojsc	17.5.2016	15				
22					SNGS	Surgutneftegas Ojsc	15.5.2015	15				
23					GAZP	Gazprom Pjsc	9.4.2015	19				
24					TRNFP	Transneft Pjsc	29.5.2015	10				
25					UPRO	Unipro Pjsc	5.5.2015	6				

Table B.4: Sample constituents - Russia - analyst count < 6

	Good news				No news				Bad news			
	Ticker	Name	Declaration date	Analyst count	Ticker	Name	Declaration date	Analyst count	Ticker	Name	Declaration date	Analyst count
1	PIKK	Pik Group Pjsc	15.9.2014	5	LSRG	Lsr Group Pjsc	5.3.2013	1	VRPH	Veropharm Pjsc	2.5.2012	5
2	GCHE	Cherkizovo Group Pjsc	15.9.2014	4	UTAR	Utair Aviation Pjsc	1.6.2011	4	UTAR	Utair Aviation Pjsc	21.5.2014	4
3	MRKK	Mrsk Severnogo Kavkaza Pjsc	13.5.2013	3	IRGZ	Irkutskenergo Pjsc	5.5.2008	1	RSTIP	Rosseti Pjsc	28.5.2014	3
4	ISKJ	Human Stem Cells institute P	19.5.2014	1	IRGZ	Irkutskenergo Pjsc	18.4.2012	1	IRGZ	Irkutskenergo Pjsc	29.4.2009	1
5	KRSG	Krasnoyarsk Hpp Pjsc	16.5.2012	1	VZRZ	Bank Vozrozhdenie Pjsc	21.4.2015	5	LNZL	Lenzoloto Pjsc	15.5.2014	0
6	MSSB	Mosenergosbyt Pjsc	16.5.2012	1	LSRG	Lsr Group Pjsc	3.3.2016	1	YKEN	Yakutskenergo Ojsc	9.4.2010	0
7	IRGZ	Irkutskenergo Pjsc	4.5.2010	1	WTCMP	World Trade Center Moscow	18.3.2015	0	SVAV	Sollers Pjsc	15.5.2015	4
8	MMBM	Bm Bank Jsc	26.4.2012	0					LSNG	Lenenergo Pjsc	22.5.2015	3
9	DGBZ	Dorogobuzh Pjsc	27.4.2015	0					MRKK	Mrsk Severnogo Kavkaza Pjsc	13.5.2015	3
10	FEES	Federal Grid Co Unified Ener	29.5.2015	0					MRKS	Mrsk Sibiri Pjsc	25.4.2016	1
11	ISKJ	Human Stem Cells institute P	17.5.2016	1					MRKZ	Idgc Of The North-West Pjsc	25.5.2015	1
12	KRSB	Krasnoyarskenergosbyt Pjsc	12.8.2015	0					PIKK	Pik Group Pjsc	28.5.2015	1
13	MRKS	Mrsk Sibiri Pjsc	26.5.2015	0					CNTL	Central Telegraph Pjsc	30.4.2015	0
14	OGKB	Ogk-2 Pjsc	8.5.2015	0					ISKJ	Human Stem Cells institute P	15.5.2015	0
15	VRSB	Tns Energo Voronezh Pjsc	28.4.2016	0					RTSB	Tns Energo Rostov-On-Don Pjs	9.4.2015	0
16									VLHZ	Vladimir Chemical Plant Pjsc	27.5.2015	0

Table B.5: Sample constituents - Poland - analyst count > 5

	Good news				No news				Bad news			
	Ticker	Name	Declaration date	Analyst count	Ticker	Name	Declaration date	Analyst count	Ticker	Name	Declaration date	Analyst count
1	PEO	Bank Pekao Sa	15.3.2010	29	CEZ	Cez As	22.4.2014	31	PEO	Bank Pekao Sa	13.3.2009	29
2	PKN	Polski Koncern Naftowy Orlen	4.4.2013	24	PKO	Pko Bank Polski Sa	8.6.2009	29	PKN	Polski Koncern Naftowy Orlen	17.7.2009	24
3	BZW	Bank Zachodni Wbk Sa	2.3.2010	23	PKN	Polski Koncern Naftowy Orlen	27.3.2014	24	BHW	Bank Handlowy W Warszawie Sa	19.3.2009	16
4	KGH	Kghm Polska Miedz Sa	15.3.2005	21	PKN	Polski Koncern Naftowy Orlen	1.4.2005	24	PGN	Polskie Gornictwo Naftowe i	26.4.2012	16
5	LPP	Lpp Sa	21.6.2010	17	OPL	Orange Polska Sa	12.2.2014	23	MIL	Bank Millennium Sa	13.2.2009	15
6	MOL	Mol Hungarian Oil And Gas Pl	26.4.2012	17	OPL	Orange Polska Sa	14.2.2012	23	ING	Ing Bank Slaski Sa	17.6.2010	14
7	BHW	Bank Handlowy W Warszawie Sa	13.4.2010	16	OPL	Orange Polska Sa	23.2.2011	23	KTY	Grupa Kety Sa	24.4.2009	10
8	CCC	Ccc Sa	29.6.2009	16	OPL	Orange Polska Sa	23.2.2010	23	CAR	inter Cars Sa	10.6.2009	8
9	PGN	Polskie Gornictwo Naftowe i	22.5.2013	16	OPL	Orange Polska Sa	17.3.2009	23	PKO	Pko Bank Polski Sa	7.4.2015	26
10	MIL	Bank Millennium Sa	31.3.2011	15	OPL	Orange Polska Sa	12.3.2008	23	ENA	Enea Sa	25.5.2016	13
11	ING	ing Bank Slaski Sa	16.2.2011	14	EUR	Eurocash Sa	17.5.2011	18	ATT	Grupa Azoty Sa	13.5.2015	11
12	BDX	Budimex	29.4.2009	13	LPP	Lpp Sa	7.5.2014	17	SNS	Synthos Sa	7.3.2016	9
13	NET	Netia Sa	20.2.2014	12	CCC	Ccc Sa	13.5.2014	16	CMR	Comarch Sa	18.5.2015	6
14	NET	Netia Sa	3.3.2005	12	CCC	Ccc Sa	21.5.2013	16				
15	ATT	Grupa Azoty Sa	19.3.2013	11	ING	Ing Bank Slaski Sa	23.4.2007	14				
16	CIE	Ciech Sa	23.5.2014	11	SNS	Synthos Sa	4.3.2013	11				
17	SNS	Synthos Sa	20.6.2011	11	KTY	Grupa Kety Sa	11.4.2011	10				
18	KTY	Grupa Kety Sa	7.4.2010	10	KTY	Grupa Kety Sa	4.4.2007	10				
19	ACP	Asseco Poland Sa	26.5.2006	8	EMP	Emperia Holding Sa	9.5.2014	9				
20	CAR	Inter Cars Sa	6.7.2012	8	ACP	Asseco Poland Sa	24.3.2014	8				
21	AGO	Agora Sa	14.2.2005	7	ACP	Asseco Poland Sa	6.3.2013	8				
22	FMF	Famur Sa	24.4.2014	6	AGO	Agora Sa	30.5.2006	7				
23	KPX	Kopex Sa	30.4.2013	6	ABE	Ab Sa	29.12.2010	6				
24	ATT	Grupa Azoty Sa	21.4.2016	11	PEO	Bank Pekao Sa	11.2.2015	26				
25	AGO	Agora Sa	12.5.2016	7	EUR	Eurocash Sa	27.3.2015	18				
26					BHW	Bank Handlowy W Warszawie Sa	10.3.2015	14				
27					ACP	Asseco Poland Sa	16.3.2016	8				
28					CAR	Inter Cars Sa	19.5.2016	7				
29					CAR	Inter Cars Sa	5.5.2015	7				
30					ABE	Ab Sa	9.10.2015	6				
31					GPW	Warsaw Stock Exchange	20.5.2016	6				

Table B.6: Sample constituents - Poland - analyst count < 6

	Good news				No news				Bad news			
	Ticker	Name	Declaration date	Analyst count	Ticker	Name	Declaration date	Analyst count	Ticker	Name	Declaration date	Analyst count
1	AMC	Amica Sa	21.4.2011	5	NEU	Neuca Sa	15.6.2010	5	FTE	Fabryki Mebli Forte Sa	11.6.2008	5
2	FTE	Fabryki Mebli Forte Sa	24.6.2009	5	PEL	Pelion Sa	14.6.2007	5	PEL	Pelion Sa	6.6.2008	5
3	PCE	Zaklady Chemiczne Police Sa	25.4.2013	5	PEL	Pelion Sa	2.6.2006	5	ORB	Orbis Sa	15.5.2009	4
4	PEL	Pelion Sa	17.3.2011	5	CMR	Comarch Sa	26.6.2014	4	PND	Polnord Sa	31.7.2012	3
5	CMR	Comarch Sa	25.6.2012	4	CMR	Comarch Sa	14.5.2013	4	COL	Colian Holding Sa	20.6.2005	2
6	GTN	Getin Holding Sa	17.4.2013	4	ORB	Orbis Sa	2.6.2006	4	IPX	Impexmetal Sa	28.5.2012	2
7	ORB	Orbis Sa	23.4.2012	4	ORB	Orbis Sa	26.4.2005	4	IPX	Impexmetal Sa	25.6.2009	2
8	MSZ	Mostostal Zabrze Sa	28.9.2011	3	STP	Stalprodukt Sa	29.4.2010	4	MNC	Mennica Polska Sa	26.5.2010	2
9	PND	Polnord Sa	1.6.2010	3	SGN	Sygnity Sa	14.6.2007	3	ATM	Atm Sa	3.9.2009	1
10	RON	Ronson Europe Nv	8.5.2013	3	ABS	Asseco Business Solutions Sa	6.3.2014	2	IPL	Impel Sa	13.3.2014	1
11	SGN	Sygnity Sa	14.6.2006	3	DBC	Firma Oponiarska Debica Sa	7.7.2008	1	BCM	Betacom Sa	29.9.2010	0
12	SNK	Sanok Rubber Company Sa	12.7.2010	3	DCR	Decora Sa	16.4.2010	1	DGA	Dga Sa	24.6.2009	0
13	BTM	Bytom Sa	10.10.2006	2	ETL	Eurotel Sa	22.3.2012	1	ELZ	Zaklady Urzadzen Komputerowy	2.6.2004	0
14	IPX	Impexmetal Sa	6.6.2011	2	INK	Instal Krakow	11.6.2010	1	MCL	Macrologic Sa	30.3.2007	0
15	IPX	Impexmetal Sa	13.5.2005	2	IPL	Impel Sa	12.3.2013	1	NTT	Ntt System Sa	20.5.2014	0
16	MWT	Mw Trade Sa	5.4.2013	2	KSW	Zaklady Tluszczowe Kruszwica	29.6.2010	1	PJP	Projprzem Sa	24.6.2010	0
17	AMB	Ambra Sa	18.11.2009	1	LEN	Lena Lighting Sa	18.3.2014	1	YWL	Yawal Sa	12.6.2009	0
18	ATR	Atrem Sa	19.5.2014	1	PGD	Paged Sa	8.6.2007	1	FMF	Famur Sa	27.4.2015	2
19	EGS	Ergis Sa	8.5.2014	1	RPC	Zaklady Magnezytowe Ropczyce	13.4.2005	1	DCR	Decora Sa	24.3.2015	1
20	EMF	Empik Media & Fashion Sa	4.10.2010	1	TIM	Tim Sa	26.4.2006	1	INK	Instal Krakow	17.4.2015	1
21	LEN	Lena Lighting Sa	1.4.2011	1	AAT	Alta Sa	13.4.2011	0	ARR	Arteria Sa	28.5.2015	0
22	MSW	Mostostal Warszawa Sa	5.5.2010	1	AAT	Alta Sa	25.3.2010	0				
23	NVA	Pa Nova Sa	30.5.2012	1	AAT	Alta Sa	23.5.2008	0				
24	OPN	Oponeo.Pl Sa	30.5.2012	1	DGA	Dga Sa	13.6.2008	0				
25	PEK	Pekaes Sa	12.4.2011	1	HDR	Przedsiebiorstwo Hydrauliki	30.4.2014	0				
26	PRI	Pragma inkaso Sa	19.6.2012	1	STF	Stalprofil Sa	29.7.2008	0				
27	PRT	Lubelskie Zaklady Przemyslu	30.6.2014	1	STF	Stalprofil Sa	13.4.2007	0				
28	RFK	Rafako Sa	30.6.2009	1	TLX	Talex	12.5.2006	0				
29	TIM	Tim Sa	14.4.2010	1	WAS	Wasko Sa	9.5.2013	0				
30	TIM	Tim Sa	21.9.2005	1	WAS	Wasko Sa	18.5.2012	0				
31	TSG	Tesgas Sa	14.5.2014	1	ABC	Abc Data Sa	5.4.2016	3				
32	ULM	Ulma Construccion Polska Sa	20.5.2011	1	ABC	Abc Data Sa	17.3.2015	3				
33	06N	Magna Polonia Sa	8.9.2006	0	ACT	Action Sa	24.3.2015	3				

Table B.6: (continued)

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
34	ARR	Arteria Sa	20.4.2012	0	ABS	Asseco Business Solutions Sa	4.3.2015	2				
35	ATP	Atlanta Poland Sa	28.10.2014	0	ETL	Eurotel Sa	13.4.2015	1				
36	BCM	Betacom Sa	18.6.2014	0	LEN	Lena Lighting Sa	4.3.2015	1				
37	CAM	Cam Media Sa	26.4.2013	0	WAS	Wasko Sa	20.5.2016	0				
38	CNT	Centrum Nowoczesnych Technol	22.5.2013	0	RWL	Rawlplug Sa	13.5.2015	0				
39	DGA	Dga Sa	23.4.2010	0	PRI	Pragma inkaso Sa	23.3.2015	1				
40	ELZ	Zaklady Urzadzen Komputerowy	10.6.2005	0								
41	ENI	Energoinstal Sa	26.4.2012	0								
42	ENP	Energoaparatura Sa	30.4.2013	0								
43	IND	Indykpol Sa	12.5.2010	0								
44	KCH	Krakchemia Sa	11.4.2012	0								
45	KST	Konsorcjum Stali Sa	17.4.2012	0								
46	LBW	Lubawa Sa	29.6.2009	0								
47	LTX	Zaklady Lentex Sa	30.6.2009	0								
48	MCL	Macrologic Sa	19.6.2008	0								
49	MSP	Mostostal Plock	27.3.2013	0								
50	MSP	Mostostal Plock	12.4.2005	0								
51	MZA	Muza Sa	22.6.2006	0								
52	NVT	Novita Sa	21.6.2006	0								
53	PJP	Projprzem Sa	18.4.2013	0								
54	PLA	Zaklady Automatyki Polna Sa	26.6.2014	0								
55	RMK	Remak Sa	16.4.2009	0								
56	RWL	Rawlplug Sa	6.4.2012	0								
57	SME	Simple Sa	23.6.2010	0								
58	SUW	Suwary Sa	20.6.2006	0								
59	SWG	Seco/Warwick Sa	30.4.2014	0								
60	WAS	Wasko Sa	4.6.2007	0								
61	YWL	Yawal Sa	28.5.2007	0								
62	GRJ	Pfleiderer Group Sa	21.3.2016	4								
63	CMP	Comp Sa	2.6.2015	3								
64	LCC	Lc Corp Sa	17.3.2016	4								
65	MAG	Magellan Sa	19.3.2015	5								
66	NTT	Ntt System Sa	15.4.2015	0								
67	VTG	Vantage Development Sa	28.4.2016	0								

Table B.7: Sample constituents – South Africa - analyst count > 5

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
1	LON	Lonmin Plc	15.11.2010	27	BIL	Bhp Billiton Plc	23.9.2009	33	AGL	Anglo American Plc	20.2.2009	35
2	AMS	Anglo American Platinum Ltd	7.2.2011	22	BIL	Bhp Billiton Plc	26.5.2009	33	LON	Lonmin Plc	9.11.2012	27
3	AQP	Aquarius Platinum Ltd	11.2.2010	21	SAB	Sabmiller Plc	14.5.2009	33	LON	Lonmin Plc	18.11.2008	27
4	ITU	intu Properties Plc	31.7.2009	21	SAB	Sabmiller Plc	13.11.2008	33	AMS	Anglo American Platinum Ltd	23.7.2012	22
5	OML	Old Mutual Plc	11.3.2010	18	LON	Lonmin Plc	14.11.2011	27	AMS	Anglo American Platinum Ltd	9.2.2009	22
6	MDC	Mediclinic international Ltd	11.5.2005	14	AQP	Aquarius Platinum Ltd	11.8.2011	21	AQP	Aquarius Platinum Ltd	10.2.2012	21
7	NTC	Netcare Ltd	15.11.2010	14	ITU	Intu Properties Plc	1.8.2013	21	AQP	Aquarius Platinum Ltd	6.2.2009	21
8	ARI	African Rainbow Minerals Ltd	3.9.2007	12	ITU	Intu Properties Plc	27.2.2013	21	ITU	Intu Properties Plc	26.2.2009	21
9	IPL	Imperial Holdings Ltd	28.2.2007	12	ITU	Intu Properties Plc	26.7.2012	21	IMP	Impala Platinum Holdings Ltd	27.2.2014	20
10	DSY	Discovery Ltd	6.9.2006	8	ITU	Intu Properties Plc	23.2.2012	21	OML	Old Mutual Plc	4.3.2009	18
11	PAN	Pan African Resources Plc	17.9.2013	8	ITU	Intu Properties Plc	6.8.2008	21	ANG	Anglogold Ashanti Ltd	7.8.2013	17
12	DRD	Drdgold Ltd	21.8.2008	6	IMP	Impala Platinum Holdings Ltd	17.2.2005	20	GFI	Gold Fields Ltd	22.8.2013	17
13	TKG	Telkom Sa Soc Ltd	8.6.2015	17	MTN	Mtn Group Ltd	23.3.2006	18	HAR	Harmony Gold Mining Co Ltd	15.8.2013	16
14					VOD	Vodacom Group Ltd	19.5.2014	18	HAR	Harmony Gold Mining Co Ltd	3.2.2005	16
15					GFI	Gold Fields Ltd	4.8.2005	17	IPL	Imperial Holdings Ltd	27.2.2008	12
16					HAR	Harmony Gold Mining Co Ltd	16.8.2010	16	AEG	Aveng Ltd	10.9.2013	10
17					PIK	Pick N Pay Stores Ltd	22.10.2013	16	MUR	Murray & Roberts Holdings	23.2.2011	10
18					FSR	Firstrand Ltd	9.3.2010	15	JDG	Jd Group Ltd	20.2.2014	8
19					INP	investec Plc	18.11.2010	15	JDG	Jd Group Ltd	31.3.2009	8
20					NED	Nedbank Group Ltd	6.8.2008	15	PAN	Pan African Resources Plc	27.9.2012	8
21					TFG	The Foschini Group Ltd	30.10.2008	15	SAP	Sappi Limited	9.11.2009	7
22					TFG	The Foschini Group Ltd	29.5.2008	15	ARL	Astral Foods Ltd	13.5.2013	6
23					TRU	Truworths international Ltd	22.8.2013	15	RCL	Rcl Foods Ltd/South Africa	20.2.2013	6
24					MDC	Mediclinic international Ltd	8.11.2011	14	NPK	Nampak Ltd	1.6.2016	9
25					MDC	Mediclinic international Ltd	24.5.2011	14				
26					MDC	Mediclinic international Ltd	9.11.2010	14				
27					MDC	Mediclinic international Ltd	8.11.2006	14				
28					NTC	Netcare Ltd	14.5.2012	14				
29					SBK	Standard Bank Group Ltd	11.8.2011	14				
30					SBK	Standard Bank Group Ltd	3.3.2011	14				
31					SBK	Standard Bank Group Ltd	12.8.2010	14				
32					ABL	African Bank investments Ltd	24.5.2010	13				
33					AVI	Avi Ltd	5.9.2011	13				

Table B.7: (continued)

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
34					MSM	Massmart Holdings Ltd	27.2.2014	13				
35					MSM	Massmart Holdings Ltd	22.8.2013	13				
36					MSM	Massmart Holdings Ltd	22.2.2012	13				
37					MSM	Massmart Holdings Ltd	25.8.2011	13				
38					MSM	Massmart Holdings Ltd	24.2.2011	13				
39					TBS	Tiger Brands Ltd	19.5.2009	13				
40					NPK	Nampak Ltd	26.5.2005	12				
41					AIP	Adcock ingram Holdings Ltd	4.6.2013	11				
42					LEW	Lewis Group Ltd	19.5.2010	11				
43					LEW	Lewis Group Ltd	9.11.2009	11				
44					AEG	Aveng Ltd	5.9.2011	10				
45					AEG	Aveng Ltd	8.9.2010	10				
46					AEG	Aveng Ltd	9.9.2009	10				
47					MUR	Murray & Roberts Holdings	31.8.2005	10				
48					MUR	Murray & Roberts Holdings	28.2.2005	10				
49					WBO	Wilson Bayly Holmes-Ovcon	24.2.2014	10				
50					WBO	Wilson Bayly Holmes-Ovcon	20.2.2012	10				
51					WBO	Wilson Bayly Holmes-Ovcon	5.9.2011	10				
52					WBO	Wilson Bayly Holmes-Ovcon	21.2.2011	10				
53					ASR	Assore Ltd	13.2.2013	8				
54					JDG	Jd Group Ltd	7.6.2012	8				
55					SAC	Sa Corporate Real Estate Ltd	24.8.2009	8				
56					TON	Tongaat Hulett Ltd	11.11.2013	8				
57					FPT	Fountainhead Property Trust	10.5.2012	7				
58					PPC	Ppc Ltd	20.5.2014	7				
59					PPC	Ppc Ltd	16.5.2013	7				
60					SAP	Sappi Limited	9.11.2006	7				
61					ARL	Astral Foods Ltd	16.11.2009	6				
62					ARL	Astral Foods Ltd	13.5.2009	6				
63					ARL	Astral Foods Ltd	14.11.2008	6				
64					DRD	Drdgold Ltd	23.8.2013	6				
65					DRD	Drdgold Ltd	30.8.2010	6				
66					GRF	Group Five Ltd	10.8.2010	6				

Table B.7: (continued)

	Good news				No news				Bad news			
	Ticker	**Name**	**Dividend declaration**	**Analyst count**	**Ticker**	**Name**	**Dividend declaration**	**Analyst count**	**Ticker**	**Name**	**Dividend declaration**	**Analyst count**
67					RBX	Raubex Group Ltd	12.5.2014	6				
68					RBX	Raubex Group Ltd	11.11.2013	6				
69					RCL	Rcl Foods Ltd/South Africa	19.5.2005	6				
70					MTN	Mtn Group Ltd	3.3.2016	18				
71					VOD	Vodacom Group Ltd	17.5.2016	18				
72					VOD	Vodacom Group Ltd	9.11.2015	18				
73					VOD	Vodacom Group Ltd	18.5.2015	18				
74					SHP	Shoprite Holdings Ltd	23.2.2016	17				
75					SHP	Shoprite Holdings Ltd	24.2.2015	17				
76					TRU	Truworths international Ltd	20.8.2015	15				
77					TRU	Truworths international Ltd	19.2.2015	15				
78					GFI	Gold Fields Ltd	18.2.2016	17				
79					NED	Nedbank Group Ltd	2.3.2016	15				
80					BGA	Barclays Africa Group Ltd	29.7.2016	13				
81					BGA	Barclays Africa Group Ltd	1.3.2016	13				
82					NTC	Netcare Ltd	16.5.2016	14				
83					IPL	Imperial Holdings Ltd	23.2.2016	10				
84					IPL	Imperial Holdings Ltd	25.8.2015	10				
85					TBS	Tiger Brands Ltd	19.11.2015	13				
86					TBS	Tiger Brands Ltd	20.5.2015	13				
87					LBH	Liberty Holdings Ltd	29.7.2016	7				
88					LBH	Liberty Holdings Ltd	7.8.2015	7				
89					LBH	Liberty Holdings Ltd	26.2.2015	7				
90					MMI	Mmi Holdings Ltd	3.3.2016	8				
91					SLM	Sanlam Ltd	10.3.2016	7				

Table B.8: Sample constituents – South Africa - analyst count < 6

	Good news				No news				Bad news			
	Ticker	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**	**Ticker**	**Name**	**Declaration date**	**Analyst count**
1	SUI	Sun international Ltd	27.8.2010	5	DTC	Datatec Ltd	11.5.2011	5	SPG	Super Group Ltd	16.9.2008	5
2	KAP	Kap industrial Holdings Ltd	7.9.2010	4	RMH	Rmb Holdings Ltd	10.3.2010	5	SUI	Sun international Ltd	26.2.2009	5
3	APK	Astrapak Ltd-Uts	10.5.2010	3	RMH	Rmb Holdings Ltd	22.9.2005	5	APK	Astrapak Ltd-Uts	24.4.2012	3
4	BSR	Basil Read Holdings Ltd	15.3.2013	3	SUI	Sun international Ltd	10.3.2008	5	APK	Astrapak Ltd-Uts	6.5.2009	3
5	COM	Comair Ltd	7.9.2005	2	BLU	Blue Label Telecoms Ltd	20.8.2013	4	BSR	Basil Read Holdings Ltd	22.3.2012	3
6	HCI	Hosken Cons investments Ltd	3.6.2010	2	AFE	Aeci Ltd	24.2.2009	3	BSR	Basil Read Holdings Ltd	2.3.2005	3
7	OMN	Omnia Holdings Ltd	22.11.2011	2	AFE	Aeci Ltd	26.2.2008	3	BSR	Basil Read Holdings Ltd	29.9.2004	3
8	TRE	Trencor Ltd	1.3.2005	2	APK	Astrapak Ltd-Uts	9.5.2011	3	BAT	Brait Se	2.6.2011	2
9	ART	Argent industrial Ltd	9.11.2010	1	APK	Astrapak Ltd-Uts	8.5.2007	3	COM	Comair Ltd	17.1.2008	2
10	BEL	Bell Equipment Ltd	18.3.2013	1	JSE	Jse Ltd	12.3.2013	3	DAW	Distribution & Warehousing	13.9.2010	2
11	ELI	Ellies Holdings Ltd	23.7.2012	1	RLO	Reunert Ltd	20.5.2014	3	HCI	Hosken Cons investments Ltd	14.5.2009	2
12	CVN	Convergenet Holdings Ltd	28.11.2011	0	RLO	Reunert Ltd	20.11.2013	3	OMN	Omnia Holdings Ltd	30.11.2009	2
13	GIJ	Gijima Group Ltd	29.8.2007	0	RLO	Reunert Ltd	21.5.2013	3	ART	Argent industrial Ltd	12.11.2009	1
14	DTA	Delta Emd Ltd	9.2.2015	0	AFX	African Oxygen Ltd	22.8.2013	2	EHS	Evraz Highveld Steel And Van	13.3.2009	1
15	HLM	Hulamin Ltd	23.2.2015	0	BAT	Brait Se	3.11.2006	2	ESR	Esor Ltd	26.5.2011	1
16					BAT	Brait Se	2.6.2006	2	MST	Mustek Ltd	26.2.2009	1
17					COM	Comair Ltd	11.2.2014	2	TSX	Trans Hex Group Ltd	29.10.2012	1
18					CSB	Cashbuild Ltd	12.3.2013	2	DGC	Digicore Holdings Ltd	27.9.2012	0
19					HCI	Hosken Cons investments Ltd	19.5.2011	2	HWN	Howden Africa Holdings Ltd	5.3.2014	0
20					HDC	Hudaco industries Ltd	31.1.2014	2	AFX	African Oxygen Ltd	26.2.2015	1
21					HDC	Hudaco industries Ltd	1.2.2013	2	HLM	Hulamin Ltd	22.2.2016	1
22					HDC	Hudaco industries Ltd	28.1.2011	2	TSX	Trans Hex Group Ltd	4.11.2015	1
23					HDC	Hudaco industries Ltd	19.7.2010	2				
24					SUR	Spur Corp Ltd	16.9.2010	2				
25					ADR	Adcorp Holdings Ltd	17.10.2013	1				
26					ADR	Adcorp Holdings Ltd	22.5.2013	1				
27					ART	Argent industrial Ltd	10.11.2011	1				
28					ILA	Iliad Africa Ltd	11.3.2014	1				
29					ILA	Iliad Africa Ltd	15.3.2011	1				
30					PNC	Pinnacle Holdings Ltd	15.9.2009	1				
31					SFN	Sasfin Holdings Ltd	7.3.2012	1				
32					TSX	Trans Hex Group Ltd	14.11.2007	1				
33					ZED	Zeder investments Ltd	8.3.2012	1				

Table B.8: (continued)

	Good news				No news				Bad news			
	Ticker	Name	Declaration date	Analyst count	Ticker	Name	Declaration date	Analyst count	Ticker	Name	Declaration date	Analyst count
34					CMH	Combined Motor Holdings Ltd	23.4.2014	0				
35					CMH	Combined Motor Holdings Ltd	25.4.2012	0				
36					CMH	Combined Motor Holdings Ltd	12.10.2011	0				
37					DCT	Datacentrix Holdings Ltd	5.10.2010	0				
38					DCT	Datacentrix Holdings Ltd	20.4.2010	0				
39					DCT	Datacentrix Holdings Ltd	6.10.2009	0				
40					DGC	Digicore Holdings Ltd	24.2.2012	0				
41					DGC	Digicore Holdings Ltd	20.9.2011	0				
42					DGC	Digicore Holdings Ltd	11.2.2011	0				
43					DGC	Digicore Holdings Ltd	3.3.2009	0				
44					FFA	Fortress income Fund Ltd-A	30.7.2015	5				
45					VKE	Vukile Property Fund Ltd	26.5.2016	4				
46					VKE	Vukile Property Fund Ltd	25.11.2015	4				
47					VKE	Vukile Property Fund Ltd	26.5.2015	4				
48					HDC	Hudaco industries Ltd	1.7.2016	2				
49					PGR	Peregrine Holdings Ltd	8.6.2016	3				
50					RBX	Raubex Group Ltd	9.11.2015	3				
51					RBX	Raubex Group Ltd	11.5.2015	3				
52					FBR	Famous Brands Ltd	30.5.2016	2				
53					RLO	Reunert Ltd	24.5.2016	3				
54					RLO	Reunert Ltd	23.11.2015	3				
55					RLO	Reunert Ltd	18.11.2014	3				
56					RLO	Reunert Ltd	7.3.2016	3				
57					RLO	Reunert Ltd	11.9.2015	3				
58					CLR	Clover industries Ltd	2.3.2016	1				
59					HPA	Hospitality Property Fund-A	23.2.2016	1				
60					HPA	Hospitality Property Fund-A	24.8.2015	1				
61					HPA	Hospitality Property Fund-A	25.2.2015	1				
62					SUR	Spur Corp Ltd	25.2.2016	2				
63					SUR	Spur Corp Ltd	10.9.2015	2				
64					SUR	Spur Corp Ltd	26.2.2015	2				

Table B.9: Model selection - Turkey - good news - analyst coverage > 5

Stocks	**YKBNK**	**GARAN**	**MGROS**	**MGROS**	**THYAO**	**ARCLK**	**ARCLK**	**EREGL**	**KCHOL**	**TRKCM**	**DOAS**	**SISE**	**KRDMD**	**AKENR**	**AYGAZ**	**AYGAZ**	**ASELS**
Mean equation	ARMA(2/1)	ARMA(1/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/1)	ARMA(0/2)	ARMA(2/1)	ARMA(2/2)	ARMA(0/0)	ARMA(1/0)	ARMA(0/0)	ARMA(2/0)	ARMA(0/1)	ARMA(2/2)	ARMA(2/0)	ARMA(0/1)
C	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	-0.001
p-values	0.123	0.205	0.282	0.999	0.420	0.475	0.088	0.941	0.894	0.087	0.714	0.913	0.661	0.975	0.390	0.536	0.510
INDEX	1.366	1.378	0.836	0.484	1.002	1.068	0.793	0.992	1.099	0.759	0.989	0.960	0.950	0.683	0.817	0.806	0.748
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.778	0.919	0.012	-0.404	-1.002	0.707		0.641	1.236		0.072		-0.122		-0.820	0.002	
p-values	0.000*	0.000*	0.966	0.000*	0.000*	0.000*		0.000*	0.000*		0.043*		0.003*		0.000*	0.961	
AR(2)	-0.055		0.568	-0.991	-0.769	0.082		-0.079	-0.258				-0.033		-0.973	-0.061	
p-values	0.114		0.017*	0.000*	0.000*	0.038*		0.012*	0.000*				0.263		0.000*	0.021*	
MA(1)	-0.777	-0.885	-0.061	0.395	1.059	-0.819	0.038	-0.602	-1.242					0.019	0.851		0.031
p-values	0.000*	0.000*	0.815	0.000*	0.000*	0.000*	0.340	0.000*	0.000*					0.558	0.000*		0.383
MA(2)		-0.066	-0.637	0.994	0.817		-0.070		0.243						0.994		
p-values		0.046*	0.007*	0.000*	0.000*		0.035*		0.000*						0.000*		
Variance equation	GARCH(1/1)	EGARCH(1/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/1)	EGARCH(1/2)
C	0.000	-1.195	-0.343	-2.310	-0.163	-0.065	0.000	-0.004	-0.805	-0.284	-0.352	0.000	-0.007	-1.286	-2.378	-0.189	-1.000
p-values	0.044*	0.008*	0.000*	0.000*	0.018*	0.161	0.000*	0.305	0.006*	0.003*	0.042*	0.004*	0.476	0.000*	0.000*	0.001*	0.000*
α1	0.057	0.110	0.099	0.408	0.221	0.229	0.408	0.146	0.212	0.103	0.332	0.092	0.324	0.264	0.360	0.379	0.385
p-values	0.001*	0.020*	0.093	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2			0.022	0.145	-0.151	-0.195		-0.141		0.014	-0.241		-0.316	0.206		-0.341	
p-values			0.718	0.075	0.002*	0.001*		0.000*		0.479	0.000*		0.000*	0.000*		0.000*	
γ1		0.052	0.196	0.165	0.130	0.107		0.049	0.047	-0.016	0.098		0.137	0.015	0.028	0.061	0.068
p-values		0.032*	0.000*	0.000*	0.000*	0.004*		0.043*	0.064	0.114	0.011*		0.000*	0.433	0.311	0.157	0.003*
γ2			-0.184	-0.102	-0.107	-0.099		-0.046		0.004	-0.078		-0.148	0.090		-0.057	
p-values			0.000*	0.008*	0.000*	0.005*		0.061		0.744	0.046*		0.000*	0.000*		0.194	
β1	0.833	0.867	0.969	0.206	0.284	1.511	0.292	1.851	0.121	-0.003	0.964	0.833	1.348	-0.037	0.744	0.980	0.310
p-values	0.000*	0.000*	0.000*	0.099	0.000*	0.000*	0.000*	0.000*	0.043*	0.674	0.000*	0.000*	0.000*	0.024*	0.000*	0.000*	0.000*
β2				0.549	0.702	-0.516		-0.851	0.802	0.979			-0.348	0.912			0.584
p-values				0.000*	0.000*	0.016*		0.000*	0.000*	0.000*			0.000*	0.000*			0.000*
AIC	-6.029	-5.518	-5.182	-4.950	-5.304	-5.080	-4.883	-5.183	-5.411	-5.389	-5.014	-5.440	-5.114	-4.688	-5.413	-5.161	-4.066
SIC	-5.991	-5.474	-5.124	-4.888	-5.241	-5.022	-4.849	-5.125	-5.358	-5.345	-4.971	-5.415	-5.061	-4.640	-5.364	-5.113	-4.027
R-square	72%	76%	43%	21%	38%	69%	35%	51%	64%	47%	46%	56%	47%	27%	46%	42%	27%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	1.373	0.230	3.161	2.728	2.689	0.801	4.044	1.450	3.367	6.251	5.866	3.023	1.754	1.962	2.957	3.822	1.761
p-values	0.503	0.891	0.075	0.099	0.101	0.670	0.257	0.484	0.067	0.283	0.209	0.696	0.625	0.743	0.086	0.281	0.780
Q(15)	5.720	14.887	13.529	12.894	7.537	15.858	10.988	12.600	13.866	14.926	11.666	7.810	5.610	7.861	6.401	12.614	9.368
p-values	0.930	0.248	0.260	0.300	0.754	0.198	0.612	0.399	0.241	0.457	0.633	0.931	0.959	0.896	0.845	0.478	0.807
Q(25)	17.378	19.855	28.474	19.473	14.101	28.408	23.007	17.333	26.136	24.392	19.555	11.404	15.767	13.422	25.163	25.564	25.841
p-values	0.742	0.592	0.127	0.555	0.865	0.163	0.460	0.745	0.201	0.497	0.722	0.991	0.865	0.959	0.240	0.322	0.361
Q(35)	21.498	32.211	37.008	23.711	31.063	37.496	27.466	34.222	37.252	30.759	26.860	28.041	30.435	22.192	36.970	34.759	38.408
p-values	0.920	0.456	0.211	0.822	0.463	0.232	0.739	0.361	0.203	0.673	0.803	0.792	0.595	0.940	0.212	0.384	0.277
Box-Pierce Q test (squared residuals)																	
Q(5)	4.935	1.282	0.292	0.767	2.572	2.028	0.843	1.404	1.321	4.798	2.777	3.713	0.964	5.066	1.067	4.167	0.543
p-values	0.085	0.527	0.589	0.381	0.109	0.363	0.839	0.496	0.250	0.441	0.596	0.591	0.810	0.281	0.302	0.244	0.969
Q(15)	18.855	4.509	6.528	6.343	7.352	11.267	13.814	6.640	9.829	8.446	12.881	6.011	2.982	9.806	8.140	11.994	2.660
p-values	0.092	0.972	0.836	0.850	0.770	0.506	0.387	0.880	0.546	0.905	0.536	0.980	0.998	0.776	0.701	0.528	1.000
Q(25)	26.108	8.431	13.931	12.306	15.373	19.660	28.819	10.898	22.706	13.129	19.289	11.115	6.760	19.882	14.853	18.091	16.940
p-values	0.247	0.996	0.873	0.931	0.804	0.604	0.186	0.976	0.360	0.975	0.736	0.992	1.000	0.703	0.830	0.753	0.851
Q(35)	34.457	18.836	27.599	18.215	28.236	37.559	38.779	22.023	33.728	17.001	30.056	19.549	10.711	29.156	27.826	28.786	18.406
p-values	0.351	0.969	0.642	0.967	0.609	0.229	0.225	0.907	0.337	0.996	0.661	0.984	1.000	0.704	0.630	0.677	0.986
ARCH LM test																	
p-values	0.362	0.790	0.913	0.956	0.982	0.696	0.787	0.722	0.666	0.195	0.518	0.941	0.914	0.264	0.620	0.882	0.783
Normality tests																	
Skewness	0.26	0.12	0.72	0.26	0.83	0.57	0.86	0.39	0.33	0.15	0.35	0.29	1.08	0.29	1.06	0.94	0.93
Kurtosis	4.16	3.53	5.26	9.40	6.30	5.25	9.73	5.78	4.86	5.31	4.26	4.56	10.53	8.43	8.30	6.99	8.23
Jarque-Bera	69.51	14.54	305.97	1757.59	581.63	270.94	2058.56	356.14	165.50	230.64	88.92	117.65	2618.76	1268.78	1387.53	827.18	1314.75
p-value	0.960	0.515	0.042*	0.967	0.006*	0.000*	0.698	0.000*	0.003*	0.003*	0.966	0.000*	0.000*	0.000*	0.018*	0.107	0.000*

Table B.9: (continued)

Stocks	ISGYO	ISGYO	DOHOL	GUBRF	ALARK	ANSGR	SODA	SODA	SODA	BAGFS	BAGFS	BRISA	AKSA	CLEBI	CLEBI	PRKME	ASYAB
Mean equation	ARMA(0/1)	ARMA(2/2)	ARMA(2/2)	ARMA(1/2)	ARMA(0/1)	ARMA(2/2)	ARMA(0/0)	ARMA(1/1)	ARMA(1/1)	ARMA(2/2)	ARMA(2/0)	ARMA(1/2)	ARMA(2/2)	ARMA(1/1)	ARMA(2/2)	ARMA(0/0)	ARMA(2/1)
C	-0.001	0.000	-0.001	0.000	-0.001	0.001	0.001	0.000	0.000	0.000	-0.001	0.001	0.000	0.001	0.000	-0.001	-0.001
p-values	0.233	0.254	0.006*	0.578	0.165	0.132	0.263	0.522	0.513	0.478	0.343	0.253	0.718	0.297	0.669	0.045*	0.000*
INDEX	0.958	0.993	1.083	1.030	0.907	0.909	0.784	0.682	0.701	0.730	0.912	0.785	0.701	0.568	0.706	1.007	1.152
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)		0.056	-1.313	-0.855		0.228		-0.955	-0.602	0.317	-0.019	0.720	-0.718	0.809	0.744		0.986
p-values		0.918	0.000*	0.000*		0.000*		0.000*	0.000*	0.000*	0.537	0.001*	0.019*	0.000*	0.059		0.000*
AR(2)		0.686	-0.744			-0.968				-0.981	-0.063		-0.079		0.080		0.002
p-values		0.137	0.000*			0.000*				0.000*	0.038*		0.782		0.808		0.958
MA(1)	-0.138	-0.110	1.327	0.904	-0.108	-0.242		0.968	0.619	-0.312		-0.840	0.741	-0.862	-0.671		-0.998
p-values	0.001*	0.845	0.000*	0.000*	0.002*	0.000*		0.000*	0.000*	0.000*		0.000*	0.012*	0.000*	0.086		0.000*
MA(2)		-0.710	0.783	0.096		0.971				0.997		0.098	0.185		-0.163		
p-values		0.156	0.000*	0.006*		0.000*				0.000*		0.008*	0.492		0.620		
Variance equation	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/2)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(1/1)	GARCH(1/2)	GARCH(1/2)	GARCH(2/2)	EGARCH(2/2)
C	-6.743	0.000	0.000	-5.224	-1.320	-0.291	-1.142	-1.136	-0.062	0.000	-0.449	-0.692	-1.525	0.000	0.000	0.000	-2.995
p-values	0.000*	0.000*	0.016*	0.000*	0.000*	0.002*	0.000*	0.043*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.306	0.151	0.080	0.287	0.271	0.183	0.248	0.377	0.268	0.198	0.270	0.012	0.281	0.231	0.115	0.081	0.383
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.613	0.000*	0.000*	0.000*	0.005*	0.000*
α2	0.362			0.207		-0.112		-0.236	-0.303			0.071				0.354	0.158
p-values	0.000*			0.002*		0.011*		0.002*	0.000*			0.018*				0.000*	0.039*
γ1	0.220			0.019	0.031	0.104	0.186	0.194	0.009		0.007	0.078	0.109				-0.012
p-values	0.000*			0.635	0.176	0.001*	0.000*	0.000*	0.792		0.822	0.000*	0.000*				0.717
γ2	0.098			0.145		-0.118		-0.133	0.045			0.118					-0.052
p-values	0.149			0.000*		0.000*		0.001*	0.186			0.000*					0.083
β1	-0.182	0.732	0.904	-0.170	0.866	1.665	0.424	0.874	0.990	0.158	0.965	0.006	0.831	0.422	0.442	0.114	-0.001
p-values	0.364	0.000*	0.000*	0.149	0.000*	0.000*	0.000*	0.000*	0.000*	0.018*	0.000*	0.881	0.000*	0.000*	0.028*	0.048*	0.991
β2	0.383			0.551		-0.695	0.458			0.608		0.911		0.311	0.355	0.221	0.698
p-values	0.001*			0.000*		0.000*	0.000*			0.000*		0.000*		0.000*	0.054	0.000*	0.000*
AIC	-4.954	-5.248	-5.062	-4.973	-5.446	-5.109	-5.321	-5.321	-5.455	-5.112	-4.600	-4.745	-4.995	-4.703	-4.984	-4.279	-5.690
R-square	60%	46%	48%	37%	57%	52%	46%	36%	26%	52%	34%	47%	30%	20%	20%	28%	56%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	0.867	3.280	3.521	5.027	1.881	2.370	4.121	4.535	4.598	1.381	6.648	2.263	0.939	4.883	2.431	5.475	2.675
p-values	0.929	0.070	0.061	0.081	0.758	0.124	0.532	0.209	0.204	0.240	0.084	0.323	0.333	0.181	0.119	0.361	0.263
Q(15)	8.778	11.359	17.102	13.273	11.460	14.873	13.191	11.443	15.500	5.504	17.787	6.135	6.692	14.404	14.378	14.315	9.367
p-values	0.845	0.414	0.105	0.350	0.650	0.188	0.588	0.574	0.277	0.904	0.166	0.909	0.823	0.346	0.213	0.502	0.671
Q(25)	14.671	21.124	26.058	21.385	29.090	20.697	19.720	18.088	26.877	15.701	33.291	10.494	10.923	27.609	17.531	21.632	24.630
p-values	0.930	0.451	0.204	0.497	0.217	0.478	0.761	0.753	0.261	0.786	0.076	0.981	0.964	0.231	0.678	0.657	0.315
Q(35)	21.669	30.904	39.297	33.873	44.936	35.665	29.139	36.848	42.630	31.103	45.173	15.861	23.206	36.649	21.400	35.464	31.189
p-values	0.950	0.471	0.146	0.377	0.099	0.258	0.746	0.295	0.122	0.461	0.077	0.992	0.842	0.303	0.901	0.446	0.507
Box-Pierce Q test (squared residuals)																	
Q(5)	2.990	3.431	1.695	0.331	2.308	0.790	1.702	1.052	7.740	3.675	4.264	3.616	1.408	4.010	2.815	0.895	4.828
p-values	0.559	0.064	0.193	0.848	0.679	0.374	0.889	0.789	0.052	0.055	0.234	0.164	0.235	0.260	0.093	0.971	0.089
Q(15)	13.162	11.918	9.187	5.078	6.112	4.853	10.813	7.334	13.791	11.141	11.159	8.511	8.089	13.492	8.969	4.442	9.302
p-values	0.514	0.370	0.605	0.955	0.964	0.938	0.766	0.884	0.389	0.432	0.597	0.744	0.705	0.411	0.625	0.996	0.677
Q(25)	16.395	18.392	20.775	11.527	13.861	14.259	26.323	10.586	19.475	15.878	22.207	12.157	17.314	32.106	31.133	25.787	13.855
p-values	0.873	0.624	0.473	0.966	0.950	0.858	0.391	0.987	0.673	0.776	0.508	0.954	0.692	0.098	0.071	0.419	0.907
Q(35)	21.768	23.062	34.842	17.884	19.602	38.570	31.834	16.216	28.124	27.004	36.072	20.461	41.932	43.091	36.010	28.096	27.997
p-values	0.948	0.847	0.290	0.979	0.977	0.165	0.622	0.994	0.709	0.672	0.327	0.943	0.091	0.112	0.246	0.790	0.669
ARCH LM test																	
p-values	0.850	0.751	0.516	0.997	0.489	0.850	0.565	0.819	0.110	0.411	0.603	0.456	0.821	0.390	0.380	0.825	0.903
Normality tests																	
Skewness	1.14	1.08	0.27	0.67	0.45	0.77	0.61	0.65	1.00	0.84	0.66	0.63	1.67	2.03	1.24	1.34	0.58
Kurtosis	7.85	6.45	8.22	5.77	5.18	6.39	6.90	7.27	7.59	9.28	6.82	5.36	10.48	12.24	8.09	8.10	5.31
Jarque-Bera	1222.92	705.50	1174.83	403.34	237.70	589.96	710.56	849.92	1067.99	1804.45	695.59	305.61	2856.24	4342.04	1364.40	1416.17	285.55
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.176	0.000*	0.600	0.000*	0.000*	0.202	0.000*	0.164	0.000*	0.013*	0.012*

Table B.9: (continued)

Stocks	BANVT	SKBNK	TKFEN	BOLUC	TATGD	ANSGR	BAGFS
Mean equation	ARMA(2/2)	ARMA(2/2)	ARMA(0/1)	ARMA(0/0)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)
C	-0.001	-0.002	-0.001	0.001	0.000	0.000	0.000
p-values	0.179	0.002*	0.096	0.007*	0.536	0.538	0.628
INDEX	0.703	0.883	0.840	0.637	0.678	0.686	0.761
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.450	-0.992			-0.010	0.911	-0.236
p-values	0.014*	0.000*			0.680	0.000*	0.001*
AR(2)	-0.649	-0.861			0.961	-0.100	-0.841
p-values	0.000*	0.000*			0.000*	0.612	0.000*
MA(1)	-0.427	1.028	0.074		0.035	-1.063	0.243
p-values	0.035*	0.000*	0.043*		0.151	0.000*	0.001*
MA(2)	0.575	0.894			-0.958	0.244	0.834
p-values	0.003*	0.000*			0.000*	0.187	0.000*
Variance equation	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)		EGARCH(2/1)	EGARCH(1/1)	EGARCH(2/2)
C	-1.739	-1.397	-4.128		-0.201	-5.464	-4.217
p-values	0.000*	0.007*	0.000*		0.000*	0.000*	0.000*
α1	0.401	0.491	0.324		0.442	0.356	0.265
p-values	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*
α2	0.008	0.105	-0.093		-0.345		0.424
p-values	0.895	0.582	0.151		0.000*		0.000*
γ1	0.155	0.156	-0.057		0.100	0.047	0.085
p-values	0.000*	0.043*	0.084		0.003*	0.106	0.024*
γ2	-0.148	-0.091	-0.182		-0.081		0.010
p-values	0.000*	0.282	0.000*		0.022*		0.809
β1	0.805	0.438	0.835		0.985	0.389	0.510
p-values	0.000*	0.188	0.000*		0.000*	0.000*	0.000*
β2		0.413	-0.306				0.036
p-values		0.153	0.026*				0.758
AIC	-4.655	-4.540	-5.544	-5.510	-5.482	-5.652	-5.361
R-square	22%	24%	41%	27%	26%	30%	32%
Residual diagnostics							
Box-Pierce Q test (residuals)							
Q(5)	1.747	3.474	4.123	2.181	0.973	3.187	1.165
p-values	0.186	0.062	0.390	0.824	0.324	0.074	0.280
Q(15)	12.133	18.087	13.571	10.931	7.340	9.542	13.056
p-values	0.354	0.080	0.482	0.757	0.771	0.572	0.290
Q(25)	28.242	27.586	19.439	23.961	16.345	18.537	32.287
p-values	0.133	0.152	0.728	0.522	0.750	0.615	0.055
Q(35)	35.722	32.213	37.165	28.897	25.253	23.064	43.354
p-values	0.256	0.406	0.325	0.757	0.756	0.847	0.069
Box-Pierce Q test (squared residuals)							
Q(5)	0.675	0.722	3.423	3.254	1.110	1.548	1.985
p-values	0.411	0.395	0.490	0.661	0.292	0.213	0.159
Q(15)	4.097	16.280	12.165	13.166	11.761	8.017	3.024
p-values	0.967	0.131	0.593	0.589	0.382	0.712	0.990
Q(25)	11.680	24.565	30.485	18.685	18.590	11.057	9.063
p-values	0.948	0.266	0.169	0.812	0.611	0.962	0.989
Q(35)	15.540	28.076	40.874	21.966	27.271	17.896	16.034
p-values	0.991	0.617	0.194	0.958	0.659	0.971	0.988
ARCH LM test							
p-values	0.913	0.997	0.509	0.450	0.652	0.581	0.976
Normality tests							
Skewness	1.74	0.47	-0.76	0.34	0.72	0.72	1.17
Kurtosis	12.75	10.78	10.66	10.03	6.01	11.73	17.16
Jarque-Bera	4575.23	2616.61	2595.67	2124.60	474.68	3341.25	8777.40
p-value	0.000*	0.034*	0.000*	0.000*	0.000*	0.000*	0.002*

Table B.10: Model selection - Turkey - good news - analyst coverage < 6

Stocks	**GLYHO**	**VESBE**	**ALGYO**	**ALGYO**	**ECILC**	**NTHOL**	**TEBNK**	**EGSER**	**IZMDC**	**ASUZU**	**ASUZU**	**BRSAN**	**DGZTE**	**EGEEN**	**EGEEN**	**EGGUB**	**FENER**
Mean equation	ARMA(2/1)	ARMA(2/0)	ARMA(2/2)	ARMA(0/2)	ARMA(1/1)	ARMA(2/2)	ARMA(2/1)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(1/1)	ARMA(0/1)	ARMA(0/2)	ARMA(1/0)
C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.002	0.000	-0.001	0.000	0.000	-0.001
p-values	0.992	0.974	0.784	0.512	0.410	0.984	0.490	0.492	0.680	0.859	0.622	0.017*	0.838	0.546	0.999	0.503	0.183
INDEX	0.858	0.610	0.722	0.586	0.908	0.473	1.221	1.015	0.704	0.964	0.825	0.739	0.775	0.676	0.797	0.878	0.202
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.321	-0.032	1.583		0.874	-0.767	0.504	-0.487	-1.933	1.767	1.806	-1.684	0.923	-0.560			0.084
p-values	0.025*	0.440	0.000*		0.000*	0.000*	0.106	0.064	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*			0.030*
AR(2)	-0.045	-0.070	-0.993			-0.976	-0.073	0.455	-0.969	-0.938	-0.817	-0.704	-0.980				
p-values	0.167	0.043*	0.000*			0.000*	0.029*	0.063	0.000*	0.000*	0.000*	0.000*	0.000*				
MA(1)	0.255		-1.579	0.055	-0.880	0.772	-0.479	0.429	1.958	-1.774	-1.784	1.702	-0.933	0.622	0.098	0.090	
p-values	0.087		0.000*	0.158	0.000*	0.000*	0.129	0.094	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.012*	0.007*	
MA(2)			0.986	0.074		0.997		-0.511	0.995	0.956	0.796	0.720	0.999			-0.021	
p-values			0.000*	0.032*		0.000*		0.031*	0.000*	0.000*	0.000*	0.000*	0.000*			0.499	
Variance equation	GARCH(1/1)	EGARCH(2/1)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/2)	GARCH(1/1)	EGARCH(2/1)	EGARCH(1/2)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(1/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)
C	0.000	-1.354	-1.572	-8.979	-1.341	0.000	0.000	0.000	-0.553	-0.637	-0.354	-3.199	-1.479	0.000	-0.085	-3.957	-0.723
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.037	0.287	0.366	0.498	0.407	0.081	0.211	0.245	0.458	0.307	0.400	0.335	0.383	0.218	0.462	0.303	0.438
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2		-0.040		0.557	-0.074				-0.285		-0.234	0.207	0.108		-0.466	0.461	-0.179
p-values		0.520		0.000*	0.234				0.000*		0.000*	0.000*	0.000*		0.000*	0.000*	0.001*
γ1		0.008	0.101	0.060	0.101				0.148	0.054	0.157	0.076			0.103	0.196	0.214
p-values		0.855	0.000*	0.078	0.001*				0.000*	0.010*	0.000*	0.000*			0.010*	0.000*	0.000*
γ2		0.114		0.053	-0.027				-0.065		-0.094	0.095			-0.076	-0.024	-0.225
p-values		0.017*		0.131	0.337				0.028*		0.004*	0.000*			0.058	0.440	0.000*
β1	0.948	0.857	0.835	-0.500	0.426	0.883	0.226	0.525	0.944	0.348	0.970	-0.159	0.689	0.438	1.434	0.553	1.101
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.018*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
β2				0.443	0.435		0.388			0.595		0.783	0.143		-0.446		-0.182
p-values				0.000*	0.000*		0.000*			0.000*		0.000*	0.072		0.000*		0.066
AIC	-4.972	-5.431	-4.969	-4.908	-5.060	-5.251	-4.919	-4.386	-4.792	-4.493	-4.885	-4.612	-4.496	-4.422	-4.401	-4.789	-4.157
R-square	26%	28%	29%	23%	36%	16%	55%	33%	25%	46%	32%	28%	13%	18%	20%	14%	6%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	4.826	1.556	0.462	1.518	7.036	1.340	2.119	3.685	1.634	1.038	1.700	1.694	2.180	6.270	3.339	0.375	6.020
p-values	0.090	0.669	0.497	0.678	0.071	0.247	0.347	0.055	0.201	0.308	0.192	0.193	0.140	0.099	0.503	0.945	0.198
Q(15)	14.001	7.124	11.933	5.301	20.811	13.101	9.421	14.750	16.843	5.353	8.572	15.684	15.608	14.993	20.537	8.909	15.382
p-values	0.301	0.896	0.369	0.968	0.077	0.287	0.667	0.194	0.113	0.913	0.661	0.153	0.156	0.308	0.114	0.780	0.353
Q(25)	28.276	15.895	16.256	11.244	28.792	14.756	22.979	20.491	30.770	16.242	14.658	26.991	30.743	27.857	29.756	15.274	22.446
p-values	0.167	0.860	0.755	0.981	0.187	0.835	0.403	0.490	0.078	0.756	0.840	0.171	0.078	0.221	0.193	0.885	0.553
Q(35)	34.981	29.897	28.139	27.407	31.907	30.985	32.291	30.024	39.435	23.197	17.648	36.376	41.541	47.375	34.996	19.921	24.329
p-values	0.328	0.622	0.614	0.742	0.521	0.467	0.452	0.516	0.142	0.842	0.974	0.233	0.098	0.050	0.421	0.965	0.890
Box-Pierce Q test (squared residuals)																	
Q(5)	4.757	0.739	2.794	0.669	3.912	1.211	4.008	1.389	2.944	0.939	0.704	0.657	0.492	1.049	0.236	0.767	0.715
p-values	0.093	0.864	0.095	0.881	0.271	0.271	0.135	0.239	0.086	0.332	0.401	0.418	0.483	0.789	0.994	0.857	0.949
Q(15)	10.694	3.391	17.370	9.629	8.293	6.202	7.561	8.457	12.023	13.891	4.976	12.916	2.623	20.795	5.852	11.280	3.591
p-values	0.555	0.996	0.097	0.724	0.824	0.860	0.818	0.672	0.362	0.239	0.932	0.299	0.995	0.077	0.970	0.587	0.997
Q(25)	26.106	8.885	25.866	13.683	13.422	9.418	13.477	15.571	29.505	30.286	17.303	28.874	5.020	27.665	21.125	21.276	6.852
p-values	0.247	0.996	0.212	0.936	0.942	0.986	0.919	0.793	0.102	0.086	0.693	0.117	1.000	0.229	0.631	0.564	1.000
Q(35)	40.460	33.459	28.817	26.450	21.416	13.409	29.048	23.728	34.627	36.899	21.151	37.821	25.447	31.739	32.964	30.661	20.259
p-values	0.145	0.445	0.579	0.783	0.940	0.997	0.617	0.821	0.299	0.215	0.908	0.186	0.747	0.530	0.518	0.584	0.970
ARCH LM test																	
p-values	0.141	0.928	0.772	0.910	0.386	0.964	0.530	0.699	0.581	0.777	0.892	0.743	0.972	0.867	0.953	0.930	0.889
Normality tests																	
Skewness	1.27	1.01	0.46	0.32	1.28	1.03	0.52	1.25	1.36	0.89	0.72	0.59	1.24	0.49	1.01	1.53	0.06
Kurtosis	7.55	9.26	5.72	5.73	9.97	9.77	4.76	8.70	10.56	9.62	8.46	10.72	13.66	6.99	8.26	11.90	12.57
Jarque-Bera	1155.46	1847.88	350.06	334.91	2351.06	2135.36	178.52	1651.12	2749.81	2001.73	1360.62	2602.62	5106.40	719.45	1354.17	3775.81	3908.34
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.10: (continued)

Stocks	GOODY	GOODY	MRSHL	NTTUR	PTOFS	SAFGY	TSPOR	YKSGR	LOGO	KORDS	DGATE	ANELE	GLYHO	BAKAB	BFREN	COMDO	ECBYO
Mean equation	ARMA(2/2)	ARMA(2/0)	ARMA(2/2)	ARMA(0/0)	ARMA(2/0)	ARMA(0/2)	ARMA(2/1)	ARMA(2/2)	ARMA(2/1)	ARMA(2/0)	ARMA(2/2)	ARMA(2/1)	ARMA(2/2)	ARMA(2/2)	ARMA(1/2)	ARMA(1/2)	ARMA(0/1)
C	-0.001	0.000	0.000	-0.001	0.000	0.000	-0.001	0.001	-0.001	0.000	0.002	-0.001	0.000	0.000	0.000	0.000	0.000
p-values	0.195	0.726	0.805	0.152	0.800	0.889	0.345	0.315	0.399	0.336	0.029*	0.034*	0.899	0.389	0.000*	0.474	0.977
INDEX	0.692	0.737	0.537	0.777	0.832	0.713	0.395	0.866	0.730	0.603	0.766	0.680	0.650	0.585	0.797	0.700	0.699
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-1.552	0.058	0.361		0.064		-0.888	-1.087	0.596	0.013	-0.326	0.986	-0.348	-1.569	0.962	-0.878	
p-values	0.000*	0.118	0.000*		0.040*		0.000*	0.000*	0.001*	0.779	0.011*	0.000*	0.013*	0.000*	0.000*	0.000*	
AR(2)	-0.601	-0.025	-0.918		-0.068		0.105	-0.586	-0.124	0.080	-0.798	-0.081	-0.713	-1.000			
p-values	0.117	0.438	0.000*		0.031*		0.002*	0.047*	0.000*	0.009*	0.000*	0.027*	0.000*	0.000*			
MA(1)	1.559		-0.407			-0.038	0.996	1.043	-0.509		0.384	-0.926	0.289	1.567	-1.045	0.863	-0.207
p-values	0.000*		0.000*			0.307	0.000*	0.000*	0.003*		0.002*	0.000*	0.033*	0.000*	0.000*	0.000*	0.000*
MA(2)	0.610		0.934			0.064		0.569			0.811		0.747	0.993	0.047	0.042	
p-values	0.105		0.000*			0.087		0.067			0.000*		0.000*	0.000*	0.000*	0.170	
Variance equation	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/2)	EGARCH(2/2)		EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(1/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)
C	-1.572	-0.783	0.000	-0.816		-0.065	-1.693	-1.352	0.000	-0.097	-0.100	-1.468	-0.370	-0.197	-0.108	-0.572	-0.877
p-values	0.003*	0.000*	0.000*	0.000*		0.005*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.024*	0.000*	0.000*
α1	0.266	0.366	0.170	0.241		0.341	0.297	0.274	0.379	0.575	0.385	0.304	0.240	0.477	0.587	0.444	0.461
p-values	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	-0.010	-0.151		0.200		-0.302	0.407	0.212		-0.537	-0.359			-0.373	-0.503	-0.235	-0.274
p-values	0.901	0.000*		0.000*		0.000*	0.000*	0.000*		0.000*	0.000*			0.000*	0.000*	0.000*	0.000*
γ1	0.238	0.258		0.033		0.073	0.140	0.105		0.005	0.105	0.040	0.032	0.081	-0.123	0.165	-0.025
p-values	0.000*	0.000*		0.283		0.026*	0.000*	0.000*		0.887	0.001*	0.125	0.053	0.015*	0.000*	0.000*	0.409
γ2	-0.083	-0.100		-0.106		-0.047	0.050	0.099		0.059	-0.069			-0.056	0.073	-0.040	0.168
p-values	0.080	0.008*		0.001*		0.181	0.073	0.000*		0.082	0.054			0.071	0.016*	0.250	0.000*
β1	0.584	0.921	0.181	0.169		1.461	-0.006	-0.062	0.453	1.371	1.476	0.852	0.287	0.868	1.551	0.945	0.912
p-values	0.009*	0.000*	0.067	0.101		0.000*	0.907	0.000*	0.000*	0.000*	0.000*	0.000*	0.003*	0.000*	0.000*	0.000*	0.000*
β2	0.239		0.447	0.767		-0.466	0.831	0.926		-0.379	-0.487		0.688	0.117	-0.558		
p-values	0.169		0.000*	0.000*		0.000*	0.000*	0.000*		0.000*	0.000*		0.000*	0.180	0.000*		
AIC	-4.985	-4.995	-4.708	-4.910	-4.634	-4.835	-4.081	-4.454	-4.606	-5.600	-4.611	-5.524	-5.091	-5.457	-5.139	-5.125	-5.640
R-square	31%	29%	22%	32%	35%	16%	8%	27%	25%	24%	15%	29%	16%	26%	29%	14%	30%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	1.542	1.142	3.580	8.980	0.883	3.101	5.837	2.154	3.749	4.158	3.530	3.057	1.447	1.065	4.082	5.697	3.460
p-values	0.214	0.767	0.058	0.110	0.829	0.376	0.054	0.142	0.153	0.245	0.060	0.217	0.229	0.302	0.130	0.058	0.484
Q(15)	5.448	10.429	7.596	15.322	13.789	18.251	12.896	6.717	20.780	16.709	14.768	6.284	3.493	15.241	10.557	14.929	9.335
p-values	0.908	0.659	0.749	0.428	0.389	0.148	0.377	0.822	0.054	0.213	0.193	0.901	0.982	0.172	0.567	0.245	0.809
Q(25)	9.673	15.849	10.772	24.349	24.713	25.650	20.821	15.138	31.691	31.188	21.123	16.649	10.691	20.397	30.406	21.688	18.011
p-values	0.983	0.862	0.967	0.499	0.365	0.318	0.532	0.816	0.083	0.118	0.451	0.782	0.968	0.496	0.109	0.479	0.802
Q(35)	20.300	23.887	17.289	26.705	40.045	33.484	31.067	23.123	43.109	35.178	26.024	21.001	15.514	34.439	37.944	28.426	33.828
p-values	0.929	0.877	0.978	0.842	0.186	0.444	0.514	0.845	0.091	0.365	0.720	0.932	0.991	0.307	0.217	0.648	0.476
Box-Pierce Q test (squared residuals)																	
Q(5)	0.544	1.050	0.336	0.172	6.883	3.300	2.422	2.504	1.627	1.965	0.879	1.989	1.498	2.206	0.472	2.095	0.818
p-values	0.461	0.789	0.562	0.999	0.076	0.348	0.298	0.114	0.443	0.580	0.348	0.370	0.221	0.137	0.790	0.351	0.936
Q(15)	2.603	5.913	12.730	6.369	13.117	15.900	6.718	10.561	14.495	10.755	5.255	10.659	13.667	11.491	3.152	4.023	2.541
p-values	0.995	0.949	0.311	0.973	0.439	0.255	0.876	0.481	0.270	0.631	0.918	0.558	0.252	0.403	0.994	0.983	1.000
Q(25)	7.545	11.725	18.045	10.494	28.625	20.805	11.596	26.702	22.340	16.968	8.819	14.605	20.481	15.406	15.196	5.590	7.696
p-values	0.997	0.974	0.646	0.995	0.193	0.593	0.965	0.181	0.440	0.811	0.991	0.879	0.491	0.802	0.854	1.000	0.999
Q(35)	12.178	14.052	22.516	13.933	40.434	24.324	32.501	31.210	33.240	28.403	14.375	33.979	34.128	30.391	17.913	10.433	14.560
p-values	0.999	0.998	0.866	0.999	0.175	0.863	0.442	0.456	0.407	0.695	0.995	0.372	0.320	0.497	0.979	1.000	0.999
ARCH LM test																	
p-values	0.947	0.846	0.865	0.998	0.121	0.265	0.621	0.365	0.886	0.974	0.943	0.936	0.886	0.643	0.989	0.987	0.943
Normality tests																	
Skewness	0.99	1.01	1.22	0.80	1.25	1.48	0.44	0.95	0.41	1.87	1.08	0.17	-0.28	0.18	1.33	1.57	0.84
Kurtosis	13.74	8.01	10.23	6.41	23.15	11.49	7.99	7.44	8.13	17.90	11.49	6.31	18.75	9.18	15.97	20.04	15.44
Jarque-Bera	5085.95	1241.55	2481.43	603.58	17566.52	3447.36	1094.44	991.26	1148.80	10063.49	3271.19	471.18	10588.54	1634.60	7473.62	12801.06	6711.97
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.10: (continued)

Stocks	ERBOS	GSDHO	KENT	KLMSN	NIBAS	PRKAB	SILVR
Mean equation	ARMA(2/2)	ARMA(0/0)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(0/1)	ARMA(0/2)
C	0.000	-0.001	0.000	-0.001	-0.001	0.000	-0.001
p-values	0.671	0.413	0.681	0.426	0.100	0.447	0.329
INDEX	0.819	0.953	0.408	0.711	0.504	0.591	0.710
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-1.523			-0.628			
p-values	0.000*			0.000*			
AR(2)	-0.600			-0.842			
p-values	0.000*			0.000*			
MA(1)	1.570			0.625		-0.115	-0.080
p-values	0.000*			0.000*		0.001*	0.017*
MA(2)	0.624			0.900			0.026
p-values	0.000*			0.000*			0.449
Variance equation	GARCH(1/1)	EGARCH(1/2)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)
C	0.000	-2.049	-2.460	0.000	-0.050	-6.272	-2.084
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.121	0.397	0.807	0.166	0.461	0.211	0.390
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2			-0.175		-0.418	0.299	0.262
p-values			0.001*		0.000*	0.000*	0.000*
γ1		0.123	0.123		0.135	0.087	-0.062
p-values		0.000*	0.000*		0.000*	0.007*	0.007*
γ2			0.096		-0.153	0.178	0.068
p-values			0.002*		0.000*	0.000*	0.001*
β1	0.795	0.310	0.730	0.768	1.662	-0.301	-0.001
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.969
β2		0.452			-0.665	0.591	0.786
p-values		0.000*			0.000*	0.000*	0.000*
AIC	-4.819	-4.634	-4.651	-4.912	-4.575	-5.484	-4.805
R-square	23%	26%	5%	17%	7%	22%	15%
Residual diagnostics							
Box-Pierce Q test (residuals)							
Q(5)	2.384	5.342	2.758	0.742	5.110	4.619	3.067
p-values	0.123	0.376	0.737	0.389	0.403	0.329	0.381
Q(15)	8.770	9.645	17.053	10.444	16.390	12.259	19.540
p-values	0.643	0.841	0.316	0.491	0.357	0.586	0.107
Q(25)	21.877	23.022	24.952	18.843	22.623	19.647	25.492
p-values	0.407	0.576	0.465	0.595	0.600	0.717	0.325
Q(35)	35.537	32.395	32.276	28.459	29.456	33.049	37.383
p-values	0.263	0.594	0.600	0.597	0.733	0.514	0.275
Box-Pierce Q test (squared residuals)							
Q(5)	3.319	2.545	0.551	0.536	0.907	0.449	4.098
p-values	0.068	0.770	0.990	0.464	0.970	0.978	0.251
Q(15)	11.203	5.312	5.113	2.409	6.693	2.742	15.338
p-values	0.426	0.989	0.991	0.996	0.966	0.999	0.287
Q(25)	13.269	9.234	8.237	5.176	13.712	5.163	18.300
p-values	0.899	0.998	0.999	1.000	0.967	1.000	0.741
Q(35)	29.724	13.276	11.955	5.999	18.510	8.905	21.070
p-values	0.532	1.000	1.000	1.000	0.990	1.000	0.946
ARCH LM test							
p-values	0.548	0.853	0.967	0.889	0.743	0.889	0.248
Normality tests							
Skewness	0.94	1.31	1.16	-0.53	0.40	1.27	-1.08
Kurtosis	7.11	13.36	13.21	27.78	14.84	14.51	19.24
Jarque-Bera	870.26	4865.84	4675.48	26212.08	6003.88	5921.53	11447.36
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.11: Model selection - Turkey - no news - analyst coverage > 5

Stocks	GARAN	GARAN	TUPRS	TUPRS	TUPRS	AKBNK	VAKBN	FROTO	FROTO	TOASO	TOASO	ARCLK	CCOLA	ENKAI	SAHOL	SAHOL	AEFES
Mean equation	ARMA(1/2)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)	ARMA(2/1)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(1/2)	ARMA(2/2)	ARMA(0/1)	ARMA(2/2)	ARMA(1/1)	ARMA(1/2)	ARMA(0/0)	ARMA(1/2)	ARMA(1/2)
C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	-0.001	0.001	0.000	-0.001	0.000	0.001
p-values	0.423	0.001*	0.877	0.778	0.058	0.238	0.346	0.000*	0.000*	0.953	0.243	0.006*	0.014*	0.990	0.175	0.633	0.025*
INDEX	1.405	1.408	0.922	0.799	0.859	1.265	1.329	0.652	0.718	1.047	0.982	0.979	0.573	0.759	1.151	1.128	0.475
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.652	0.168		1.493	0.988	0.595	1.467	-0.008	0.958	-0.307		-0.034	0.827	0.770		0.667	0.887
p-values	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.683	0.000*	0.697		0.264	0.000*	0.000*		0.000*	0.000*
AR(2)		0.786		-0.705	-0.071	0.362	-0.907	0.946		0.276		0.911					
p-values		0.000*		0.000*	0.048*	0.004*	0.000*	0.000*		0.594		0.000*					
MA(1)	-0.602	-0.161		-1.442	-0.959	-0.571	-1.437	-0.014	-0.914	0.262	0.107	0.028	-0.905	-0.720		-0.754	-0.953
p-values	0.001*	0.000*		0.000*	0.000*	0.000*	0.000*	0.379	0.000*	0.739	0.002*	0.182	0.000*	0.000*		0.000*	0.000*
MA(2)	-0.102	-0.833		0.609		-0.446	0.859	-0.984	-0.084	-0.272		-0.966		-0.118		-0.048	0.011
p-values	0.001*	0.000*		0.000*		0.000*	0.000*	0.000*	0.017*	0.578		0.000*		0.001*		0.287	0.784
Variance equation	EGARCH(1/2)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(2/2)	GARCH(2/1)	EGARCH(1/2)	GARCH(1/1)	GARCH(1/2)	EGARCH(1/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(2/2)	EGARCH(2/2)
C	-0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.568	0.000	0.000	-2.148	0.000	-0.588	-1.043	-2.636	-0.084
p-values	0.068	0.012*	0.000*	0.000*	0.009*	0.007*	0.064	0.002*	0.000*	0.002*	0.005*	0.000*	0.017*	0.015*	0.012*	0.009*	0.042*
$\alpha1$	0.074	0.100	0.111	0.224	0.101	0.100	0.054	0.109	0.317	0.085	0.112	0.456	0.074	0.305	0.200	0.247	0.424
p-values	0.004*	0.000*	0.000*	0.000*	0.000*	0.002*	0.068	0.002*	0.000*	0.000*	0.000*	0.000*	0.008*	0.000*	0.000*	0.000*	0.000*
$\alpha2$							0.061	0.019						-0.159		0.004	-0.383
p-values							0.192	0.636						0.023*		0.964	0.000*
$\gamma1$	0.054								0.047			0.065		-0.013	0.026	0.056	0.037
p-values	0.005*								0.076			0.041*		0.715	0.389	0.151	0.311
$\gamma2$														0.100		0.091	-0.019
p-values														0.005*		0.001*	0.598
$\beta1$	0.137	0.798	0.802	0.501	0.789	0.679	0.230	0.696	0.332	0.760	0.462	0.299	0.710	0.809	0.148	0.054	1.436
p-values	0.253	0.000*	0.000*	0.000*	0.000*	0.000*	0.756	0.000*	0.002*	0.000*	0.163	0.001*	0.000*	0.002*	0.174	0.706	0.000*
$\beta2$	0.859						0.448		0.626		0.389	0.481		0.134	0.749	0.662	-0.442
p-values	0.000*						0.478		0.000*		0.210	0.000*		0.583	0.000*	0.000*	0.000*
AIC	0.000	-6.255	-5.180	-5.091	-5.438	-5.682	-6.053	-5.080	-4.967	-5.261	-4.822	-5.311	-4.763	-5.500	-5.695	-5.738	-4.929
R-square	80%	78%	52%	44%	38%	70%	75%	28%	31%	56%	42%	52%	16%	31%	66%	60%	16%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	1.027	2.375	5.595	3.451	1.259	3.821	3.292	3.042	0.715	1.691	5.272	0.731	7.067	2.950	4.877	0.863	3.842
p-values	0.598	0.123	0.348	0.063	0.533	0.051	0.070	0.081	0.699	0.193	0.261	0.393	0.070	0.229	0.431	0.650	0.146
Q(15)	15.507	15.540	14.404	13.266	6.029	14.704	7.129	13.692	8.652	16.799	8.626	6.524	16.340	17.164	13.022	7.483	11.108
p-values	0.215	0.159	0.495	0.276	0.915	0.196	0.789	0.251	0.732	0.114	0.854	0.836	0.231	0.144	0.601	0.824	0.520
Q(25)	24.814	22.324	22.663	29.183	13.450	27.458	13.272	32.692	18.447	31.003	32.398	15.491	30.369	26.360	31.439	14.603	19.466
p-values	0.306	0.381	0.597	0.110	0.920	0.156	0.899	0.050	0.679	0.074	0.117	0.798	0.139	0.237	0.175	0.879	0.616
Q(35)	40.413	32.208	29.103	43.332	29.856	33.039	26.726	44.576	23.578	40.782	40.049	39.379	41.515	39.754	44.012	25.457	42.180
p-values	0.146	0.407	0.748	0.070	0.575	0.368	0.686	0.054	0.859	0.112	0.219	0.144	0.147	0.163	0.141	0.787	0.108
Box-Pierce Q test (squared residuals)																	
Q(5)	5.623	3.593	1.592	3.739	2.655	2.742	0.764	1.681	0.604	2.985	2.023	3.330	1.638	2.856	3.094	3.364	2.983
p-values	0.060	0.058	0.902	0.053	0.265	0.098	0.382	0.195	0.739	0.084	0.731	0.068	0.651	0.240	0.685	0.186	0.225
Q(15)	19.246	16.348	15.058	6.242	12.414	13.142	6.918	5.197	15.405	7.223	9.671	10.512	10.835	12.587	6.041	9.627	12.363
p-values	0.083	0.129	0.447	0.857	0.413	0.284	0.806	0.921	0.220	0.781	0.786	0.485	0.625	0.400	0.979	0.649	0.417
Q(25)	26.858	30.627	22.583	18.563	16.622	30.593	14.378	16.419	32.107	11.451	19.162	18.462	16.626	21.790	16.659	16.628	24.521
p-values	0.217	0.080	0.602	0.613	0.784	0.081	0.853	0.746	0.076	0.953	0.743	0.620	0.827	0.472	0.894	0.784	0.321
Q(35)	38.219	35.205	27.760	27.154	31.133	35.446	21.374	27.619	44.990	14.398	25.276	25.188	21.907	26.296	26.226	20.715	44.671
p-values	0.208	0.276	0.803	0.664	0.510	0.266	0.902	0.641	0.064	0.995	0.860	0.759	0.930	0.750	0.858	0.938	0.068
ARCH LM test																	
p-values	0.356	0.982	0.566	0.972	0.667	0.547	0.931	0.989	0.958	0.904	0.837	0.358	0.921	0.724	0.843	0.866	0.661
Normality tests																	
Skewness	0.19	0.13	0.43	0.29	0.31	0.28	0.19	0.16	0.28	0.41	-0.07	0.53	0.66	0.12	0.12	0.62	-0.08
Kurtosis	4.30	4.41	5.55	5.55	3.82	4.11	3.84	4.86	6.41	4.62	6.65	6.97	5.03	4.59	3.44	5.28	5.98
Jarque-Bera	78.28	87.43	308.46	292.21	45.15	65.86	35.81	151.48	509.70	141.52	570.21	720.86	250.46	110.59	10.54	286.92	380.71
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.005*	0.000*	0.000*

Table B.11: (continued)

Stocks	AEFES	AKCNS	SISE	CIMSA	TTRAK	AYGAZ	TSKB	ANHYT	ISGYO	ISGYO	ISGYO	ISGYO	SNGYO	SNGYO	KOZAL	SELEC	OTKAR
Mean equation	ARMA(1/1)	ARMA(2/0)	ARMA(2/1)	ARMA(2/2)	ARMA(2/1)	ARMA(0/1)	ARMA(2/1)	ARMA(0/0)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(1/2)	ARMA(1/0)	ARMA(0/1)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)
C	0.001	0.000	0.000	0.001	0.002	-0.001	0.000	0.001	-0.001	-0.001	-0.001	0.000	0.000	0.000	0.000	0.000	0.001
p-values	0.069	0.718	0.614	0.231	0.002*	0.111	0.000*	0.229	0.118	0.040*	0.172	0.582	0.608	0.820	0.632	0.555	0.328
INDEX	0.424	0.906	0.959	0.820	0.698	0.831	0.955	0.818	0.968	0.984	0.987	0.911	0.895	0.988	0.701	0.654	0.768
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.859	0.061	0.808	-1.218	0.873		1.009			-0.105		0.843	0.074		1.252	1.715	-0.258
p-values	0.000*	0.087	0.000*	0.000*	0.000*		0.000*			0.521		0.000*	0.025*		0.000*	0.000*	0.058
AR(2)		0.088	-0.094	-0.980	-0.124		-0.042			0.730					-0.693	-0.986	0.639
p-values		0.008*	0.005*	0.000*	0.002*		0.236			0.000*					0.000*	0.000*	0.000*
MA(1)	-0.924		-0.753	1.218	-0.774	-0.158	-0.998			0.073		-0.978		0.064	-1.210	-1.726	0.284
p-values	0.000*		0.000*	0.000*	0.000*	0.000*	0.000*			0.621		0.000*		0.041*	0.000*	0.000*	0.046*
MA(2)				0.985						-0.781		0.066			0.617	0.991	-0.596
p-values				0.000*						0.000*		0.111			0.000*	0.000*	0.000*
Variance equation	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	GARCH(1/2)	GARCH(1/2)	EGARCH(1/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/1)
C	-0.102	0.000	-0.067	0.000	0.000	-0.031	0.000	0.000	-0.144	0.000	0.000	-0.311	0.000	-1.296	-0.210	-0.373	0.000
p-values	0.023*	0.000*	0.000*	0.000*	0.000*	0.026*	0.000*	0.005*	0.004*	0.000*	0.001*	0.007*	0.000*	0.000*	0.002*	0.142	0.002*
$\alpha 1$	0.311	0.139	0.215	0.092	0.289	0.337	0.120	0.055	0.269	0.174	0.092	0.138	0.159	0.327	0.318	0.271	0.063
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.004*	0.000*	0.000*	0.000*	0.000*	0.000*
$\alpha 2$	-0.287		-0.207			-0.321			-0.206					0.217	-0.206	-0.157	
p-values	0.000*		0.001*			0.000*			0.000*					0.000*	0.003*	0.012*	
$\gamma 1$	-0.011		0.046			-0.032			0.037			0.054		0.021	-0.111	-0.101	
p-values	0.705		0.195			0.394			0.212			0.005*		0.359	0.005*	0.010*	
$\gamma 2$	0.033		-0.031			0.040			-0.075					0.043	0.103	0.066	
p-values	0.279		0.396			0.286			0.017*					0.034*	0.015*	0.048*	
$\beta 1$	1.545	0.224	1.652	0.856	0.148	1.346	0.531	0.870	1.681	0.097	0.189	0.521	0.794	-0.022	0.984	1.190	0.845
p-values	0.000*	0.071	0.000*	0.000*	0.015*	0.000*	0.000*	0.000*	0.000*	0.036*	0.072	0.128	0.000*	0.277	0.000*	0.001*	0.000*
$\beta 2$	-0.555	0.429	-0.659		0.368	-0.348			-0.693	0.643	0.690	0.455		0.913		-0.225	
p-values	0.000*	0.000*	0.000*		0.000*	0.070			0.000*	0.000*	0.000*	0.174		0.000*		0.502	
AIC	-5.292	-4.875	-5.469	-5.111	-4.903	-5.285	-5.522	-5.393	-5.204	-5.179	-5.302	-5.657	-4.900	-5.133	-4.747	-5.239	-4.901
R-square	13%	36%	44%	45%	20%	63%	49%	35%	49%	49%	48%	44%	36%	33%	21%	24%	30%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	2.359	0.962	3.027	1.443	2.675	1.945	5.426	4.164	0.803	0.515	9.774	5.556	2.120	5.535	0.911	1.109	2.827
p-values	0.501	0.811	0.220	0.230	0.262	0.746	0.066	0.526	0.977	0.473	0.082	0.062	0.714	0.237	0.340	0.292	0.093
Q(15)	9.294	10.038	11.782	3.876	16.753	9.510	11.850	11.069	12.349	8.544	24.023	14.439	13.013	11.991	5.030	9.888	7.238
p-values	0.750	0.691	0.463	0.973	0.159	0.797	0.458	0.748	0.652	0.664	0.065	0.274	0.526	0.607	0.930	0.541	0.780
Q(25)	14.490	23.186	20.818	18.278	24.826	24.240	15.426	36.920	24.433	20.550	33.736	21.756	26.242	26.827	10.018	17.256	15.698
p-values	0.912	0.450	0.532	0.631	0.305	0.448	0.843	0.059	0.494	0.487	0.114	0.475	0.341	0.313	0.979	0.695	0.786
Q(35)	34.799	39.260	24.200	27.327	33.872	32.057	23.128	45.824	32.902	29.475	43.417	36.069	33.874	34.535	19.403	25.820	31.474
p-values	0.382	0.210	0.837	0.656	0.377	0.563	0.874	0.104	0.570	0.545	0.155	0.284	0.474	0.442	0.948	0.730	0.443
Box-Pierce Q test (squared residuals)																	
Q(5)	3.212	0.799	2.351	2.614	1.144	3.349	2.407	2.575	3.959	3.721	2.100	1.665	3.439	3.359	3.084	2.009	0.352
p-values	0.360	0.850	0.309	0.106	0.564	0.501	0.300	0.765	0.555	0.054	0.835	0.435	0.487	0.500	0.079	0.156	0.553
Q(15)	8.417	11.722	9.118	11.752	13.214	8.362	10.387	9.387	21.170	7.129	9.106	6.521	11.628	16.894	15.397	12.101	1.811
p-values	0.815	0.551	0.693	0.383	0.354	0.870	0.582	0.856	0.131	0.789	0.872	0.888	0.636	0.262	0.165	0.356	0.999
Q(25)	16.378	20.413	17.595	24.748	25.436	23.079	16.673	11.263	27.973	15.088	15.669	22.354	23.610	26.011	20.553	24.324	4.851
p-values	0.839	0.617	0.730	0.258	0.277	0.515	0.781	0.992	0.309	0.819	0.924	0.439	0.484	0.353	0.487	0.278	1.000
Q(35)	32.209	26.474	26.383	34.212	34.729	35.030	26.196	17.000	37.433	20.706	19.930	28.959	33.107	38.581	38.166	27.766	13.804
p-values	0.506	0.782	0.746	0.316	0.339	0.419	0.755	0.996	0.358	0.919	0.981	0.621	0.511	0.270	0.176	0.633	0.997
ARCH LM test																	
p-values	0.480	0.940	0.933	0.418	0.964	0.515	0.708	0.823	0.791	0.730	0.419	0.914	0.443	0.849	0.827	0.797	0.941
Normality tests																	
Skewness	-0.12	0.47	0.27	0.58	0.65	0.65	0.30	0.55	0.45	0.38	0.21	0.65	0.61	0.77	-0.20	0.16	1.13
Kurtosis	6.41	5.09	4.93	7.37	7.32	5.58	5.25	5.89	9.57	9.35	9.69	5.57	5.95	6.84	5.02	6.60	7.38
Jarque-Bera	499.13	224.77	170.69	871.41	867.43	356.49	231.26	406.92	1875.10	1743.33	1916.07	351.87	432.64	729.75	181.54	557.72	1036.14
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.11: (continued)

Stocks	TRCAS	AKSA	SKBNK	YKBNK	VAKBN	VAKBN	AKBNK	ISGYO
Mean equation	ARMA(2/2)	ARMA(2/2)	ARMA(1/2)	ARMA(1/1)	ARMA(0/2)	ARMA(2/2)	ARMA(2/2)	ARMA(1/1)
C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
p-values	0.921	0.837	0.426	0.190	0.936	0.875	0.085	0.306
INDEX	0.953	0.737	1.198	1.365	1.460	1.398	1.367	0.803
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.751	-1.540	-0.912	-0.854		0.705	0.622	-0.389
p-values	0.015*	0.000*	0.000*	0.008*		0.004*	0.244	0.025*
AR(2)	-0.337	-0.946				-0.463	0.264	
p-values	0.202	0.000*				0.002*	0.580	
MA(1)	-0.740	1.552	0.978	0.852	0.035	-0.655	-0.738	0.231
p-values	0.018*	0.000*	0.000*	0.008*	0.288	0.009*	0.176	0.207
MA(2)	0.238	0.977	0.083		-0.050	0.418	-0.216	
p-values	0.388	0.000*	0.032*		0.121	0.006*	0.678	
Variance equation	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	EGARCH(1/2)
C	0.000	-2.509	-0.053	0.000	0.000	0.000	0.000	-1.753
p-values	0.000*	0.000*	0.006*	0.004*	0.049*	0.008*	0.001*	0.000*
α1	0.074	0.290	0.341	0.064	0.039	0.064	0.127	0.291
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2		0.038	-0.295					
p-values		0.493	0.000*					
γ1		0.108	0.013					0.038
p-values		0.000*	0.718					0.205
γ2		0.107	0.010					
p-values		0.001*	0.793					
β1	0.779	0.716	1.219	0.872	0.927	0.881	0.748	0.239
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.025*
β2			-0.221					0.586
p-values			0.224					0.000*
AIC	-5.367	-5.141	-5.038	-6.305	-6.210	-6.132	-6.477	-5.857
R-square	40%	35%	55%	79%	77%	76%	79%	42%
Residual diagnostics								
Box-Pierce Q test (residuals)								
Q(5)	1.231	3.560	2.159	4.898	0.484	1.769	2.893	5.531
p-values	0.267	0.059	0.340	0.179	0.922	0.184	0.089	0.137
Q(15)	7.643	9.950	11.545	8.508	12.753	10.831	6.418	8.876
p-values	0.745	0.535	0.483	0.809	0.467	0.457	0.844	0.782
Q(25)	13.126	16.918	19.525	24.835	15.415	17.488	14.637	14.107
p-values	0.904	0.716	0.613	0.359	0.879	0.681	0.841	0.924
Q(35)	19.163	31.850	34.858	40.055	24.251	29.095	22.970	25.239
p-values	0.952	0.424	0.334	0.186	0.866	0.564	0.850	0.831
Box-Pierce Q test (squared residuals)								
Q(5)	2.705	1.876	0.403	4.331	3.533	0.484	0.748	7.507
p-values	0.100	0.171	0.817	0.228	0.316	0.487	0.387	0.057
Q(15)	12.488	8.267	9.237	19.583	8.193	8.038	5.629	19.904
p-values	0.328	0.689	0.683	0.106	0.831	0.710	0.897	0.098
Q(25)	15.877	20.026	16.325	33.992	21.039	15.456	15.592	27.921
p-values	0.777	0.520	0.799	0.065	0.579	0.799	0.792	0.219
Q(35)	29.777	37.670	21.181	43.550	31.577	28.302	20.939	38.203
p-values	0.529	0.190	0.928	0.104	0.538	0.606	0.914	0.245
ARCH LM test								
p-values	0.887	0.898	0.991	0.515	0.976	0.888	0.746	0.116
Normality tests								
Skewness	0.80	1.53	0.72	0.12	0.13	0.23	0.05	0.397615
Kurtosis	6.82	10.34	8.41	4.42	4.53	4.24	6.92	5.22808
Jarque-Bera	732.75	2692.90	1336.38	88.46	102.83	74.57	655.72	238.5607
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.12: Model selection - Turkey - no news - analyst coverage < 6

Stocks	**ECILC**	**ECILC**	**PETUN**	**YAZIC**	**YAZIC**	**YAZIC**	**YAZIC**	**ADNAC**	**ALKIM**	**ALKIM**	**ASUZU**	**ECZYT**	**ECZYT**	**ECZYT**	**EGEEN**	**GOLTS**	**GOLTS**
Mean equation	ARMA(0/0)	ARMA(0/1)	ARMA(1/0)	ARMA(2/2)	ARMA(1/1)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(0/2)	ARMA(1/1)	ARMA(0/1)	ARMA(2/2)	ARMA(0/0)	ARMA(2/0)	ARMA(2/2)	ARMA(2/2)	ARMA(0/1)
C	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	-0.001	0.000	0.004	0.002	0.000
p-values	0.520	0.738	0.115	0.351	0.749	0.250	0.017*	0.913	0.690	0.846	0.317	0.475	0.170	0.854	0.001*	0.048*	0.856
INDEX	0.839	0.897	0.637	0.580		0.493	0.534	0.608	0.653	0.597	0.969	0.931	0.888	0.820	0.693	0.538	0.570
p-values	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)			0.032	1.066	0.926	-0.091	-0.408	-0.597		0.961		-0.292		-0.041	0.241	1.281	
p-values			0.382	0.000*	0.000*	0.080	0.000*	0.000*		0.000*		0.000*		0.300	0.129	0.000*	
AR(2)				-0.971		0.899	-0.836	0.263				-0.840		-0.062	-0.702	-0.911	
p-values				0.000*		0.000*	0.000*	0.012*				0.000*		0.083	0.000*	0.000*	
MA(1)		-0.048		-1.075	-0.963	0.053	0.393	0.364	-0.017	-0.956	-0.036	0.294			-0.171	-1.256	0.089
p-values		0.187		0.000*	0.000*	0.180	0.001*	0.022*	0.652	0.000*	0.373	0.000*			0.301	0.000*	0.004*
MA(2)				0.986		-0.930	0.823	-0.445	0.088			0.890			0.638	0.922	
p-values				0.000*		0.000*	0.000*	0.000*	0.007*			0.000*			0.000*	0.000*	
Variance equation	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/2)	GARCH(1/2)	EGARCH(2/1)	GARCH(1/2)	EGARCH(1/2)	GARCH(1/2)	GARCH(1/2)	EGARCH(2/1)	EGARCH(2/1)	ARCH(2)	ARCH(2)	EGARCH(2/2)	EGARCH(1/1)		
C	-0.075	-0.111	0.000	0.000	-2.640	0.250	-1.397	0.000	0.000	-0.345	-0.209	0.000	0.000	-0.076	-0.461		
p-values	0.001*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*		
α1	0.311	0.202	0.112	0.149	0.349	0.241	0.178	0.193	0.185	0.189	0.354	0.259	0.252	0.250	0.159		
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*		
α2	-0.281	-0.197			0.029		0.155			-0.036	-0.289	0.016	0.048	-0.226			
p-values	0.000*	0.000*			0.716		0.000*			0.490	0.000*	0.467	0.043*	0.000*			
γ1	-0.016	0.049			0.042					0.189	0.078			0.140	0.069		
p-values	0.506	0.236			0.284					0.000*	0.012*			0.000*	0.000*		
γ2	0.030	0.038			-0.088					-0.223	-0.006			-0.107			
p-values	0.246	0.378			0.030*					0.000*	0.856			0.000*			
β1	1.675	0.987	0.302	0.398	0.707	0.343	0.608	0.036	0.044	0.970	0.979			1.592	0.950		
p-values	0.000*	0.000*	0.008*	0.111	0.000*	0.042*	0.002*	0.427	0.010*	0.000*	0.000*			0.000*	0.000*		
β2	-0.681		0.576	0.104		0.159	0.240	0.655	0.725					-0.599			
p-values	0.000*		0.000*	0.583		0.255	0.170	0.000*	0.000*					0.000*			
AIC	-5.278	-5.554	-5.246	-5.166	-5.196	-5.431	-5.508	-5.212	-4.729	-5.000	-4.747	-5.187	-5.224	-5.417	-4.179	-4.489	-4.204
R-square	41%	38%	30%	31%	32%	26%	21%	28%	29%	21%	40%	44%	43%	32%	12%	14%	14%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	4.2	1.0	6.9	2.7	2.6	3.0	0.8	3.3	4.7	5.9	4.8	1.8	5.0	2.3	2.2	3.5	3.3
p-values	0.523	0.906	0.141	0.101	0.459	0.083	0.364	0.070	0.194	0.117	0.306	0.177	0.417	0.505	0.140	0.061	0.516
Q(15)	10.0	7.1	11.0	9.7	13.2	6.2	10.2	11.8	14.0	12.7	12.6	9.4	13.5	8.5	10.6	9.6	7.9
p-values	0.821	0.932	0.686	0.557	0.432	0.858	0.510	0.380	0.375	0.468	0.561	0.584	0.561	0.811	0.481	0.567	0.892
Q(25)	16.7	20.9	23.2	26.7	20.4	10.8	13.5	25.0	23.5	20.4	19.8	15.7	19.0	16.8	22.3	16.7	23.3
p-values	0.893	0.646	0.507	0.181	0.616	0.966	0.890	0.245	0.433	0.620	0.707	0.784	0.798	0.820	0.384	0.730	0.502
Q(35)	24.3	29.3	29.5	40.9	27.9	21.1	24.6	39.7	37.3	32.9	26.2	20.2	26.5	34.8	27.4	23.4	34.4
p-values	0.912	0.697	0.687	0.110	0.720	0.910	0.784	0.135	0.279	0.471	0.829	0.932	0.849	0.381	0.651	0.836	0.448
Box-Pierce Q test (squared residuals)																	
Q(5)	1.3	1.0	5.8	2.2	3.7	2.0	1.5	2.5	1.4	1.8	1.5	0.4	0.1	1.0	2.7	0.6	2.6
p-values	0.940	0.905	0.216	0.141	0.290	0.156	0.218	0.112	0.696	0.623	0.827	0.528	1.000	0.796	0.100	0.454	0.625
Q(15)	4.7	2.8	12.2	8.4	10.0	9.5	10.6	12.4	11.8	4.6	9.8	7.2	6.5	3.6	3.9	1.9	4.4
p-values	0.994	0.999	0.592	0.679	0.697	0.580	0.478	0.332	0.540	0.984	0.777	0.782	0.971	0.995	0.974	0.999	0.992
Q(25)	10.2	6.8	21.7	16.9	21.1	20.0	18.2	23.4	14.4	7.7	27.7	13.1	10.2	5.8	21.6	2.6	5.4
p-values	0.996	1.000	0.597	0.715	0.576	0.522	0.638	0.325	0.916	0.999	0.272	0.905	0.996	1.000	0.423	1.000	1.000
Q(35)	42.3	32.3	32.0	22.9	33.2	44.7	35.3	33.0	19.0	13.8	30.6	21.9	18.7	17.5	37.7	2.7	5.7
p-values	0.184	0.549	0.564	0.852	0.458	0.053	0.270	0.370	0.975	0.999	0.637	0.885	0.989	0.988	0.190	1.000	1.000
ARCH LM test																	
p-values	0.996	0.876	0.160	0.919	0.660	0.904	0.657	0.888	0.964	0.987	0.933	0.986	0.981	0.919	0.324	0.840	0.336
Normality tests																	
Skewness	1.07	1.45	0.03	0.15	0.01	-0.09	0.47	1.79	0.69	0.67	0.70	1.16	1.12	1.84	0.75	5.38	3.99
Kurtosis	8.46	10.23	8.72	6.42	5.79	7.57	5.29	16.11	11.16	7.82	10.42	9.42	9.81	14.45	8.26	83.89	52.48
Jarque-Bera	1462.71	2587.53	1394.78	503.93	332.50	890.10	261.41	7869.51	2922.03	1068.22	2427.88	1982.79	2192.74	6163.97	1276.14	283807.20	107091.20
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.12: (continued)

Stocks	GOLTS	GSRAY	GSRAY	TIRE	YKSGR	ALARK	EGSER	KOZAL	AKMGY	BFREN	ISYAT	KUTPO
Mean equation	ARMA(2/0)	ARMA(2/2)	ARMA(2/2)	ARMA(1/1)	ARMA(1/0)	ARMA(2/2)	ARMA(1/1)	ARMA(0/1)	ARMA(2/1)	ARMA(1/1)	ARMA(0/1)	ARMA(1/0)
C	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	-0.001	0.000	0.000	0.000
p-values	0.207	0.707	0.946	0.503	0.999	0.247	0.222	0.917	0.151	0.885	0.304	0.836
INDEX	0.575	0.008	-0.002	0.720	1.026	0.692	0.855	0.679	0.634	0.787	0.329	0.745
p-values	0.000*	0.688	0.897	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.022	-1.502	-0.610	0.211	0.058	1.036	-0.918		0.584	0.898		-0.051
p-values	0.576	0.000*	0.142	0.571	0.133	0.000*	0.000*		0.397	0.000*		0.103
AR(2)	-0.041	-0.878	0.387			-0.979			-0.004			
p-values	0.247	0.000*	0.350			0.000*			0.936			
MA(1)		1.492	0.583	-0.294		-1.022	0.938	0.068	-0.610	-0.950	-0.240	
p-values		0.000*	0.166	0.412		0.000*	0.000*	0.032*	0.377	0.000*	0.000*	
MA(2)		0.884	-0.414			0.972						
p-values		0.000*	0.324			0.000*						
Variance equation	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(1/2)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)	
C	-1.408	-2.453	-2.293	-0.165	-0.394	0.000	-13.068	-0.219	-0.448	-0.810	-0.009	
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	
α1	0.379	0.581	0.603	0.379	0.376	0.234	0.337	0.130	0.559	0.370	0.405	
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	
α2	-0.160	0.614	0.334	-0.287	-0.222		0.369		-0.320	0.007	-0.406	
p-values	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*		0.000*	0.871	0.000*	
γ1	0.090	-0.047	0.012	0.197	0.046		0.123	-0.046	0.007	0.058	0.054	
p-values	0.004*	0.161	0.693	0.000*	0.000*		0.001*	0.001*	0.834	0.118	0.037*	
γ2	0.092	0.224	0.110	-0.152	0.959		0.104		-0.193	-0.141	-0.069	
p-values	0.010*	0.000*	0.000*	0.000*	0.000*		0.003*		0.000*	0.000*	0.009*	
β1	0.824	0.295	0.780	1.225		0.434	-0.579	0.479	0.962	0.929	1.758	
p-values	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.166	0.000*	0.000*	0.000*	
β2		0.484		-0.237				0.504			-0.759	
p-values		0.000*		0.019*				0.144			0.000*	
AIC	-4.321	-4.800	-4.915	-4.920	-4.115	-5.767	-5.105	-4.545	-5.149	-5.240	-6.064	-5.146
R-square	16%	1%	0%	30%	26%	40%	29%	16%	19%	25%	18%	26%
Residual diagnostics												
Box-Pierce Q test (residuals)												
Q(5)	1.6	2.1	2.8	0.9	5.4	1.2	5.4	6.7	3.4	0.3	7.0	2.7
p-values	0.665	0.148	0.096	0.837	0.246	0.272	0.143	0.151	0.186	0.953	0.135	0.607
Q(15)	12.2	4.5	9.5	10.9	14.3	2.9	16.6	11.7	16.4	9.7	14.2	11.2
p-values	0.509	0.951	0.578	0.621	0.425	0.993	0.217	0.627	0.174	0.716	0.438	0.667
Q(25)	24.4	14.6	21.1	22.6	22.4	13.8	22.6	18.8	28.1	24.0	26.8	14.5
p-values	0.384	0.841	0.454	0.486	0.557	0.879	0.482	0.763	0.173	0.407	0.312	0.934
Q(35)	37.5	21.7	31.1	35.3	30.4	22.0	31.7	24.1	43.7	37.5	34.0	20.3
p-values	0.270	0.893	0.463	0.362	0.643	0.884	0.530	0.897	0.081	0.270	0.467	0.969
Box-Pierce Q test (squared residuals)												
Q(5)	1.9	2.5	2.4	1.5	4.0	0.9	5.5	6.7	0.3	0.4	2.7	7.1
p-values	0.591	0.113	0.120	0.674	0.405	0.332	0.138	0.152	0.849	0.949	0.603	0.130
Q(15)	5.2	9.9	7.5	4.8	15.2	12.3	9.8	14.5	15.7	4.3	4.4	12.5
p-values	0.972	0.540	0.760	0.979	0.364	0.341	0.707	0.411	0.203	0.988	0.993	0.566
Q(25)	9.2	29.1	31.7	12.3	24.1	19.5	16.6	17.2	19.6	13.5	12.6	14.0
p-values	0.995	0.111	0.063	0.966	0.457	0.554	0.828	0.841	0.611	0.939	0.973	0.947
Q(35)	23.8	33.0	40.1	20.6	28.4	24.0	27.6	31.5	24.5	16.9	14.2	15.2
p-values	0.880	0.369	0.127	0.954	0.740	0.812	0.734	0.589	0.827	0.991	0.999	0.998
ARCH LM test												
p-values	0.995	0.881	0.657	0.840	0.256	0.740	0.100	0.506	0.734	0.936	0.921	0.076
Normality tests												
Skewness	1.34	-0.33	-0.45	1.19	0.88	-0.56	0.63	0.02	1.75	1.12	0.93	1.58
Kurtosis	9.82	17.07	20.68	10.29	6.57	16.25	6.81	4.90	19.48	15.15	17.53	18.80
Jarque-Bera	2290.09	8458.78	13351.33	2507.25	672.40	7532.68	687.22	154.52	12103.27	6504.29	9146.87	11068.64
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.13: Model selection - TR - bad news - analyst coverage > 5

Stocks	**TCELL**	**GARAN**	**THYAO**	**ARCLK**	**EREGL**	**TKFEN**	**SISE**	**DOAS**	**SISE**	**ANACM**	**KRDMD**	**AYGAZ**	**AYGAZ**	**AKENR**	**ISGYO**	**AKGRT**	**GUBRF**
Mean equation	ARMA(2/2)	ARMA(1/1)	ARMA(1/2)	ARMA(2/1)	ARMA(0/1)	ARMA(0/1)	ARMA(0/0)	ARMA(0/0)	ARMA(1/1)	ARMA(0/0)	ARMA(1/2)	ARMA(1/2)	ARMA(2/2)	ARMA(0/1)	ARMA(2/2)	ARMA(2/1)	ARMA(2/2)
C	0.000	0.000	0.001	-0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.001	-0.001	0.000	0.001	0.000	-0.001	-0.002
p-values	0.701	0.384	0.294	0.092	0.715	0.725	0.546	0.262	0.422	0.731	0.056	0.169	0.433	0.190	0.323	0.002*	0.000*
INDEX	0.828	1.299	0.872	0.851	0.918	0.945	1.032	1.093	1.033	0.657	0.819	0.847	0.804	0.714	1.002	1.132	0.748
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-1.528	0.915	-0.484	-0.705					0.703		-0.742	-0.923	0.119		0.111	0.748	-0.703
p-values	0.000*	0.000*	0.087	0.007*					0.000*		0.006*	0.000*	0.105		0.388	0.000*	0.000*
AR(2)	-0.532			-0.053									-0.784		0.821	-0.056	0.212
p-values	0.000*			0.154									0.000*		0.000*	0.109	0.000*
MA(1)	1.570	-0.953	0.623	0.698	0.035	0.136			-0.748		0.565	0.803	-0.143	0.031	-0.168	-0.750	0.587
p-values	0.000*	0.000*	0.025*	0.007*	0.292	0.000*			0.000*		0.034*	0.000*	0.083	0.404	0.237	0.000*	0.000*
MA(2)	0.572		0.136								-0.156	-0.103	0.730		-0.818		-0.361
p-values	0.000*		0.001*								0.003*	0.004*	0.000*		0.000*		0.000*
Variance equation	EGARCH(2/2)	EGARCH(2/1)	EGARCH(1/2)	GARCH(1/1)	GARCH(1/1)		GARCH(1/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/1)	GARCH(1/2)	GARCH(1/1)	EGARCH(1/2)
C	-3.985	-2.427	-1.914	0.000	0.000		0.000	0.000	-0.529	-6.373	-1.813	-0.148	-0.072	0.000	0.000	0.000	-1.357
p-values	0.007*	0.026*	0.000*	0.000*	0.000*		0.031*	0.002*	0.001*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.002*	0.000*
α1	0.424	0.223	0.335	0.189	0.096		0.040	0.036	0.175	0.073	0.220	0.319	0.476	0.110	0.193	0.205	0.333
p-values	0.000*	0.000*	0.000*	0.000*	0.000*		0.003*	0.000*	0.003*	0.242	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*
α2	0.068	-0.157							-0.005	0.343	-0.028	-0.237	-0.464				
p-values	0.742	0.010*							0.940	0.000*	0.663	0.000*	0.000*				
γ1	0.078	0.093	0.181						0.105	0.087	0.051	0.022	0.071				0.119
p-values	0.032*	0.017*	0.000*						0.007*	0.043*	0.138	0.540	0.102				0.021*
γ2	0.059	0.045							-0.111	-0.060	0.142	-0.006	-0.034				
p-values	0.260	0.438							0.001*	0.096	0.000*	0.876	0.444				
β1	0.619	0.717	0.116	0.482	0.866		0.909	0.949	0.951	0.268	0.141	0.989	0.992	0.793	0.326	0.630	0.637
p-values	0.167	0.000*	0.001*	0.000*	0.000*		0.000*	0.000*	0.000*	0.115	0.266	0.000*	0.000*	0.000*	0.024*	0.000*	0.005*
β2	-0.069		0.668								0.653				0.309		0.209
p-values	0.819		0.000*								0.000*				0.007*		0.324
AIC	-5.157	-5.536	-4.828	-5.023	-4.908	-5.476	-5.553	-4.937	-5.423	-5.411	-5.225	-5.365	-5.374	-4.561	-5.082	-4.950	-4.672
R-square	39%	67%	33%	40%	44%	47%	58%	52%	64%	34%	30%	52%	40%	26%	47%	48%	26%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	3.5	5.2	4.6	1.2	1.6	2.7	7.5	6.5	4.6	1.3	3.4	3.3	3.5	2.5	1.6	5.5	3.4
p-values	0.061	0.158	0.098	0.554	0.806	0.602	0.188	0.262	0.201	0.937	0.185	0.191	0.062	0.651	0.207	0.063	0.064
Q(15)	11.1	18.0	9.3	7.0	10.4	10.7	12.4	14.1	9.6	16.7	11.9	9.1	18.4	17.8	8.0	7.4	15.8
p-values	0.437	0.159	0.675	0.855	0.735	0.708	0.652	0.515	0.728	0.335	0.455	0.697	0.074	0.216	0.715	0.828	0.148
Q(25)	22.4	25.5	14.2	12.4	22.5	14.9	15.8	32.2	12.9	23.3	19.7	22.1	29.7	21.6	13.6	13.0	20.9
p-values	0.377	0.326	0.893	0.947	0.549	0.923	0.921	0.152	0.954	0.560	0.605	0.457	0.098	0.605	0.887	0.933	0.468
Q(35)	27.9	30.8	25.5	20.6	32.1	34.8	23.5	49.1	22.4	34.2	29.5	29.8	41.5	25.7	28.6	22.7	28.6
p-values	0.626	0.578	0.787	0.941	0.560	0.428	0.931	0.058	0.919	0.505	0.592	0.579	0.098	0.845	0.592	0.887	0.592
Box-Pierce Q test (squared residuals)																	
Q(5)	1.1	6.0	1.5	0.7	0.8	6.4	0.8	1.9	2.0	1.4	2.7	2.3	3.3	3.6	2.7	0.8	0.5
p-values	0.286	0.113	0.477	0.718	0.937	0.168	0.978	0.862	0.579	0.927	0.265	0.324	0.070	0.462	0.099	0.656	0.467
Q(15)	13.7	9.4	5.8	10.8	4.1	9.4	9.2	17.7	12.2	11.6	7.1	8.9	11.4	10.3	9.7	3.1	10.5
p-values	0.251	0.741	0.926	0.543	0.995	0.804	0.866	0.277	0.515	0.711	0.854	0.713	0.414	0.740	0.556	0.995	0.486
Q(25)	21.4	20.5	20.5	20.9	9.2	25.6	12.7	28.0	18.9	26.1	10.4	13.8	18.0	30.7	13.8	3.9	25.8
p-values	0.433	0.612	0.550	0.526	0.997	0.375	0.980	0.306	0.708	0.405	0.982	0.909	0.651	0.163	0.879	1.000	0.216
Q(35)	23.4	33.8	35.9	26.2	26.5	28.3	34.0	34.0	28.8	38.0	14.3	21.8	33.2	39.4	21.6	41.9	43.0
p-values	0.834	0.430	0.291	0.755	0.817	0.744	0.518	0.517	0.678	0.334	0.997	0.913	0.360	0.241	0.895	0.113	0.074
ARCH LM test																	
p-values	0.735	0.489	0.792	0.936	0.912	0.073	0.977	0.978	0.947	0.673	0.456	0.918	0.782	0.358	0.797	0.890	0.929
Normality tests																	
Skewness	-0.2	-0.3	0.0	0.3	0.4	-0.7	0.6	0.4	0.7	0.3	0.9	1.3	1.2	0.2	1.0	2.4	1.5
Kurtosis	8.3	6.4	9.8	7.0	5.2	10.2	4.5	4.7	5.1	4.6	8.1	8.6	8.7	6.8	6.1	27.3	12.3
Jarque-Bera	1,224.6	515.0	1,953.0	705.9	229.0	2,321.3	150.8	163.3	277.6	128.9	1,260.6	1,635.1	1,609.0	613.7	579.2	26,233.3	4,038.3
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.13: (continued)

Stocks	DOHOL	DOHOL	GUBRF	ANSGR	ALARK	SODA	SODA	BAGFS	CLEBI	PRKME	AKSA	CLEBI	HURGZ	ASYAB	SKBNK	YKBNK	TCELL
Mean equation	ARMA(2/0)	ARMA(0/2)	ARMA(0/1)	ARMA(2/1)	ARMA(2/2)	ARMA(1/1)	ARMA(2/1)	ARMA(0/2)	ARMA(0/2)	ARMA(0/0)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(1/0)	ARMA(1/0)	ARMA(2/2)	ARMA(2/1)
C	0.000	-0.001	0.001	0.001	-0.001	-0.014	0.001	-0.001	0.000	-0.001	-0.001	0.001	0.000	0.000	-0.001	0.000	0.000
p-values	0.605	0.064	0.158	0.017*	0.123	0.892	0.173	0.067	0.567	0.325	0.051	0.276	0.476	0.765	0.126	0.356	0.592
INDEX	1.299	1.171	0.946	0.922	0.913	0.762	0.699	0.900	0.571	0.975	0.664	0.757	1.120	1.011	1.116	1.311	0.688
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.041			0.937	1.420	1.000	-0.432				-1.502	-1.233	0.339	0.077	-0.010	0.496	0.861
p-values	0.197			0.000*	0.000*	0.000*	0.098				0.000*	0.000*	0.000*	0.028*	0.788	0.000*	0.000*
AR(2)	0.082			0.056	-0.845		-0.067				-0.933	-0.305	-0.981			-0.951	-0.095
p-values	0.006*			0.081	0.000*		0.055				0.000*	0.011*	0.000*			0.000*	0.011*
MA(1)		-0.015	0.125	-0.998	-1.495	-1.000	0.432	-0.025	-0.011		1.514	1.312	-0.341			-0.495	-0.846
p-values		0.648	0.000*	0.000*	0.000*	0.000*	0.100	0.395	0.781		0.000*	0.000*	0.000*			0.000*	0.000*
MA(2)		0.053			0.907			-0.018	-0.065		0.969	0.381	0.995			0.979	
p-values		0.096			0.000*			0.537	0.041*		0.000*	0.001*	0.000*			0.000*	
Variance equation	EGARCH(1/1)	GARCH(1/1)	EGARCH(1/2)	EGARCH(1/1)	GARCH(1/1)	EGARCH(1/2)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/1)	GARCH(2/2)	GARCH(1/2)	GARCH(1/2)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	EGARCH(1/2)
C	-0.482	0.000	-0.257	-0.450	0.000	-1.654	-0.109	-0.205	-0.153	0.000	0.000	0.000	-3.278	-0.030	-0.072	0.000	-5.982
p-values	0.000*	0.000*	0.000*	0.000*	0.036*	0.000*	0.034*	0.000*	0.000*	0.000*	0.000*	0.000*	0.003*	0.190	0.000*	0.006*	0.000*
α1	0.082	0.057	0.076	0.192	0.089	0.107	0.364	0.165	0.493	0.058	0.242	0.134	0.245	0.349	0.381	0.104	0.180
p-values	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.012*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*
α2							-0.342		-0.353	0.283				-0.320	-0.329		
p-values							0.000*		0.000*	0.000*				0.000*	0.000*		
γ1	0.068		0.111	-0.005		0.125	0.139	0.040	-0.003				0.010	-0.063	-0.033		-0.059
p-values	0.000*		0.000*	0.725		0.000*	0.000*	0.056	0.904				0.755	0.045*	0.397		0.076
γ2							-0.121		-0.019					0.064	0.064		
p-values							0.000*		0.425					0.034*	0.093		
β1	0.949	0.907	0.184	0.961	0.855	0.031	1.380	0.988	0.993	0.175	0.299	0.389	0.618	1.439	0.996	0.710	0.792
p-values	0.000*	0.000*	0.007*	0.000*	0.000*	0.412	0.000*	0.000*	0.000*	0.016*	0.004*	0.015*	0.000*	0.000*	0.000*	0.000*	0.000*
β2			0.787			0.775	-0.392			0.301	0.332	0.427		-0.440			-0.463
p-values			0.000*			0.000*	0.000*			0.000*	0.000*	0.004*		0.000*			0.010*
AIC	-5.465	-5.532	-4.158	-4.969	-5.426	-5.249	-5.155	-4.658	-4.488	-4.364	-5.393	-4.611	-5.226	-5.100	-5.289	-6.479	-5.851
R-square	67%	64%	27%	61%	66%	33%	31%	35%	23%	26%	30%	28%	57%	51%	58%	78%	35%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	1.2	1.0	3.8	1.4	3.8	4.8	2.1	4.6	3.0	3.0	0.3	1.8	1.4	2.6	6.1	2.9	1.5
p-values	0.761	0.792	0.427	0.492	0.050	0.190	0.353	0.203	0.397	0.703	0.572	0.184	0.233	0.629	0.193	0.089	0.468
Q(15)	6.5	6.1	16.6	8.7	9.6	15.9	9.3	11.9	9.1	9.9	7.9	11.0	7.3	9.1	15.0	15.6	10.4
p-values	0.924	0.944	0.277	0.727	0.564	0.252	0.676	0.534	0.768	0.829	0.721	0.441	0.777	0.827	0.375	0.158	0.581
Q(25)	17.5	17.8	22.5	13.9	17.4	19.4	12.3	26.3	15.8	14.1	11.3	15.4	14.6	15.5	26.6	27.1	18.3
p-values	0.783	0.770	0.549	0.904	0.685	0.679	0.950	0.285	0.866	0.960	0.956	0.802	0.841	0.906	0.324	0.167	0.688
Q(35)	23.0	25.5	30.3	27.1	31.4	28.2	26.6	37.2	23.1	24.4	15.0	19.1	24.9	17.5	43.4	37.3	26.7
p-values	0.904	0.820	0.650	0.713	0.447	0.705	0.735	0.282	0.899	0.910	0.993	0.953	0.771	0.991	0.129	0.203	0.730
Box-Pierce Q test (squared residuals)																	
Q(5)	6.0	3.6	2.9	3.6	3.7	2.6	2.5	5.9	4.2	2.0	3.1	2.0	2.9	1.6	1.1	2.8	1.0
p-values	0.110	0.308	0.576	0.162	0.054	0.454	0.291	0.116	0.243	0.842	0.079	0.161	0.088	0.816	0.899	0.096	0.606
Q(15)	14.4	15.4	19.1	9.0	8.5	10.6	6.0	10.8	16.7	11.6	11.4	15.3	12.2	5.1	10.1	8.1	4.4
p-values	0.343	0.284	0.161	0.707	0.664	0.645	0.916	0.626	0.214	0.707	0.410	0.167	0.349	0.984	0.754	0.706	0.975
Q(25)	20.9	26.6	23.2	15.6	19.7	16.8	13.5	16.8	23.0	23.2	17.7	24.8	32.3	14.3	18.3	15.7	11.7
p-values	0.585	0.273	0.507	0.834	0.539	0.820	0.920	0.821	0.462	0.563	0.669	0.257	0.055	0.940	0.786	0.786	0.963
Q(35)	34.9	46.9	27.1	45.9	38.8	23.6	18.1	24.2	27.3	27.4	22.5	39.3	37.5	47.8	23.3	22.5	28.5
p-values	0.377	0.056	0.795	0.053	0.158	0.887	0.977	0.867	0.748	0.818	0.866	0.146	0.197	0.058	0.917	0.866	0.644
ARCH LM test																	
p-values	0.116	0.437	0.998	0.366	0.488	0.483	0.625	0.126	0.363	0.845	0.350	0.831	0.969	0.770	0.682	0.742	0.960
Normality tests																	
Skewness	0.4	0.5	0.7	0.5	0.2	0.6	0.9	0.6	0.4	1.3	2.1	1.4	0.2	0.7	0.2	0.1	0.2
Kurtosis	5.6	5.2	6.8	6.2	4.4	6.5	7.3	7.2	10.0	8.5	15.9	9.6	4.0	8.7	7.1	4.0	4.4
Jarque-Bera	306.9	251.4	686.5	482.0	85.6	585.4	921.0	817.5	2,131.9	1,558.8	7,795.5	2,185.9	55.9	1,455.3	736.0	45.3	90.5
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.13: (continued)

Stocks	**PETKM**	**ANSGR**	**BAGFS**
Mean equation	ARMA(2/2)	ARMA(2/0)	ARMA(0/2)
C	-0.001	0.000	0.000
p-values	0.004*	0.270	0.882
INDEX	0.787	0.443	0.709
p-values	0.000*	0.000*	0.000*
AR(1)	-0.654	-0.207	
p-values	0.011*	0.000*	
AR(2)	-0.298	0.010	
p-values	0.167	0.741	
MA(1)	0.596		-0.044
p-values	0.024*		0.148
MA(2)	0.249		-0.080
p-values	0.251		0.034*
Variance equation	EGARCH(2/2)	ARCH(1)	EGARCH(2/1)
C	-0.402	0.000	-4.067
p-values	0.323	0.000*	0.000*
α1	0.424	0.180	0.338
p-values	0.000*	0.000*	0.000*
α2	-0.333		0.419
p-values	0.002*		0.000*
γ1	0.118		0.116
p-values	0.033*		0.001*
γ2	-0.085		-0.039
p-values	0.169		0.287
β1	1.447		0.578
p-values	0.000*		0.000*
β2	-0.486		
p-values	0.070		
AIC	-5.804	-5.977	-5.504
R-square	38%	20%	29%
Residual diagnostics			
Box-Pierce Q test (residuals)			
Q(5)	2.8	0.8	4.8
p-values	0.095	0.857	0.189
Q(15)	17.9	8.8	17.2
p-values	0.084	0.787	0.190
Q(25)	24.4	21.3	35.1
p-values	0.276	0.566	0.050
Q(35)	30.3	26.4	40.3
p-values	0.500	0.786	0.178
Box-Pierce Q test (squared residuals)			
Q(5)	1.9	2.4	1.8
p-values	0.170	0.491	0.610
Q(15)	19.4	14.8	7.9
p-values	0.054	0.323	0.852
Q(25)	27.3	22.9	17.7
p-values	0.161	0.466	0.774
Q(35)	32.3	36.8	37.5
p-values	0.403	0.298	0.271
ARCH LM test			
p-values	0.972	0.395	0.785
Normality tests			
Skewness	0.9	1.7	1.3
Kurtosis	6.8	16.1	19.6
Jarque-Bera	752.7	7,791.3	11,972.6
p-value	0.000*	0.000*	0.000*

Table B.14: Model selection - Turkey - bad news - analyst coverage < 6

Stocks	IPEKE	AYEN	VESBE	ALGYO	SASA	ECILC	ALGYO	MUTLU	GUSGR	AFYON	MRSHL	KIPA	DEVA	GOODY	BRSAN	FENER	AFYON
Mean equation	ARMA(1/1)	ARMA(2/2)	ARMA(2/2)	ARMA(0/1)	ARMA(1/2)	ARMA(1/2)	ARMA(1/1)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/0)	ARMA(2/1)
C	-0.001	0.001	0.000	0.000	0.000	0.001	-0.001	0.000	-0.001	0.001	0.000	0.002	0.002	0.000	-0.001	0.001	-0.001
p-values	0.435	0.402	0.699	0.748	0.292	0.058	0.426	0.913	0.308	0.085	0.692	0.014*	0.143	0.418	0.017*	0.131	0.309
INDEX	0.911	0.804	0.807	0.757	0.744	0.771	0.592	0.689	0.848	0.438	0.571	0.183	0.732	0.682	0.657	0.011	0.600
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.689	0.000*
AR(1)	-0.997	0.710	-1.612		0.862	-0.334	0.965	-0.763	-0.261	-0.559	-0.969	1.637	1.492	-1.848	-0.122	0.140	0.518
p-values	0.000*	0.000*	0.000*		0.000*	0.738	0.000*	0.000*	0.000*	0.067	0.000*	0.000*	0.001*	0.000*	0.746	0.000*	0.001*
AR(2)		-0.958	-0.812					-0.968	-0.833	0.272	0.015	-0.973	-0.607	-0.980	0.384	0.042	-0.117
p-values		0.000*	0.000*					0.000*	0.000*	0.188	0.941	0.000*	0.119	0.000*	0.184	0.146	0.003*
MA(1)	0.990	-0.743	1.638	-0.092	-0.957	0.224	-0.938	0.760	0.263	0.387	0.818	-1.651	-1.487	1.865	0.091		-0.455
p-values	0.000*	0.000*	0.000*	0.008*	0.000*	0.823	0.000*	0.000*	0.000*	0.190	0.000*	0.000*	0.001*	0.000*	0.802		0.004*
MA(2)		0.994	0.834		0.045	-0.011		0.990	0.898	-0.371	-0.171	0.992	0.623	0.996	-0.429		
p-values		0.000*	0.000*		0.272	0.933		0.000*	0.000*	0.035*	0.387	0.000*	0.079	0.000*	0.129		
Variance equation	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/1)	EGARCH(1/1)	EGARCH(2/1)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/2)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)
C	-0.520	0.000	-0.628	-0.267	0.000	-1.357	-1.408	-0.850	-0.882	-0.078	-0.510	0.000	-0.292	-1.966	-0.381	-0.797	-2.165
p-values	0.000*	0.000*	0.000*	0.023*	0.000*	0.000*	0.000*	0.000*	0.000*	0.005*	0.000*	0.000*	0.000*	0.000*	0.046*	0.000*	0.000*
α1	0.189	0.208	0.395	0.276	0.067	0.063	0.256	0.440	0.357	0.346	0.382	0.180	0.478	0.382	0.487	0.504	0.358
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.273	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	0.074		-0.139	-0.240		0.269		-0.159		-0.323	-0.245		-0.458		-0.279	-0.152	0.196
p-values	0.001*		0.001*	0.000*		0.000*		0.013*		0.000*	0.000*		0.000*		0.068	0.000*	0.010*
γ1	0.035		-0.057	0.047		0.141	0.069	0.052	-0.002	0.144	-0.001		-0.043	0.263	0.009	0.269	0.161
p-values	0.055		0.079	0.200		0.000*	0.009*	0.137	0.934	0.000*	0.981		0.310	0.000*	0.920	0.000*	0.000*
γ2	0.139		0.087	-0.012		-0.025		-0.008		-0.104	0.076		0.176		0.030	-0.252	-0.075
p-values	0.000*		0.007*	0.790		0.406		0.817		0.009*	0.017*		0.000*		0.731	0.000*	0.100
β1	0.018	0.624	0.941	1.718	0.231	0.855	0.846	0.912	0.917	1.486	0.945	0.316	1.060	0.785	0.882	0.922	0.343
p-values	0.046*	0.000*	0.000*	0.000*	0.063	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.012*	0.000*	0.000*	0.007*	0.000*	0.090
β2	0.934			-0.750	0.673					-0.494		0.466	-0.098		0.083		0.399
p-values	0.000*			0.000*	0.000*					0.000*		0.000*	0.387		0.790		0.018*
AIC	-4.164	-5.001	-4.832	-4.763	-4.601	-4.824	-5.029	-4.574	-4.620	-4.369	-4.679	-4.895	-4.389	-5.009	-4.944	-4.471	-4.205
R-square	30%	39%	30%	43%	43%	37%	26%	19%	33%	13%	28%	7%	16%	30%	26%	5%	13%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	7.475	3.668	3.111	2.828	5.506	3.006	3.876	4.202	3.118	2.331	2.778	3.255	2.192	0.534	3.360	7.125	1.062
p-values	0.058	0.055	0.078	0.587	0.064	0.222	0.275	0.040*	0.077	0.127	0.096	0.071	0.139	0.465	0.067	0.068	0.588
Q(15)	20.553	17.881	11.176	11.816	12.544	8.471	13.695	12.180	13.473	15.612	7.496	10.082	7.741	6.938	11.570	16.999	10.866
p-values	0.082	0.084	0.429	0.621	0.403	0.747	0.396	0.350	0.264	0.156	0.758	0.523	0.736	0.804	0.397	0.199	0.540
Q(25)	28.424	22.794	25.036	27.318	17.438	19.705	16.132	21.857	19.325	22.811	17.782	26.975	14.891	11.454	17.824	25.999	16.017
p-values	0.200	0.355	0.246	0.290	0.739	0.601	0.850	0.408	0.564	0.354	0.663	0.172	0.828	0.953	0.660	0.301	0.815
Q(35)	32.683	39.042	32.251	36.996	22.713	29.437	23.321	29.125	30.182	31.809	29.749	31.598	28.148	24.347	27.254	30.215	26.763
p-values	0.483	0.152	0.405	0.332	0.887	0.597	0.894	0.563	0.508	0.426	0.530	0.436	0.614	0.796	0.659	0.606	0.729
Box-Pierce Q test (squared residuals)																	
Q(5)	2.777	2.147	0.249	1.153	2.116	1.249	5.175	1.329	3.247	0.676	0.690	0.321	0.595	0.731	0.579	0.589	0.536
p-values	0.427	0.143	0.618	0.886	0.347	0.535	0.159	0.249	0.072	0.411	0.406	0.571	0.440	0.393	0.447	0.899	0.765
Q(15)	6.553	6.355	3.457	10.106	7.960	11.887	11.797	4.837	7.968	13.971	11.008	2.220	2.948	4.425	4.523	3.783	4.805
p-values	0.924	0.849	0.983	0.754	0.788	0.455	0.544	0.939	0.716	0.235	0.443	0.998	0.991	0.956	0.952	0.993	0.964
Q(25)	10.119	11.499	7.890	16.501	12.768	17.939	23.003	12.306	13.635	19.090	17.686	9.547	6.426	13.611	12.410	6.875	6.838
p-values	0.991	0.952	0.996	0.869	0.939	0.710	0.461	0.931	0.885	0.579	0.669	0.984	0.999	0.886	0.928	1.000	0.999
Q(35)	18.291	15.065	13.176	21.086	17.019	25.954	32.610	16.050	16.724	23.285	21.758	10.310	11.298	15.429	21.872	13.953	13.138
p-values	0.982	0.993	0.998	0.959	0.986	0.766	0.486	0.988	0.983	0.839	0.890	1.000	1.000	0.991	0.887	0.999	0.999
ARCH LM test																	
p-values	0.519	0.519	0.956	0.842	0.360	0.785	0.339	0.750	0.650	0.936	0.828	0.961	0.866	0.925	0.957	0.963	0.958
Normality tests																	
Skewness	0.89	1.15	0.36	0.48	0.41	1.51	0.26	1.65	1.12	1.28	1.20	0.70	0.96	1.06	0.86	-0.32	1.21
Kurtosis	8.53	9.14	10.67	5.12	7.85	9.14	4.62	12.65	8.66	8.66	10.03	17.67	9.59	11.84	11.36	14.67	12.20
Jarque-Bera	1437.61	1832.58	2527.91	229.41	1029.84	1996.13	123.46	4437.25	1580.79	1642.33	2353.64	9252.08	2009.38	3524.65	3103.95	5820.09	3861.34
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.14: (continued)

Stocks	NTTUR	YKSGR	ASUZU	FENER	EGGUB	EGEEN	EGGUB	MRSHL	NETAS	SAFGY	TIRE	TUDDF	KORDS	AGYO	LOGO	HEKTS	USAS
Mean equation	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(0/1)	ARMA(2/0)	ARMA(2/2)	ARMA(1/1)	ARMA(1/1)	ARMA(1/1)	ARMA(2/2)	ARMA(1/1)	ARMA(2/2)	ARMA(0/0)	ARMA(0/0)	ARMA(0/1)	ARMA(0/1)	ARMA(2/1)
C	-0.001	-0.001	0.000	-0.001	-0.001	-0.002	-0.001	0.001	-0.001	0.000	0.000	0.001	0.000	0.000	-0.001	0.000	0.358
p-values	0.015*	0.028*	0.179	0.264	0.349	0.007*	0.279	0.193	0.241	0.769	0.854	0.000*	0.714	0.692	0.573	0.524	0.996
INDEX	0.731	0.678	0.744	0.495	0.905	0.650	0.937	0.502	0.911	0.860	0.356	0.768	0.677	0.941	0.809	0.836	0.720
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.817	-0.208	0.577		0.049	-0.233	-0.869	-0.133	-0.292	-0.644	-0.195	0.005					1.048
p-values	0.000*	0.273	0.076		0.132	0.000*	0.000*	0.735	0.091	0.000*	0.392	0.493					0.000*
AR(2)	-0.967	0.486	0.395		-0.064	-0.927				-0.857		0.973					-0.048
p-values	0.000*	0.001*	0.218		0.097	0.000*				0.000*		0.000*					0.000*
MA(1)	-0.812	0.148	-0.534	0.196		0.242	0.893	0.050	0.414	0.656	0.162	0.000			0.092	-0.059	-0.993
p-values	0.000*	0.402	0.090	0.000*		0.000*	0.000*	0.900	0.008*	0.000*	0.491	0.821			0.015*	0.131	0.000*
MA(2)	0.946	-0.554	-0.457			0.943				0.907		-0.995					
p-values	0.000*	0.000*	0.144			0.000*				0.000*		0.000*					
Variance equation	EGARCH(2/2)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	GARCH(2/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(1/1)	EGARCH(1/2)	EGARCH(2/2)
C	-0.047	-6.214	-1.371	-2.204	-3.365	-7.428	0.000	-0.490	-0.183	-0.247	-0.354	-1.981	-0.049	-0.735	-2.259	-1.896	-1.576
p-values	0.011*	0.079	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.074	0.003*	0.000*	0.000*	0.004*
α1	0.439	0.505	0.346	0.341	0.216	0.571	0.267	0.447	0.543	0.249	0.737	0.223	0.279	0.408	0.255	0.348	0.432
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	-0.410	0.330		0.398	0.341	0.496	0.187	-0.376	-0.415	-0.153	-0.583	0.182	-0.255	-0.278			-0.333
p-values	0.000*	0.412		0.000*	0.000*	0.015*	0.000*	0.000*	0.000*	0.001*	0.000*	0.005*	0.000*	0.000*			0.000*
γ1	0.008	0.136	0.214	0.138	0.150	0.100		0.167	0.159	0.152	0.117	0.109	0.169	0.078	0.110	0.082	0.179
p-values	0.785	0.075	0.000*	0.000*	0.000*	0.175		0.000*	0.000*	0.000*	0.000*	0.003*	0.000*	0.012*	0.000*	0.008*	0.000*
γ2	-0.012	0.029		0.077	0.057	0.087		-0.065	-0.141	-0.064	0.005	-0.055	-0.169	-0.023			-0.014
p-values	0.687	0.830		0.000*	0.057	0.221		0.033*	0.000*	0.081	0.866	0.239	0.000*	0.453			0.796
β1	1.637	-0.089	0.337	-0.123	0.627	-0.209	0.304	1.381	0.987	0.977	0.759	0.235	1.805	0.915	0.717	0.302	1.108
p-values	0.000*	0.908	0.004*	0.000*	0.000*	0.542	0.000*	0.000*	0.000*	0.000*	0.000*	0.313	0.000*	0.000*	0.000*	0.000*	0.000*
β2	-0.640	0.364	0.517	0.885		0.292		-0.442			0.211	0.550	-0.809			0.485	-0.308
p-values	0.000*	0.358	0.000*	0.000*		0.191		0.000*			0.000*	0.008*	0.000*			0.000*	0.005*
AIC	-5.036	-5.237	-4.886	-4.347	-5.107	-4.757	-4.509	-4.453	-4.640	-4.841	-5.293	-4.924	-5.195	-4.642	-4.508	-4.869	-4.698
R-square	29%	21%	15%	8%	28%	23%	29%	8%	20%	22%	14%	32%	29%	30%	29%	39%	26%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	3.078	2.636	3.587	2.517	1.692	3.130	5.321	2.444	5.514	1.651	2.548	2.748	4.349	4.023	0.468	2.440	0.703
p-values	0.079	0.104	0.058	0.642	0.639	0.077	0.150	0.485	0.138	0.199	0.467	0.097	0.500	0.546	0.977	0.655	0.704
Q(15)	9.739	12.741	17.361	9.917	5.548	13.079	18.661	12.522	16.854	17.573	15.682	8.265	8.937	14.154	14.720	5.479	8.713
p-values	0.554	0.311	0.098	0.768	0.961	0.288	0.134	0.485	0.206	0.092	0.267	0.689	0.881	0.514	0.398	0.978	0.727
Q(25)	24.826	18.782	21.048	18.296	8.731	18.107	28.646	19.663	27.708	22.421	33.138	22.608	14.129	26.224	27.077	17.323	24.383
p-values	0.255	0.599	0.456	0.788	0.997	0.642	0.192	0.662	0.227	0.376	0.079	0.365	0.959	0.396	0.301	0.835	0.327
Q(35)	31.367	34.144	22.604	19.239	19.707	25.962	34.473	26.545	32.888	28.114	39.192	39.290	23.218	37.069	38.122	29.099	36.690
p-values	0.448	0.319	0.863	0.980	0.967	0.723	0.397	0.779	0.473	0.615	0.212	0.146	0.936	0.374	0.287	0.707	0.260
Box-Pierce Q test (squared residuals)																	
Q(5)	1.234	1.713	2.671	5.228	1.001	1.318	1.869	2.335	2.884	1.789	1.502	3.159	2.245	1.875	0.575	2.856	1.462
p-values	0.267	0.191	0.102	0.265	0.801	0.251	0.600	0.506	0.410	0.181	0.682	0.075	0.814	0.866	0.966	0.582	0.481
Q(15)	16.275	4.952	6.193	8.028	4.426	8.047	12.175	5.500	9.432	8.534	6.645	5.973	4.494	4.405	5.282	5.349	5.496
p-values	0.131	0.933	0.860	0.888	0.986	0.709	0.513	0.962	0.740	0.665	0.920	0.875	0.996	0.996	0.981	0.980	0.939
Q(25)	24.232	8.043	22.536	27.498	23.832	12.758	24.653	25.094	24.016	11.824	12.860	12.144	9.724	7.922	13.776	8.496	9.291
p-values	0.282	0.995	0.369	0.282	0.413	0.917	0.368	0.345	0.403	0.944	0.955	0.936	0.997	1.000	0.952	0.998	0.992
Q(35)	29.424	35.646	29.154	39.795	40.572	16.658	33.089	29.962	26.231	14.797	14.778	20.357	37.212	11.832	18.118	11.533	19.005
p-values	0.547	0.259	0.561	0.228	0.171	0.983	0.463	0.619	0.792	0.994	0.997	0.928	0.368	1.000	0.988	1.000	0.966
ARCH LM test																	
p-values	0.819	0.489	0.386	0.096	0.897	0.540	0.732	0.923	0.814	0.449	0.898	0.709	0.605	0.488	0.985	0.676	0.813
Normality tests																	
Skewness	0.76	1.11	0.69	0.29	1.25	0.87	1.39	0.87	1.44	1.74	2.28	0.50	1.59	1.06	0.97	0.86	0.91
Kurtosis	7.08	7.56	12.59	12.70	11.94	7.96	8.67	13.11	10.97	11.91	17.73	5.03	12.22	7.82	7.47	8.29	8.86
Jarque-Bera	809.82	1096.70	3998.53	4026.01	3672.47	1176.36	1698.69	4482.26	3065.91	3905.01	10135.11	218.45	4052.37	1182.50	1011.79	1319.30	1603.69
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.14: (continued)

Stocks	LOGO	TSPOR	BSOKE	ECBYO	ISGSY	PRKAB
Mean equation	ARMA(2/1)	ARMA(2/2)	ARMA(2/2)	ARMA(1/1)	ARMA(1/1)	ARMA(2/2)
C	0.001	-0.002	0.000	0.000	0.000	-0.001
p-values	0.346	0.049*	0.811	0.316	0.911	0.007*
INDEX	0.736	0.557	0.625	0.697	0.300	0.590
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.849	-0.678	1.126	-0.130	-0.992	-0.463
p-values	0.000*	0.084	0.000*	0.386	0.000*	0.068
AR(2)	0.091	-0.550	-0.742			0.422
p-values	0.008*	0.019*	0.000*			0.013*
MA(1)	0.943	0.743	-1.208	-0.064	0.994	0.353
p-values	0.000*	0.060	0.000*	0.657	0.000*	0.153
MA(2)		0.565	0.810			-0.510
p-values		0.013*	0.000*			0.002*
Variance equation	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)
C	-2.274	-0.588	-0.160	-0.705	-0.058	-0.161
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.163
α1	0.375	0.304	0.321	0.418	0.155	0.423
p-values	0.000*	0.000*	0.000*	0.000*	0.002*	0.000*
α2	0.049	-0.021	-0.238	-0.261	-0.102	-0.379
p-values	0.371	0.672	0.000*	0.000*	0.037*	0.000*
γ1	0.122	0.114	0.143	0.209	0.099	-0.004
p-values	0.000*	0.001*	0.000*	0.000*	0.005*	0.749
γ2	0.107	-0.102	-0.073	-0.076	-0.095	1.554
p-values	0.002*	0.006*	0.042*	0.006*	0.006*	0.000*
β1	0.740	0.944	0.640	0.930	0.998	-0.570
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*
β2			0.348			
p-values			0.001*			
AIC	-4.761	-4.286	-5.493	-5.600	-6.234	-5.680
R-square	15%	10%	26%	23%	14%	26%
Residual diagnostics						
Box-Pierce Q test (residuals)						
Q(5)	2.228	2.507	0.864	2.889	4.124	3.215
p-values	0.328	0.113	0.353	0.409	0.248	0.073
Q(15)	9.787	18.457	4.173	14.156	15.668	8.670
p-values	0.635	0.072	0.965	0.363	0.268	0.652
Q(25)	27.296	23.556	15.001	22.640	18.955	27.129
p-values	0.200	0.315	0.823	0.482	0.704	0.167
Q(35)	45.506	34.484	21.312	35.486	22.335	36.513
p-values	0.057	0.305	0.903	0.352	0.920	0.228
Box-Pierce Q test (squared residuals)						
Q(5)	1.617	1.229	2.922	4.594	5.494	1.375
p-values	0.446	0.268	0.087	0.204	0.139	0.241
Q(15)	10.467	7.550	7.251	12.077	15.974	4.241
p-values	0.575	0.753	0.778	0.521	0.251	0.962
Q(25)	18.691	14.324	11.196	18.424	25.781	9.137
p-values	0.664	0.855	0.959	0.734	0.311	0.988
Q(35)	31.273	40.969	17.866	38.827	33.353	24.045
p-values	0.503	0.109	0.971	0.224	0.450	0.809
ARCH LM test						
p-values	0.980	0.940	0.855	0.540	0.288	0.695
Normality tests						
Skewness	0.37	0.92	0.61	1.10	1.15	1.47
Kurtosis	9.41	8.71	14.47	12.39	10.79	18.31
Jarque-Bera	1774.01	1532.78	5668.06	3962.57	2812.49	10360.41
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.15: Model selection - Russia - good news - analyst coverage > 5

Stocks	PIKK	GCHE	MRKK	ISKJ	KRSG	MSSB	IRGZ	MMBM	DGBZ	FEES	ISKJ	KRSB	MRKS	OGKB	VRSB
Mean equation	ARMA(0/0)	ARMA(1/0)	ARMA(1/2)	ARMA(0/1)	ARMA(0/1)	ARMA(2/2)	ARMA(2/0)	ARMA(0/1)	ARMA(1/1)	ARMA(2/1)	ARMA(2/1)	ARMA(1/1)	ARMA(1/0)	ARMA(1/2)	ARMA(2/2)
C	0.000	0.000	-0.002	-0.001	0.000	-0.002	-0.001	0.001	0.000	-0.002	-0.001	-0.001	-0.001	-0.003	0.000
p-values	0.525	0.431	0.048*	0.427	0.510	0.002*	0.256	0.005*	0.612	0.001*	0.178	0.000*	0.281	0.000*	0.110
INDEX	0.426	0.391	0.936	0.661	0.472	0.729	0.568	0.240	0.207	1.124	0.442	0.250	0.440	1.035	-0.220
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.067
AR(1)		-0.127	-0.944			-0.764	0.033		0.293	-0.863	-0.138	0.765	-0.092	0.763	-0.043
p-values		0.000*	0.000*			0.000*	0.320		0.009*	0.000*	0.000*	0.000*	0.008*	0.000*	0.069
AR(2)						0.239	-0.068			0.138	-0.080				0.921
p-values						0.263	0.017*			0.001*	0.026*				0.000*
MA(1)			1.025	-0.078	-0.104	0.688		-0.079	-0.468	0.993		-0.953		-0.756	-0.029
p-values			0.000*	0.050*	0.000*	0.001*		0.005*	0.000*	0.000*		0.000*		0.000*	0.295
MA(2)			0.119			-0.303								-0.034	-0.971
p-values			0.001*			0.137								0.368	0.000*
Variance equation	GARCH(2/1)	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/2)	GARCH(1/2)	GARCH(1/2)	GARCH(1/1)
C	0.000	-1.234	0.000	-6.808	-0.318	-0.415	-0.297	-0.733	-0.089	-1.163	0.000	-0.948	0.000	0.000	0.000
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.371	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.111	0.267	0.257	0.313	0.324	0.311	0.263	0.108	0.618	0.444	0.300	0.163	0.240	0.398	0.056
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.006*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	0.178	0.123		0.310		0.132	0.004	0.283	-0.579	0.023		0.253			
p-values	0.000*	0.001*		0.000*		0.000*	0.935	0.000*	0.006*	0.750		0.000*			
γ1		-0.084		0.094	0.067	-0.020	0.185	0.347	0.011	0.019		0.073			
p-values		0.002*		0.001*	0.000*	0.174	0.000*	0.000*	0.891	0.590		0.003*			
γ2		0.013		0.165		-0.030	-0.180	-0.495	-0.025	-0.184		-0.047			
p-values		0.638		0.000*		0.009*	0.000*	0.000*	0.758	0.000*		0.023*			
β1	0.249	0.012	0.149	-0.366	0.985	0.014	0.315	0.944	1.799	0.674	0.400	0.098	0.038	0.167	0.879
p-values	0.008*	0.705	0.030*	0.000*	0.000*	0.022*	0.000*	0.000*	0.000*	0.000*	0.000*	0.015*	0.183	0.004*	0.000*
β2		0.871	0.500	0.527		0.970	0.671		-0.809	0.219	0.179	0.789	0.604	0.332	
p-values		0.000*	0.000*	0.000*		0.000*	0.000*		0.000*	0.189	0.001*	0.000*	0.000*	0.000*	
AIC	-5.399	-5.288	-4.511	-4.744	-3.792	-4.351	-4.950	-5.484	-5.586	-4.853	-4.487	-3.536	-4.272	-5.002	-3.057
R-square	11%	12%	20%	16%	1%	36%	30%	23%	13%	35%	4%	7%	9%	30%	3%
Residual diagnostics															
Box-Pierce Q test (residuals)															
Q(5)	2.0	2.3	0.9	5.5	2.8	3.4	2.8	6.8	2.3	3.2	3.4	3.3	6.7	5.5	1.6
p-values	0.846	0.508	0.645	0.237	0.431	0.067	0.425	0.079	0.513	0.201	0.336	0.347	0.155	0.064	0.213
Q(15)	10.8	9.2	16.1	11.8	20.7	13.1	14.9	15.8	13.8	7.9	12.2	14.9	18.7	13.4	9.2
p-values	0.769	0.759	0.188	0.626	0.079	0.288	0.311	0.263	0.386	0.792	0.510	0.316	0.175	0.340	0.604
Q(25)	26.8	18.7	22.8	18.7	27.6	19.8	21.1	22.8	18.5	15.8	20.1	24.3	27.6	26.6	26.4
p-values	0.368	0.717	0.415	0.768	0.232	0.532	0.575	0.470	0.731	0.825	0.638	0.385	0.279	0.225	0.190
Q(35)	35.4	26.5	27.7	27.9	33.6	24.9	32.9	33.1	21.5	24.1	34.5	38.5	34.9	35.0	31.4
p-values	0.449	0.779	0.686	0.762	0.438	0.771	0.474	0.465	0.938	0.840	0.396	0.234	0.424	0.326	0.447
Box-Pierce Q test (squared residuals)															
Q(5)	0.844	1.522	3.028	0.364	2.182	1.764	0.888	0.183	1.074	0.314	4.758	0.670	2.639	0.676	1.443
p-values	0.974	0.677	0.220	0.985	0.535	0.184	0.828	0.980	0.783	0.855	0.190	0.880	0.620	0.713	0.230
Q(15)	4.144	17.495	7.812	1.961	7.545	19.300	18.793	18.790	3.427	2.051	11.728	11.013	14.061	7.436	9.215
p-values	0.997	0.178	0.800	1.000	0.872	0.056	0.130	0.130	0.996	0.999	0.550	0.610	0.445	0.828	0.602
Q(25)	13.721	32.913	14.895	36.421	13.543	22.427	26.701	34.935	4.872	16.341	18.767	15.305	19.612	10.658	19.103
p-values	0.966	0.083	0.867	0.050	0.939	0.375	0.269	0.053	1.000	0.799	0.715	0.883	0.719	0.979	0.579
Q(35)	18.589	39.608	22.239	41.188	30.036	28.325	29.715	37.698	6.221	21.738	23.989	35.686	26.132	14.138	22.080
p-values	0.990	0.199	0.901	0.185	0.615	0.604	0.631	0.263	1.000	0.914	0.874	0.343	0.831	0.997	0.880
ARCH LM test															
p-values	1.000	0.867	0.458	0.875	0.475	0.779	0.785	0.968	0.766	0.921	0.419	0.871	0.756	0.827	0.738
Normality tests															
Skewness	1.18	-0.03	2.41	1.48	-1.27	1.13	0.65	1.64	0.04	0.21	2.19	-0.86	0.75	0.96	-0.80
Kurtosis	8.85	9.70	22.75	13.13	28.77	17.55	16.32	17.68	15.52	9.52	26.71	13.12	19.65	12.63	25.10
Jarque-Bera	1698.00	1916.20	17618.09	4747.67	28590.14	9240.85	7638.17	9638.31	6683.86	1818.35	24786.13	4492.31	11913.18	4107.30	20921.25
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.16: Model selection - Russia - good news - analyst coverage < 6

Stocks	**PIKK**	**GCHE**	**MRKK**	**ISKJ**	**KRSG**	**MSSB**	**IRGZ**	**MMBM**	**DGBZ**	**FEES**	**ISKJ**	**KRSB**	**MRKS**	**OGKB**	**VRSB**
Mean equation	ARMA(0/0)	ARMA(1/0)	ARMA(1/2)	ARMA(0/1)	ARMA(0/1)	ARMA(2/2)	ARMA(2/0)	ARMA(0/1)	ARMA(1/1)	ARMA(2/1)	ARMA(2/1)	ARMA(1/1)	ARMA(1/0)	ARMA(1/2)	ARMA(2/2)
C	0.000	0.000	-0.002	-0.001	0.000	-0.002	-0.001	0.001	0.000	-0.002	-0.001	-0.001	-0.001	-0.003	0.000
p-values	0.525	0.431	0.048*	0.427	0.510	0.002*	0.256	0.005*	0.612	0.001*	0.178	0.000*	0.281	0.000*	0.110
INDEX	0.426	0.391	0.936	0.661	0.472	0.729	0.568	0.240	0.207	1.124	0.442	0.250	0.440	1.035	-0.220
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.067
AR(1)		-0.127	-0.944			-0.764	0.033		0.293	-0.863	-0.138	0.765	-0.092	0.763	-0.043
p-values		0.000*	0.000*			0.000*	0.320		0.009*	0.000*	0.000*	0.000*	0.008*	0.000*	0.069
AR(2)						0.239	-0.068			0.138	-0.080				0.921
p-values						0.263	0.017*			0.001*	0.026*				0.000*
MA(1)			1.025	-0.078	-0.104	0.688		-0.079	-0.468	0.993		-0.953		-0.756	-0.029
p-values			0.000*	0.050*	0.000*	0.001*		0.005*	0.000*	0.000*		0.000*		0.000*	0.295
MA(2)			0.119			-0.303								-0.034	-0.971
p-values			0.001*			0.137								0.368	0.000*
Variance equation	GARCH(2/1)	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/2)	GARCH(1/2)	GARCH(1/2)	GARCH(1/1)
C	0.000	-1.234	0.000	-6.808	-0.318	-0.415	-0.297	-0.733	-0.089	-1.163	0.000	-0.948	0.000	0.000	0.000
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.371	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
$\alpha1$	0.111	0.267	0.257	0.313	0.324	0.311	0.263	0.108	0.618	0.444	0.300	0.163	0.240	0.398	0.056
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.006*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
$\alpha2$	0.178	0.123		0.310		0.132	0.004	0.283	-0.579	0.023		0.253			
p-values	0.000*	0.001*		0.000*		0.000*	0.935	0.000*	0.006*	0.750		0.000*			
$\gamma1$		-0.084		0.094	0.067	-0.020	0.185	0.347	0.011	0.019		0.073			
p-values		0.002*		0.001*	0.000*	0.174	0.000*	0.000*	0.891	0.590		0.003*			
$\gamma2$		0.013		0.165		-0.030	-0.180	-0.495	-0.025	-0.184		-0.047			
p-values		0.638		0.000*		0.009*	0.000*	0.000*	0.758	0.000*		0.023*			
$\beta1$	0.249	0.012	0.149	-0.366	0.985	0.014	0.315	0.944	1.799	0.674	0.400	0.098	0.038	0.167	0.879
p-values	0.008*	0.705	0.030*	0.000*	0.000*	0.022*	0.000*	0.000*	0.000*	0.000*	0.000*	0.015*	0.183	0.004*	0.000*
$\beta2$		0.871	0.500	0.527		0.970	0.671		-0.809	0.219	0.179	0.789	0.604	0.332	
p-values		0.000*	0.000*	0.000*		0.000*	0.000*		0.000*	0.189	0.001*	0.000*	0.000*	0.000*	
AIC	-5.399	-5.288	-4.511	-4.744	-3.792	-4.351	-4.950	-5.484	-5.586	-4.853	-4.487	-3.536	-4.272	-5.002	-3.057
R-square	11%	12%	20%	16%	1%	36%	30%	23%	13%	35%	4%	7%	9%	30%	3%
Residual diagnostics															
Box-Pierce Q test (residuals)															
Q(5)	2.0	2.3	0.9	5.5	2.8	3.4	2.8	6.8	2.3	3.2	3.4	3.3	6.7	5.5	1.6
p-values	0.846	0.508	0.645	0.237	0.431	0.067	0.425	0.079	0.513	0.201	0.336	0.347	0.155	0.064	0.213
Q(15)	10.8	9.2	16.1	11.8	20.7	13.1	14.9	15.8	13.8	7.9	12.2	14.9	18.7	13.4	9.2
p-values	0.769	0.759	0.188	0.626	0.079	0.288	0.311	0.263	0.386	0.792	0.510	0.316	0.175	0.340	0.604
Q(25)	26.8	18.7	22.8	18.7	27.6	19.8	21.1	22.8	18.5	15.8	20.1	24.3	27.6	26.6	26.4
p-values	0.368	0.717	0.415	0.768	0.232	0.532	0.575	0.470	0.731	0.825	0.638	0.385	0.279	0.225	0.190
Q(35)	35.4	26.5	27.7	27.9	33.6	24.9	32.9	33.1	21.5	24.1	34.5	38.5	34.9	35.0	31.4
p-values	0.449	0.779	0.686	0.762	0.438	0.771	0.474	0.465	0.938	0.840	0.396	0.234	0.424	0.326	0.447
Box-Pierce Q test (squared residuals)															
Q(5)	0.844	1.522	3.028	0.364	2.182	1.764	0.888	0.183	1.074	0.314	4.758	0.670	2.639	0.676	1.443
p-values	0.974	0.677	0.220	0.985	0.535	0.184	0.828	0.980	0.783	0.855	0.190	0.880	0.620	0.713	0.230
Q(15)	4.144	17.495	7.812	1.961	7.545	19.300	18.793	18.790	3.427	2.051	11.728	11.013	14.061	7.436	9.215
p-values	0.997	0.178	0.800	1.000	0.872	0.056	0.130	0.130	0.996	0.999	0.550	0.610	0.445	0.828	0.602
Q(25)	13.721	32.913	14.895	36.421	13.543	22.427	26.701	34.935	4.872	16.341	18.767	15.305	19.612	10.658	19.103
p-values	0.966	0.083	0.867	0.050	0.939	0.375	0.269	0.053	1.000	0.799	0.715	0.883	0.719	0.979	0.579
Q(35)	18.589	39.608	22.239	41.188	30.036	28.325	29.715	37.698	6.221	21.738	23.989	35.686	26.132	14.138	22.080
p-values	0.990	0.199	0.901	0.185	0.615	0.604	0.631	0.263	1.000	0.914	0.874	0.343	0.831	0.997	0.880
ARCH LM test															
p-values	1.000	0.867	0.458	0.875	0.475	0.779	0.785	0.968	0.766	0.921	0.419	0.871	0.756	0.827	0.738
Normality tests															
Skewness	1.18	-0.03	2.41	1.48	-1.27	1.13	0.65	1.64	0.04	0.21	2.19	-0.86	0.75	0.96	-0.80
Kurtosis	8.85	9.70	22.75	13.13	28.77	17.55	16.32	17.68	15.52	9.52	26.71	13.12	19.65	12.63	25.10
Jarque-Bera	1698.00	1916.20	17618.09	4747.67	28590.14	9240.85	7638.17	9638.31	6683.86	1818.35	24786.13	4492.31	11913.18	4107.30	20921.25
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.17: Model selection - Russia - no news - analyst coverage > 5

Stocks	RTKM	BSPB	BSPB	VZRZ	VZRZ	VZRZ	EONR	TATN	MSNG	SIBN	SIBN	SVAV	MTSS	NLMK	URKA	GMKN	MTLR
Mean equation	ARMA(1/1)	ARMA(2/1)	ARMA(1/0)	ARMA(1/1)	ARMA(2/2)	ARMA(1/2)	ARMA(1/1)	ARMA(2/1)	ARMA(2/2)	ARMA(2/2)	ARMA(1/1)	ARMA(1/0)	ARMA(2/2)	ARMA(0/1)	ARMA(2/1)	ARMA(2/2)	ARMA(1/1)
C	0.002	-0.001	-0.002	-0.001	-0.001	-0.001	0.000	0.000	-0.001	-0.001	0.000	-0.001	0.000	-0.001	0.001	0.000	-0.003
p-values	0.005*	0.075	0.013*	0.115	0.175	0.147	0.325	0.909	0.425	0.033*	0.889	0.348	0.514	0.060	0.166	0.296	0.000*
INDEX	0.483	0.732	0.917	0.581	0.750	0.685	0.825	0.954	0.569	0.857	0.830	0.957	0.785	1.250	0.866	0.937	1.296
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.935	-0.437	0.151	0.758	1.512	0.784	0.943	-0.623	0.987	-0.856	0.570	0.092	1.128		0.974	-0.258	0.992
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.027*	0.000*	0.000*	0.001*	0.011*	0.000*		0.000*	0.191	0.000*
AR(2)		0.064			-0.540			-0.056	0.010	-0.851			-0.981		-0.086	-0.658	
p-values		0.062			0.000*			0.140	0.948	0.000*			0.000*		0.007*	0.000*	
MA(1)	-0.915	0.516		-0.697	-1.478	-0.755	-0.974	0.622	-0.868	0.905	-0.474		-1.116	0.084	-0.903	0.311	-0.999
p-values	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.027*	0.000*	0.000*	0.010*		0.000*	0.015*	0.000*	0.093	0.000*
MA(2)					0.504	0.029			-0.130	0.859			0.994			0.708	
p-values					0.000*	0.397			0.400	0.000*			0.000*			0.000*	
Variance equation	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(1/2)	EGARCH(1/2)	GARCH(1/2)	EGARCH(2/2)
C	-0.757	-0.170	-0.803	-0.178	0.000	-4.156	-0.207	0.000	0.000	-0.214	-0.121	-4.392	-0.303	-1.881	-0.200	0.000	-0.198
p-values	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.012*	0.001*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.241	0.456	0.308	0.441	0.034	0.289	0.234	0.158	0.103	0.235	0.271	0.505	0.197	0.326	0.163	0.138	0.190
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	0.279	-0.362	-0.146	-0.291		0.170	-0.111			-0.148	-0.209	0.272					-0.154
p-values	0.000*	0.000*	0.035*	0.000*		0.003*	0.045*			0.001*	0.000*	0.000*					0.004*
γ1	0.144	0.185	0.097	0.030		0.121	0.072			0.077	0.186	0.035	-0.031	0.009	-0.003		-0.091
p-values	0.000*	0.000*	0.009*	0.393		0.000*	0.009*			0.011*	0.000*	0.206	0.050	0.771	0.847		0.017*
γ2	-0.031	-0.204	-0.161	-0.058		0.146	-0.123			-0.093	-0.189	0.028					-0.001
p-values	0.338	0.000*	0.000*	0.090		0.000*	0.000*			0.003*	0.000*	0.365					0.985
β1	0.219	1.210	0.915	0.990	0.935	-0.168	0.747	0.819	0.813	0.981	1.281	-0.134	0.721	0.143	0.216	0.396	0.502
p-values	0.035*	0.000*	0.000*	0.000*	0.000*	0.012*	0.000*	0.000*	0.000*	0.000*	0.000*	0.075	0.008*	0.045*	0.010*	0.014*	0.000*
β2	0.733	-0.223				0.693	0.238				-0.290	0.651	0.260	0.662	0.774	0.399	0.476
p-values	0.000*	0.088				0.000*	0.235				0.039*	0.000*	0.338	0.000*	0.000*	0.010*	0.000*
AIC	-5.321	-4.903	-5.190	-4.629	-4.827	-5.189	-5.206	-5.893	-4.277	-5.274	-5.266	-5.022	-5.393	-5.515	-5.164	-5.914	-4.955
R-square	28%	25%	38%	32%	29%	23%	32%	53%	31%	52%	63%	35%	65%	58%	44%	48%	55%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	4.9	6.0	8.4	3.4	4.1	4.6	0.7	4.2	2.0	2.6	2.3	1.9	3.4	1.0	3.1	1.4	1.2
p-values	0.176	0.050	0.079	0.329	0.044*	0.101	0.879	0.120	0.156	0.107	0.519	0.757	0.064	0.911	0.212	0.236	0.745
Q(15)	8.7	20.9	15.7	6.5	8.6	16.2	7.1	13.5	8.8	11.3	10.9	11.6	13.6	7.4	9.1	10.7	14.3
p-values	0.797	0.051	0.334	0.924	0.658	0.183	0.898	0.333	0.643	0.421	0.617	0.638	0.253	0.917	0.697	0.466	0.353
Q(25)	26.1	30.8	26.2	11.4	12.0	27.0	12.7	29.2	15.1	26.1	19.3	21.4	24.0	13.8	14.1	31.4	18.5
p-values	0.294	0.101	0.342	0.979	0.939	0.211	0.959	0.140	0.819	0.202	0.686	0.615	0.292	0.952	0.898	0.067	0.732
Q(35)	32.5	42.3	33.5	17.8	14.0	34.1	22.4	38.3	20.5	31.7	22.5	34.9	37.4	30.0	30.4	36.3	27.2
p-values	0.491	0.106	0.494	0.986	0.996	0.368	0.919	0.206	0.925	0.432	0.915	0.426	0.198	0.664	0.546	0.235	0.751
Box-Pierce Q test (squared residuals)																	
Q(5)	3.319	3.593	0.457	2.032	3.353	0.654	0.881	3.742	0.513	1.095	1.076	1.644	1.731	3.251	4.302	1.757	4.691
p-values	0.345	0.166	0.978	0.566	0.067	0.721	0.830	0.154	0.474	0.295	0.783	0.801	0.188	0.517	0.116	0.185	0.196
Q(15)	6.821	11.729	4.291	13.498	7.921	10.655	11.488	11.321	0.722	5.485	3.371	6.576	7.135	13.975	18.546	11.933	17.440
p-values	0.911	0.468	0.993	0.410	0.720	0.559	0.570	0.502	1.000	0.905	0.996	0.950	0.788	0.452	0.100	0.369	0.180
Q(25)	15.853	19.511	18.219	32.099	10.738	12.917	18.674	16.472	0.989	13.725	14.453	11.875	10.156	17.866	32.794	22.788	26.487
p-values	0.861	0.614	0.792	0.098	0.968	0.935	0.720	0.792	1.000	0.881	0.913	0.981	0.977	0.809	0.065	0.355	0.278
Q(35)	21.397	30.472	24.619	40.272	13.054	17.267	21.465	22.432	1.666	22.025	17.744	17.780	27.393	31.272	36.673	40.911	32.380
p-values	0.940	0.544	0.881	0.179	0.998	0.984	0.939	0.895	1.000	0.882	0.986	0.990	0.652	0.602	0.261	0.110	0.498
ARCH LM test																	
p-values	0.728	0.785	0.926	0.809	0.213	0.976	0.999	0.659	0.853	0.840	0.984	0.766	0.706	0.275	0.419	0.619	0.372
Normality tests																	
Skewness	-0.29	0.53	0.10	0.93	0.93	-0.02	1.05	0.19	2.31	-0.25	0.12	0.61	-0.21	0.45	1.30	0.15	0.48
Kurtosis	23.53	6.18	6.05	9.70	9.92	8.61	11.39	6.38	23.59	7.53	8.51	7.78	12.29	4.68	10.43	6.61	5.01
Jarque-Bera	17974.40	478.50	399.53	2059.47	2190.60	1342.43	3185.98	492.83	18969.99	886.76	1298.03	1039.14	3690.48	155.12	2641.53	558.78	212.37
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.17: (continued)

Stocks	NMTP	NMTP	RTKM	SNGS	SNGS	GAZP	TRNFP	UPRO
Mean equation	ARMA(0/1)	ARMA(0/1)	ARMA(0/2)	ARMA(2/2)	ARMA(1/2)	ARMA(2/1)	ARMA(2/1)	ARMA(1/1)
C	-0.001	-0.001	-0.001	0.000	0.000	0.000	0.001	0.000
p-values	0.202	0.012*	0.186	0.797	0.868	0.059	0.000*	0.968
INDEX	0.609	0.455	0.742	0.988	1.031	1.075	0.735	0.814
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)				0.312	0.890	1.113	1.016	0.763
p-values				0.000*	0.000*	0.000*	0.000*	0.000*
AR(2)				0.640		-0.195	-0.030	
p-values				0.000*		0.000*	0.412	
MA(1)	-0.068	-0.159	0.033	-0.298	-0.797	-0.930	-0.997	-0.821
p-values	0.062	0.000*	0.378	0.000*	0.000*	0.000*	0.000*	0.000*
MA(2)			-0.103	-0.694	-0.137			
p-values			0.000*	0.000*	0.000*			
Variance equation	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(1/1)	GARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)
C	0.000	-0.044	-0.586	-3.295	-1.622	0.000	-0.248	-0.582
p-values	0.000*	0.001*	0.000*	0.000*	0.000*	0.011*	0.000*	0.074
α1	0.105	0.411	0.531	0.475	0.439	0.066	0.411	0.176
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.016*	0.000*	0.000*
α2		-0.359	-0.220	0.403		0.081	-0.246	-0.033
p-values		0.000*	0.000*	0.000*		0.036*	0.000*	0.588
γ1		0.004	0.036	-0.012	0.101		0.042	0.095
p-values		0.881	0.159	0.730	0.000*		0.185	0.002*
γ2		-0.019	-0.197	0.080			-0.047	-0.116
p-values		0.507	0.000*	0.020*			0.166	0.000*
β1	0.764	1.605	0.605	-0.054	0.856	0.229	0.984	0.516
p-values	0.000*	0.000*	0.000*	0.412	0.000*	0.659	0.000*	0.011*
β2		-0.606	0.351	0.760		0.521		0.425
p-values		0.000*	0.000*	0.000*		0.244		0.021*
AIC	-5.060	-4.562	-5.348	-6.090	-6.115	-6.681	-5.391	-5.252
R-square	18%	21%	26%	51%	55%	76%	24%	30%
Residual diagnostics								
Box-Pierce Q test (residuals)								
Q(5)	1.3	2.5	3.4	3.0	2.6	2.9	4.4	1.1
p-values	0.862	0.636	0.336	0.084	0.267	0.237	0.111	0.777
Q(15)	9.0	10.5	16.2	14.5	14.6	6.7	15.5	5.7
p-values	0.834	0.723	0.238	0.206	0.263	0.875	0.217	0.955
Q(25)	12.6	17.7	24.5	21.0	20.9	15.5	21.5	12.2
p-values	0.973	0.818	0.377	0.460	0.527	0.840	0.489	0.967
Q(35)	16.9	25.2	35.6	29.0	29.8	29.4	25.0	26.5
p-values	0.994	0.862	0.348	0.570	0.577	0.601	0.806	0.783
Box-Pierce Q test (squared residuals)								
Q(5)	0.474	2.644	3.305	2.519	2.982	5.080	2.708	1.196
p-values	0.976	0.619	0.347	0.112	0.225	0.079	0.258	0.754
Q(15)	10.774	14.439	8.829	6.053	9.078	15.222	6.186	5.122
p-values	0.704	0.418	0.786	0.870	0.696	0.229	0.906	0.972
Q(25)	14.419	18.585	18.786	10.185	11.984	19.229	15.209	13.164
p-values	0.937	0.774	0.714	0.976	0.958	0.631	0.853	0.948
Q(35)	44.998	24.801	24.720	25.672	18.765	34.153	16.739	20.379
p-values	0.098	0.876	0.850	0.737	0.970	0.365	0.988	0.958
ARCH LM test								
p-values	0.999	0.935	0.261	0.627	0.969	0.474	0.361	0.960
Normality tests								
Skewness	0.04	0.67	1.67	0.40	0.50	0.39	0.83	0.12
Kurtosis	7.11	20.48	34.30	6.03	6.63	4.68	14.05	5.96
Jarque-Bera	719.53	13100.50	42227.52	418.56	605.58	147.49	5319.37	375.22
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.18: Model selection - Russia - no news - analyst coverage < 6

Stocks	LSRG	UTAR	IRGZ	IRGZ	VZRZ	LSRG	WTCMP
Mean equation	ARMA(1/1)	ARMA(2/2)	ARMA(2/2)	ARMA(1/2)	ARMA(2/2)	ARMA(2/2)	ARMA(1/2)
C	0.000	0.001	0.000	-0.001	-0.001	0.000	0.000
p-values	0.690	0.567	0.578	0.149	0.100	0.029*	0.437
INDEX	0.918	0.391	0.619	0.582	0.634	0.842	0.147
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.986	1.375	-1.779	0.424	1.982	0.038	0.743
p-values	0.000*	0.000*	0.000*	0.014*	0.000*	0.549	0.000*
AR(2)		-0.407	-0.952		-0.992	0.905	
p-values		0.000*	0.000*		0.000*	0.000*	
MA(1)	0.996	-1.434	1.802	-0.338	-1.980	-0.069	-0.996
p-values	0.000*	0.000*	0.000*	0.055	0.000*	0.288	0.000*
MA(2)		0.483	0.979	-0.045	0.990	-0.929	0.113
p-values		0.000*	0.000*	0.175	0.000*	0.000*	0.044*
Variance equation	EGARCH(2/1)	GARCH(1/1)	EGARCH(1/2)	EGARCH(2/1)	EGARCH(2/2)	ARCH(2)	EGARCH(1/1)
C	-0.251	0.000	-1.554	-0.141	-2.998	0.000	-6.097
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.315	0.071	0.453	0.433	0.252	0.126	0.415
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.002*	0.000*
α2	-0.164			-0.318	0.162	0.153	
p-values	0.011*			0.000*	0.021*	0.000*	
γ1	0.187		0.019	0.141	0.157		-0.069
p-values	0.000*		0.367	0.000*	0.000*		0.064
γ2	-0.170			-0.132	0.170		
p-values	0.000*			0.000*	0.000*		
β1	0.982	0.922	0.390	0.992	-0.052		0.109
p-values	0.000*	0.000*	0.000*	0.000*	0.736		0.007*
β2			0.460		0.714		
p-values			0.000*		0.000*		
AIC	-4.720	-4.617	-5.361	-4.706	-5.095	-5.095	-3.739
R-square	23%	20%	28%	26%	17%	26%	10%
Residual diagnostics							
Box-Pierce Q test (residuals)							
Q(5)	1.7	1.4	0.6	5.9	1.4	1.9	1.8
p-values	0.636	0.241	0.425	0.053	0.240	0.167	0.398
Q(15)	19.5	9.1	5.8	11.4	14.5	10.7	15.1
p-values	0.107	0.613	0.888	0.491	0.207	0.470	0.236
Q(25)	30.0	31.1	11.3	22.1	25.6	17.9	19.4
p-values	0.150	0.072	0.956	0.452	0.221	0.653	0.619
Q(35)	38.1	38.5	20.7	37.3	29.0	25.2	27.4
p-values	0.248	0.165	0.919	0.238	0.571	0.760	0.700
Box-Pierce Q test (squared residuals)							
Q(5)	3.205	1.960	2.964	1.365	0.649	0.658	3.449
p-values	0.361	0.162	0.085	0.505	0.421	0.417	0.178
Q(15)	11.154	6.179	9.786	10.909	8.276	16.656	5.698
p-values	0.598	0.861	0.550	0.537	0.688	0.118	0.931
Q(25)	15.587	25.190	18.397	16.253	10.620	27.560	12.702
p-values	0.872	0.239	0.624	0.803	0.970	0.153	0.941
Q(35)	17.334	34.258	28.586	18.109	15.050	37.453	15.041
p-values	0.989	0.314	0.591	0.977	0.993	0.197	0.995
ARCH LM test							
p-values	0.604	0.849	0.806	0.773	0.908	0.996	0.708
Normality tests							
Skewness	1.42	0.12	2.76	0.70	-0.27	-0.11	-0.43
Kurtosis	11.61	12.58	25.86	14.42	7.82	4.38	13.62
Jarque-Bera	3502.66	3915.35	23566.05	5647.32	1003.74	83.35	4837.43
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.19: Model selection - Russia - bad news - analyst coverage > 5

Stocks	RTKM	SNGS	SNGSP	OGKB	MTLR	AFLT	ENRU
Mean equation	ARMA(1/1)	ARMA(2/1)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(2/1)	ARMA(2/2)
C	-0.001	-0.001	-0.001	-0.002	-0.002	0.000	-0.001
p-values	0.000*	0.006*	0.011*	0.001*	0.000*	0.685	0.076
INDEX	0.367	1.093	0.952	1.130	1.291	0.739	0.668
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.987	-0.773		-0.662		1.089	-1.459
p-values	0.000*	0.000*		0.082		0.000*	0.000*
AR(2)		0.088		0.090		-0.093	-0.992
p-values		0.038*		0.733		0.003*	0.000*
MA(1)	-0.988	0.829		0.778		-0.997	1.457
p-values	0.000*	0.000*		0.044*		0.000*	0.000*
MA(2)				-0.011			0.994
p-values				0.969			0.000*
Variance equation	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(1/1)	GARCH(1/1)
C	-0.084	-0.067	-0.174	-0.329	-0.077	-0.723	0.000
p-values	0.138	0.001*	0.002*	0.000*	0.039*	0.000*	0.000*
α1	0.533	0.491	0.504	0.211	0.332	0.273	0.137
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	-0.471	-0.407	-0.413	-0.042	-0.259		
p-values	0.000*	0.000*	0.000*	0.463	0.005*		
γ1	0.046	0.082	0.002	0.174	-0.019	-0.054	
p-values	0.465	0.000*	0.950	0.000*	0.756	0.000*	
γ2	-0.048	-0.114	-0.028	-0.174	-0.020		
p-values	0.446	0.000*	0.312	0.000*	0.746		
β1	1.568	1.293	1.512	0.973	0.997	0.935	0.698
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
β2	-0.574	-0.294	-0.525				
p-values	0.000*	0.000*	0.000*				
AIC	-5.361	-5.608	-5.483	-4.928	-5.007	-5.347	-5.399
R-square	23%	71%	68%	39%	55%	32%	24%
Residual diagnostics							
Box-Pierce Q test (residuals)							
Q(5)	6.0	5.6	8.7	2.0	1.7	2.1	1.1
p-values	0.051	0.061	0.120	0.156	0.892	0.345	0.302
Q(15)	16.7	11.3	13.2	9.2	13.6	6.4	8.9
p-values	0.163	0.506	0.584	0.606	0.555	0.897	0.628
Q(25)	26.2	21.5	18.7	16.6	19.7	11.5	16.8
p-values	0.245	0.491	0.809	0.737	0.761	0.967	0.721
Q(35)	43.4	36.5	24.1	25.2	29.3	17.3	23.8
p-values	0.086	0.267	0.918	0.757	0.740	0.984	0.820
Box-Pierce Q test (squared residuals)							
Q(5)	2.766	4.002	2.061	0.362	0.667	0.851	2.424
p-values	0.251	0.135	0.841	0.547	0.985	0.654	0.119
Q(15)	6.674	19.612	9.735	4.856	10.295	2.650	8.041
p-values	0.878	0.075	0.836	0.938	0.801	0.998	0.710
Q(25)	10.441	21.901	16.507	7.531	15.151	5.331	11.995
p-values	0.982	0.466	0.899	0.997	0.938	1.000	0.940
Q(35)	12.614	31.063	20.233	9.416	21.596	9.855	16.984
p-values	0.999	0.514	0.978	1.000	0.963	1.000	0.981
ARCH LM test							
p-values	0.449	0.203	0.649	0.902	0.842	0.937	0.942
Normality tests							
Skewness	0.49	3.45	0.91	1.43	0.68	-1.15	-0.38
Kurtosis	18.06	49.12	30.66	11.83	5.23	19.14	7.45
Jarque-Bera	9711.70	92711.67	32746.82	3675.61	292.32	11336.24	870.17
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.20: Model selection - RU - bad news - analyst coverage < 6

Stocks	**VRPH**	**UTAR**	**RSTIP**	**IRGZ**	**LNZL**	**YKEN**	**SVAV**	**LSNG**	**MRKK**	**MRKS**	**MRKZ**	**PIKK**	**CNTL**	**ISKJ**	**RTSB**	**VLHZ**
Mean equation	ARMA(1/2)	ARMA(1/0)	ARMA(1/1)	ARMA(2/1)	ARMA(0/0)	ARMA(2/0)	ARMA(0/1)	ARMA(2/2)	ARMA(2/2)	ARMA(1/0)	ARMA(0/1)	ARMA(2/2)	ARMA(1/2)	ARMA(0/1)	ARMA(2/0)	ARMA(1/0)
C	0.000	0.000	-0.002	-0.001	0.001	-0.001	-0.001	-0.002	-0.002	-0.001	-0.002	0.000	-0.001	-0.001	-0.001	-0.001
p-values	0.843	0.796	0.000*	0.013*	0.012*	0.006*	0.152	0.005*	0.003*	0.182	0.011*	0.900	0.001*	0.054	0.034*	0.280
INDEX	0.424	0.187	0.820	0.598	0.298	0.548	0.868	0.632	0.839	0.255	0.693	0.332	0.609	0.528	0.359	0.483
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.709	-0.064	0.980	-0.906		-0.082		-0.148	-0.902	-0.140		-0.258	0.787		-0.208	-0.265
p-values	0.000*	0.052	0.000*	0.000*		0.018*		0.000*	0.000*	0.000*		0.203	0.000*		0.000*	0.000*
AR(2)				0.085		-0.063		-0.977	-0.994			0.708			-0.086	
p-values				0.003*		0.001*		0.000*	0.000*			0.000*			0.023*	
MA(1)	0.625		-0.997	0.996			0.179	0.143	0.914		-0.128	0.319	-0.949	-0.123		
p-values	0.001*		0.000*	0.000*			0.000*	0.000*	0.000*		0.000*	0.133	0.000*	0.002*		
MA(2)	-0.061							0.994	0.995			-0.680	0.029			
p-values	0.091							0.000*	0.000*			0.001*	0.470			
Variance equation	EGARCH(1/1)	GARCH(1/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	GARCH(1/2)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)	GARCH(1/1)	EGARCH(1/1)
C	-0.250	0.000	-0.623	-0.753	-0.218	-0.443	-4.784	-0.439	0.000	0.000	-2.301	0.000	-0.890	-2.685	0.000	-3.050
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.205	0.133	0.378	0.335	0.980	0.683	0.634	0.514	0.145	0.206	0.363	0.236	0.517	0.521	0.164	0.433
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2			-0.171	0.167	-0.817	-0.418	0.389	-0.349			0.220		-0.102			
p-values			0.002*	0.000*	0.000*	0.000*	0.000*	0.000*			0.001*		0.140			
γ1	-0.046		-0.054	0.053	0.012	-0.240	0.037	-0.095			-0.010		-0.171	0.027		0.220
p-values	0.001*		0.046*	0.000*	0.620	0.000*	0.259	0.005*			0.723		0.000*	0.227		0.000*
γ2			-0.063	0.007	0.220	0.255	-0.160	0.086			0.062		-0.088			
p-values			0.033*	0.128	0.000*	0.000*	0.000*	0.008*			0.032*		0.012*			
β1	0.987	0.508	0.378	0.000	0.985	0.786	0.031	0.959	0.724	0.053	-0.003	0.455	0.389	0.552	0.823	0.630
p-values	0.000*	0.000*	0.000*	0.953	0.000*	0.000*	0.801	0.000*	0.000*	0.141	0.977	0.000*	0.000*	0.000*	0.000*	0.000*
β2		0.351	0.564	0.951		0.177	0.449			0.605	0.749		0.520	0.141		
p-values		0.004*	0.000*	0.000*		0.002*	0.000*			0.000*	0.000*		0.000*	0.030*		
AIC	-4.812	-5.432	-5.370	-5.121	-4.691	-4.445	-4.904	-4.781	-4.632	-4.319	-4.503	-5.326	-3.997	-4.692	-3.783	-4.616
R-square	14%	6%	36%	29%	3%	30%	27%	16%	22%	9%	16%	10%	10%	10%	7%	9%
Residual diagnostics																
Box-Pierce Q test (residuals)																
Q(5)	2.4	2.8	5.8	5.4	2.9	4.9	3.6	0.8	1.5	5.5	7.4	3.1	4.6	1.8	2.6	7.8
p-values	0.299	0.587	0.120	0.066	0.712	0.182	0.461	0.367	0.219	0.240	0.114	0.079	0.101	0.772	0.274	0.100
Q(15)	21.0	20.6	8.6	15.2	7.8	13.6	11.9	13.6	13.5	18.2	21.9	14.4	16.0	6.0	9.8	14.6
p-values	0.051	0.111	0.804	0.229	0.930	0.406	0.615	0.258	0.262	0.196	0.081	0.214	0.191	0.966	0.638	0.409
Q(25)	26.8	26.7	15.7	18.8	16.3	32.6	29.3	18.9	24.6	26.5	28.1	25.1	27.6	12.3	15.9	18.6
p-values	0.218	0.319	0.869	0.658	0.905	0.088	0.210	0.591	0.265	0.328	0.255	0.244	0.190	0.977	0.820	0.773
Q(35)	36.0	39.7	20.1	27.7	23.9	38.1	45.9	26.1	31.4	37.4	38.7	35.0	32.2	19.8	21.0	24.0
p-values	0.286	0.232	0.962	0.685	0.923	0.248	0.083	0.718	0.446	0.316	0.264	0.285	0.456	0.975	0.932	0.899
Box-Pierce Q test (squared residuals)																
Q(5)	5.079	5.116	1.029	5.084	0.766	1.606	1.375	3.501	0.969	2.536	5.833	1.040	1.375	3.788	5.099	0.158
p-values	0.079	0.276	0.794	0.079	0.979	0.658	0.849	0.061	0.325	0.638	0.212	0.308	0.503	0.435	0.078	0.997
Q(15)	13.973	10.413	13.454	16.543	2.542	3.539	9.671	11.339	6.160	13.801	10.159	4.622	3.057	13.465	8.530	8.512
p-values	0.302	0.731	0.413	0.168	1.000	0.995	0.786	0.415	0.863	0.465	0.750	0.948	0.995	0.490	0.742	0.861
Q(25)	24.612	44.586	18.720	24.193	5.903	17.856	18.992	17.443	11.313	19.597	17.377	17.787	10.652	17.401	13.231	12.349
p-values	0.316	0.007*	0.717	0.337	1.000	0.765	0.752	0.684	0.956	0.719	0.832	0.662	0.979	0.831	0.927	0.976
Q(35)	45.000	58.952	30.915	36.469	15.803	20.847	25.519	19.753	17.390	23.127	25.102	22.605	12.755	22.433	21.246	16.202
p-values	0.063	0.005*	0.571	0.269	0.998	0.950	0.852	0.941	0.977	0.921	0.866	0.863	0.999	0.936	0.926	0.996
ARCH LM test																
p-values	0.415	0.216	0.992	0.155	0.896	0.491	0.802	0.504	0.886	0.690	0.427	0.748	0.621	0.958	0.195	0.978
Normality tests																
Skewness	-1.15	0.18	0.07	0.94	1.36	1.63	0.27	0.26	0.32	0.77	0.36	0.87	2.08	0.74	-0.54	2.29
Kurtosis	23.02	10.12	6.05	18.81	30.06	24.33	9.95	6.44	10.15	20.61	7.18	7.89	20.42	15.09	18.64	38.20
Jarque-Bera	17309.36	2163.24	396.97	10802.08	31533.82	19844.85	2068.57	515.23	2197.52	13318.79	766.16	1145.58	13673.80	6322.90	10460.90	53722.46
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.21: Model selection - Poland - good news - analyst coverage > 5

Stocks	**PEO**	**PKN**	**BZW**	**KGH**	**LPP**	**MOL**	**BHW**	**CCC**	**PGN**	**MIL**	**ING**	**BDX**	**NET**	**NET**	**ATT**	**CIE**	**SNS**
Mean equation	ARMA(0/0)	ARMA(0/0)	ARMA(1/1)	ARMA(0/1)	ARMA(1/1)	ARMA(1/2)	ARMA(0/0)	ARMA(0/0)	ARMA(1/2)	ARMA(2/1)	ARMA(0/0)	ARMA(0/0)	ARMA(1/1)	ARMA(1/1)	ARMA(2/0)	ARMA(1/1)	ARMA(1/0)
C	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	-0.001	0.001	0.000	0.001
p-values	0.590	0.830	0.438	0.024*	0.419	0.385	0.764	0.508	0.713	0.233	0.636	0.583	0.891	0.027*	0.065	0.647	0.070
INDEX	1.483	1.435	1.349	1.577	0.490	0.997	0.662	0.545	0.703	1.224	0.797	0.520	0.600	0.956	0.661	0.910	0.935
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)			0.778		0.691	0.760			-0.851	0.787			0.905	-0.474	0.152	-0.628	0.067
p-values			0.000*		0.001*	0.000*			0.000*	0.000*			0.000*	0.008*	0.000*	0.001*	0.065
AR(2)										-0.119					-0.116		
p-values										0.000*					0.000*		
MA(1)			-0.839	0.152	-0.657	-0.959			0.764	-0.728			-0.958	0.580		0.704	
p-values			0.000*	0.000*	0.002*	0.000*			0.000*	0.000*			0.000*	0.000*		0.000*	
MA(2)						0.104			-0.125								
p-values						0.049*			0.000*								
Variance equation	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(1/2)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	GARCH(1/2)	GARCH(1/1)	EGARCH(1/2)	EGARCH(2/2)	0	GARCH(1/1)	EGARCH(2/2)
C	-2.028	-0.140	0.000	0.000	0.000	-0.153	-0.620	-1.179	0.000	-0.064	0.000	0.000	-0.392	-0.051		0.000	-0.030
p-values	0.000*	0.000*	0.026*	0.024*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.001*	0.000*	0.000*	0.000*		0.001*	0.007*
α1	0.268	-0.061	0.079	0.046	0.143	0.400	0.181	0.240	0.034	0.340	0.120	0.129	0.149	0.633		0.063	0.306
p-values	0.000*	0.000*	0.003*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*
α2	0.145	0.064				-0.284		0.046		-0.280				-0.598			-0.292
p-values	0.001*	0.000*				0.000*		0.454		0.000*				0.000*			0.000*
γ1	0.019	0.050				0.022	-0.030	0.075		0.085			-0.109	0.028			-0.071
p-values	0.456	0.000*				0.517	0.098	0.028*		0.011*			0.000*	0.510			0.013*
γ2	-0.092	-0.052				-0.015		-0.126		-0.078				-0.086			0.060
p-values	0.000*	0.000*				0.655		0.000*		0.026*				0.046*			0.042*
β1	-0.058	1.934	0.798	0.934	0.793	0.990	0.232	0.216	0.932	0.864	0.083	0.701	0.319	1.228		0.894	1.617
p-values	0.119	0.000*	0.000*	0.000*	0.000*	0.000*	0.037*	0.059	0.000*	0.000*	0.089	0.000*	0.007*	0.000*		0.000*	0.000*
β2	0.853	-0.949					0.706	0.657		0.133	0.751		0.646	-0.231			-0.619
p-values	0.000*	0.000*					0.000*	0.000*		0.301	0.000*		0.000*	0.007*			0.000*
AIC	-5.460	-5.780	-5.141	-5.478	-4.776	-4.386	-5.177	-4.777	-5.680	-4.732	-5.130	-4.633	-5.494	-4.477	-4.958	-4.856	-4.618
R-square	69%	61%	59%	56%	10%	24%	31%	13%	27%	42%	30%	11%	16%	18%	15%	19%	27%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	2.0	1.9	2.1	0.4	4.9	3.6	4.3	6.5	2.9	1.8	0.1	8.9	2.9	3.6	2.9	1.4	1.5
p-values	0.843	0.867	0.558	0.981	0.176	0.168	0.505	0.261	0.234	0.401	1.000	0.115	0.412	0.312	0.407	0.710	0.829
Q(15)	15.4	14.1	11.2	8.4	11.4	8.5	9.7	21.5	7.7	8.2	7.1	13.1	15.1	17.9	5.7	9.0	9.8
p-values	0.424	0.521	0.592	0.868	0.580	0.748	0.837	0.122	0.807	0.769	0.954	0.597	0.304	0.163	0.956	0.774	0.780
Q(25)	24.7	23.0	21.2	23.2	23.2	19.1	17.2	26.6	26.6	15.5	17.6	24.3	32.5	24.7	15.7	21.0	16.2
p-values	0.480	0.577	0.567	0.506	0.451	0.639	0.875	0.375	0.229	0.839	0.858	0.500	0.091	0.368	0.866	0.582	0.881
Q(35)	34.0	29.1	35.4	28.9	33.8	22.8	23.5	33.6	32.5	21.7	33.8	37.5	45.8	30.8	23.4	28.0	19.1
p-values	0.516	0.747	0.354	0.716	0.431	0.884	0.932	0.538	0.442	0.915	0.524	0.355	0.068	0.579	0.893	0.714	0.982
Box-Pierce Q test (squared residuals)																	
Q(5)	9.157	7.813	5.106	4.157	1.668	1.483	0.429	0.431	0.425	0.679	2.884	8.508	0.324	0.504	6.163	0.712	3.033
p-values	0.103	0.167	0.164	0.385	0.644	0.476	0.994	0.994	0.809	0.712	0.718	0.130	0.956	0.918	0.104	0.870	0.552
Q(15)	14.921	12.066	7.735	14.601	13.563	11.582	12.214	7.639	3.336	3.501	12.848	15.916	3.073	2.831	11.728	11.846	16.579
p-values	0.457	0.674	0.860	0.406	0.405	0.480	0.663	0.937	0.993	0.991	0.614	0.388	0.998	0.998	0.550	0.540	0.279
Q(25)	31.392	30.064	16.703	27.063	24.491	15.201	14.459	13.752	29.592	7.598	18.776	19.443	9.184	6.941	33.576	19.098	28.077
p-values	0.176	0.222	0.824	0.302	0.377	0.853	0.953	0.966	0.129	0.998	0.808	0.775	0.995	0.999	0.072	0.695	0.257
Q(35)	36.913	34.465	22.782	29.990	29.702	22.899	21.455	17.613	35.955	14.200	32.359	22.105	24.401	11.249	38.358	22.301	42.120
p-values	0.381	0.494	0.909	0.665	0.632	0.881	0.965	0.994	0.288	0.997	0.596	0.956	0.861	1.000	0.239	0.921	0.160
ARCH LM test																	
p-values	0.286	0.184	0.690	0.428	0.735	0.894	0.964	0.873	0.835	0.995	0.503	0.102	0.992	0.822	0.101	0.996	0.700
Normality tests																	
Skewness	-0.08	0.13	0.16	-0.53	0.17	0.07	0.06	-0.05	0.41	-0.55	-0.33	0.80	-1.71	1.05	1.09	-0.02	0.32
Kurtosis	5.81	3.92	3.39	4.85	7.19	8.09	5.68	5.44	5.84	10.24	5.57	9.17	20.63	19.02	9.71	10.06	5.35
Jarque-Bera	338.43	39.27	10.50	193.43	754.55	1105.38	307.66	253.92	371.98	2283.77	299.10	1731.67	13755.66	11127.47	2122.84	2127.49	253.00
p-value	0.000*	0.000*	0.005*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.21: (continued)

Stocks	**KTY**	**ACP**	**CAR**	**AGO**	**FMF**	**KPX**	**ATT**	**AGO**
Mean equation	ARMA(1/2)	ARMA(1/1)	ARMA(1/0)	ARMA(1/0)	ARMA(2/2)	ARMA(0/0)	ARMA(0/0)	ARMA(0/2)
C	0.000	-0.001	0.001	-0.001	0.000	-0.001	0.000	0.000
p-values	0.526	0.048*	0.187	0.081	0.682	0.070	0.463	0.780
INDEX	0.651	1.102	0.525	1.185	0.525	0.863	0.868	0.732
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.579	0.452	-0.119	0.083	-0.307			
p-values	0.019*	0.018*	0.000*	0.014*	0.000*			
AR(2)					-0.967			
p-values					0.000*			
MA(1)	-0.640	-0.296			0.305			0.006
p-values	0.009*	0.141			0.000*			0.855
MA(2)	0.016				0.994			0.058
p-values	0.648				0.000*			0.076
Variance equation	EGARCH(1/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	GARCH(1/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/1)
C	-1.622	-1.408	0.000	0.000	0.000	0.000	0.000	-1.782
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.004*	0.002*	0.000*
α1	0.313	0.392	0.082	0.119	0.143	0.113	0.216	0.237
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*
α2		-0.144						-0.127
p-values		0.042*						0.032*
γ1	-0.095	-0.135						-0.162
p-values	0.000*	0.000*						0.000*
γ2		0.145						-0.018
p-values		0.000*						0.697
β1	0.085	1.415	0.899	0.726	0.667	0.488	0.482	0.783
p-values	0.021*	0.000*	0.000*	0.000*	0.000*	0.002*	0.000*	0.000*
β2	0.737	-0.572			0.123			
p-values	0.000*	0.000*			0.408			
AIC	-4.967	-4.969	-4.911	-5.652	-5.186	-5.132	-4.803	-4.962
R-square	21%	24%	11%	49%	11%	23%	15%	11%
Residual diagnostics								
Box-Pierce Q test (residuals)								
Q(5)	2.7	5.4	6.4	3.2	1.8	4.2	5.8	2.6
p-values	0.260	0.145	0.174	0.525	0.177	0.383	0.211	0.451
Q(15)	8.7	13.2	11.3	17.3	10.2	13.5	13.3	9.1
p-values	0.732	0.435	0.664	0.238	0.514	0.485	0.500	0.765
Q(25)	20.9	27.9	15.4	27.2	20.3	26.8	22.0	20.1
p-values	0.527	0.220	0.909	0.296	0.499	0.316	0.581	0.637
Q(35)	42.2	36.0	28.9	43.1	37.2	33.3	41.3	28.7
p-values	0.107	0.330	0.717	0.136	0.204	0.500	0.182	0.680
Box-Pierce Q test (squared residuals)								
Q(5)	0.444	1.227	3.582	4.790	1.529	1.559	7.494	1.558
p-values	0.801	0.746	0.465	0.310	0.216	0.816	0.112	0.669
Q(15)	4.240	12.139	17.154	9.242	13.070	5.010	13.312	4.982
p-values	0.979	0.516	0.248	0.815	0.289	0.986	0.502	0.976
Q(25)	13.278	20.131	23.023	20.708	20.924	10.622	23.030	14.407
p-values	0.925	0.634	0.518	0.656	0.464	0.991	0.518	0.915
Q(35)	22.827	31.301	30.505	33.931	35.207	24.053	35.453	17.926
p-values	0.884	0.552	0.640	0.471	0.276	0.897	0.400	0.985
ARCH LM test								
p-values	0.834	0.683	0.729	0.708	0.552	0.967	0.599	0.778
Normality tests								
Skewness	0.18	-1.25	0.14	0.17	-0.19	0.52	0.07	0.19
Kurtosis	5.53	26.68	9.54	4.00	7.60	4.71	5.44	6.24
Jarque-Bera	278.94	24166.90	1826.78	47.64	906.86	170.16	254.23	452.28
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.22: Model selection - Poland - good news - analyst coverage < 6

Stocks	AMC	FTE	PCE	PEL	CMR	GTN	ORB	MSZ	PND	RON	SGN	SNK	BTM	IPX	IPX	MWT	AMB
Mean equation	ARMA(2/1)	ARMA(1/1)	ARMA(0/2)	ARMA(0/0)	ARMA(0/0)	ARMA(2/2)	ARMA(2/2)	ARMA(1/0)	ARMA(2/1)	ARMA(1/1)	ARMA(2/2)	ARMA(0/1)	ARMA(0/1)	ARMA(1/1)	ARMA(0/1)	ARMA(1/1)	ARMA(0/0)
C	0.001	-0.007	0.001	0.000	0.000	-0.001	0.000	-0.002	-0.002	-0.001	-0.001	-0.001	0.001	-0.001	0.000	0.001	-0.001
p-values	0.232	0.023*	0.347	0.990	0.571	0.054	0.474	0.000*	0.158	0.254	0.000*	0.342	0.607	0.314	0.883	0.279	0.213
INDEX	0.722	0.340	0.752	0.606	0.665	1.223	0.577	0.976	1.108	0.564	0.907	0.492	0.096	1.070	0.541	0.919	0.638
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.415	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.800	0.995				0.043	-0.771	0.031	-0.588	0.334	1.008			-0.750		-0.690	
p-values	0.000*	0.000*				0.000*	0.004*	0.435	0.000*	0.001*	0.000*			0.000*		0.001*	
AR(2)	0.093					-0.978	-0.338		0.143		-0.023						
p-values	0.029*					0.000*	0.078		0.000*		0.891						
MA(1)	0.871	-0.984	0.007			-0.033	0.638		0.796	-0.551	-0.930	-0.044	-0.173	0.808	0.068	0.742	
p-values	0.000*	0.000*	0.830			0.000*	0.021*		0.000*	0.000*	0.000*	0.281	0.000*	0.000*	0.063	0.000*	
MA(2)			-0.065			0.994	0.217				-0.070						
p-values			0.043*			0.000*	0.293				0.691						
Variance equation	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/2)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/1)	EGARCH(1/2)	EGARCH(2/1)	GARCH(1/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)
C	-0.508	-0.016	0.000	0.000	-0.070	-1.543	-0.294	-0.195	0.000	-0.188	-0.627	-0.353	0.000	-1.115	-0.477	-0.076	-0.795
p-values	0.000*	0.259	0.000*	0.000*	0.011*	0.000*	0.000*	0.057	0.000*	0.000*	0.004*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
$\alpha1$	0.486	0.130	0.064	0.098	0.262	0.346	0.331	0.368	0.141	0.349	0.192	0.358	0.091	0.292	0.356	0.221	0.290
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
$\alpha2$	-0.224	-0.120		0.882	-0.218	0.131	-0.216	-0.306		-0.246		-0.301		0.161	-0.185	-0.209	0.070
p-values	0.000*	0.000*		0.000*	0.000*	0.001*	0.000*	0.000*		0.000*		0.000*		0.000*	0.000*	0.000*	0.090
$\gamma1$	-0.018	-0.062			-0.052	-0.048	0.069	-0.047		-0.036	-0.037	-0.065		-0.022	0.012	0.012	0.009
p-values	0.574	0.003*			0.074	0.007*	0.057	0.171		0.342	0.098	0.047*		0.269	0.744	0.725	0.616
$\gamma2$	0.002	-0.050			0.027	-0.032	-0.066	0.018		0.041		0.043		-0.045	-0.032	0.000	-0.055
p-values	0.937	0.012*			0.339	0.106	0.083	0.609		0.274		0.205		0.006*	0.399	0.993	0.000*
$\beta1$	0.956	0.192	0.157		0.995	-0.036	0.972	1.497	0.842	0.984	0.310	0.958	0.200	0.005	0.950	1.618	0.078
p-values	0.000*	0.006*	0.255		0.000*	0.019*	0.000*	0.000*	0.000*	0.000*	0.062	0.000*	0.097	0.835	0.000*	0.000*	0.089
$\beta2$		0.805	0.703			0.890		-0.517			0.632		0.679	0.884		-0.627	0.847
p-values		0.000*	0.000*			0.000*		0.001*			0.000*		0.000*	0.000*		0.000*	0.000*
AIC	-4.515	-4.785	-4.541	-4.545	-4.936	-5.341	-4.733	-4.839	-4.204	-4.561	-5.566	-4.615	-3.194	-4.368	-4.331	-4.190	-4.327
R-square	17%	7%	11%	13%	20%	42%	13%	36%	26%	9%	31%	9%	4%	28%	5%	12%	15%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	3.9	2.5	4.8	6.7	6.5	2.1	3.8	2.4	4.1	2.2	1.5	1.1	2.4	2.9	1.1	2.8	0.6
p-values	0.143	0.483	0.188	0.240	0.259	0.148	0.050	0.658	0.131	0.531	0.228	0.894	0.671	0.402	0.898	0.427	0.986
Q(15)	16.2	13.6	13.6	12.6	13.9	5.2	9.3	13.1	18.7	10.5	10.6	11.2	11.3	12.4	6.8	9.0	7.1
p-values	0.182	0.404	0.404	0.637	0.532	0.919	0.596	0.517	0.095	0.650	0.480	0.667	0.664	0.499	0.942	0.773	0.956
Q(25)	24.0	24.2	21.2	29.5	22.7	18.3	11.7	17.3	24.6	19.9	22.6	23.5	24.6	18.0	22.8	19.4	19.4
p-values	0.350	0.393	0.571	0.242	0.594	0.627	0.947	0.835	0.318	0.647	0.367	0.489	0.430	0.759	0.532	0.678	0.776
Q(35)	33.3	36.9	26.5	43.4	35.0	27.8	21.5	25.6	28.2	27.5	34.0	28.6	43.2	33.9	30.7	23.5	27.5
p-values	0.406	0.294	0.779	0.156	0.467	0.630	0.897	0.850	0.659	0.736	0.327	0.727	0.134	0.424	0.629	0.889	0.811
Box-Pierce Q test (squared residuals)																	
Q(5)	2.894	3.590	3.789	4.772	3.015	2.285	3.067	0.861	0.822	1.544	1.426	1.593	3.791	4.173	3.423	1.001	1.366
p-values	0.235	0.309	0.285	0.444	0.698	0.131	0.080	0.930	0.663	0.672	0.232	0.810	0.435	0.243	0.490	0.801	0.928
Q(15)	13.049	8.755	8.485	10.707	7.993	7.282	9.668	8.261	17.170	7.565	5.442	4.281	12.693	11.162	13.610	3.526	3.180
p-values	0.365	0.791	0.811	0.773	0.924	0.776	0.560	0.875	0.143	0.871	0.908	0.994	0.551	0.597	0.479	0.995	0.999
Q(25)	19.687	16.607	15.121	18.603	11.983	12.389	18.822	14.111	19.967	13.872	21.362	15.491	24.436	17.358	23.280	12.752	11.619
p-values	0.603	0.828	0.890	0.816	0.987	0.929	0.597	0.944	0.585	0.930	0.437	0.906	0.437	0.791	0.503	0.957	0.989
Q(35)	22.982	20.793	22.188	37.457	25.288	21.189	32.404	15.390	24.870	20.645	27.369	20.911	31.349	20.194	31.261	27.842	22.396
p-values	0.879	0.951	0.923	0.357	0.886	0.907	0.397	0.997	0.811	0.954	0.654	0.962	0.598	0.961	0.603	0.722	0.951
ARCH LM test																	
p-values	0.958	0.403	0.192	0.479	0.315	0.862	0.779	0.814	0.940	0.848	0.712	0.988	0.270	0.509	0.374	0.915	0.862
Normality tests																	
Skewness	-0.14	0.32	0.94	0.38	0.19	0.11	0.37	0.14	1.03	0.18	0.03	-0.59	0.18	0.90	0.17	0.40	0.31
Kurtosis	11.26	7.67	7.74	7.46	6.43	7.05	7.75	5.96	13.58	5.65	4.64	10.65	8.58	11.58	6.91	5.66	7.99
Jarque-Bera	2910.68	947.05	1110.40	871.06	508.15	702.92	984.62	377.07	4948.63	305.95	114.59	2554.50	1334.81	3276.87	658.33	327.18	1076.78
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.22: (continued)

Stocks	**ATR**	**EGS**	**EMF**	**LEN**	**MSW**	**NVA**	**OPN**	**PEK**	**PRI**	**PRT**	**RFK**	**TIM**	**TIM**	**TSG**	**ULM**	**06N**	**ARR**
Mean equation	ARMA(0/1)	ARMA(2/0)	ARMA(2/2)	ARMA(2/2)	ARMA(0/0)	ARMA(0/1)	ARMA(0/0)	ARMA(0/1)	ARMA(0/0)	ARMA(1/0)	ARMA(2/0)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(0/0)	ARMA(0/1)	ARMA(0/1)
C	-0.001	-0.002	0.000	-0.001	0.001	-0.001	0.000	-0.001	0.001	-0.001	0.002	0.000	0.001	-0.002	-0.001	0.000	-0.001
p-values	0.000*	0.000*	0.733	0.578	0.128	0.048*	0.653	0.021*	0.176	0.083	0.042*	0.870	0.312	0.029*	0.069	0.664	0.055
INDEX	0.526	0.587	0.588	0.599	0.552	0.390	0.464	0.336	0.108	0.402	0.680	0.588	0.706	0.411	0.529	0.144	0.359
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.004*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)		-0.101	0.997	-1.663						-0.155	0.145	0.392	-0.251	0.237			
p-values		0.007*	0.000*	0.000*						0.000*	0.000*	0.000*	0.282	0.043*			
AR(2)		-0.076	-0.505	-0.831							0.047	-0.976	0.621	-0.756			
p-values		0.001*	0.028*	0.000*							0.141	0.000*	0.001*	0.000*			
MA(1)	0.121		-0.957	1.648		-0.147		-0.193				-0.402	0.166	-0.147		-0.117	-0.109
p-values	0.001*		0.000*	0.000*		0.000*		0.000*				0.000*	0.464	0.213		0.001*	0.004*
MA(2)			0.420	0.785								0.993	-0.676	0.744			
p-values			0.085	0.000*								0.000*	0.000*	0.000*			
Variance equation	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/1)	GARCH(1/1)	EGARCH(1/2)	GARCH(1/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/1)	GARCH(1/2)	EGARCH(2/1)
C	-0.006	0.001	-0.198	0.000	0.000	-0.419	0.000	-0.116	0.000	-0.077	-7.262	0.000	-0.958	-1.835	-0.168	0.000	-0.162
p-values	0.000*	0.853	0.000*	0.000*	0.000*	0.000*	0.000*	0.005*	0.000*	0.007*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α_1	0.319	0.529	0.387	0.091	0.181	0.223	0.342	0.355	0.119	0.422	0.567	0.097	0.194	0.412	0.191	0.163	0.493
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.002*	0.000*	0.000*	0.000*	0.000*	0.000*
α_2	-0.332	-0.528	-0.267					-0.328		-0.397	0.450		0.107		-0.094		-0.390
p-values	0.000*	0.000*	0.000*					0.000*		0.000*	0.000*		0.000*		0.012*		0.000*
γ_1	-0.018	-0.017	-0.035			-0.058		-0.072		-0.007	0.068		-0.068	-0.149	-0.127		-0.093
p-values	0.584	0.613	0.311			0.000*		0.039*		0.839	0.022*		0.008*	0.000*	0.000*		0.001*
γ_2	0.005	-0.031	-0.022					0.035		-0.027	0.151		0.092		0.079		0.088
p-values	0.891	0.365	0.499					0.296		0.456	0.000*		0.001*		0.014*		0.002*
β_1	1.652	1.000	0.985	0.768	0.426	0.138	0.254	1.527	0.801	0.992	-0.329	0.514	0.118	0.788	0.986	0.337	0.988
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.085	0.000*	0.000*	0.000*	0.000*
β_2	-0.654					0.825		-0.539			0.474		0.767			0.481	
p-values	0.000*					0.000*		0.000*			0.000*		0.000*			0.000*	
AIC	-4.643	-4.570	-4.541	-4.219	-4.772	-4.400	-4.419	-4.775	-4.910	-4.784	-4.804	-4.335	-3.776	-4.468	-4.408	-5.546	-4.652
R-square	10%	6%	13%	11%	15%	4%	10%	9%	1%	5%	21%	12%	6%	7%	9%	3%	6%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	1.7	1.6	2.0	0.3	4.5	3.4	7.1	2.6	6.0	2.2	1.2	1.8	2.2	2.3	7.5	0.7	0.3
p-values	0.798	0.661	0.162	0.563	0.483	0.494	0.216	0.635	0.302	0.701	0.755	0.180	0.134	0.129	0.185	0.948	0.992
Q(15)	18.4	7.8	5.1	11.9	14.7	15.2	19.8	7.9	21.1	6.6	4.7	10.2	15.2	8.7	18.9	10.0	14.2
p-values	0.188	0.856	0.927	0.369	0.470	0.364	0.179	0.895	0.134	0.948	0.982	0.515	0.174	0.653	0.219	0.761	0.435
Q(25)	27.4	12.2	24.7	21.2	23.2	21.2	26.0	23.2	35.6	11.6	14.4	23.4	24.9	16.6	25.8	16.7	24.5
p-values	0.288	0.967	0.261	0.446	0.564	0.626	0.405	0.507	0.078	0.984	0.915	0.324	0.250	0.733	0.418	0.863	0.431
Q(35)	32.0	15.6	36.3	29.8	33.4	28.1	36.1	34.9	48.6	21.3	20.8	34.5	40.7	19.2	41.4	23.1	29.7
p-values	0.565	0.996	0.235	0.527	0.544	0.753	0.416	0.424	0.063	0.957	0.951	0.304	0.114	0.951	0.213	0.920	0.678
Box-Pierce Q test (squared residuals)																	
Q(5)	0.338	2.348	0.470	1.207	2.169	2.585	2.253	1.580	1.871	6.343	2.464	0.553	0.396	0.630	3.639	3.098	2.017
p-values	0.987	0.503	0.493	0.272	0.825	0.629	0.813	0.812	0.867	0.175	0.482	0.457	0.529	0.427	0.602	0.542	0.733
Q(15)	3.134	5.801	3.911	2.358	8.801	11.982	19.056	4.010	6.352	9.794	4.843	1.773	7.777	7.505	9.959	10.953	12.681
p-values	0.999	0.953	0.972	0.997	0.888	0.608	0.211	0.995	0.973	0.777	0.978	0.999	0.733	0.757	0.822	0.690	0.552
Q(25)	14.356	18.902	7.362	3.767	16.107	23.252	28.526	11.718	17.330	16.216	20.696	17.772	10.114	13.236	17.385	24.716	19.713
p-values	0.938	0.707	0.997	1.000	0.912	0.505	0.284	0.983	0.869	0.880	0.600	0.663	0.977	0.900	0.867	0.421	0.713
Q(35)	28.206	20.168	12.681	5.023	27.630	29.055	35.446	20.569	21.991	24.865	37.448	22.550	16.806	22.411	27.833	35.311	38.269
p-values	0.747	0.961	0.999	1.000	0.808	0.709	0.447	0.966	0.957	0.874	0.272	0.865	0.982	0.870	0.800	0.406	0.282
ARCH LM test																	
p-values	0.927	0.982	0.936	0.755	0.788	0.846	0.319	0.952	0.453	0.963	0.660	0.870	0.988	0.842	0.763	0.961	0.569
Normality tests																	
Skewness	0.52	0.87	0.28	0.51	0.16	0.20	-0.36	0.76	0.31	-0.04	1.02	-0.17	1.84	0.43	0.19	0.41	0.43
Kurtosis	6.52	12.79	7.65	8.50	7.45	7.26	16.71	11.66	13.89	5.61	9.25	7.21	13.52	7.38	8.61	6.56	7.61
Jarque-Bera	574.73	4217.11	935.88	1332.02	848.85	781.56	8032.70	3293.72	5067.46	291.36	1846.11	758.67	5295.46	849.76	1348.56	568.60	936.56
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.22: (continued)

Stocks	ATP	BCM	CAM	CNT	DGA	ELZ	ENI	ENP	IND	KCH	KST	LBW	LTX	MCL	MSP	MSP	MZA
Mean equation	ARMA(1/0)	ARMA(1/1)	ARMA(0/0)	ARMA(1/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(0/1)	ARMA(2/2)	ARMA(2/0)	ARMA(0/2)	ARMA(0/1)	ARMA(2/2)	ARMA(2/2)	ARMA(1/0)	ARMA(0/1)	ARMA(0/2)
C	-0.001	-0.001	-0.001	0.000	-0.001	0.001	0.000	-0.001	-0.001	0.000	0.000	0.001	0.001	0.000	-0.002	0.000	-0.002
p-values	0.229	0.213	0.106	0.488	0.397	0.354	0.571	0.077	0.210	0.704	0.459	0.520	0.661	0.617	0.000*	0.580	0.009*
INDEX	0.054	0.368	0.220	0.385	0.724	0.453	0.617	0.450	0.329	0.504	0.321	0.747	0.761	0.467	0.500	0.242	0.201
p-values	0.557	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.055	-0.942		0.987	-0.095	1.136	-0.338		1.012	-0.116			-0.190	0.275	-0.040		
p-values	0.111	0.000*		0.000*	0.000*	0.000*	0.069		0.005*	0.001*			0.703	0.558	0.308		
AR(2)					-0.974	-0.513	0.349		-0.387	-0.134			0.366	0.415			
p-values					0.000*	0.006*	0.050*		0.056	0.000*			0.177	0.310			
MA(1)		0.923		-0.988	0.091	-1.189	0.305	-0.252	-1.111		-0.123	0.045	0.391	-0.292		-0.172	-0.152
p-values		0.000*		0.000*	0.000*	0.000*	0.085	0.000*	0.002*		0.000*	0.254	0.436	0.528		0.000*	0.000*
MA(2)				-0.010	0.996	0.490	-0.429		0.446		-0.042		-0.225	-0.488			-0.107
p-values				0.723	0.000*	0.025*	0.012*		0.037*		0.177		0.267	0.239			0.005*
Variance equation	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/2)
C	-2.335	-0.079	0.000	-0.173	0.000	-4.747	-2.328	-2.582	-1.390	-2.368	-0.035	-0.080	0.000	0.000	-3.091	-0.677	-1.574
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.008*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.325	0.477	0.341	0.478	0.118	0.223	0.679	0.343	0.309	0.340	0.015	0.328	0.174	0.129	0.409	0.369	0.420
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	0.082	-0.443	0.126	-0.352		0.259		0.062	0.125	-0.074		-0.290			0.188	-0.228	0.122
p-values	0.015*	0.000*	0.000*	0.000*		0.000*		0.150	0.001*	0.174		0.000*			0.001*	0.000*	0.158
γ1	-0.022	-0.042	0.438	0.001		0.140	-0.111	0.102	-0.070	0.058	-0.036	0.000			0.049	0.077	0.150
p-values	0.304	0.275	0.000*	0.966		0.000*	0.000*	0.000*	0.000*	0.017*	0.000*	0.999			0.161	0.020*	0.000*
γ2	-0.177	0.066		-0.042		-0.028		0.208	0.074	-0.110		0.015			-0.021	-0.011	-0.124
p-values	0.000*	0.069		0.210		0.459		0.000*	0.000*	0.001*		0.616			0.494	0.736	0.000*
β1	-0.033	1.214		0.988	0.757	-0.226	0.409	0.025	-0.029	0.141	0.997	1.563	0.825	0.192	0.647	0.543	0.415
p-values	0.353	0.000*		0.000*	0.000*	0.005*	0.000*	0.695	0.066	0.087	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.002*
β2	0.719	-0.221				0.590	0.324	0.669	0.873	0.559		-0.571				0.380	0.392
p-values	0.000*	0.000*				0.000*	0.000*	0.000*	0.000*	0.000*		0.000*				0.000*	0.000*
AIC	-3.784	-4.502	-4.562	-4.538	-4.446	-4.133	-4.136	-4.642	-4.172	-4.430	-4.649	-4.050	-3.963	-4.526	-4.734	-4.686	-3.554
R-square	0%	3%	0%	3%	17%	3%	6%	7%	4%	9%	5%	12%	12%	5%	7%	1%	1%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	4.9	2.5	0.8	3.3	2.0	3.5	2.3	3.1	3.0	4.7	0.7	4.8	4.6	7.1	8.1	3.0	3.2
p-values	0.299	0.479	0.975	0.192	0.158	0.060	0.128	0.534	0.084	0.193	0.882	0.309	0.332	0.215	0.089	0.552	0.359
Q(15)	19.3	10.1	8.0	18.1	8.9	12.1	8.9	10.1	10.8	14.3	10.9	12.1	15.8	14.7	17.3	15.5	6.0
p-values	0.154	0.689	0.923	0.114	0.629	0.359	0.628	0.753	0.464	0.354	0.623	0.600	0.327	0.471	0.238	0.343	0.947
Q(25)	28.1	18.2	22.3	25.2	12.7	23.3	17.2	23.2	25.0	23.1	20.2	24.9	21.3	25.4	30.5	34.9	13.3
p-values	0.257	0.748	0.621	0.290	0.918	0.326	0.698	0.510	0.247	0.454	0.630	0.414	0.621	0.442	0.170	0.070	0.945
Q(35)	34.3	26.8	33.1	34.4	20.0	32.6	28.7	27.8	35.3	44.4	27.2	36.1	38.3	45.4	40.5	43.4	16.6
p-values	0.453	0.769	0.560	0.351	0.936	0.388	0.583	0.765	0.273	0.088	0.749	0.372	0.279	0.112	0.205	0.131	0.992
Box-Pierce Q test (squared residuals)																	
Q(5)	0.550	6.313	2.457	4.094	0.888	1.640	1.782	3.001	3.475	0.708	3.492	0.960	0.872	1.826	1.119	2.444	1.824
p-values	0.968	0.097	0.783	0.129	0.346	0.200	0.182	0.558	0.062	0.871	0.322	0.916	0.928	0.873	0.891	0.655	0.610
Q(15)	3.418	8.845	6.040	19.618	6.683	7.285	5.193	10.545	6.987	2.286	19.227	4.775	6.587	13.036	6.139	11.731	7.334
p-values	0.998	0.785	0.979	0.075	0.824	0.776	0.921	0.721	0.800	1.000	0.116	0.989	0.949	0.600	0.963	0.628	0.884
Q(25)	24.460	12.476	26.004	23.768	11.135	13.393	10.901	14.704	16.246	4.322	22.846	9.479	14.478	21.842	17.240	28.114	11.942
p-values	0.436	0.962	0.407	0.360	0.960	0.894	0.965	0.929	0.756	1.000	0.470	0.996	0.935	0.645	0.838	0.255	0.971
Q(35)	33.830	37.464	33.387	28.045	34.768	21.550	31.625	24.946	23.804	13.118	24.563	14.018	18.190	31.624	24.571	37.975	15.159
p-values	0.476	0.272	0.546	0.667	0.293	0.897	0.435	0.871	0.818	0.999	0.855	0.999	0.988	0.632	0.882	0.293	0.997
ARCH LM test																	
p-values	0.939	0.999	0.508	0.879	0.961	0.975	0.847	0.540	0.860	0.712	0.512	0.822	0.883	0.866	0.945	0.855	0.943
Normality tests																	
Skewness	-0.17	0.43	0.08	1.31	0.49	2.29	1.45	1.20	-0.30	1.14	0.67	0.87	-1.66	0.84	0.41	0.70	0.88
Kurtosis	7.58	12.40	8.78	15.39	7.84	22.58	13.60	10.54	5.38	11.64	9.46	11.30	38.26	8.09	7.00	10.33	13.11
Jarque-Bera	898.35	3796.32	1425.43	6831.36	1037.96	17234.64	5149.91	2670.94	256.11	3405.40	1857.88	3067.21	53450.50	1227.41	710.29	2377.41	4487.89
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.22: (continued)

Stocks	NVT	PJP	PLA	RMK	RWL	SME	SUW	SWG	WAS	YWL	GRJ	CMP	LCC	MAG	NTT	VTG
Mean equation	ARMA(2/2)	ARMA(0/0)	ARMA(0/0)	ARMA(1/2)	ARMA(0/0)	ARMA(2/2)	ARMA(1/1)	ARMA(1/1)	ARMA(1/1)	ARMA(2/2)	ARMA(2/2)	ARMA(0/1)	ARMA(1/1)	ARMA(0/0)	ARMA(2/2)	ARMA(0/1)
C	-0.001	-0.001	0.000	-0.001	-0.001	0.000	0.000	-0.001	0.000	0.000	0.001	-0.001	0.000	0.000	-0.001	0.000
p-values	0.529	0.065	0.746	0.426	0.144	0.350	0.736	0.239	0.889	0.904	0.229	0.323	0.496	0.664	0.059	0.461
INDEX	0.322	0.292	0.504	0.727	0.522	0.681	0.120	0.327	0.755	0.964	0.661	0.370	0.836	0.299	0.369	0.356
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.207			-0.933		0.995	0.450	0.247	0.606	-1.937	0.966		-0.745		0.086	
p-values	0.011*			0.000*		0.007*	0.000*	0.255	0.000*	0.000*	0.000*		0.000*		0.937	
AR(2)	0.786					-0.007				-0.966	-0.956				0.129	
p-values	0.000*					0.986				0.000*	0.000*				0.640	
MA(1)	0.165			0.796		-1.084	-0.607	-0.335	-0.811	1.939	-0.947	-0.185	0.698		-0.320	-0.249
p-values	0.022*			0.000*		0.003*	0.000*	0.113	0.000*	0.000*	0.000*	0.000*	0.002*		0.769	0.000*
MA(2)	-0.830			-0.160		0.086				0.971	0.969				-0.145	
p-values	0.000*			0.000*		0.815				0.000*	0.000*				0.779	
Variance equation	GARCH(1/1)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)
C	0.000	-4.868	0.000	-0.020	-1.605	-0.830	-9.886	-1.123	-5.874	-0.872	0.000	-0.156	0.000	-1.570	-0.999	0.000
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.002*	0.000*	0.010*	0.002*	0.000*	0.000*
α1	0.059	0.363	0.092	0.335	0.396	0.128	0.428	0.229	0.227	0.373	0.103	0.263	0.030	0.298	0.287	0.167
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.004*	0.000*	0.000*	0.000*	0.000*	0.012*	0.000*	0.000*	0.000*	0.000*	0.000*
α2		0.199		-0.325		0.045	0.490		-0.081			-0.255		-0.164	0.005	
p-values		0.006*		0.000*		0.391	0.000*		0.025*			0.000*		0.004*	0.899	
γ1		0.059		0.149	-0.025	-0.190	0.110	-0.028	0.186	0.040		-0.044		-0.092	0.093	
p-values		0.018*		0.000*	0.387	0.000*	0.001*	0.123	0.000*	0.034*		0.188		0.001*	0.005*	
γ2		-0.182		-0.154		0.232	0.050		-0.214			0.013		-0.045	-0.135	
p-values		0.000*		0.000*		0.000*	0.128		0.000*			0.717		0.238	0.000*	
β1	0.925	0.394	0.796	1.471	0.271	0.895	-0.638	0.869	0.918	0.903	0.287	1.609	0.962	0.319	0.243	0.672
p-values	0.000*	0.000*	0.000*	0.000*	0.003*	0.000*	0.000*	0.000*	0.000*	0.000*	0.191	0.000*	0.000*	0.007*	0.007*	0.000*
β2				-0.473	0.547		0.291		-0.777			-0.628		0.502	0.645	
p-values				0.000*	0.000*		0.000*		0.000*			0.000*		0.000*	0.000*	
AIC	-3.357	-4.556	-4.609	-3.886	-4.451	-3.912	-4.099	-4.590	-3.874	-3.507	-4.789	-4.922	-4.676	-5.447	-4.311	-4.658
R-square	1%	4%	8%	9%	7%	6%	-2%	4%	8%	5%	10%	6%	11%	5%	-1%	7%
Residual diagnostics																
Box-Pierce Q test (residuals)																
Q(5)	0.3	2.6	6.2	2.4	1.0	1.4	7.5	7.5	4.8	2.3	1.4	4.2	1.9	2.1	3.7	6.7
p-values	0.600	0.759	0.183	0.302	0.965	0.231	0.057	0.058	0.187	0.128	0.234	0.376	0.604	0.833	0.056	0.152
Q(15)	15.5	8.5	13.4	7.5	12.0	9.8	14.8	10.7	19.9	12.6	19.4	15.3	12.4	13.3	18.6	17.8
p-values	0.159	0.903	0.499	0.826	0.678	0.552	0.321	0.637	0.098	0.317	0.054	0.359	0.496	0.580	0.068	0.216
Q(25)	28.1	22.1	26.0	26.0	28.5	17.1	19.3	31.1	30.6	25.4	29.8	30.9	32.0	26.6	22.1	30.0
p-values	0.138	0.627	0.354	0.252	0.283	0.703	0.685	0.119	0.132	0.229	0.095	0.156	0.101	0.375	0.396	0.186
Q(35)	34.2	32.6	35.8	32.5	35.4	22.5	27.1	35.3	37.5	33.7	35.0	35.4	46.2	39.9	25.8	34.2
p-values	0.316	0.586	0.383	0.442	0.450	0.867	0.755	0.358	0.271	0.336	0.284	0.400	0.064	0.262	0.730	0.459
Box-Pierce Q test (squared residuals)																
Q(5)	3.517	1.331	4.025	8.127	0.806	2.418	2.137	2.372	1.267	2.236	3.049	2.152	4.492	1.099	0.962	0.437
p-values	0.061	0.932	0.403	0.017*	0.977	0.120	0.544	0.499	0.737	0.135	0.081	0.708	0.213	0.954	0.327	0.979
Q(15)	13.024	8.027	8.245	12.135	14.782	5.033	4.516	8.429	7.127	5.907	4.787	14.480	11.686	5.681	3.083	8.222
p-values	0.292	0.923	0.876	0.435	0.467	0.930	0.984	0.815	0.895	0.879	0.941	0.415	0.554	0.985	0.990	0.877
Q(25)	18.923	10.038	13.539	15.917	22.363	16.248	17.016	19.888	8.212	15.684	9.916	22.304	21.318	8.007	8.268	13.501
p-values	0.590	0.997	0.956	0.820	0.615	0.756	0.808	0.649	0.998	0.787	0.980	0.561	0.562	0.999	0.994	0.957
Q(35)	23.063	17.819	19.477	27.199	39.172	20.709	31.576	27.087	11.134	35.715	16.297	28.831	26.564	12.757	30.813	19.213
p-values	0.847	0.993	0.978	0.708	0.288	0.919	0.538	0.756	1.000	0.256	0.986	0.719	0.778	1.000	0.476	0.981
ARCH LM test																
p-values	0.363	0.784	0.683	0.395	0.950	0.763	0.918	0.850	0.748	0.528	0.663	0.951	0.167	0.903	0.890	0.987
Normality tests																
Skewness	-1.07	0.49	0.16	0.36	0.14	-0.89	0.34	0.49	2.44	0.90	-0.24	0.16	0.11	0.07	1.03	0.05
Kurtosis	16.83	9.74	8.19	8.14	6.29	12.19	16.70	6.63	20.38	9.72	6.83	4.89	6.61	8.34	11.73	6.24
Jarque-Bera	8345.57	1974.35	1151.64	1147.71	465.24	3736.07	8013.80	603.63	13886.68	2066.36	635.11	157.04	557.95	1217.64	3425.84	446.74
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.23: Model selection - Poland - no news - analyst coverage > 5

Stocks	**CEZ**	**PKO**	**PKN**	**PKN**	**OPL**	**OPL**	**OPL**	**OPL**	**OPL**	**OPL**	**EUR**	**LPP**	**CCC**	**CCC**	**ING**	**SNS**	**KTY**
Mean equation	ARMA(2/1)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)	ARMA(2/2)	ARMA(1/0)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)	ARMA(0/1)	ARMA(0/1)	ARMA(0/1)	ARMA(2/2)	ARMA(1/1)	ARMA(0/0)
C	-0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.002	0.000
p-values	0.021*	0.554	0.777	0.613	0.408	0.629	0.526	0.416	0.903	0.477	0.000*	0.059	0.300	0.843	0.129	0.015*	0.315
INDEX	0.321	1.308	1.393	1.203	0.599	0.597	0.706	0.751	0.832	1.115	0.488	0.635	0.650	0.426	0.359	0.929	0.542
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.731		-0.527		-0.514	-0.072	-0.060		-0.014		-0.048				0.023	-0.133	
p-values	0.000*		0.000*		0.003*	0.780	0.118		0.000*		0.008*				0.142	0.634	
AR(2)	0.120		-0.925		-0.399	0.567			-0.995		0.951				-0.971		
p-values	0.002*		0.000*		0.021*	0.000*			0.000*		0.000*				0.000*		
MA(1)	-0.901		0.535		0.536	-0.039			0.013		0.014	-0.135	-0.057	-0.065	-0.038	0.245	
p-values	0.000*		0.000*		0.001*	0.881			0.000*		0.115	0.000*	0.062	0.056	0.003*	0.372	
MA(2)			0.914		0.529	-0.587			0.996		-0.983				0.981		
p-values			0.000*		0.001*	0.000*			0.000*		0.000*				0.000*		
Variance equation	GARCH(1/2)	GARCH(1/1)		GARCH(1/1)		EGARCH(2/1)	ARCH(1)	EGARCH(1/1)	EGARCH(1/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/1)
C	0.000	0.000		0.000		-14.078	0.000	-4.643	-2.338	0.000	-0.640	-0.235	0.000	-0.134	-0.486	-1.455	0.000
p-values	0.001*	0.021*		0.005*		0.000*	0.000*	0.000*	0.028*	0.086	0.000*	0.000*	0.000*	0.003*	0.000*	0.000*	0.096
α1	0.092	0.060		0.069		0.284	0.172	0.301	0.196	0.036	0.317	0.262	0.053	0.277	0.447	0.180	0.056
p-values	0.000*	0.001*		0.000*		0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*
α2						0.265					-0.095	-0.243		-0.220	-0.272	0.146	
p-values						0.000*					0.216	0.000*		0.000*	0.000*	0.020*	
γ1						0.041		0.016	0.035		0.048	-0.005		-0.007	0.019	0.057	
p-values						0.250		0.667	0.353		0.198	0.874		0.864	0.524	0.116	
γ2						-0.060					-0.125	0.025		-0.036	-0.011	-0.166	
p-values						0.195					0.000*	0.466		0.383	0.694	0.000*	
β1	0.068	0.890		0.869		-0.668		0.463	0.344	0.956	0.540	0.972	0.892	0.988	0.960	0.423	0.935
p-values	0.190	0.000*		0.000*		0.000*		0.002*	0.214	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.025*	0.000*
β2	0.793								0.396		0.398					0.420	
p-values	0.000*								0.129		0.007*					0.009*	
AIC	-5.446	-5.763	-5.813	-6.158	-5.023	-5.336	-5.390	-5.378	-5.572	-5.806	-4.856	-5.252	-5.290	-5.309	-6.216	-4.906	-5.232
R-square	7%	69%	57%	59%	11%	26%	31%	35%	41%	44%	14%	13%	15%	10%	15%	25%	21%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	3.5	2.6	0.7	7.4	0.1	2.1	3.4	1.4	0.5	1.6	2.2	1.7	3.8	3.0	3.1	0.7	4.7
p-values	0.176	0.764	0.394	0.195	0.701	0.143	0.488	0.923	0.498	0.896	0.138	0.795	0.433	0.553	0.080	0.865	0.458
Q(15)	19.5	22.5	13.1	11.1	9.3	5.5	7.6	5.4	15.4	5.8	9.6	12.1	10.2	10.9	16.8	14.6	11.8
p-values	0.077	0.096	0.287	0.742	0.599	0.903	0.909	0.989	0.166	0.982	0.567	0.599	0.747	0.696	0.112	0.336	0.697
Q(25)	27.8	30.3	25.5	16.0	19.2	15.6	17.9	16.9	26.1	17.1	12.4	15.1	28.8	20.9	32.3	20.7	17.4
p-values	0.183	0.215	0.227	0.915	0.575	0.792	0.809	0.886	0.202	0.878	0.928	0.918	0.227	0.645	0.054	0.598	0.867
Q(35)	32.7	41.6	31.0	24.3	34.3	23.1	23.6	23.9	29.4	26.9	19.1	25.2	36.5	36.3	43.3	25.1	31.7
p-values	0.433	0.205	0.464	0.913	0.311	0.846	0.910	0.921	0.548	0.836	0.953	0.862	0.352	0.361	0.070	0.836	0.627
Box-Pierce Q test (squared residuals)																	
Q(5)	4.200	4.793	1.196	4.762	2.817	0.757	0.817	1.232	1.431	2.027	1.932	2.840	3.016	5.120	2.740	1.844	4.963
p-values	0.122	0.442	0.274	0.446	0.093	0.384	0.936	0.942	0.232	0.845	0.165	0.585	0.555	0.275	0.098	0.605	0.420
Q(15)	12.190	11.465	4.812	9.440	4.238	1.543	1.750	4.668	11.240	16.790	7.035	15.994	10.269	8.217	13.011	14.237	9.028
p-values	0.431	0.719	0.940	0.853	0.962	1.000	1.000	0.995	0.423	0.332	0.796	0.314	0.742	0.878	0.293	0.357	0.876
Q(25)	19.934	22.130	29.827	12.686	4.470	4.321	10.770	9.987	20.153	19.201	11.872	19.815	27.448	23.445	24.936	27.565	16.914
p-values	0.587	0.628	0.096	0.980	1.000	1.000	0.991	0.997	0.512	0.787	0.943	0.707	0.284	0.494	0.250	0.233	0.885
Q(35)	26.288	44.014	37.424	17.606	4.963	8.564	17.563	16.263	26.258	29.167	19.284	29.315	44.625	39.113	36.031	39.224	28.096
p-values	0.751	0.141	0.198	0.994	1.000	1.000	0.991	0.997	0.709	0.745	0.950	0.697	0.105	0.251	0.245	0.211	0.790
ARCH LM test																	
p-values	0.726	0.350	0.734	0.922	0.261	0.725	0.858	0.618	0.882	0.927	0.799	0.881	0.550	0.736	0.713	0.584	0.121
Normality tests																	
Skewness	-0.37	0.19	0.06	-0.05	-5.28	-0.56	-0.26	-0.14	0.06	0.13	0.54	0.20	-0.05	0.08	0.32	0.32	0.15
Kurtosis	7.01	3.60	3.79	4.92	82.20	7.69	6.93	5.70	4.38	4.93	5.66	6.13	5.24	7.16	7.95	7.28	6.37
Jarque-Bera	708.22	21.23	27.28	158.34	272151.00	990.24	668.92	314.10	82.18	161.10	352.23	425.23	215.01	738.91	1061.53	797.15	487.58
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.23: (continued)

Stocks	**KTY**	**EMP**	**ACP**	**ACP**	**AGO**	**ABE**	**PEO**	**EUR**	**BHW**	**ACP**	**CAR**	**CAR**	**ABE**	**GPW**
Mean equation	ARMA(0/1)	ARMA(1/0)	ARMA(1/1)	ARMA(2/2)	ARMA(0/1)	ARMA(0/0)	ARMA(1/1)	ARMA(2/2)	ARMA(1/1)	ARMA(1/1)	ARMA(0/1)	ARMA(0/1)	ARMA(0/0)	ARMA(0/0)
C	0.000	0.000	0.000	-0.001	-0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000
p-values	0.672	0.718	0.273	0.156	0.037*	0.808	0.653	0.616	0.303	0.496	0.043*	0.014*	0.586	0.878
INDEX	0.815	0.395	0.850	0.847	1.022	0.690	1.252	0.751	0.994	0.670	0.494	0.460	0.640	0.557
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)		0.068	0.596	-0.829			0.793	0.696	0.836	0.369				
p-values		0.132	0.000*	0.000*			0.000*	0.223	0.000*	0.005*				
AR(2)				-0.905				-0.595						
p-values				0.000*				0.152						
MA(1)	-0.056		-0.705	0.775	0.109		-0.917	-0.670	-0.927	-0.547	-0.131	-0.148		
p-values	0.151		0.000*	0.000*	0.002*		0.000*	0.237	0.000*	0.000*	0.001*	0.000*		
MA(2)				0.887				0.609						
p-values				0.000*				0.124						
Variance equation	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(1/2)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	GARCH(1/1)
C	0.000	0.000	0.000	0.000	-0.099	-0.054	-0.450	-1.083	-0.243	-16.333	-2.041	-0.938	0.000	0.000
p-values	0.000*	0.000*	0.000*	0.000*	0.045*	0.000*	0.000*	0.000*	0.003*	0.000*	0.074	0.008*	0.000*	0.002*
$\alpha 1$	0.173	0.160	0.104	0.096	0.353	0.233	0.012	0.090	0.093	0.305	0.497	0.296	0.064	0.083
p-values	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
$\alpha 2$					-0.318	-0.194				0.257	-0.239	-0.171		
p-values					0.000*	0.000*				0.000*	0.056	0.001*		
$\gamma 1$					-0.004	0.085	0.002	-0.032	-0.025	-0.074	0.039	0.007		
p-values					0.916	0.009*	0.207	0.003*	0.035*	0.036*	0.324	0.855		
$\gamma 2$					-0.027	-0.126				-0.078	-0.056	0.001		
p-values					0.482	0.000*				0.026*	0.121	0.989		
$\beta 1$	0.207	0.232	0.678	0.689	1.357	0.865	1.939	1.659	0.979	-0.920	0.562	0.896	0.829	0.566
p-values	0.034*	0.013*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.011*	0.000*	0.000*	0.000*
$\beta 2$					-0.366	0.131	-0.989	-0.790		0.069	0.208			
p-values					0.008*	0.410	0.000*	0.000*		0.000*	0.101			
AIC	-5.413	-5.462	-5.536	-5.612	-5.643	-4.403	-5.996	-4.917	-5.367	-5.738	-5.225	-5.307	-5.075	-5.737
R-square	23%	8%	30%	35%	32%	9%	55%	15%	33%	19%	8%	10%	9%	13%
Residual diagnostics														
Box-Pierce Q test (residuals)														
Q(5)	3.7	7.2	5.3	2.8	1.4	3.4	3.6	0.7	3.4	1.8	2.9	1.4	7.5	6.7
p-values	0.455	0.128	0.153	0.094	0.840	0.645	0.304	0.403	0.336	0.625	0.579	0.847	0.188	0.241
Q(15)	19.1	14.4	8.2	12.1	11.0	11.8	7.9	11.7	13.9	9.1	12.6	15.7	16.2	9.9
p-values	0.161	0.423	0.833	0.353	0.688	0.694	0.849	0.385	0.384	0.764	0.555	0.331	0.368	0.826
Q(25)	25.8	22.3	13.6	14.8	26.7	26.6	17.9	22.0	28.4	22.5	17.6	20.7	29.7	29.1
p-values	0.361	0.563	0.938	0.833	0.317	0.377	0.761	0.402	0.202	0.489	0.821	0.654	0.237	0.261
Q(35)	35.3	41.4	26.5	22.7	38.6	34.9	22.5	30.1	39.8	41.4	35.6	30.1	32.9	35.0
p-values	0.405	0.180	0.782	0.860	0.269	0.475	0.916	0.510	0.194	0.150	0.393	0.658	0.571	0.469
Box-Pierce Q test (squared residuals)														
Q(5)	6.287	1.924	0.875	1.252	0.787	8.146	3.337	2.394	0.701	4.410	4.085	1.718	5.213	0.839
p-values	0.179	0.750	0.832	0.263	0.940	0.148	0.343	0.122	0.873	0.220	0.395	0.787	0.390	0.974
Q(15)	10.911	7.304	5.929	4.683	8.274	15.376	7.456	5.445	3.332	12.342	11.479	12.405	13.742	2.036
p-values	0.693	0.922	0.949	0.946	0.875	0.425	0.877	0.908	0.996	0.500	0.648	0.574	0.545	1.000
Q(25)	13.335	14.260	14.903	15.742	21.609	19.534	13.409	12.194	18.456	16.737	25.854	23.977	34.478	3.925
p-values	0.960	0.941	0.898	0.784	0.603	0.771	0.943	0.934	0.732	0.822	0.361	0.463	0.098	1.000
Q(35)	25.172	19.326	34.076	19.731	43.865	26.011	21.061	18.638	29.909	35.631	30.310	31.501	42.140	7.262
p-values	0.864	0.980	0.416	0.941	0.120	0.865	0.947	0.961	0.622	0.346	0.649	0.591	0.189	1.000
ARCH LM test														
p-values	0.870	0.962	0.947	0.556	0.756	0.691	0.472	0.489	0.868	0.132	0.871	0.961	0.494	0.850
Normality tests														
Skewness	0.09	-0.16	-0.10	0.03	-0.19	0.00	-0.12	-0.27	-0.10	-0.19	-0.29	0.26	0.13	1.03
Kurtosis	6.68	8.85	5.04	4.47	6.00	9.13	5.53	5.18	4.35	5.75	8.78	5.23	5.77	13.12
Jarque-Bera	579.41	1465.55	179.56	92.61	390.37	1599.19	274.89	215.13	78.99	327.76	1438.13	222.68	328.76	4543.95
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.24: Model selection - Poland - no news - analyst coverage < 6

Stocks	**NEU**	**PEL**	**PEL**	**CMR**	**CMR**	**ORB**	**ORB**	**STP**	**SGN**	**ABS**	**DBC**	**DCR**	**ETL**	**INK**	**IPL**	**KSW**	**LEN**
Mean equation	ARMA(2/0)	ARMA(1/1)	ARMA(2/2)	ARMA(1/0)	ARMA(0/0)	ARMA(0/0)	ARMA(0/0)	ARMA(1/1)	ARMA(1/0)	ARMA(0/1)	ARMA(1/1)	ARMA(0/0)	ARMA(2/2)	ARMA(2/2)	ARMA(1/1)	ARMA(0/1)	ARMA(2/2)
C	0.387	0.000	0.000	-0.001	0.000	0.000	-0.001	0.000	-0.001	0.000	-0.001	-0.001	-0.001	0.001	0.001	0.000	0.001
p-values	0.275	0.522	0.709	0.231	0.001*	0.507	0.166	0.992	0.005*	0.455	0.314	0.132	0.290	0.356	0.192	0.715	0.375
INDEX	0.000	0.585	0.534	0.601	0.584	0.762	0.856	0.699	0.632	0.343	0.414	0.398	0.185	0.725	0.497	0.373	0.690
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.118	0.532	-0.373	-0.058				0.805	0.091		0.593		1.505	-0.515	0.680		1.586
p-values	0.001*	0.003*	0.154	0.066				0.000*	0.014*		0.001*		0.000*	0.000*	0.000*		0.000*
AR(2)	0.070		0.468										-0.617	-0.654			-0.742
p-values	0.047*		0.057										0.000*	0.000*			0.000*
MA(1)		-0.639	0.328					-0.746		-0.210	-0.494		-1.629	0.602	-0.727	-0.167	-1.681
p-values		0.000*	0.181					0.000*		0.000*	0.010*		0.000*	0.000*	0.000*	0.000*	0.000*
MA(2)			-0.552										0.720	0.721			0.809
p-values			0.018*										0.000*	0.000*			0.000*
Variance equation	GARCH(1/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/2)	GARCH(1/2)	EGARCH(2/1)	EGARCH(2/1)		EGARCH(1/2)	EGARCH(2/1)	GARCH(1/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)
C	0.000	-0.042	-0.317	-0.084	0.000	0.000	0.000	0.000	-1.016	-0.839		-1.698	-0.552	0.000	-1.873	0.000	0.000
p-values	0.000*	0.008*	0.001*	0.001*	0.001*	0.002*	0.004*	0.000*	0.022*	0.000*		0.000*	0.000*	0.177	0.000*	0.000*	0.013*
α1	0.194	0.306	0.183	0.127	0.081	0.066	0.123	0.156	0.375	0.083		0.381	0.392	0.055	0.269	0.114	0.038
p-values	0.000*	0.000*	0.000*	0.002*	0.000*	0.000*	0.000*	0.000*	0.000*	0.051		0.000*	0.000*	0.000*	0.000*	0.000*	0.013*
α2		-0.253	-0.135	-0.145	-0.083				-0.225	0.041			-0.230		0.119		
p-values		0.000*	0.025*	0.000*	0.000*				0.000*	0.311			0.000*		0.001*		
γ1		0.015	-0.026	-0.064	-0.042				0.069	-0.067		-0.049	0.067		0.018		
p-values		0.687	0.409	0.018*	0.132				0.058	0.046*		0.050*	0.071		0.450		
γ2		0.008	0.012	-0.001	0.052				-0.080	-0.058			-0.143		0.089		
p-values		0.830	0.719	0.964	0.066				0.013*	0.087			0.000*		0.000*		
β1	0.448	0.941	0.610	0.400	1.726	0.901	0.072	0.121	0.892	0.905		0.187	0.941	0.127	-0.039	0.845	0.792
p-values	0.008*	0.000*	0.021*	0.015*	0.000*	0.000*	0.318	0.226	0.000*	0.000*		0.001*	0.000*	0.153	0.205	0.000*	0.000*
β2	0.264	0.058	0.357	0.588	-0.733		0.692	0.520				0.609		0.815	0.834		
p-values	0.077	0.794	0.167	0.000*	0.000*		0.000*	0.000*				0.000*		0.000*	0.000*		
AIC	-4.959	-5.330	-5.656	-5.222	-5.177	-5.591	-5.506	-4.577	-5.522	-5.148	-5.214	-4.186	-4.726	-4.484	-4.935	-4.808	-4.655
R-square	5%	12%	16%	12%	13%	25%	30%	18%	21%	8%	9%	5%	6%	19%	8%	10%	10%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	4.6	2.0	2.6	3.1	3.5	5.8	6.2	0.9	0.9	3.3	0.1	4.0	3.7	0.7	2.5	1.6	3.0
p-values	0.201	0.571	0.108	0.542	0.622	0.330	0.283	0.825	0.929	0.511	0.986	0.542	0.053	0.414	0.471	0.808	0.084
Q(15)	12.4	7.9	11.3	17.5	7.2	15.4	10.6	11.1	5.9	9.1	5.9	16.0	6.5	12.8	12.1	11.8	10.2
p-values	0.493	0.851	0.419	0.230	0.952	0.420	0.782	0.607	0.970	0.825	0.949	0.383	0.840	0.308	0.523	0.620	0.508
Q(25)	26.7	15.9	14.7	22.0	10.4	22.5	21.9	15.0	19.2	14.4	19.1	21.0	15.2	26.9	16.8	22.6	20.9
p-values	0.267	0.861	0.838	0.579	0.995	0.609	0.641	0.896	0.739	0.937	0.693	0.695	0.815	0.173	0.821	0.542	0.468
Q(35)	35.7	24.0	26.4	39.2	19.2	31.9	36.3	21.3	30.8	22.9	38.0	25.2	22.7	41.5	27.4	33.8	28.4
p-values	0.345	0.873	0.704	0.247	0.986	0.618	0.406	0.942	0.625	0.927	0.252	0.888	0.860	0.098	0.743	0.480	0.601
Box-Pierce Q test (squared residuals)																	
Q(5)	4.240	1.755	0.842	6.009	6.101	2.660	1.510	0.660	0.672	1.014	6.375	1.398	2.628	3.255	4.171	2.942	0.347
p-values	0.237	0.625	0.359	0.198	0.297	0.752	0.912	0.883	0.955	0.908	0.095	0.925	0.105	0.071	0.244	0.568	0.556
Q(15)	12.799	5.393	6.839	16.046	10.604	15.315	8.977	9.060	7.883	3.067	12.762	10.114	16.108	7.854	15.865	6.490	1.675
p-values	0.463	0.965	0.812	0.311	0.780	0.429	0.879	0.768	0.895	0.999	0.466	0.813	0.137	0.726	0.257	0.953	0.999
Q(25)	21.283	19.761	14.893	18.934	13.435	23.084	19.581	15.923	24.386	5.642	25.153	19.655	20.664	16.462	26.001	13.317	2.365
p-values	0.564	0.656	0.828	0.756	0.971	0.573	0.768	0.859	0.440	1.000	0.342	0.765	0.480	0.743	0.301	0.961	1.000
Q(35)	32.052	24.591	26.328	37.799	38.779	28.126	27.082	20.064	26.876	8.092	45.322	32.403	27.856	27.176	36.285	31.465	4.209
p-values	0.514	0.854	0.705	0.300	0.303	0.789	0.828	0.963	0.802	1.000	0.075	0.594	0.629	0.663	0.318	0.592	1.000
ARCH LM test																	
p-values	0.527	0.791	0.943	0.161	0.091	0.866	0.963	0.999	0.993	0.858	0.136	0.877	0.827	0.752	0.690	0.894	0.897
Normality tests																	
Skewness	0.53	-0.05	0.03	0.49	0.55	0.01	-0.07	0.28	0.10	-0.49	0.30	-0.31	0.12	0.44	-0.11	0.37	1.03
Kurtosis	6.08	7.42	5.62	6.17	6.25	4.07	4.12	4.44	4.70	8.29	11.23	7.65	8.82	5.27	8.42	7.43	12.56
Jarque-Bera	452.94	832.89	292.84	468.67	502.83	49.04	53.84	102.27	124.81	1230.96	2902.12	938.84	1444.04	253.17	1254.94	860.95	4082.16
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.24: (continued)

Stocks	PGD	RPC	TIM	AAT	AAT	AAT	DGA	HDR	STF	STF	TLX	WAS	WAS	ABC	ABC	ACT	ABS
Mean equation	ARMA(2/1)	ARMA(0/0)	ARMA(0/2)	ARMA(2/2)	ARMA(2/2)	ARMA(1/1)	ARMA(0/0)	ARMA(1/1)	ARMA(1/0)	ARMA(1/0)	ARMA(2/2)	ARMA(0/1)	ARMA(1/1)	ARMA(1/2)	ARMA(1/2)	ARMA(0/0)	ARMA(1/1)
C	0.000	0.000	0.002	-0.001	-0.001	-0.001	-0.002	0.000	0.000	0.001	0.000	0.000	-0.001	0.000	0.000	0.001	0.000
p-values	0.274	0.804	0.064	0.080	0.212	0.587	0.025*	0.184	0.649	0.579	0.578	0.977	0.420	0.387	0.485	0.043*	0.582
INDEX	0.463	0.260	0.543	0.773	0.864	1.054	0.706	0.291	0.975	0.827	0.570	0.970	0.762	0.536	0.668	0.631	0.348
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.908			-0.189	-0.160	-0.733		0.896	0.152	0.223	0.393		-0.930	0.946	0.777		0.244
p-values	0.000*			0.000*	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*		0.027*
AR(2)	0.091			-0.974	-0.975						-0.857						
p-values	0.000*			0.000*	0.000*						0.000*						
MA(1)	1.009		-0.024	0.190	0.169	0.754		-0.945			-0.333	-0.088	0.914	-1.030	-0.817		-0.483
p-values	0.000*		0.519	0.000*	0.000*	0.000*		0.000*			0.000*	0.001*	0.000*	0.000*	0.000*		0.000*
MA(2)			-0.078	0.994	0.997						0.829			0.066	-0.024		
p-values			0.030*	0.000*	0.000*						0.000*			0.076	0.593		
Variance equation	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/2)	GARCH(2/1)	GARCH(1/2)	GARCH(1/1)	EGARCH(1/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(1/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(1/1)
C	-0.161	0.000	0.000	-0.571	-0.051	0.000	0.000	0.000	0.000	-1.373	0.000	0.000	-3.020	-0.074	0.000	0.000	-1.340
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.004*	0.000*	0.000*	0.000*
α1	0.341	0.145	0.044	0.342	0.265	0.101	0.040	0.099	0.086	0.182	0.252	0.572	0.685	0.207	0.087	0.190	0.168
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.191	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	-0.221			-0.094	-0.227		0.076						-0.050	-0.169			
p-values	0.000*			0.101	0.000*		0.022*						0.126	0.000*			
γ1	0.157			-0.043	0.083					0.049				0.028			-0.113
p-values	0.000*			0.268	0.003*					0.000*				0.383			0.000*
γ2	-0.148			0.045	-0.072									-0.008			
p-values	0.000*			0.194	0.007*									0.820			
β1	0.964	0.719	0.942	0.945	1.608	0.315	0.760	0.494	0.732	1.283	0.468	0.300	0.601	0.890	0.813	0.432	0.845
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.047*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*
β2	0.026				-0.611	0.541		0.320		-0.451			0.039	0.104			
p-values	0.825				0.000*	0.000*		0.151		0.000*			0.553	0.695			
AIC	-4.579	-4.981	-3.957	-4.307	-3.940	-3.306	-4.699	-5.077	-4.532	-4.521	-4.649	-4.433	-4.227	-5.238	-4.949	-5.117	-5.069
R-square	7%	4%	4%	17%	15%	6%	10%	4%	22%	16%	8%	15%	13%	9%	12%	12%	9%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	3.8	5.2	2.2	2.9	2.5	4.1	4.8	2.5	1.9	3.8	2.1	2.6	4.7	3.4	1.5	4.4	2.1
p-values	0.151	0.391	0.527	0.089	0.113	0.250	0.445	0.476	0.748	0.433	0.145	0.630	0.199	0.185	0.476	0.499	0.548
Q(15)	17.2	19.6	16.8	9.8	8.3	12.1	9.8	11.5	10.5	12.2	9.0	19.4	15.2	6.4	10.4	17.0	9.6
p-values	0.141	0.187	0.209	0.553	0.690	0.520	0.833	0.568	0.724	0.594	0.626	0.152	0.297	0.897	0.583	0.320	0.727
Q(25)	20.7	22.2	22.1	25.2	18.3	20.6	17.9	19.9	21.5	24.3	20.2	31.7	27.9	23.0	24.5	25.5	13.8
p-values	0.539	0.624	0.514	0.238	0.627	0.607	0.845	0.648	0.609	0.443	0.508	0.134	0.219	0.402	0.321	0.432	0.932
Q(35)	28.7	29.8	33.4	34.1	32.1	43.2	28.0	27.4	31.1	38.4	38.7	42.2	37.8	26.4	36.2	32.6	23.7
p-values	0.633	0.718	0.446	0.320	0.414	0.110	0.794	0.744	0.609	0.277	0.161	0.158	0.258	0.744	0.280	0.584	0.882
Box-Pierce Q test (squared residuals)																	
Q(5)	1.251	1.287	0.355	0.737	3.198	6.447	1.195	2.969	3.339	1.686	3.085	1.543	2.345	1.362	4.204	3.134	0.861
p-values	0.535	0.936	0.949	0.391	0.074	0.092	0.945	0.396	0.503	0.793	0.079	0.819	0.504	0.506	0.122	0.679	0.835
Q(15)	6.490	7.218	10.689	4.785	5.337	11.151	10.197	8.621	12.828	5.988	9.445	5.746	5.773	3.689	12.686	6.967	2.612
p-values	0.889	0.951	0.637	0.941	0.914	0.598	0.807	0.801	0.540	0.967	0.581	0.972	0.954	0.988	0.392	0.959	0.999
Q(25)	15.724	13.955	15.253	8.358	8.508	34.084	14.221	15.690	21.925	12.639	17.425	6.860	6.994	7.870	16.061	14.864	6.022
p-values	0.829	0.963	0.885	0.993	0.993	0.064	0.958	0.868	0.584	0.972	0.685	1.000	0.999	0.997	0.813	0.945	1.000
Q(35)	22.952	26.261	20.248	11.993	14.131	41.357	28.171	20.993	35.402	20.814	25.557	20.268	15.442	21.097	22.176	22.707	9.869
p-values	0.880	0.857	0.960	0.999	0.996	0.151	0.787	0.948	0.402	0.963	0.742	0.970	0.996	0.930	0.903	0.946	1.000
ARCH LM test																	
p-values	0.594	0.981	0.975	0.992	0.603	0.418	0.709	0.685	0.990	0.873	0.990	0.650	0.514	0.871	0.213	0.783	0.932
Normality tests																	
Skewness	2.04	0.12	1.83	0.86	1.13	-0.23	0.31	-0.28	0.49	1.36	-0.19	2.92	2.06	0.51	0.28	-0.28	-0.51
Kurtosis	19.96	10.45	14.57	8.17	9.36	14.16	7.76	6.73	6.01	9.94	8.11	33.81	25.87	7.89	6.44	12.44	7.68
Jarque-Bera	12971.84	2366.34	6272.45	1267.27	1940.40	5317.90	983.23	605.70	428.42	2368.56	1117.31	41908.67	23025.42	1065.12	518.73	3811.98	977.38
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.24: (continued)

Stocks	ETL	LEN	WAS	RWL	PRI
Mean equation	ARMA(1/1)	ARMA(1/2)	ARMA(2/1)	ARMA(0/0)	ARMA(0/1)
C	0.000	0.001	0.000	-0.001	-0.001
p-values	0.489	0.129	0.831	0.140	0.036*
INDEX	0.013	0.121	0.026	-0.122	0.020
p-values	0.000*	0.097	0.685	0.085	0.627
AR(1)	0.846	0.786	0.772		
p-values	0.000*	0.000*	0.000*		
AR(2)			0.054		
p-values			0.101		
MA(1)	-0.907	-0.800	-0.869		0.044
p-values	0.000*	0.000*	0.000*		0.261
MA(2)		-0.043			
p-values		0.278			
Variance equation	EGARCH(2/1)	GARCH(1/1)		EGARCH(2/1)	EGARCH(2/2)
C	-2.989	0.000		-2.556	-1.293
p-values	0.000*	0.008*		0.000*	0.009*
α1	0.153	0.057		0.366	0.373
p-values	0.001*	0.000*		0.000*	0.000*
α2	0.281			-0.075	-0.191
p-values	0.000*			0.258	0.004*
γ1	-0.024			-0.035	-0.074
p-values	0.534			0.308	0.028*
γ2	0.047			-0.073	-0.007
p-values	0.224			0.052	0.826
β1	0.642	0.829		0.680	0.646
p-values	0.000*	0.000*		0.000*	0.001*
β2					0.210
p-values					0.154
AIC	-4.702	-4.767	-4.846	-4.557	-5.382
R-square	0%	1%	2%	0%	0%
Residual diagnostics					
Box-Pierce Q test (residuals)					
Q(5)	2.7	3.9	0.8	5.4	0.9
p-values	0.436	0.140	0.665	0.373	0.919
Q(15)	6.5	11.4	12.4	14.5	12.4
p-values	0.928	0.495	0.418	0.488	0.575
Q(25)	22.8	26.1	16.2	25.9	28.0
p-values	0.472	0.248	0.808	0.413	0.259
Q(35)	33.1	38.8	24.5	34.5	34.7
p-values	0.462	0.191	0.825	0.494	0.435
Box-Pierce Q test (squared residuals)					
Q(5)	1.567	2.669	2.393	6.349	2.877
p-values	0.667	0.263	0.302	0.274	0.579
Q(15)	7.624	8.848	4.119	9.251	18.870
p-values	0.867	0.716	0.981	0.864	0.170
Q(25)	20.368	16.712	12.348	11.756	26.606
p-values	0.620	0.779	0.950	0.988	0.323
Q(35)	24.480	30.711	14.930	17.684	35.617
p-values	0.858	0.532	0.996	0.993	0.392
ARCH LM test					
p-values	0.746	0.961	0.573	0.985	0.823
Normality tests					
Skewness	-0.15	0.10	0.64	0.69	0.40
Kurtosis	8.24	4.64	9.92	8.54	7.95
Jarque-Bera	1176.11	116.22	2108.84	1389.39	1071.60
p-value	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.25: Model selection - Poland - bad news - analyst coverage > 5

Stocks	**PEO**	**PKN**	**BHW**	**PGN**	**MIL**	**ING**	**KTY**	**CAR**	**PKO**	**ENA**	**ATT**	**SNS**	**CMR**
Mean equation	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(0/0)	ARMA(0/0)	ARMA(0/0)	ARMA(2/2)	ARMA(1/1)	ARMA(1/2)	ARMA(2/1)	ARMA(2/2)	ARMA(2/0)	ARMA(1/1)
C	0.000	-0.001	0.000	0.000	0.000	0.000	-0.001	0.001	0.000	0.000	0.000	-0.001	0.000
p-values	0.449	0.053	0.478	0.839	0.780	0.530	0.045*	0.547	0.014*	0.035*	0.596	0.360	0.564
INDEX	1.404	1.219	0.656	0.635	0.963	0.754	0.716	0.447	1.102	0.922	0.927	0.995	0.597
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)		-0.079					0.979	0.988	0.892	0.772	0.337	0.067	-0.921
p-values		0.000*					0.000*	0.000*	0.000*	0.000*	0.094	0.043*	0.000*
AR(2)		-0.974					0.007			0.060	-0.475	-0.111	
p-values		0.000*					0.875			0.081	0.012*	0.002*	
MA(1)		0.092					-1.032	-0.978	-0.991	-0.924	-0.287		0.907
p-values		0.000*					0.000*	0.000*	0.000*	0.000*	0.173		0.000*
MA(2)		0.990					0.035		0.043		0.350		
p-values		0.000*					0.146		0.253		0.077		
Variance equation	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	EGARCH(1/2)	EGARCH(1/2)	GARCH(1/1)		GARCH(1/1)	GARCH(1/1)	
C	-2.084	-0.008	0.000	0.000	0.000	0.000	-2.122	-0.292	0.000		0.000	0.000	
p-values	0.000*	0.000*	0.002*	0.000*	0.000*	0.000*	0.000*	0.000*	0.027*		0.000*	0.000*	
α1	0.205	0.143	0.042	0.082	0.143	0.089	0.321	0.171	0.041		0.153	0.087	
p-values	0.000*	0.013*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.004*		0.000*	0.000*	
α2	0.145	-0.146											
p-values	0.000*	0.012*											
γ1	0.007	0.056					-0.086	-0.049					
p-values	0.753	0.151					0.005*	0.002*					
γ2	-0.071	-0.052											
p-values	0.006*	0.194											
β1	-0.071	1.509	0.924	0.894	0.607	0.874	0.270	0.278	0.899		0.653	0.824	
p-values	0.048*	0.000*	0.000*	0.000*	0.000*	0.000*	0.008*	0.031*	0.000*		0.000*	0.000*	
β2	0.852	-0.510					0.490	0.697					
p-values	0.000*	0.000*					0.000*	0.000*					
AIC	-5.499	-5.348	-5.224	-5.507	-4.665	-5.167	-5.018	-4.374	-6.277	-5.403	-4.807	-5.275	-5.080
R-square	65%	55%	28%	27%	29%	30%	21%	8%	57%	23%	17%	24%	10%
Residual diagnostics													
Box-Pierce Q test (residuals)													
Q(5)	1.5	2.8	4.5	8.9	5.1	0.3	0.8	0.9	1.6	0.9	3.7	2.5	2.9
p-values	0.917	0.094	0.475	0.113	0.400	0.998	0.369	0.826	0.447	0.625	0.054	0.283	0.412
Q(15)	18.1	9.9	10.0	11.6	11.6	5.4	8.9	10.3	12.9	8.6	18.4	15.7	20.2
p-values	0.259	0.543	0.821	0.711	0.709	0.988	0.632	0.669	0.376	0.738	0.073	0.205	0.089
Q(25)	25.5	19.1	18.9	21.4	16.6	15.4	14.9	28.3	17.6	24.4	22.8	23.2	26.7
p-values	0.433	0.576	0.801	0.671	0.895	0.932	0.827	0.205	0.727	0.326	0.357	0.391	0.271
Q(35)	28.3	28.4	25.4	31.5	23.1	32.6	27.6	31.3	23.9	37.5	35.2	34.4	43.3
p-values	0.780	0.599	0.882	0.636	0.938	0.583	0.644	0.554	0.849	0.232	0.275	0.352	0.109
Box-Pierce Q test (squared residuals)													
Q(5)	5.359	0.732	0.193	1.015	0.583	2.528	0.644	1.573	1.987	5.827	3.200	2.535	6.410
p-values	0.374	0.392	0.999	0.961	0.989	0.772	0.422	0.666	0.370	0.054	0.074	0.282	0.093
Q(15)	11.110	3.851	0.456	9.272	4.046	12.692	4.626	4.695	9.978	13.725	11.553	5.295	12.672
p-values	0.745	0.974	1.000	0.863	0.998	0.626	0.948	0.981	0.618	0.319	0.398	0.947	0.473
Q(25)	21.869	20.092	1.386	26.575	5.199	20.632	12.059	9.986	18.495	19.285	19.086	16.169	15.123
p-values	0.643	0.515	1.000	0.377	1.000	0.713	0.938	0.991	0.676	0.628	0.580	0.807	0.890
Q(35)	27.347	24.907	1.828	38.921	13.021	28.419	22.028	36.999	24.467	22.354	29.598	25.796	21.510
p-values	0.819	0.772	1.000	0.298	1.000	0.777	0.882	0.289	0.827	0.898	0.538	0.773	0.938
ARCH LM test													
p-values	0.309	0.743	0.961	0.708	0.798	0.665	0.778	0.897	0.910	0.073	0.952	0.730	0.089
Normality tests													
Skewness	-0.17	0.28	-1.33	0.10	-0.31	-0.41	0.06	0.32	-0.38	-0.35	0.00	-0.38	0.67
Kurtosis	6.50	4.79	18.08	5.00	9.65	5.81	5.98	8.87	6.28	8.30	5.97	6.40	6.59
Jarque-Bera	527.42	150.72	9998.49	171.65	1900.30	366.94	379.88	1486.08	483.42	1220.32	375.45	517.66	627.04
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.26: Model selection - Poland - bad news - analyst coverage < 6

Stocks	**FTE**	**PEL**	**ORB**	**PND**	**COL**	**IPX**	**IPX**	**MNC**	**ATM**	**IPL**	**BCM**	**DGA**	**ELZ**	**MCL**	**NTT**	**PJP**	**YWL**
Mean equation	ARMA(1/1)	ARMA(1/1)	ARMA(0/1)	ARMA(2/1)	ARMA(0/1)	ARMA(0/2)	ARMA(0/1)	ARMA(0/1)	ARMA(0/1)	ARMA(2/2)	ARMA(2/1)	ARMA(0/0)	ARMA(1/1)	ARMA(0/2)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)
C	-0.002	0.000	0.001	-0.002	0.001	0.001	-0.001	0.001	0.000	0.000	-0.001	-0.001	-0.001	0.000	-0.001	-0.001	0.000
p-values	0.010*	0.323	0.180	0.000*	0.096	0.290	0.235	0.259	0.920	0.988	0.180	0.119	0.548	0.599	0.063	0.106	0.967
INDEX	0.360	0.515	0.610	1.130	0.365	1.161	0.801	0.187	0.454	0.378	0.426	0.717	0.556	0.756	0.374	0.501	0.792
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.954	0.741		0.712						-0.573	-1.063		-0.789		-0.730		-1.223
p-values	0.000*	0.000*		0.000*						0.013*	0.000*		0.000*		0.000*		0.000*
AR(2)				-0.148						-0.612	-0.124				0.266		-0.944
p-values				0.000*						0.000*	0.000*				0.000*		0.000*
MA(1)	-0.946	-0.860	-0.018	-0.610	0.026	0.045	0.132	-0.197	0.091	0.451	0.953		0.814	-0.014	0.514		1.199
p-values	0.000*	0.000*	0.616	0.000*	0.473	0.177	0.001*	0.000*	0.013*	0.052	0.000*		0.000*	0.693	0.000*		0.000*
MA(2)						-0.097				0.581				-0.059	-0.475		0.943
p-values						0.003*				0.000*				0.124	0.000*		0.000*
Variance equation	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(1/2)	GARCH(1/1)	GARCH(1/1)		EGARCH(2/1)	GARCH(1/1)	EGARCH(1/2)	EGARCH(2/2)		EGARCH(2/2)	EGARCH(1/2)	GARCH(1/1)	EGARCH(2/1)
C	-0.239	-0.009	-0.143	-1.538	-1.168	0.000	0.000		-1.725	0.000	-1.330	-0.239		-5.330	-0.774	0.000	-0.267
p-values	0.000*	0.337	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*
α1	0.258	0.279	0.325	0.302	0.197	0.080	0.342		0.516	0.170	0.331	0.146		0.131	0.329	0.250	0.275
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*		0.007*	0.000*	0.000*	0.000*
α2	-0.200	-0.275	-0.251	0.367	0.079				-0.063			-0.104		0.394	-0.032		-0.167
p-values	0.000*	0.000*	0.000*	0.000*	0.000*				0.088			0.008*		0.000*	0.170		0.000*
γ1	-0.089	-0.006	0.084	0.034					-0.005		0.035	-0.032		0.050			0.128
p-values	0.008*	0.876	0.012*	0.309					0.875		0.098	0.156		0.120			0.000*
γ2	0.015	0.035	-0.106	-0.252					0.049			0.035		-0.078			-0.128
p-values	0.651	0.358	0.002*	0.000*					0.100			0.134		0.005*			0.000*
β1	0.485	0.999	0.988	0.132	0.328	0.911	0.241		0.811	0.679	0.086	1.829		0.495	0.509	0.659	0.971
p-values	0.000*	0.000*	0.000*	0.002*	0.039*	0.000*	0.000*		0.000*	0.000*	0.003*	0.000*		0.000*	0.000*	0.000*	0.000*
β2	0.489			0.727	0.544						0.769	-0.858		-0.200	0.417		
p-values	0.000*			0.000*	0.000*						0.000*	0.000*		0.005*	0.000*		
AIC	-5.270	-4.901	-4.838	-4.728	-5.254	-4.620	-4.372	-5.136	-4.634	-5.152	-4.649	-4.400	-4.009	-4.184	-4.458	-4.380	-3.926
R-square	8%	11%	14%	33%	6%	31%	22%	6%	12%	6%	9%	14%	5%	8%	-1%	11%	10%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	4.4	4.3	1.9	1.2	1.9	2.4	3.9	4.2	5.3	1.4	1.6	3.6	4.3	3.0	3.2	2.6	2.4
p-values	0.221	0.226	0.758	0.554	0.761	0.499	0.424	0.385	0.256	0.239	0.445	0.604	0.230	0.385	0.076	0.622	0.125
Q(15)	13.1	11.4	10.2	9.6	9.4	7.5	13.3	15.3	14.0	6.2	8.8	10.9	12.2	13.8	21.7	17.9	15.3
p-values	0.444	0.579	0.744	0.650	0.802	0.875	0.500	0.357	0.448	0.860	0.721	0.761	0.509	0.389	0.027*	0.210	0.168
Q(25)	25.2	26.6	18.6	19.7	20.5	14.0	16.3	35.2	22.7	12.8	16.3	15.2	22.6	17.7	24.4	25.2	27.0
p-values	0.338	0.271	0.774	0.605	0.667	0.928	0.875	0.066	0.535	0.916	0.800	0.937	0.486	0.775	0.273	0.393	0.172
Q(35)	34.8	33.2	26.0	28.5	24.1	26.2	31.7	47.9	35.1	19.7	28.1	22.3	33.2	32.8	33.9	32.7	36.2
p-values	0.384	0.456	0.837	0.645	0.897	0.793	0.580	0.057	0.414	0.942	0.666	0.952	0.459	0.478	0.330	0.533	0.238
Box-Pierce Q test (squared residuals)																	
Q(5)	0.963	1.838	2.278	0.638	2.406	0.607	1.373	8.420	0.839	2.867	0.931	0.145	7.010	3.943	2.115	1.475	0.499
p-values	0.810	0.607	0.685	0.727	0.662	0.895	0.849	0.077	0.933	0.090	0.628	1.000	0.072	0.268	0.146	0.831	0.480
Q(15)	7.747	5.318	8.594	6.125	6.482	4.091	7.044	9.493	4.108	15.220	12.093	2.453	14.322	14.150	4.239	3.991	4.013
p-values	0.860	0.968	0.856	0.910	0.953	0.990	0.933	0.798	0.995	0.173	0.438	1.000	0.352	0.363	0.962	0.996	0.970
Q(25)	11.455	16.619	25.121	11.406	9.061	10.540	10.597	10.379	34.969	28.686	17.768	6.007	19.319	20.180	6.515	12.270	9.879
p-values	0.978	0.828	0.399	0.968	0.997	0.987	0.992	0.993	0.069	0.122	0.720	1.000	0.683	0.631	0.999	0.977	0.980
Q(35)	15.911	20.157	31.570	15.417	11.559	16.495	16.011	20.876	42.340	34.660	23.455	34.450	26.080	31.064	37.662	16.042	22.128
p-values	0.995	0.961	0.587	0.994	1.000	0.993	0.996	0.962	0.154	0.297	0.863	0.494	0.798	0.564	0.191	0.996	0.879
ARCH LM test																	
p-values	0.885	0.903	0.691	0.964	0.607	0.988	0.887	0.742	0.955	0.800	0.735	0.968	0.143	0.556	0.740	0.663	0.987
Normality tests																	
Skewness	-0.38	0.39	0.42	1.77	1.58	1.38	0.54	2.06	-0.23	-0.27	-0.27	0.27	1.84	1.20	1.20	0.10	1.31
Kurtosis	7.65	9.41	7.93	22.11	13.60	14.43	7.86	26.16	9.63	9.51	6.40	8.28	19.23	9.10	13.08	9.98	10.84
Jarque-Bera	945.57	1779.25	1065.99	16104.74	5212.42	5890.54	1058.03	23584.56	1883.91	1816.74	504.22	1201.70	11803.74	1832.71	4579.86	2078.19	2914.33
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.26: (continued)

Stocks	FMF	DCR	INK	ARR
Mean equation	ARMA(2/2)	ARMA(2/2)	ARMA(1/0)	ARMA(1/1)
C	0.000	-0.002	0.000	0.000
p-values	0.671	0.002*	0.504	0.748
INDEX	0.467	0.497	0.424	0.281
p-values	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.417	1.406	-0.145	0.675
p-values	0.170	0.000*	0.000*	0.000*
AR(2)	-0.460	-0.993		
p-values	0.056	0.000*		
MA(1)	0.356	-1.398		-0.773
p-values	0.250	0.000*		0.000*
MA(2)	0.419	0.995		
p-values	0.101	0.000*		
Variance equation	EGARCH(2/2)	EGARCH(2/1)	ARCH(2)	EGARCH(2/2)
C	-0.373	-2.859	0.000	-2.817
p-values	0.000*	0.000*	0.000*	0.000*
α1	0.142	0.352	0.168	0.332
p-values	0.000*	0.000*	0.000*	0.000*
α2	0.122	0.162	0.168	0.193
p-values	0.000*	0.025*	0.000*	0.001*
γ1	-0.096	0.061	0.065	0.056
p-values	0.000*	0.129	0.035*	0.029*
γ2	0.046	-0.067		-0.046
p-values	0.000*	0.043*		0.108
β1	-0.011	0.656		-0.014
p-values	0.023*	0.000*		0.867
β2	0.986			0.696
p-values	0.000*			0.000*
AIC	-5.097	-4.395	-5.016	-4.875
R-square	8%	4%	5%	4%
Residual diagnostics				
Box-Pierce Q test (residuals)				
Q(5)	2.2	2.2	3.3	6.6
p-values	0.138	0.135	0.511	0.086
Q(15)	6.1	6.9	11.9	14.4
p-values	0.865	0.804	0.614	0.344
Q(25)	21.6	10.4	22.6	21.7
p-values	0.420	0.973	0.544	0.539
Q(35)	34.4	23.7	28.5	29.0
p-values	0.307	0.824	0.733	0.667
Box-Pierce Q test (squared residuals)				
Q(5)	1.933	1.028	2.106	4.852
p-values	0.164	0.311	0.716	0.183
Q(15)	7.194	9.764	7.110	12.211
p-values	0.783	0.552	0.930	0.510
Q(25)	10.741	18.890	9.378	18.817
p-values	0.968	0.592	0.997	0.712
Q(35)	14.679	31.015	18.730	23.243
p-values	0.994	0.465	0.984	0.896
ARCH LM test				
p-values	0.758	0.832	0.961	0.798
Normality tests				
Skewness	-1.32	0.23	0.20	0.28
Kurtosis	18.80	5.99	6.56	7.72
Jarque-Bera	10938.74	390.47	545.59	962.46
p-value	0.000*	0.000*	0.000*	0.000*

Table B.27: Model selection – South Africa - good news - analyst coverage > 5

Stocks	**LON**	**AMS**	**AQP**	**ITU**	**OML**	**MDC**	**NTC**	**ARI**	**IPL**	**DSY**	**PAN**	**DRD**	**TKG**
Mean equation	ARMA(0/0)	ARMA(1/2)	ARMA(0/2)	ARMA(2/2)	ARMA(2/2)	ARMA(1/0)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)	ARMA(1/0)	ARMA(2/1)	ARMA(1/0)
C	-0.001	0.000	0.001	0.000	-0.001	0.001	0.000	0.000	0.001	0.001	0.001	-0.003	-0.001
p-values	0.182	0.306	0.120	0.654	0.025*	0.056	0.603	0.737	0.082	0.323	0.241	0.047*	0.305
INDEX	1.406	1.387	1.316	0.659	0.934	0.123	0.557	0.713	0.608	0.332	0.514	0.947	0.458
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)		0.993		-0.014	-0.423	0.121		1.364		-0.668	-0.112	-0.919	0.088
p-values		0.000*		0.516	0.000*	0.001*		0.000*		0.077	0.003*	0.000*	0.025*
AR(2)				0.979	0.563			-0.967		0.312		0.073	
p-values				0.000*	0.000*			0.000*		0.400		0.060	
MA(1)		-0.992	-0.082	0.022	0.350			-1.384		0.759		0.995	
p-values		0.000*	0.012*	0.428	0.000*			0.000*		0.047*		0.000*	
MA(2)		-0.014	-0.064	-0.968	-0.635			0.996		-0.235			
p-values		0.351	0.042*	0.000*	0.000*			0.000*		0.537			
Variance equation	GARCH(1/1)	EGARCH(1/1)	GARCH(1/2)	EGARCH(2/1)	EGARCH(2/1)	ARCH(1)	GARCH(1/1)	EGARCH(1/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/1)
C	0.000	-0.143	0.000	-0.088	-0.118	0.000	0.000	-4.710	0.000	-3.332	-0.272	-4.680	-0.380
p-values	0.069	0.000*	0.002*	0.001*	0.000*	0.000*	0.001*	0.000*	0.005*	0.000*	0.000*	0.000*	0.000*
α1	0.050	0.124	0.118	0.169	0.314	0.260	0.071	0.048	0.098	0.198	0.358	0.383	0.416
p-values	0.000*	0.000*	0.000*	0.013*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*
α2				-0.087	-0.213					-0.052	-0.211	0.327	-0.271
p-values				0.186	0.000*					0.343	0.000*	0.000*	0.000*
γ1		0.000		0.073	-0.017			0.032		0.042	0.037	0.052	0.001
p-values		0.993		0.065	0.635			0.000*		0.163	0.349	0.123	0.977
γ2				-0.062	-0.016					0.033	-0.034	-0.087	0.036
p-values				0.133	0.664					0.317	0.403	0.003*	0.275
β1	0.948	0.994	0.216	0.997	0.995		0.915	1.379	0.694	1.326	0.979	-0.173	0.966
p-values	0.000*	0.000*	0.090	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.000*	0.101	0.000*
β2			0.645					-0.970		-0.718		0.543	
p-values			0.000*					0.000*		0.000*		0.000*	
AIC	-4.892	-4.919	-3.948	-5.461	-5.102	-5.724	-5.316	-5.054	-5.729	-5.368	-4.781	-3.759	-5.219
R-square	42%	46%	29%	25%	36%	1%	18%	15%	21%	6%	7%	8%	6%
Residual diagnostics													
Box-Pierce Q test (residuals)													
Q(5)	3.7	3.1	2.3	2.9	0.9	1.7	9.7	3.5	9.9	3.4	2.1	1.3	1.8
p-values	0.600	0.207	0.520	0.090	0.353	0.788	0.086	0.062	0.077	0.066	0.724	0.512	0.781
Q(15)	14.5	7.2	10.9	12.0	14.2	14.5	18.9	10.0	18.4	11.3	12.3	21.0	8.8
p-values	0.491	0.843	0.618	0.362	0.224	0.412	0.221	0.527	0.241	0.418	0.585	0.051	0.846
Q(25)	25.2	19.6	31.6	15.4	28.5	21.4	31.9	15.3	29.5	20.9	17.9	31.0	15.3
p-values	0.451	0.609	0.108	0.802	0.127	0.612	0.162	0.805	0.242	0.468	0.807	0.095	0.911
Q(35)	32.1	26.4	38.7	21.5	40.6	31.0	40.0	23.7	44.4	26.6	23.4	42.7	26.3
p-values	0.611	0.747	0.227	0.899	0.115	0.616	0.257	0.824	0.133	0.691	0.915	0.098	0.826
Box-Pierce Q test (squared residuals)													
Q(5)	6.580	2.418	2.804	1.922	1.303	3.936	2.303	3.005	2.141	2.207	5.970	2.021	2.493
p-values	0.254	0.299	0.423	0.166	0.254	0.415	0.806	0.083	0.829	0.137	0.201	0.364	0.646
Q(15)	10.441	11.057	10.569	9.107	5.095	14.566	5.536	14.444	5.286	13.663	15.527	9.865	7.309
p-values	0.791	0.524	0.647	0.612	0.927	0.408	0.987	0.209	0.989	0.252	0.343	0.628	0.922
Q(25)	15.207	18.122	15.822	13.742	13.425	23.898	15.207	28.411	11.401	21.860	25.220	22.432	12.359
p-values	0.936	0.699	0.863	0.880	0.893	0.467	0.936	0.129	0.991	0.408	0.394	0.434	0.976
Q(35)	25.823	24.702	19.254	19.172	20.955	36.897	35.072	37.943	42.792	31.818	27.933	26.127	19.210
p-values	0.871	0.818	0.973	0.952	0.913	0.336	0.465	0.182	0.171	0.426	0.759	0.758	0.981
ARCH LM test													
p-values	0.187	0.393	0.554	0.705	0.843	0.956	0.328	0.301	0.612	0.447	0.103	0.876	0.611
Normality tests													
Skewness	-0.38	-0.37	-0.34	-0.34	-0.39	-0.14	0.11	0.06	-0.13	0.47	0.02	-0.50	-0.13
Kurtosis	6.95	5.51	6.75	7.26	8.68	5.59	4.84	4.70	4.07	5.51	5.33	10.31	4.99
Jarque-Bera	689.41	291.67	620.94	792.68	1399.70	288.70	146.42	123.62	51.69	304.74	230.69	2316.77	172.00
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.28: Model selection – South Africa - good news - analyst coverage < 6

Stocks	SUI	KAP	APK	BSR	COM	HCI	OMN	TRE	ART	BEL	ELI	CVN	GIJ	DTA	HLM
Mean equation	ARMA(2/2)	ARMA(0/1)	ARMA(0/0)	ARMA(2/2)	ARMA(2/1)	ARMA(1/0)	ARMA(0/0)	ARMA(2/2)	ARMA(2/2)	ARMA(2/0)	ARMA(1/1)	ARMA(0/1)	ARMA(0/2)	ARMA(1/1)	ARMA(2/2)
C	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	-0.002	0.001	-0.002	0.000
p-values	0.838	0.313	0.623	0.536	0.748	0.799	0.545	0.046*	0.894	0.830	0.071	0.005*	0.520	0.000*	0.577
INDEX	0.370	0.180	0.141	0.298	0.217	0.169	0.183	0.278	0.240	0.160	0.296	0.042	0.220	0.088	0.224
p-values	0.000*	0.000*	0.000*	0.000*	0.008*	0.000*	0.000*	0.000*	0.000*	0.002*	0.000*	0.360	0.013*	0.209	0.003*
AR(1)	1.463			0.027	0.392	-0.101		0.603	1.066	-0.031	0.227			0.248	1.227
p-values	0.000*			0.895	0.220	0.008*		0.000*	0.000*	0.479	0.060			0.002*	0.000*
AR(2)	-0.976			0.564	-0.062			-0.604	-0.945	0.083					-0.920
p-values	0.000*			0.002*	0.087			0.000*	0.000*	0.008*					0.000*
MA(1)	-1.470	-0.131		-0.036	-0.428			-0.625	-1.053		-0.431	-0.260	-0.021	-0.537	-1.243
p-values	0.000*	0.000*		0.868	0.180			0.000*	0.000*		0.000*	0.000*	0.587	0.000*	0.000*
MA(2)	0.964			-0.467				0.696	0.963				-0.013		0.966
p-values	0.000*			0.016*				0.000*	0.000*				0.712		0.000*
Variance equation	GARCH(2/1)	EGARCH(1/2)	GARCH(1/1)	EGARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/2)	GARCH(1/1)	EGARCH(2/1)	GARCH(1/2)	EGARCH(2/2)	EGARCH(1/1)
C	0.000	-0.195	0.000	-0.078	0.000	-0.013	0.000	-4.194	-0.032	0.000	0.000	-0.032	0.000	-0.037	-0.294
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.081	0.151	0.139	0.043	0.015	0.184	0.101	0.344	0.316	0.286	0.027	0.325	0.256	0.346	0.160
p-values	0.003*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	0.054					-0.176		0.441	-0.315			-0.276		-0.345	
p-values	0.124					0.000*		0.000*	0.000*			0.000*		0.000*	
γ1		-0.026		-0.042		-0.018		0.065	-0.090			0.015		-0.002	0.009
p-values		0.004*		0.000*		0.412		0.002*	0.020*			0.679		0.951	0.395
γ2						-0.008		0.094	0.078			-0.039		-0.040	
p-values						0.709		0.000*	0.043*			0.271		0.191	
β1	0.608	0.657	0.569	0.994	0.980	1.237	0.856	-0.231	1.375	0.027	0.968	0.999	0.453	0.895	0.976
p-values	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.639	0.000*	0.000*	0.001*	0.000*	0.000*
β2		0.328				-0.238		0.762	-0.379	0.151			0.278	0.099	
p-values		0.081				0.118		0.000*	0.000*	0.022*			0.011*	0.307	
AIC	-5.279	-4.350	-4.904	-5.192	-3.827	-4.889	-5.157	-5.071	-5.077	-4.603	-4.099	-3.771	-3.869	-4.085	-4.534
R-square	12%	2%	1%	5%	1%	4%	4%	6%	4%	2%	7%	8%	0%	7%	1%
Residual diagnostics															
Box-Pierce Q test (residuals)															
Q(5)	1.8	2.6	4.9	3.0	2.4	2.2	5.1	1.8	3.2	2.8	0.3	5.9	4.5	4.4	2.1
p-values	0.176	0.633	0.427	0.085	0.302	0.699	0.403	0.178	0.073	0.418	0.959	0.209	0.215	0.219	0.146
Q(15)	7.9	9.8	10.2	8.9	6.3	12.3	18.2	6.4	15.6	10.3	5.5	16.0	13.2	14.4	9.3
p-values	0.726	0.778	0.807	0.628	0.901	0.581	0.254	0.848	0.157	0.669	0.963	0.312	0.431	0.348	0.592
Q(25)	17.3	14.8	24.6	18.8	10.7	17.3	36.1	12.2	20.0	18.0	12.8	21.6	20.2	21.1	15.7
p-values	0.692	0.925	0.486	0.596	0.979	0.835	0.070	0.934	0.522	0.756	0.956	0.603	0.633	0.573	0.785
Q(35)	26.3	25.6	31.3	24.1	24.5	24.7	49.3	16.2	28.7	30.9	29.2	30.0	31.8	27.3	34.5
p-values	0.706	0.848	0.648	0.807	0.824	0.880	0.056	0.986	0.587	0.573	0.658	0.665	0.527	0.747	0.303
Box-Pierce Q test (squared residuals)															
Q(5)	0.096	4.764	0.644	2.024	5.056	5.525	5.685	1.309	3.687	0.666	2.430	6.417	1.519	0.952	3.713
p-values	0.757	0.312	0.986	0.155	0.080	0.238	0.338	0.253	0.055	0.881	0.488	0.170	0.678	0.813	0.054
Q(15)	1.818	10.850	2.447	5.347	10.929	11.156	12.225	3.693	10.401	5.459	7.113	11.935	7.288	3.760	14.647
p-values	0.999	0.698	1.000	0.913	0.535	0.674	0.662	0.978	0.495	0.964	0.896	0.612	0.887	0.993	0.199
Q(25)	3.700	17.244	14.952	10.053	15.282	18.343	23.739	23.261	19.089	9.940	10.253	14.293	19.919	9.342	24.284
p-values	1.000	0.838	0.942	0.978	0.850	0.786	0.535	0.330	0.579	0.992	0.990	0.940	0.647	0.995	0.280
Q(35)	6.997	21.846	16.959	30.976	21.809	22.299	28.502	26.134	24.788	13.348	16.700	18.743	22.895	18.162	33.317
p-values	1.000	0.947	0.996	0.467	0.912	0.938	0.773	0.715	0.777	0.999	0.992	0.984	0.906	0.983	0.355
ARCH LM test															
p-values	0.971	0.167	0.998	0.548	0.135	0.099	0.114	0.661	0.727	0.886	0.315	0.143	0.901	0.821	0.279
Normality tests															
Skewness	-0.55	-0.80	-0.60	0.35	-0.07	0.34	0.30	0.71	-0.30	0.50	0.18	0.17	0.79	-1.01	-0.05
Kurtosis	8.56	16.38	19.74	12.88	10.87	16.95	10.12	15.95	6.75	13.72	11.20	10.59	11.41	18.89	6.95
Jarque-Bera	1367.77	7745.48	12002.39	4177.79	2643.17	8311.85	2174.26	7233.70	614.16	4941.80	2873.20	2458.34	3119.47	10935.00	665.84
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.29: Model selection – South Africa - no news - analyst coverage > 5

Stocks	**BIL**	**BIL**	**SAB**	**SAB**	**LON**	**AQP**	**ITU**	**ITU**	**ITU**	**ITU**	**ITU**	**IMP**	**MTN**	**VOD**	**GFI**	**HAR**	**PIK**
Mean equation	ARMA(2/0)	ARMA(2/0)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)	ARMA(0/1)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(1/1)	ARMA(2/2)	ARMA(2/1)	ARMA(2/1)	ARMA(0/0)	ARMA(2/2)	ARMA(0/1)	ARMA(2/2)
C	0.000	0.000	0.000	0.000	-0.002	-0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.001	0.001	-0.001	-0.001	0.000
p-values	0.611	0.966	0.542	0.687	0.000*	0.299	0.242	0.029*	0.309	0.071	0.285	0.466	0.009*	0.060	0.035*	0.309	0.677
INDEX	1.471	1.466	0.643	0.658	1.384	1.617	0.884	0.939	0.860	0.806	0.655	1.197	0.702	0.748	1.009	0.818	0.457
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.004	0.027	0.246		-1.354			-0.096		0.778	-1.828	0.908	1.011		0.341		0.164
p-values	0.911	0.396	0.738		0.000*			0.003*		0.000*	0.000*	0.000*	0.000*		0.349		0.362
AR(2)	-0.041	-0.042	0.455		-0.397			0.894			-0.988	-0.180	-0.130		0.649		0.587
p-values	0.216	0.152	0.476		0.179			0.000*			0.000*	0.000*	0.000*		0.073		0.001*
MA(1)			-0.290		1.307	-0.149		0.046		-0.795	1.810	-0.794	-0.909		-0.350	0.092	-0.215
p-values			0.690		0.000*	0.000*		0.044*		0.000*	0.000*	0.000*	0.000*		0.339	0.003*	0.246
MA(2)			-0.510		0.335			-0.950			0.971				-0.647		-0.530
p-values			0.442		0.281			0.000*			0.000*				0.076		0.004*
Variance equation	GARCH(1/2)	EGARCH(2/1)	EGARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/1)	EGARCH(1/1)
C	0.000	0.018	-0.060	0.000	-0.147	-0.357	-0.089	-0.013	-0.064	-0.068	0.003	0.000	-0.090	0.001	0.000	-0.347	-3.369
p-values	0.033*	0.076	0.059	0.285	0.000*	0.000*	0.013*	0.041*	0.000*	0.000*	0.488	0.015*	0.081	0.799	0.102	0.000*	0.000*
$\alpha 1$	0.056	0.087	0.053	0.037	0.205	0.259	0.378	0.354	0.370	0.427	0.211	0.042	0.162	0.247	0.054	0.297	0.408
p-values	0.000*	0.146	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.002*	0.000*	0.002*	0.000*	0.008*	0.000*	0.000*
$\alpha 2$		-0.090			-0.010		-0.328	-0.371	-0.293	-0.341	-0.218		-0.130	-0.258		-0.108	
p-values		0.119			0.880		0.000*	0.000*	0.000*	0.000*	0.001*		0.024*	0.000*		0.057	
$\gamma 1$		0.080	-0.006		0.127	-0.038	0.027	0.053	0.029	0.009	0.051		0.095	0.079		-0.101	0.101
p-values		0.059	0.576		0.000*	0.038*	0.472	0.146	0.412	0.817	0.225		0.005*	0.015*		0.010*	0.001*
$\gamma 2$		-0.067			-0.240		-0.028	-0.051	-0.010	0.006	-0.049		-0.103	-0.085		0.134	
p-values		0.118			0.000*		0.512	0.172	0.783	0.872	0.242		0.003*	0.009*		0.000*	
$\beta 1$	0.071	1.002	0.998	0.963	0.415	0.467	0.994	0.997	0.999	1.000	1.000	0.947	1.575	1.197	0.563	0.972	0.656
p-values	0.420	0.000*	0.000*	0.000*	0.001*	0.003*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.296	0.000*	0.000*
$\beta 2$	0.857				0.584	0.509							-0.584	-0.198	0.375		
p-values	0.000*				0.000*	0.001*							0.004*	0.247	0.468		
AIC	-5.719	-5.730	-5.651	-5.797	-4.939	-3.927	-5.988	-5.865	-5.468	-5.340	-6.030	-4.884	-4.924	-5.928	-4.354	-4.459	-6.063
R-square	74%	74%	32%	29%	39%	32%	34%	37%	26%	25%	28%	28%	14%	23%	9%	12%	13%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	2.7	1.8	0.4	7.2	2.6	1.2	4.4	1.5	2.4	1.3	2.5	2.4	3.0	4.1	1.3	2.6	0.9
p-values	0.443	0.616	0.545	0.204	0.106	0.880	0.499	0.224	0.792	0.734	0.116	0.295	0.219	0.532	0.250	0.629	0.346
Q(15)	9.4	9.7	8.8	15.1	17.8	9.3	22.5	9.0	13.0	10.2	13.1	13.8	16.3	12.8	17.4	16.1	3.4
p-values	0.741	0.717	0.640	0.447	0.087	0.810	0.096	0.621	0.602	0.675	0.284	0.311	0.179	0.617	0.097	0.305	0.984
Q(25)	24.9	23.2	21.1	28.9	25.4	25.5	31.4	11.9	18.4	21.9	20.2	29.7	20.4	22.6	27.0	27.3	20.3
p-values	0.353	0.448	0.451	0.267	0.232	0.380	0.176	0.943	0.826	0.527	0.510	0.127	0.558	0.601	0.172	0.290	0.504
Q(35)	33.1	31.7	33.9	39.4	27.7	34.9	41.7	26.1	26.8	29.0	26.8	42.5	30.7	33.8	31.6	43.4	30.7
p-values	0.462	0.530	0.328	0.278	0.635	0.425	0.201	0.717	0.840	0.667	0.680	0.102	0.533	0.524	0.435	0.130	0.479
Box-Pierce Q test (squared residuals)																	
Q(5)	4.022	3.772	1.547	0.733	0.727	2.681	3.109	1.322	2.790	3.440	3.540	3.603	2.914	1.637	0.688	2.267	1.889
p-values	0.259	0.287	0.214	0.981	0.394	0.612	0.683	0.250	0.732	0.329	0.060	0.165	0.233	0.897	0.407	0.687	0.169
Q(15)	17.651	19.163	7.651	8.237	3.837	9.704	10.759	7.665	7.036	8.487	7.673	10.714	15.708	8.631	8.959	7.525	12.670
p-values	0.171	0.118	0.744	0.914	0.974	0.783	0.769	0.743	0.957	0.811	0.742	0.554	0.205	0.896	0.626	0.913	0.315
Q(25)	22.499	31.268	14.919	18.753	5.439	17.115	20.779	22.998	19.611	20.698	11.935	16.892	21.282	17.954	12.131	19.695	15.967
p-values	0.490	0.116	0.827	0.809	1.000	0.844	0.705	0.344	0.767	0.600	0.941	0.769	0.503	0.844	0.936	0.714	0.772
Q(35)	27.329	45.466	23.522	25.488	6.603	22.134	48.537	40.614	32.097	35.406	17.306	20.561	36.710	27.920	17.779	22.967	27.727
p-values	0.745	0.073	0.830	0.881	1.000	0.942	0.064	0.116	0.609	0.355	0.977	0.941	0.260	0.797	0.972	0.924	0.635
ARCH LM test																	
p-values	0.477	0.906	0.955	0.886	0.990	0.998	0.668	0.893	0.333	0.342	0.473	0.443	0.679	0.649	0.901	0.381	0.955
Normality tests																	
Skewness	0.24	0.24	0.56	0.70	2.26	-0.45	-0.11	-0.24	-0.45	-0.37	0.18	-0.03	0.14	-0.25	0.26	0.21	0.07
Kurtosis	5.60	5.57	6.66	8.17	41.59	8.12	6.90	7.92	7.80	7.16	4.63	4.17	4.57	5.15	5.49	7.52	7.29
Jarque-Bera	298.48	291.87	624.46	1222.46	64356.15	1150.68	649.71	1041.44	1018.13	762.89	119.27	58.29	108.00	207.74	274.64	880.02	785.81
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.29: (continued)

Stocks	FSR	INP	NED	TFG	TFG	TRU	MDC	MDC	MDC	MDC	NTC	SBK	SBK	SBK	ABL	AVI	MSM
Mean equation	ARMA(2/1)	ARMA(0/0)	ARMA(2/0)	ARMA(1/0)	ARMA(0/1)	ARMA(0/0)	ARMA(1/1)	ARMA(1/1)	ARMA(1/1)	ARMA(2/2)	ARMA(1/1)	ARMA(2/2)	ARMA(1/2)	ARMA(2/1)	ARMA(0/0)	ARMA(2/1)	ARMA(0/0)
C	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	-0.001	0.000	0.000	0.001	0.000
p-values	0.691	0.039*	0.517	0.758	0.483	0.369	0.199	0.656	0.254	0.038*	0.689	0.206	0.034*	0.944	0.524	0.109	0.779
INDEX	0.928	1.098	0.878	0.616	0.581	0.924	0.289	0.293	0.284	0.201	0.491	0.895	0.936	0.926	0.808	0.467	0.711
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.695		0.118	0.122			0.249	0.422	0.538	1.831	0.474	-0.327	0.566	0.744		0.539	
p-values	0.000*		0.001*	0.000*			0.069	0.001*	0.000*	0.000*	0.001*	0.035*	0.006*	0.000*		0.000*	
AR(2)	-0.069		-0.045							-0.922		0.466		-0.083			
p-values	0.049*		0.159							0.000*		0.001*		0.031*			
MA(1)	-0.724				0.158		-0.446	-0.601	-0.683	-1.814	-0.603	0.274	-0.596	-0.760		-0.653	
p-values	0.000*				0.000*		0.000*	0.000*	0.000*	0.000*	0.000*	0.048*	0.004*	0.000*		0.000*	
MA(2)										0.893		-0.587	-0.059				
p-values										0.000*		0.000*	0.153				
Variance equation	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)		EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	GARCH(1/1)	
C	0.000	0.000	0.000	0.000	0.000	0.000	-0.388	-0.528	-0.430		-0.041	-0.138	-0.296	-0.239	0.000	0.000	
p-values	0.036*	0.068	0.005*	0.018*	0.024*	0.066	0.000*	0.000*	0.000*		0.020*	0.003*	0.002*	0.002*	0.036*	0.139	
α1	0.055	0.075	0.043	0.080	0.061	0.037	0.496	0.478	0.494		0.363	0.146	0.184	0.089	0.047	0.102	
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*		0.000*	0.035*	0.000*	0.212	0.000*	0.000*	
α2							-0.315	-0.234	-0.354		-0.293	-0.023	0.060	0.059			
p-values							0.000*	0.000*	0.000*		0.000*	0.722	0.186	0.405			
γ1							-0.095	-0.069	-0.044		0.037	0.127	0.032	0.084			
p-values							0.013*	0.057	0.228		0.376	0.005*	0.278	0.079			
γ2							0.153	0.119	0.117		-0.069	-0.155	-0.097	-0.115			
p-values							0.000*	0.002*	0.005*		0.087	0.001*	0.000*	0.018*			
β1	0.933	0.922	0.933	0.887	0.909	0.951	0.738	0.622	0.961		1.002	0.995	0.140	0.985	0.940	0.912	
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.047*	0.000*	0.000*	0.000*	
β2							0.232	0.337					0.847				
p-values							0.078	0.007*					0.000*				
AIC	-5.101	-5.229	-5.527	-5.218	-5.418	-5.663	-5.690	-5.618	-5.510	-5.549	-5.661	-5.508	-5.424	-5.335	-4.880	-5.192	-5.839
R-square	36%	35%	32%	18%	18%	28%	11%	9%	8%	4%	19%	39%	39%	39%	28%	7%	22%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	0.9	7.4	1.2	2.4	0.9	3.7	1.3	1.2	1.5	2.8	1.4	2.1	2.9	1.2	4.4	2.3	2.0
p-values	0.634	0.194	0.752	0.500	0.643	0.595	0.721	0.749	0.687	0.096	0.706	0.151	0.238	0.537	0.498	0.512	0.849
Q(15)	8.1	17.1	14.1	13.7	12.7	15.8	9.0	7.6	8.1	6.4	18.6	11.5	11.3	10.0	15.1	7.5	13.3
p-values	0.776	0.312	0.370	0.396	0.394	0.398	0.776	0.870	0.836	0.843	0.137	0.401	0.504	0.617	0.444	0.877	0.579
Q(25)	14.6	29.9	24.4	24.9	22.6	26.1	25.5	22.6	24.0	12.6	30.2	21.9	24.6	24.6	17.8	13.0	22.3
p-values	0.878	0.226	0.380	0.354	0.423	0.400	0.325	0.486	0.403	0.923	0.143	0.403	0.319	0.315	0.852	0.953	0.617
Q(35)	18.2	38.8	40.3	46.0	33.7	36.4	36.4	28.5	30.6	20.2	34.5	31.1	34.9	33.5	25.0	22.9	29.9
p-values	0.976	0.301	0.180	0.065	0.383	0.405	0.315	0.689	0.589	0.931	0.395	0.462	0.330	0.392	0.893	0.905	0.712
Box-Pierce Q test (squared residuals)																	
Q(5)	2.196	6.692	2.581	3.902	4.687	5.068	1.346	1.163	1.053	0.700	5.638	3.755	1.535	3.643	4.342	0.732	6.554
p-values	0.334	0.245	0.461	0.272	0.096	0.408	0.718	0.762	0.788	0.403	0.131	0.053	0.464	0.162	0.501	0.866	0.256
Q(15)	10.823	14.800	12.575	11.151	10.502	15.571	5.596	3.233	2.386	1.044	11.977	14.948	11.561	9.634	11.444	2.340	14.757
p-values	0.544	0.466	0.481	0.598	0.572	0.411	0.960	0.997	0.999	1.000	0.530	0.185	0.482	0.648	0.721	0.999	0.469
Q(25)	19.228	24.081	19.003	20.946	25.725	22.407	16.613	11.757	6.123	1.428	18.226	24.979	21.798	20.449	17.077	4.946	30.558
p-values	0.631	0.515	0.701	0.584	0.264	0.612	0.828	0.974	1.000	1.000	0.745	0.248	0.472	0.555	0.879	1.000	0.204
Q(35)	27.091	39.636	24.864	36.413	39.835	31.008	26.710	19.639	14.417	1.820	25.038	33.059	28.080	26.882	25.823	18.201	38.123
p-values	0.713	0.271	0.845	0.313	0.161	0.661	0.772	0.968	0.998	1.000	0.838	0.367	0.665	0.723	0.871	0.983	0.329
ARCH LM test																	
p-values	0.905	0.075	0.820	0.787	0.753	0.912	0.995	0.978	0.845	0.990	0.311	0.930	0.904	0.903	0.541	0.936	0.118
Normality tests																	
Skewness	0.17	0.35	0.27	-0.03	0.10	-0.31	0.23	0.25	0.35	-2.30	0.33	0.29	0.32	0.26	0.13	1.70	0.29
Kurtosis	5.21	7.79	4.34	4.55	4.48	4.41	5.90	5.72	5.71	36.08	6.13	6.42	6.08	5.65	4.25	46.57	7.01
Jarque-Bera	212.43	999.19	89.23	103.20	95.77	100.20	366.68	327.36	333.52	47548.81	435.32	511.30	421.50	311.33	69.08	81409.68	700.98
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.29: (continued)

Stocks	MSM	MSM	MSM	MSM	TBS	NPK	AIP	LEW	LEW	AEG	AEG	AEG	MUR	MUR	WBO	WBO	WBO
Mean equation	ARMA(2/2)	ARMA(2/2)	ARMA(2/1)	ARMA(1/2)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(1/0)	ARMA(0/0)	ARMA(0/0)	ARMA(2/2)	ARMA(1/0)	ARMA(2/2)	ARMA(2/2)	ARMA(1/0)	ARMA(2/2)	ARMA(2/2)
C	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000
p-values	0.413	0.246	0.644	0.544	0.481	0.408	0.654	0.668	0.963	0.736	0.307	0.141	0.165	0.086	0.539	0.746	0.795
INDEX	0.673	0.561	0.497	0.468	0.548	0.445	0.371	0.561	0.530	0.723	0.757	0.682	0.193	0.218	0.328	0.412	0.425
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	1.423	1.280	0.800	0.632		-0.333		-0.049			-0.129	0.082	-0.078	-0.087	-0.030	1.829	1.908
p-values	0.000*	0.000*	0.000*	0.000*		0.011*		0.131			0.233	0.011*	0.000*	0.000*	0.374	0.000*	0.000*
AR(2)	-0.568	-0.625	-0.073			0.609					-0.742		-0.985	-0.955		-0.881	-0.970
p-values	0.001*	0.000*	0.054			0.000*					0.000*		0.000*	0.000*		0.000*	0.000*
MA(1)	-1.482	-1.287	-0.806	-0.647		0.257					0.199		0.100	0.113		-1.876	-1.929
p-values	0.000*	0.000*	0.000*	0.000*		0.029*					0.042*		0.000*	0.000*		0.000*	0.000*
MA(2)	0.616	0.585		-0.073		-0.714					0.795		0.994	0.952		0.931	0.992
p-values	0.001*	0.000*		0.061		0.000*					0.000*		0.000*	0.000*		0.000*	0.000*
Variance equation		EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/1)	GARCH(1/1)	GARCH(1/2)	GARCH(1/2)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/1)	ARCH(1)	EGARCH(2/1)	EGARCH(1/2)	EGARCH(1/2)	EGARCH(2/2)
C		-0.089	-0.125	-0.186	0.000	-0.243	0.000	0.000	0.000	0.000	-0.151	-0.132	0.000	-0.957	-1.428	-0.247	-0.221
p-values		0.003*	0.003*	0.001*	0.001*	0.002*	0.000*	0.088	0.016*	0.002*	0.001*	0.000*	0.000*	0.033*	0.002*	0.002*	0.027*
α1		0.278	0.275	0.258	0.039	0.250	0.006	0.060	0.059	0.072	0.316	0.138	0.179	0.393	0.229	0.168	0.213
p-values		0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.001*	0.000*	0.000*	0.045*	0.000*	0.000*	0.000*	0.000*	0.000*
α2		-0.222	-0.207	-0.153		-0.154					-0.215	-0.073		-0.244			-0.075
p-values		0.001*	0.003*	0.010*		0.026*					0.005*	0.309		0.000*			0.305
γ1		0.051	0.081	0.127		0.036					0.054	0.061		-0.045	-0.054	-0.042	-0.014
p-values		0.165	0.027*	0.001*		0.405					0.175	0.125		0.196	0.066	0.036*	0.677
γ2		-0.056	-0.095	-0.124		-0.040					-0.081	-0.122		0.058			-0.015
p-values		0.149	0.014*	0.001*		0.352					0.047*	0.002*		0.063			0.666
β1		0.994	0.991	0.987	0.944	0.980	0.978	0.241	0.259	0.917	0.991	0.989		0.895	0.175	0.227	0.477
p-values		0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.329	0.351	0.000*	0.000*	0.000*		0.000*	0.056	0.077	0.090
β2								0.688	0.661						0.678	0.758	0.508
p-values								0.004*	0.013*						0.000*	0.000*	0.070
AIC	-5.863	-5.388	-5.266	-5.172	-5.519	-5.629	-5.962	-5.089	-5.042	-4.886	-4.801	-4.840	-5.314	-5.210	-5.745	-5.327	-5.236
R-square	22%	18%	16%	15%	22%	15%	9%	16%	15%	24%	25%	23%	4%	4%	6%	15%	14%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	0.9	0.4	0.8	0.9	5.5	1.5	8.1	2.7	3.6	10.2	1.3	3.4	2.0	2.0	2.5	0.9	1.0
p-values	0.346	0.513	0.670	0.647	0.358	0.214	0.151	0.603	0.607	0.070	0.256	0.492	0.156	0.154	0.639	0.354	0.323
Q(15)	10.1	10.6	11.5	9.1	15.5	11.0	13.1	13.2	16.0	19.2	15.1	18.3	12.9	13.1	11.0	7.9	4.9
p-values	0.524	0.477	0.483	0.694	0.418	0.446	0.592	0.513	0.380	0.205	0.178	0.193	0.302	0.288	0.686	0.718	0.934
Q(25)	14.3	16.7	18.9	16.7	27.2	14.8	19.4	24.4	25.3	25.9	25.8	26.8	21.7	22.9	15.4	13.3	11.9
p-values	0.857	0.727	0.651	0.782	0.344	0.833	0.780	0.436	0.444	0.413	0.216	0.312	0.420	0.349	0.910	0.899	0.944
Q(35)	17.2	19.8	24.3	22.8	34.6	22.2	34.4	33.7	36.1	30.3	31.2	32.7	27.7	30.2	20.6	21.4	22.3
p-values	0.978	0.939	0.832	0.883	0.485	0.877	0.497	0.481	0.416	0.696	0.456	0.529	0.637	0.506	0.965	0.902	0.873
Box-Pierce Q test (squared residuals)																	
Q(5)	3.552	0.614	0.966	1.548	0.670	0.474	1.503	3.231	3.283	4.618	2.354	2.691	2.544	1.627	3.179	3.471	1.758
p-values	0.059	0.433	0.617	0.461	0.985	0.491	0.913	0.520	0.656	0.464	0.125	0.611	0.111	0.202	0.528	0.062	0.185
Q(15)	9.592	6.793	6.127	9.838	9.147	5.673	6.491	10.969	9.597	10.950	8.806	9.225	5.382	7.946	9.586	14.945	15.039
p-values	0.567	0.816	0.910	0.630	0.870	0.894	0.970	0.688	0.844	0.756	0.640	0.816	0.911	0.718	0.792	0.185	0.181
Q(25)	24.329	11.481	10.233	18.164	14.727	13.492	8.356	23.798	18.272	15.042	14.656	15.256	12.337	13.823	14.975	27.109	25.057
p-values	0.277	0.953	0.984	0.696	0.948	0.890	0.999	0.473	0.831	0.940	0.840	0.913	0.930	0.877	0.921	0.167	0.245
Q(35)	28.576	14.442	13.601	22.334	25.440	23.006	67.771	32.854	25.559	22.439	30.287	28.215	16.629	18.897	24.909	35.793	35.440
p-values	0.591	0.995	0.998	0.898	0.882	0.849	0.001*	0.524	0.879	0.950	0.503	0.747	0.984	0.957	0.872	0.253	0.267
ARCH LM test																	
p-values	0.457	0.919	0.900	0.973	0.761	0.989	0.709	0.574	0.911	0.199	0.817	0.755	0.729	0.953	0.784	0.541	0.763
Normality tests																	
Skewness	0.30	0.22	0.25	0.34	0.19	-0.21	0.35	0.06	0.04	-0.13	-0.12	-0.13	0.50	0.47	0.18	0.27	0.27
Kurtosis	7.16	6.10	5.53	5.11	4.95	4.11	10.78	4.03	3.94	5.81	5.43	5.86	6.29	6.04	4.58	4.89	4.68
Jarque-Bera	752.82	417.02	284.84	209.67	168.56	60.01	2600.34	45.50	37.62	339.24	254.80	351.95	503.20	431.30	111.91	165.20	132.72
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.29: (continued)

Stocks	WBO	ASR	JDG	SAC	TON	FPT	PPC	PPC	SAP	ARL	ARL	ARL	DRD	DRD	GRF	RBX	RBX
Mean equation	ARMA(2/2)	ARMA(2/1)	ARMA(2/2)	ARMA(1/1)	ARMA(0/0)	ARMA(0/2)	ARMA(1/0)	ARMA(2/2)	ARMA(2/1)	ARMA(2/2)	ARMA(0/2)	ARMA(1/0)	ARMA(1/1)	ARMA(1/1)	ARMA(0/0)	ARMA(0/0)	ARMA(0/0)
C	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.001	0.000	-0.002	0.000	-0.001	-0.001
p-values	0.167	0.000*	0.866	0.686	0.760	0.556	0.539	0.739	0.068	0.703	0.550	0.280	0.738	0.050	0.964	0.229	0.112
INDEX	0.462	0.744	0.600	0.149	0.298	0.240	0.461	0.488	0.836	0.281	0.294	0.251	0.716	0.646	0.620	0.275	0.316
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.917	0.677	0.484	-0.989			-0.076	1.480	0.957	0.588		0.182	-0.913	0.605			
p-values	0.000*	0.000*	0.017*	0.000*			0.034*	0.000*	0.000*	0.000*		0.000*	0.000*	0.002*			
AR(2)	-0.971	0.133	-0.556					-0.845	-0.100	-0.918							
p-values	0.000*	0.000*	0.011*					0.000*	0.001*	0.000*							
MA(1)	-0.943	-0.915	-0.463	0.986		-0.107		-1.531	-0.901	-0.560	0.106		0.940	-0.542			
p-values	0.000*	0.000*	0.034*	0.000*		0.005*		0.000*	0.000*	0.000*	0.003*		0.000*	0.010*			
MA(2)	0.998		0.472			-0.045		0.907		0.934	0.094						
p-values	0.000*		0.045*			0.173		0.000*		0.000*	0.005*						
Variance equation	GARCH(1/2)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)	GARCH(1/1)
C	0.000	-0.099	-0.074	-0.631	0.000	-0.374	-3.296	-0.167	-2.569	-0.138	-0.642	0.000	0.000	0.000	0.000	0.000	0.000
p-values	0.012*	0.004*	0.004*	0.000*	0.000*	0.000*	0.006*	0.002*	0.000*	0.018*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.083	0.379	0.299	0.340	0.066	0.312	0.240	0.057	0.025	0.444	0.485	0.385	0.054	0.093	0.222	0.188	0.220
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.002*	0.174	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2		-0.316	-0.232	-0.216		-0.211	-0.016		0.040	-0.374	-0.235						
p-values		0.000*	0.000*	0.000*		0.000*	0.835		0.061	0.000*	0.000*						
γ1		0.041	-0.048	0.033		0.025	-0.007	0.006	-0.025	0.088	0.028						
p-values		0.241	0.273	0.376		0.530	0.868	0.626	0.002*	0.010*	0.502						
γ2		-0.079	0.021	-0.124		0.010	0.118		0.012	-0.092	-0.003						
p-values		0.024*	0.634	0.000*		0.792	0.006*		0.219	0.007*	0.941						
β1	0.277	1.421	0.997	0.931	0.890	0.965	0.634	0.986	1.649	1.488	0.944	0.405	0.915	0.858	0.391	0.239	0.154
p-values	0.255	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.073	0.174
β2	0.607	-0.428							-0.956	-0.499							
p-values	0.010*	0.001*							0.000*	0.000*							
AIC	-5.226	-5.115	-5.212	-5.042	-6.094	-5.839	-5.684	-5.595	-5.334	-5.339	-5.368	-5.434	-4.511	-3.869	-4.961	-5.245	-5.208
R-square	16%	20%	17%	3%	7%	7%	10%	13%	26%	10%	9%	8%	7%	6%	18%	3%	4%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	0.7	1.0	3.5	2.2	9.0	1.2	0.4	3.4	5.4	3.1	0.9	5.2	1.4	3.1	8.9	2.2	2.0
p-values	0.411	0.613	0.061	0.529	0.110	0.765	0.982	0.063	0.067	0.077	0.836	0.264	0.710	0.213	0.113	0.693	0.568
Q(15)	6.7	14.8	10.9	8.5	17.8	7.4	11.8	10.4	12.0	13.7	15.2	21.4	10.7	11.0	17.9	14.0	19.0
p-values	0.820	0.252	0.450	0.812	0.271	0.879	0.619	0.494	0.445	0.248	0.297	0.092	0.636	0.525	0.267	0.448	0.123
Q(25)	12.5	21.1	19.7	13.5	22.3	21.0	25.5	20.3	16.4	21.3	18.8	27.7	22.6	24.4	33.3	26.2	29.9
p-values	0.926	0.516	0.541	0.941	0.616	0.582	0.381	0.501	0.798	0.439	0.712	0.272	0.486	0.326	0.124	0.341	0.153
Q(35)	23.6	37.0	26.0	29.1	29.2	33.3	43.6	34.2	27.6	34.3	29.7	45.8	40.2	38.6	38.1	42.9	40.3
p-values	0.827	0.248	0.722	0.663	0.745	0.451	0.126	0.319	0.688	0.312	0.630	0.085	0.180	0.195	0.329	0.141	0.178
Box-Pierce Q test (squared residuals)																	
Q(5)	2.213	0.750	3.040	0.665	7.911	0.456	1.770	3.104	2.719	1.976	1.900	1.970	5.777	4.754	4.185	2.260	4.604
p-values	0.137	0.687	0.081	0.881	0.161	0.928	0.778	0.078	0.257	0.160	0.593	0.741	0.123	0.093	0.523	0.688	0.203
Q(15)	14.264	5.512	12.521	6.485	16.807	2.864	10.054	17.495	7.288	7.349	7.478	5.651	14.015	15.916	7.659	8.587	14.188
p-values	0.219	0.939	0.326	0.927	0.331	0.998	0.758	0.094	0.838	0.770	0.876	0.975	0.373	0.195	0.937	0.857	0.361
Q(25)	22.757	11.744	24.482	15.955	29.495	6.594	28.301	24.885	10.864	31.744	28.132	33.159	16.531	27.125	25.896	16.461	25.982
p-values	0.357	0.962	0.270	0.857	0.244	1.000	0.248	0.252	0.977	0.062	0.211	0.101	0.832	0.207	0.413	0.871	0.302
Q(35)	32.630	16.722	31.752	18.266	38.984	11.658	42.655	31.937	13.563	44.990	41.016	40.324	25.115	37.895	31.028	37.827	46.093
p-values	0.387	0.988	0.429	0.982	0.295	1.000	0.147	0.420	0.998	0.050	0.159	0.211	0.836	0.218	0.660	0.299	0.065
ARCH LM test																	
p-values	0.387	0.947	0.879	0.922	0.080	0.857	0.837	0.302	0.532	0.849	0.929	0.703	0.198	0.315	0.667	0.749	0.601
Normality tests																	
Skewness	0.28	0.95	0.43	-0.37	0.09	-0.51	-0.15	-0.09	-0.28	0.10	0.14	0.28	0.01	0.15	-0.09	0.04	0.05
Kurtosis	4.87	10.36	5.58	7.56	5.27	7.68	4.58	3.96	7.33	6.35	6.53	7.19	5.14	6.43	4.61	5.40	5.60
Jarque-Bera	162.54	2461.96	315.38	909.07	220.83	976.14	110.45	40.49	813.76	480.52	533.45	762.18	196.09	506.22	111.76	245.38	289.26
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.29: (continued)

Stocks	RCL	MTN	VOD	VOD	VOD	SHP	SHP	TRU	TRU	GFI	NED	BGA	BGA	NTC	IPL	IPL	TBS
Mean equation	ARMA(0/0)	ARMA(1/1)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(0/0)	ARMA(0/1)	ARMA(1/0)	ARMA(2/2)	ARMA(2/1)	ARMA(0/2)	ARMA(0/2)	ARMA(1/1)	ARMA(1/2)	ARMA(1/0)	ARMA(0/0)
C	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.001	-0.001	0.000	0.000
p-values	0.019*	0.537	0.007*	0.515	0.198	0.437	0.931	0.702	0.953	0.090	0.663	0.214	0.224	0.039*	0.201	0.767	0.445
INDEX	0.104	1.099	0.645	0.661	0.690	0.920	0.913	0.860	0.866	0.745	0.997	0.907	0.919	0.746	1.013	0.942	0.800
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)		0.718	0.189		0.179				0.044	-0.210	0.558			0.408	-0.795	-0.064	
p-values		0.000*	0.000*		0.066				0.200	0.579	0.000*			0.016*	0.000*	0.058	
AR(2)			0.758		0.774					0.336	-0.023						
p-values			0.000*		0.000*					0.382	0.611						
MA(1)		-0.785	-0.168		-0.148			0.031		0.246	-0.708	-0.124	-0.165	-0.543	0.768		
p-values		0.000*	0.000*		0.071			0.305		0.516	0.000*	0.000*	0.000*	0.001*	0.000*		
MA(2)			-0.823		-0.848					-0.360		-0.064	-0.054		-0.041		
p-values			0.000*		0.000*					0.361		0.058	0.107		0.193		
Variance equation	EGARCH(2/1)	GARCH(1/1)	EGARCH(1/2)	ARCH(1)	EGARCH(1/2)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/2)	EGARCH(2/1)	EGARCH(2/1)	ARCH(1)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	EGARCH(1/2)	GARCH(1/1)	GARCH(1/1)
C	-1.088	0.000	-7.745	0.000	-6.231	-1.689	-4.907	0.000	-0.540	-0.101	0.000	-0.072	-0.083	0.000	-0.665	0.000	0.000
p-values	0.000*	0.001*	0.000*	0.000*	0.000*	0.008*	0.001*	0.024*	0.000*	0.000*	0.000*	0.083	0.000*	0.006*	0.000*	0.014*	0.000*
α1	0.439	0.030	0.401	0.232	0.382	0.260	0.267	0.033	0.269	0.382	0.080	0.185	0.222	0.040	0.193	0.063	0.216
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.004*	0.000*	0.000*	0.000*	0.000*	0.005*	0.000*
α2	-0.145					-0.125	0.222		-0.152	-0.282		-0.159	-0.217				
p-values	0.017*					0.083	0.000*		0.015*	0.000*		0.000*	0.000*				
γ1	0.157		0.046		0.091	-0.058	-0.053		-0.008	0.004		0.091	0.118		-0.053		
p-values	0.000*		0.137		0.003*	0.160	0.140		0.836	0.929		0.001*	0.000*		0.000*		
γ2	-0.111					-0.059	-0.120		-0.042	0.011		-0.104	-0.135				
p-values	0.002*					0.142	0.000*		0.319	0.786		0.000*	0.000*				
β1	0.885	0.968	0.186		0.262	0.812	-0.233	0.112	0.946	0.996		1.636	1.684	0.924	0.038	0.729	0.355
p-values	0.000*	0.000*	0.257		0.132	0.000*	0.005*	0.360	0.000*	0.000*		0.000*	0.000*	0.000*	0.001*	0.000*	0.003*
β2			-0.037		0.063		0.707	0.847				-0.642	-0.693		0.899		
p-values			0.803		0.687		0.000*	0.000*				0.000*	0.000*		0.000*		
AIC	-4.848	-5.523	-5.879	-5.891	-5.938	-5.582	-5.770	-5.424	-5.556	-4.396	-5.960	-5.574	-5.739	-5.737	-5.381	-5.548	-5.770
R-square	0%	33%	18%	17%	22%	24%	27%	18%	21%	2%	37%	28%	29%	24%	26%	26%	21%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	0.8	1.5	1.1	6.7	0.9	4.0	0.5	3.6	3.2	3.2	3.0	1.5	2.3	3.5	0.8	1.8	2.7
p-values	0.977	0.671	0.292	0.244	0.336	0.545	0.990	0.457	0.522	0.075	0.226	0.671	0.516	0.322	0.687	0.770	0.604
Q(15)	13.3	6.6	5.5	15.3	8.6	16.4	10.7	14.6	11.5	8.2	12.2	8.2	9.2	13.3	12.1	11.3	20.6
p-values	0.583	0.921	0.907	0.428	0.655	0.356	0.771	0.404	0.643	0.694	0.431	0.830	0.754	0.427	0.434	0.660	0.112
Q(25)	21.2	19.2	13.2	20.4	13.9	28.5	19.2	22.7	17.9	14.0	25.6	22.5	24.6	18.2	24.8	18.0	32.2
p-values	0.682	0.691	0.901	0.727	0.873	0.283	0.789	0.535	0.808	0.868	0.271	0.488	0.374	0.748	0.306	0.803	0.121
Q(35)	24.7	27.0	24.7	32.4	20.1	46.1	39.8	31.7	26.8	27.2	32.2	29.7	34.1	31.5	38.6	28.0	41.4
p-values	0.901	0.762	0.781	0.594	0.933	0.100	0.266	0.583	0.804	0.660	0.459	0.631	0.415	0.542	0.196	0.758	0.179
Box-Pierce Q test (squared residuals)																	
Q(5)	1.673	2.090	2.251	2.435	2.133	2.264	1.338	3.156	2.658	2.283	0.480	4.282	3.919	3.278	3.431	2.360	3.778
p-values	0.892	0.554	0.134	0.786	0.144	0.812	0.931	0.532	0.617	0.131	0.787	0.233	0.270	0.351	0.180	0.670	0.437
Q(15)	9.928	4.865	15.083	18.976	15.152	8.701	7.577	8.485	9.859	12.267	2.908	6.118	6.135	11.579	6.521	7.398	14.901
p-values	0.824	0.978	0.179	0.215	0.176	0.893	0.940	0.863	0.772	0.344	0.996	0.942	0.941	0.562	0.888	0.918	0.385
Q(25)	13.027	6.698	20.409	25.355	19.596	12.229	10.538	17.356	22.405	23.500	3.958	8.474	10.769	21.386	13.437	15.004	28.478
p-values	0.976	1.000	0.496	0.443	0.547	0.985	0.995	0.833	0.555	0.318	1.000	0.997	0.985	0.558	0.920	0.921	0.240
Q(35)	16.550	12.653	27.195	33.789	23.210	16.533	14.257	24.689	30.639	35.228	5.875	10.977	14.727	31.330	17.500	26.882	38.357
p-values	0.997	0.999	0.662	0.526	0.841	0.997	0.999	0.879	0.633	0.275	1.000	1.000	0.997	0.550	0.982	0.802	0.278
ARCH LM test																	
p-values	0.806	0.602	0.714	0.970	0.827	0.475	0.621	0.431	0.776	0.987	0.842	0.169	0.173	0.556	0.227	0.495	0.993
Normality tests																	
Skewness	-0.18	-1.89	-0.30	-0.23	-0.31	-0.33	-0.38	-0.21	-0.39	0.30	-0.78	-1.07	-1.21	0.06	-0.12	-0.34	-0.13
Kurtosis	6.79	20.07	5.37	5.35	5.43	5.90	6.16	5.70	6.03	7.09	8.45	13.12	16.04	5.06	6.50	4.40	4.24
Jarque-Bera	616.98	13033.03	254.85	243.43	268.75	377.80	451.97	319.57	417.57	727.47	1370.83	4559.39	7503.70	180.61	524.63	102.54	68.74
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.29: (continued)

Stocks	**TBS**	**LBH**	**LBH**	**LBH**	**MMI**	**SLM**
Mean equation	ARMA(0/0)	ARMA(0/2)	ARMA(2/2)	ARMA(1/1)	ARMA(0/2)	ARMA(1/1)
C	0.000	0.000	0.001	0.001	0.000	0.000
p-values	0.346	0.633	0.041*	0.034*	0.624	0.382
INDEX	0.800	0.701	0.493	0.470	0.944	1.176
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)			-0.741	0.392		0.953
p-values			0.000*	0.022*		0.000*
AR(2)			0.242			
p-values			0.200			
MA(1)		-0.117	0.607	-0.533	-0.094	-0.969
p-values		0.000*	0.001*	0.001*	0.002*	0.000*
MA(2)		-0.059	-0.387		-0.099	
p-values		0.066	0.031*		0.000*	
Variance equation	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/1)	EGARCH(1/2)	EGARCH(1/1)	GARCH(1/1)
C	-3.910	0.000	-0.127	-0.323	-1.563	0.000
p-values	0.000*	0.001*	0.045*	0.012*	0.000*	0.001*
$\alpha 1$	0.408	0.039	0.217	0.168	0.342	0.082
p-values	0.000*	0.000*	0.002*	0.000*	0.000*	0.000*
$\alpha 2$	0.172		-0.146			
p-values	0.060		0.036*			
$\gamma 1$	-0.021		0.086	0.054	0.078	
p-values	0.546		0.054	0.001*	0.004*	
$\gamma 2$	-0.052		-0.043			
p-values	0.122		0.349			
$\beta 1$	-0.053	0.943	0.992	0.186	0.848	0.845
p-values	0.599	0.000*	0.000*	0.035*	0.000*	0.000*
$\beta 2$	0.654			0.793		
p-values	0.000*			0.000*		
AIC	-5.833	-5.845	-6.123	-6.210	-5.777	-5.844
R-square	22%	24%	17%	17%	31%	43%
Residual diagnostics						
Box-Pierce Q test (residuals)						
Q(5)	3.4	3.2	2.1	3.8	2.3	0.6
p-values	0.639	0.366	0.152	0.288	0.521	0.896
Q(15)	11.7	14.5	15.3	16.5	12.3	7.6
p-values	0.702	0.337	0.170	0.223	0.501	0.871
Q(25)	32.6	21.3	22.2	31.3	22.1	13.7
p-values	0.142	0.560	0.390	0.115	0.516	0.935
Q(35)	47.3	29.4	28.1	43.3	31.5	33.1
p-values	0.081	0.646	0.617	0.108	0.543	0.463
Box-Pierce Q test (squared residuals)						
Q(5)	2.918	6.323	2.491	0.523	2.341	0.663
p-values	0.713	0.097	0.115	0.914	0.505	0.882
Q(15)	13.481	11.521	7.602	6.131	6.721	3.657
p-values	0.565	0.567	0.748	0.941	0.916	0.994
Q(25)	26.812	29.034	23.210	13.235	8.468	4.357
p-values	0.365	0.179	0.333	0.947	0.997	1.000
Q(35)	32.444	35.680	29.271	21.137	25.984	7.677
p-values	0.592	0.343	0.555	0.945	0.802	1.000
ARCH LM test						
p-values	0.846	0.224	0.568	0.987	0.610	0.807
Normality tests						
Skewness	-0.20	-0.17	-0.03	-0.31	-0.35	-0.17
Kurtosis	4.43	4.81	4.71	5.39	8.60	10.14
Jarque-Bera	93.94	144.83	124.26	259.48	1357.49	2177.07
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.30: Model selection – South Africa - no news - analyst coverage < 6

Stocks	DTC	RMH	RMH	SUI	BLU	AFE	AFE	APK	APK	JSE	RLO	RLO	RLO	AFX	BAT	BAT	COM
Mean equation	ARMA(0/0)	ARMA(1/1)	ARMA(1/1)	ARMA(2/2)	ARMA(2/2)	ARMA(1/1)	ARMA(0/0)	ARMA(2/0)	ARMA(0/0)	ARMA(0/0)	ARMA(1/1)	ARMA(0/0)	ARMA(1/1)	ARMA(1/0)	ARMA(0/0)	ARMA(2/2)	ARMA(1/1)
C	-0.001	0.000	0.000	0.001	0.000	0.000	0.000	-0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001
p-values	0.367	0.655	0.880	0.210	0.122	0.888	0.619	0.213	0.230	0.394	0.741	0.523	0.080	0.890	0.241	0.144	0.174
INDEX	0.617	0.910	0.620	0.374	0.330	0.345	0.328	0.210	0.222	0.320	0.471	0.469	0.487	0.240	0.273	0.290	0.043
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.588
AR(1)		0.375	0.613	-0.666	0.167	-0.989		-0.020			-0.006		0.565	-0.103		0.614	0.579
p-values		0.011*	0.000*	0.000*	0.074	0.000*		0.553			0.985		0.001*	0.002*		0.000*	0.000*
AR(2)				-0.891	0.807			0.002								-0.881	
p-values				0.000*	0.000*			0.959								0.000*	
MA(1)		-0.526	-0.693	0.718	-0.130	0.995					-0.089		-0.665			-0.587	-0.735
p-values		0.000*	0.000*	0.000*	0.093	0.000*					0.780		0.000*			0.000*	0.000*
MA(2)				0.908	-0.865											0.872	
p-values				0.000*	0.000*											0.000*	
Variance equation	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/1)		EGARCH(2/2)	EGARCH(1/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(1/2)	EGARCH(1/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(1/2)		EGARCH(1/1)	EGARCH(2/2)
C	-0.148	0.000	-0.111		-2.019	-1.711	0.000	-1.167	-1.111	-0.749	-0.280	0.000	0.000	-2.682		-13.696	-0.295
p-values	0.000*	0.001*	0.000*		0.017*	0.000*	0.001*	0.000*	0.000*	0.000*	0.005*	0.000*	0.000*	0.000*		0.000*	0.000*
α1	0.375	0.081	0.280		0.353	0.323	0.104	0.380	0.105	0.223	0.128	0.162	0.162	0.387		0.039	0.175
p-values	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.026*	0.000*	0.001*	0.000*	0.000*	0.000*		0.379	0.000*
α2	-0.300		-0.265		-0.155			-0.055	0.102								-0.101
p-values	0.000*		0.000*		0.094			0.199	0.042*								0.010*
γ1	-0.014		0.023		0.137	-0.069		-0.059	0.058	0.008	0.022			0.074		-0.179	0.113
p-values	0.701		0.570		0.001*	0.006*		0.016*	0.127	0.690	0.257			0.006*		0.000*	0.000*
γ2	-0.012		-0.093		-0.166			0.171	-0.152								-0.159
p-values	0.731		0.018*		0.000*			0.000*	0.000*								0.000*
β1	0.988	0.890	0.988		0.621	0.824	0.599	0.873	0.881	0.183	0.549	0.735	0.775	0.098		-0.691	1.469
p-values	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.000*	0.020*	0.103	0.000*	0.000*	0.017*		0.000*	0.000*
β2					0.147					0.750	0.429			0.618			-0.503
p-values					0.222					0.000*	0.197			0.000*			0.000*
AIC	-4.971	-5.016	-5.363	-5.625	-5.213	-5.540	-5.704	-4.777	-5.302	-5.806	-5.919	-5.914	-5.838	-5.637	-5.216	-5.227	-4.369
R-square	20%	35%	13%	10%	4%	10%	6%	1%	2%	7%	11%	11%	14%	5%	3%	3%	3%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	1.7	4.0	3.4	1.6	3.8	1.0	7.8	4.4	3.5	3.5	6.4	9.7	2.4	0.9	2.8	1.3	4.1
p-values	0.893	0.259	0.333	0.204	0.051	0.812	0.169	0.224	0.627	0.627	0.093	0.084	0.494	0.924	0.733	0.263	0.255
Q(15)	7.4	13.2	14.5	18.1	11.5	10.0	14.3	10.1	19.6	11.7	12.1	18.6	8.9	10.3	8.1	6.3	14.9
p-values	0.944	0.430	0.337	0.080	0.400	0.691	0.501	0.689	0.188	0.700	0.523	0.231	0.780	0.736	0.918	0.856	0.315
Q(25)	16.7	21.1	20.4	26.7	24.1	20.1	22.6	22.8	27.1	26.4	19.4	25.8	24.6	15.0	13.4	12.2	23.3
p-values	0.892	0.577	0.617	0.181	0.287	0.639	0.599	0.472	0.352	0.385	0.678	0.420	0.371	0.921	0.971	0.934	0.445
Q(35)	23.7	32.8	25.9	31.1	33.6	30.7	37.5	27.4	38.7	46.6	27.9	33.5	37.8	22.0	17.2	18.2	31.1
p-values	0.925	0.478	0.804	0.461	0.343	0.583	0.353	0.744	0.304	0.091	0.720	0.542	0.260	0.943	0.995	0.967	0.562
Box-Pierce Q test (squared residuals)																	
Q(5)	0.952	1.098	1.444	0.490	2.471	0.710	3.129	2.143	6.009	3.221	4.616	0.593	2.036	5.285	3.586	3.138	3.389
p-values	0.966	0.778	0.695	0.484	0.116	0.871	0.680	0.543	0.305	0.666	0.202	0.988	0.565	0.259	0.610	0.077	0.335
Q(15)	6.089	13.495	9.052	3.381	10.165	20.351	9.924	5.775	10.692	22.206	9.797	3.669	5.070	8.109	8.828	10.043	8.369
p-values	0.978	0.410	0.769	0.985	0.516	0.087	0.825	0.954	0.774	0.103	0.710	0.999	0.974	0.884	0.886	0.527	0.819
Q(25)	12.363	22.598	29.525	5.139	17.076	27.145	21.485	9.450	28.521	30.036	12.763	6.929	8.029	16.561	10.767	13.957	13.896
p-values	0.983	0.484	0.164	1.000	0.707	0.250	0.665	0.994	0.284	0.223	0.957	1.000	0.998	0.867	0.994	0.871	0.930
Q(35)	20.377	28.224	37.095	7.810	21.853	33.996	36.578	14.030	31.982	38.895	17.644	8.793	9.298	22.454	13.667	18.131	18.574
p-values	0.977	0.704	0.286	1.000	0.888	0.419	0.395	0.998	0.615	0.299	0.987	1.000	1.000	0.935	1.000	0.968	0.980
ARCH LM test																	
p-values	0.815	0.996	0.872	0.956	0.813	0.988	0.926	0.951	0.861	0.445	0.239	0.957	0.993	0.606	0.958	0.980	0.368
Normality tests																	
Skewness	0.00	0.29	0.08	-0.26	0.61	0.40	0.37	-0.79	0.64	0.01	0.05	-0.03	0.09	-0.14	-0.99	-0.89	0.35
Kurtosis	6.34	4.77	4.28	13.43	7.16	7.75	6.38	19.23	9.68	6.75	4.95	6.56	6.72	7.28	14.00	14.44	9.23
Jarque-Bera	474.74	147.43	70.74	4646.11	799.23	990.63	510.92	11338.12	1970.97	599.18	162.17	540.54	592.59	784.33	5327.77	5713.44	1674.15
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.30: (continued)

Stocks	CSB	HCI	HDC	HDC	HDC	HDC	SUR	ADR	ADR	ART	ILA	ILA	PNC	SFN	TSX	ZED	CMH
Mean equation	ARMA(0/2)	ARMA(1/0)	ARMA(2/1)	ARMA(1/0)	ARMA(1/0)	ARMA(0/0)	ARMA(1/1)	ARMA(0/0)	ARMA(0/1)	ARMA(1/2)	ARMA(1/1)	ARMA(0/0)	ARMA(0/1)	ARMA(0/0)	ARMA(0/0)	ARMA(1/1)	ARMA(2/1)
C	0.001	-0.001	0.000	0.000	-0.001	0.001	0.000	0.000	0.001	-0.001	0.000	-0.001	0.000	0.000	-0.001	0.000	0.000
p-values	0.154	0.011*	0.385	0.730	0.070	0.145	0.374	0.527	0.114	0.182	0.978	0.454	0.777	0.803	0.102	0.639	0.507
INDEX	0.199	0.147	0.174	0.159	0.252	0.286	0.196	0.215	0.158	0.144	-0.138	0.243	0.482	0.136	0.342	0.279	0.134
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.035*	0.000*	0.000*	0.000*	0.000*	0.000*	0.017*
AR(1)		-0.172	-1.095	-0.105	0.031		0.720			0.528	0.510					0.713	0.384
p-values		0.000*	0.000*	0.001*	0.255		0.000*			0.106	0.000*					0.000*	0.150
AR(2)			-0.102														0.060
p-values			0.000*														0.489
MA(1)	-0.072		1.008				-0.831		-0.164	-0.643	-0.652		-0.072			-0.879	-0.632
p-values	0.066		0.000*				0.000*		0.000*	0.045*	0.000*		0.035*			0.000*	0.015*
MA(2)	-0.033									0.120							
p-values	0.371									0.002*							
Variance equation	GARCH(1/1)	EGARCH(2/1)	EGARCH(1/2)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/1)	GARCH(1/1)	EGARCH(2/1)	GARCH(1/1)		EGARCH(1/1)	GARCH(1/2)
C	0.000	-0.003	-3.125	-3.842	-0.062	0.000	-5.498	0.000	-3.332	0.000	-0.097	0.000	-0.177	0.000		-1.512	0.000
p-values	0.000*	0.486	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*
α1	0.180	0.226	0.322	0.193	0.143	0.079	0.318	0.200	0.415	0.155	0.295	0.078	0.189	0.141		0.302	0.053
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*
α2		-0.210		0.293	-0.144		0.174		0.388		-0.265		-0.090				
p-values		0.000*		0.000*	0.000*		0.000*		0.000*		0.000*		0.033*				
γ1		-0.053	0.124	0.093	-0.020		0.008		0.020		0.127		-0.028			-0.106	
p-values		0.041*	0.000*	0.013*	0.339		0.731		0.358		0.000*		0.458			0.000*	
γ2		0.014		0.041	-0.030		0.002		0.039		-0.077		-0.046				
p-values		0.580		0.227	0.254		0.921		0.104		0.031*		0.249				
β1	0.256	1.001	1.064	0.587	1.377	0.887	-0.277	0.718	-0.168	0.556	0.989	0.847	0.984	0.779		0.837	0.251
p-values	0.002*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*	0.050*
β2			-0.399		-0.385		0.615		0.835								0.608
p-values			0.000*		0.002*		0.000*		0.000*								0.000*
AIC	-5.524	-4.958	-5.856	-5.678	-5.387	-5.407	-4.963	-5.627	-5.513	-4.879	-4.515	-4.392	-4.270	-5.063	-4.908	-5.104	-5.096
R-square	3%	4%	4%	3%	6%	8%	4%	2%	5%	3%	4%	2%	7%	2%	3%	7%	8%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	0.5	1.9	4.7	2.5	3.3	2.5	6.1	8.9	7.7	1.4	6.1	5.6	8.2	4.0	3.5	5.7	2.3
p-values	0.908	0.756	0.093	0.649	0.515	0.782	0.107	0.112	0.104	0.501	0.109	0.344	0.084	0.548	0.624	0.126	0.311
Q(15)	9.5	3.1	19.0	8.2	9.0	7.3	12.5	15.8	14.7	13.4	19.0	10.2	16.3	11.3	10.9	11.2	8.1
p-values	0.738	0.999	0.089	0.879	0.831	0.948	0.484	0.396	0.401	0.344	0.125	0.806	0.295	0.731	0.762	0.597	0.778
Q(25)	16.6	11.1	31.3	28.9	17.1	18.6	27.6	28.3	25.1	19.8	25.8	14.5	21.4	30.0	14.8	33.1	13.8
p-values	0.831	0.988	0.091	0.225	0.844	0.817	0.232	0.293	0.401	0.594	0.310	0.951	0.613	0.223	0.945	0.079	0.910
Q(35)	22.4	17.6	43.1	43.6	31.5	26.3	38.2	38.2	37.4	32.5	34.6	22.2	31.0	36.0	26.6	45.1	23.6
p-values	0.918	0.991	0.091	0.125	0.590	0.856	0.245	0.327	0.317	0.442	0.391	0.954	0.617	0.421	0.846	0.079	0.858
Box-Pierce Q test (squared residuals)																	
Q(5)	5.153	3.528	0.696	1.334	3.355	4.822	0.714	4.520	2.879	0.272	2.917	0.589	2.687	2.143	2.821	1.258	0.983
p-values	0.161	0.474	0.706	0.856	0.500	0.438	0.870	0.477	0.578	0.873	0.405	0.988	0.612	0.829	0.728	0.739	0.612
Q(15)	14.109	10.155	7.115	10.015	10.924	16.942	5.894	8.799	9.005	4.038	11.653	7.160	12.445	4.761	7.264	6.550	7.442
p-values	0.366	0.751	0.850	0.761	0.692	0.322	0.950	0.888	0.831	0.983	0.556	0.953	0.571	0.994	0.950	0.924	0.827
Q(25)	18.861	20.866	12.544	13.498	17.756	32.725	14.378	16.883	14.658	18.827	13.234	8.110	17.712	11.367	11.225	20.322	14.987
p-values	0.709	0.647	0.945	0.957	0.815	0.138	0.916	0.886	0.930	0.656	0.947	0.999	0.817	0.991	0.992	0.622	0.863
Q(35)	24.065	27.164	23.746	31.443	35.540	42.442	31.086	24.397	22.538	23.142	14.370	9.257	25.452	17.027	20.090	29.181	18.911
p-values	0.872	0.791	0.853	0.594	0.396	0.181	0.563	0.910	0.934	0.874	0.998	1.000	0.855	0.995	0.979	0.658	0.968
ARCH LM test																	
p-values	0.742	0.255	0.987	0.938	0.468	0.375	0.945	0.628	0.746	0.992	0.978	0.978	0.801	0.650	0.543	0.569	0.722
Normality tests																	
Skewness	0.58	0.07	0.71	0.93	1.16	1.01	0.10	0.03	0.87	-0.26	0.49	0.86	0.95	0.08	-0.50	0.31	0.85
Kurtosis	8.47	16.82	12.59	10.04	16.83	15.72	7.59	6.53	10.13	6.71	24.92	21.57	11.64	8.99	8.85	6.08	18.73
Jarque-Bera	1332.88	8141.73	4007.99	2259.98	8379.84	7063.73	900.36	532.31	2298.80	598.65	20524.97	14824.27	3340.00	1531.65	1500.00	421.20	10666.67
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.30: (continued)

Stocks	CMH	CMH	DCT	DCT	DCT	DGC	DGC	DGC	DGC	FFA	VKE	VKE	VKE	HDC	PGR	RBX	RBX
Mean equation	ARMA(1/2)	ARMA(2/2)	ARMA(0/1)	ARMA(0/0)	ARMA(0/1)	ARMA(2/2)	ARMA(0/0)	ARMA(1/1)	ARMA(0/0)	ARMA(1/1)	ARMA(0/2)	ARMA(1/1)	ARMA(1/2)	ARMA(0/0)	ARMA(0/0)	ARMA(1/1)	ARMA(1/1)
C	0.001	0.000	0.000	0.000	0.000	-0.001	0.000	-0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
p-values	0.185	0.752	0.889	0.919	0.955	0.362	0.455	0.041*	0.171	0.014*	0.407	0.262	0.141	0.918	0.399	0.584	0.251
INDEX	0.175	0.152	0.265	0.202	0.225	0.142	0.218	0.155	0.353	0.169	0.254	0.232	0.160	0.270	0.410	0.287	0.326
p-values	0.000*	0.004*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	0.987	0.908				1.493		0.670		0.361		-0.654	-0.932			0.931	0.875
p-values	0.000*	0.027*				0.000*		0.004*		0.001*		0.179	0.000*			0.000*	0.000*
AR(2)		0.002				-0.861											
p-values		0.996				0.000*											
MA(1)	-1.071	-0.983	-0.114		-0.108	-1.485		-0.648		-0.589	-0.060	0.657	0.927			-0.960	-0.907
p-values	0.000*	0.016*	0.000*		0.003*	0.000*		0.007*		0.000*	0.143	0.174	0.000*			0.000*	0.000*
MA(2)	0.082	0.092				0.859					0.020		-0.026				
p-values	0.054	0.814				0.000*					0.466		0.498				
Variance equation	GARCH(1/2)	GARCH(1/1)		GARCH(1/1)	GARCH(1/2)	EGARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)
C	0.000	0.000		0.000	0.000	-1.742	0.000	-0.126	0.000	-1.021	-0.524	-0.494	-0.503	0.000	-0.844	-6.078	-6.984
p-values	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*
α_1	0.085	0.031		0.126	0.147	0.394	0.204	0.508	0.193	0.261	0.574	0.373	0.382	0.093	0.376	0.378	0.365
p-values	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α_2								-0.463		-0.113	-0.425	-0.254	-0.240		-0.207	0.175	0.236
p-values								0.000*		0.014*	0.000*	0.000*	0.000*		0.001*	0.082	0.012*
γ_1						0.063		0.022		-0.120	0.017	0.182	0.220		0.030	0.187	0.152
p-values						0.014*		0.542		0.001*	0.592	0.000*	0.000*		0.367	0.000*	0.000*
γ_2								-0.071		0.122	-0.091	-0.253	-0.271		-0.104	-0.066	-0.069
p-values								0.051		0.000*	0.007*	0.000*	0.000*		0.008*	0.153	0.102
β_1	0.188	0.944		0.397	0.195	0.801	0.702	1.397	0.694	0.897	0.953	0.955	0.979	0.889	1.351	0.301	0.197
p-values	0.000*	0.000*		0.000*	0.027*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.106	0.282
β_2	0.671				0.497			-0.409					-0.024		-0.436		
p-values	0.000*				0.000*			0.000*					0.826		0.002*		
AIC	-4.566	-4.495	-4.819	-4.694	-4.698	-4.619	-4.643	-4.657	-4.443	-6.093	-5.949	-6.166	-6.246	-5.400	-5.595	-5.256	-5.294
R-square	3%	2%	4%	3%	4%	2%	3%	2%	4%	7%	5%	3%	2%	2%	9%	1%	3%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	0.9	0.4	3.1	4.6	1.2	3.7	3.8	4.0	3.8	6.2	7.1	3.9	2.9	7.0	0.9	3.6	2.3
p-values	0.624	0.507	0.539	0.468	0.886	0.055	0.581	0.257	0.576	0.103	0.070	0.268	0.230	0.224	0.971	0.311	0.511
Q(15)	13.3	12.0	11.6	14.0	13.3	17.3	22.2	19.9	18.5	16.0	17.2	19.0	17.9	17.6	10.5	12.3	14.8
p-values	0.344	0.366	0.637	0.528	0.501	0.098	0.104	0.098	0.235	0.249	0.190	0.122	0.118	0.282	0.790	0.500	0.322
Q(25)	22.5	24.1	19.8	23.9	19.2	20.8	24.2	24.2	28.4	24.2	29.7	34.9	28.5	37.2	20.6	24.3	27.2
p-values	0.428	0.290	0.708	0.523	0.743	0.472	0.508	0.392	0.288	0.391	0.159	0.054	0.159	0.055	0.715	0.386	0.247
Q(35)	33.9	36.7	25.5	30.0	25.8	26.7	33.1	35.1	37.9	32.6	34.7	40.7	33.8	48.0	29.6	30.8	44.8
p-values	0.374	0.220	0.852	0.709	0.841	0.685	0.562	0.368	0.336	0.487	0.389	0.167	0.380	0.071	0.725	0.575	0.082
Box-Pierce Q test (squared residuals)																	
Q(5)	1.283	1.957	0.963	0.325	0.694	2.937	6.611	1.491	8.184	1.006	1.699	4.427	3.564	1.186	0.830	2.547	0.923
p-values	0.527	0.162	0.915	0.997	0.952	0.087	0.251	0.684	0.146	0.800	0.637	0.219	0.168	0.946	0.975	0.467	0.820
Q(15)	7.390	7.764	2.511	2.036	3.257	12.364	17.634	11.049	17.651	7.090	8.031	15.923	10.972	16.505	5.992	7.535	3.417
p-values	0.831	0.734	1.000	1.000	0.999	0.337	0.282	0.607	0.281	0.897	0.842	0.253	0.531	0.349	0.980	0.873	0.996
Q(25)	16.363	20.455	4.022	4.014	8.162	19.482	23.922	18.197	22.891	14.832	18.525	23.443	14.355	18.638	15.330	20.996	13.706
p-values	0.797	0.493	1.000	1.000	0.999	0.554	0.524	0.747	0.584	0.901	0.728	0.435	0.888	0.814	0.933	0.581	0.935
Q(35)	31.725	35.408	5.627	4.588	9.994	22.412	31.663	23.151	32.665	27.634	21.023	27.447	17.263	21.648	25.714	37.162	35.556
p-values	0.480	0.268	1.000	1.000	1.000	0.870	0.630	0.899	0.581	0.731	0.947	0.740	0.984	0.962	0.874	0.283	0.349
ARCH LM test																	
p-values	0.558	0.420	0.863	0.898	0.941	0.966	0.868	0.980	0.346	0.987	0.557	0.731	0.535	0.953	0.988	0.961	0.874
Normality tests																	
Skewness	0.30	0.16	-0.76	-0.42	0.32	0.14	0.05	0.19	0.40	0.55	-1.14	0.00	-0.06	0.77	0.00	0.14	0.00
Kurtosis	15.39	14.45	17.26	16.33	9.00	7.15	6.19	6.00	5.19	9.37	24.55	6.88	7.24	11.01	6.95	5.64	6.02
Jarque-Bera	6558.33	5591.71	8761.66	7601.24	1550.71	738.34	434.59	389.06	231.27	1780.68	20024.08	640.56	768.38	2840.35	663.44	299.41	389.87
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.30: (continued)

Stocks	FBR	RLO	RLO	RLO	RLO	RLO	CLR	HPA	HPA	HPA	SUR	SUR	SUR
Mean equation	ARMA(0/0)	ARMA(1/1)	ARMA(0/0)	ARMA(1/0)	ARMA(0/0)	ARMA(0/0)	ARMA(0/0)	ARMA(1/1)	ARMA(1/1)	ARMA(1/2)	ARMA(0/2)	ARMA(0/0)	ARMA(1/0)
C	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
p-values	0.138	0.318	0.560	0.734	0.346	0.964	0.936	0.612	0.608	0.087	0.987	0.067	0.445
INDEX	0.355	0.407	0.418	0.469	0.420	0.445	0.237	0.039	0.130	0.024	0.217	0.203	0.178
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.484	0.011*	0.474	0.000*	0.000*	0.000*
AR(1)		0.933		-0.085				0.503	0.391	0.141			-0.096
p-values		0.000*		0.017*				0.000*	0.029*	0.636			0.006*
AR(2)													
p-values													
MA(1)		-0.970						-0.647	-0.538	-0.283	-0.109		
p-values		0.000*						0.000*	0.000*	0.344	0.002*		
MA(2)										-0.063	0.075		
p-values										0.282	0.030*		
Variance equation	GARCH(1/1)	EGARCH(2/1)	GARCH(1/1)	EGARCH(1/1)	GARCH(1/1)	EGARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)
C	0.000	-0.384	0.000	-1.357	0.000	-1.401	0.000	-12.596	-3.162	-0.176	-0.066	0.000	-0.166
p-values	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.249	0.304	0.125	0.251	0.131	0.259	0.467	0.375	0.332	0.342	0.276	0.134	0.254
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2		-0.231						0.151		-0.358	-0.275		-0.222
p-values		0.001*						0.001*		0.000*	0.000*		0.000*
γ1		0.106		0.034		0.063		0.077	-0.042	-0.119	-0.047		0.052
p-values		0.014*		0.151		0.010*		0.001*	0.145	0.000*	0.025*		0.013*
γ2		-0.107						0.102		0.111	0.044		-0.055
p-values		0.009*						0.000*		0.001*	0.039*		0.007*
β1	0.583	0.961	0.729	0.865	0.703	0.859	0.469	-0.020	0.235	1.122	1.823	0.758	1.818
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.763	0.001*	0.000*	0.000*	0.000*	0.000*
β2								-0.533	0.397	-0.144	-0.831		-0.836
p-values								0.000*	0.000*	0.000*	0.000*		0.000*
AIC	-5.699	-5.610	-5.671	-5.805	-5.615	-5.725	-5.511	-5.053	-5.210	-5.487	-5.485	-5.373	-5.446
R-square	7%	8%	6%	9%	7%	8%	2%	4%	4%	4%	6%	2%	3%
Residual diagnostics													
Box-Pierce Q test (residuals)													
Q(5)	9.4	1.4	8.3	6.3	6.3	9.9	1.0	1.9	1.2	1.8	0.6	5.5	2.6
p-values	0.094	0.695	0.138	0.177	0.277	0.079	0.961	0.594	0.760	0.415	0.888	0.354	0.631
Q(15)	15.0	6.8	17.2	12.8	14.7	19.7	21.5	8.4	7.0	13.5	7.8	11.3	8.3
p-values	0.450	0.910	0.307	0.539	0.476	0.184	0.121	0.817	0.900	0.333	0.853	0.729	0.875
Q(25)	25.7	14.6	22.3	19.6	22.7	26.8	28.7	17.6	14.6	20.0	22.4	27.1	14.7
p-values	0.424	0.907	0.617	0.718	0.598	0.366	0.275	0.779	0.907	0.586	0.497	0.352	0.928
Q(35)	41.0	18.4	31.0	27.9	28.9	34.8	39.0	27.0	27.8	30.8	34.5	40.6	26.4
p-values	0.225	0.981	0.660	0.758	0.756	0.480	0.295	0.758	0.726	0.529	0.397	0.238	0.821
Box-Pierce Q test (squared residuals)													
Q(5)	2.123	4.259	1.124	0.374	0.767	1.083	1.399	2.988	0.854	2.601	7.402	3.677	3.637
p-values	0.832	0.235	0.952	0.985	0.979	0.956	0.924	0.393	0.837	0.272	0.060	0.597	0.457
Q(15)	7.901	14.066	8.250	3.989	9.871	7.274	13.825	6.450	7.356	8.253	16.198	11.702	8.956
p-values	0.928	0.369	0.913	0.996	0.828	0.950	0.539	0.928	0.883	0.765	0.239	0.701	0.834
Q(25)	14.838	21.631	12.702	8.383	15.476	13.092	21.475	15.978	23.580	23.762	27.464	17.101	13.580
p-values	0.945	0.543	0.980	0.999	0.930	0.975	0.666	0.856	0.427	0.360	0.237	0.878	0.956
Q(35)	19.244	31.506	26.610	11.463	32.251	27.023	26.407	21.494	27.274	27.264	35.118	26.056	19.790
p-values	0.986	0.542	0.845	1.000	0.601	0.830	0.852	0.938	0.748	0.705	0.368	0.863	0.975
ARCH LM test													
p-values	0.685	0.181	0.828	0.928	0.909	0.734	0.535	0.570	0.957	0.954	0.135	0.278	0.350
Normality tests													
Skewness	0.00	-0.02	-0.06	0.06	-0.02	-0.03	-0.36	0.14	-0.14	-0.24	0.25	0.25	0.41
Kurtosis	5.82	4.01	4.32	4.54	4.11	4.48	14.27	10.02	10.91	13.29	7.60	14.62	14.10
Jarque-Bera	339.49	43.38	74.27	101.58	52.26	93.14	5432.17	2101.47	2667.97	4523.72	913.23	5770.83	5280.60
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.31: Model selection - South Africa - bad news - analyst coverage > 5

Stocks	AGL	LON	LON	AMS	AMS	AQP	AQP	ITU	IMP	OML	ANG	GFI	HAR	HAR	IPL	AEG	MUR
Mean equation	ARMA(0/0)	ARMA(1/0)	ARMA(0/0)	ARMA(0/0)	ARMA(1/2)	ARMA(2/0)	ARMA(1/1)	ARMA(1/1)	ARMA(1/2)	ARMA(2/2)	ARMA(2/2)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)	ARMA(0/2)	ARMA(0/0)	ARMA(2/1)
C	0.000	-0.002	0.000	-0.001	0.000	-0.001	0.001	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001	0.000	-0.001	-0.001
p-values	0.631	0.000*	0.736	0.008*	0.597	0.088	0.092	0.469	0.000*	0.082	0.010*	0.168	0.116	0.222	0.340	0.150	0.142
INDEX	1.473	1.485	1.115	1.328	1.404	1.595	1.098	0.621	1.483	0.834	0.768	0.690	0.846	0.876	0.804	0.601	0.852
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)		-0.020			0.811	-0.141	0.749	1.004	0.266	1.003	-1.865	-0.534		-0.664			0.580
p-values		0.499			0.000*	0.000*	0.000*	0.000*	0.225	0.000*	0.000*	0.000*		0.000*			0.009*
AR(2)						-0.077				-0.960	-0.975	-0.980		-0.555			-0.061
p-values						0.019*				0.000*	0.000*	0.000*		0.000*			0.083
MA(1)					-0.740		-0.823	-0.979	-0.242	-1.031	1.878	0.536		0.757	0.066		-0.529
p-values					0.000*		0.000*	0.000*	0.267	0.000*	0.000*	0.000*		0.000*	0.047*		0.018*
MA(2)					-0.120				-0.131	0.957	0.992	0.992		0.595	-0.092		
p-values					0.001*				0.000*	0.000*	0.000*	0.000*		0.000*	0.004*		
Variance equation	GARCH(1/1)	EGARCH(2/2)		GARCH(1/1)	GARCH(1/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/2)	GARCH(1/2)	GARCH(1/1)	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)
C	0.000	-0.146		0.000	0.000	-0.225	-0.047	0.025	0.002	-0.067	0.000	0.000	0.000	0.000	-0.084	-0.182	-0.122
p-values	0.115	0.000*		0.051	0.003*	0.000*	0.000*	0.014*	0.755	0.021*	0.011*	0.128	0.001*	0.001*	0.000*	0.056	0.111
α1	0.027	0.094		0.048	0.085	0.414	0.274	0.172	0.138	0.370	0.118	0.079	0.047	0.056	0.151	0.349	0.311
p-values	0.000*	0.000*		0.000*	0.000*	0.000*	0.000*	0.018*	0.006*	0.000*	0.000*	0.000*	0.000*	0.000*	0.018*	0.000*	0.000*
α2		0.038				-0.252	-0.213	-0.171	-0.142	-0.283					-0.152	-0.266	-0.260
p-values		0.046*				0.000*	0.000*	0.021*	0.004*	0.000*					0.019*	0.000*	0.000*
γ1		-0.039				-0.044	-0.011	0.031	-0.042	0.020					-0.110	-0.015	0.001
p-values		0.001*				0.276	0.747	0.471	0.238	0.609					0.014*	0.600	0.988
γ2		-0.046				0.015	0.000	0.001	0.038	-0.018					0.094	0.021	-0.012
p-values		0.000*				0.724	0.995	0.990	0.280	0.644					0.033*	0.483	0.716
β1	0.971	0.001		0.948	0.890	0.985	0.999	1.003	1.000	1.000	0.120	0.128	0.932	0.927	1.460	0.480	1.348
p-values	0.000*	0.769		0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.175	0.247	0.000*	0.000*	0.000*	0.000*	0.000*
β2		0.994									0.724	0.780			-0.470	0.506	-0.359
p-values		0.000*									0.000*	0.000*			0.000*	0.000*	0.146
AIC	-5.708	-5.249	-4.575	-5.251	-4.828	-3.920	-3.905	-5.667	-5.442	-5.363	-5.224	-5.112	-4.796	-4.051	-5.581	-5.381	-4.736
R-square	73%	44%	29%	47%	47%	31%	21%	22%	45%	33%	13%	13%	11%	8%	32%	11%	27%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	8.4	1.2	4.7	2.7	2.1	1.4	4.3	3.7	3.3	2.7	1.5	0.3	5.0	0.7	4.4	2.0	1.8
p-values	0.136	0.884	0.451	0.748	0.350	0.700	0.230	0.301	0.190	0.099	0.215	0.610	0.413	0.390	0.223	0.846	0.400
Q(15)	14.4	13.4	17.8	8.3	4.6	12.9	17.0	12.4	11.9	13.3	8.3	6.0	11.8	6.1	9.7	4.9	10.7
p-values	0.498	0.498	0.272	0.911	0.970	0.458	0.197	0.498	0.450	0.275	0.688	0.874	0.695	0.865	0.718	0.993	0.557
Q(25)	27.5	18.6	30.6	26.5	13.2	28.8	25.5	18.6	28.0	27.5	12.2	15.3	24.2	12.0	21.7	17.3	18.2
p-values	0.333	0.775	0.201	0.380	0.928	0.188	0.323	0.723	0.176	0.154	0.934	0.809	0.506	0.940	0.541	0.870	0.691
Q(35)	30.5	28.1	38.8	37.5	16.8	43.7	38.4	26.9	31.7	34.5	23.0	21.7	43.2	21.2	30.9	29.4	29.9
p-values	0.686	0.753	0.303	0.357	0.988	0.100	0.237	0.763	0.483	0.302	0.849	0.893	0.160	0.906	0.571	0.734	0.571
Box-Pierce Q test (squared residuals)																	
Q(5)	0.570	3.792	0.247	3.524	1.946	2.875	3.285	3.501	5.770	2.720	0.549	2.135	5.557	2.369	3.630	1.335	2.251
p-values	0.989	0.435	0.999	0.620	0.378	0.411	0.350	0.321	0.056	0.099	0.459	0.144	0.352	0.124	0.304	0.931	0.324
Q(15)	4.459	9.407	1.840	14.717	16.628	9.117	12.800	6.674	10.952	5.870	14.626	15.162	13.163	7.522	12.347	4.864	3.965
p-values	0.996	0.804	1.000	0.472	0.164	0.764	0.463	0.918	0.533	0.882	0.200	0.175	0.590	0.755	0.499	0.993	0.984
Q(25)	13.272	16.085	4.494	26.108	30.738	15.490	21.279	14.160	19.383	15.915	20.509	23.260	31.057	17.660	19.583	7.069	4.733
p-values	0.973	0.885	1.000	0.402	0.102	0.876	0.564	0.922	0.622	0.774	0.489	0.330	0.187	0.670	0.667	1.000	1.000
Q(35)	16.053	27.450	5.645	38.383	41.176	19.308	26.310	18.933	26.767	23.250	30.666	35.386	35.969	24.272	30.184	25.287	11.613
p-values	0.997	0.779	1.000	0.319	0.128	0.972	0.789	0.976	0.729	0.840	0.483	0.269	0.423	0.799	0.608	0.887	1.000
ARCH LM test																	
p-values	0.823	0.240	0.887	0.214	0.577	0.752	0.920	0.362	0.292	0.938	0.972	0.750	0.413	0.489	0.292	0.800	0.551
Normality tests																	
Skewness	0.29	-0.30	4.03	-0.39	-0.36	-0.45	-0.64	-0.23	-0.10	-0.58	0.21	0.53	0.27	0.05	-0.06	-0.14	-0.05
Kurtosis	6.91	8.39	67.11	6.86	5.14	8.14	8.32	7.16	4.24	10.61	4.47	5.05	5.84	5.09	3.56	6.66	5.38
Jarque-Bera	667.63	1254.55	177973.50	661.77	217.98	1163.00	1275.58	748.14	67.38	2523.72	99.49	226.74	356.66	186.84	13.76	574.22	242.83
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*	0.000*

Table B.31: (continued)

Stocks	JDG	JDG	PAN	SAP	ARL	RCL	NPK
Mean equation	ARMA(1/1)	ARMA(2/2)	ARMA(1/0)	ARMA(1/2)	ARMA(2/2)	ARMA(1/1)	ARMA(2/2)
C	-0.001	-0.001	0.001	-0.001	0.000	0.000	0.000
p-values	0.008*	0.276	0.184	0.252	0.742	0.719	0.827
INDEX	0.547	0.593	0.536	0.837	0.219	0.128	0.696
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)	-0.787	0.460	-0.186	0.851	-1.371	0.403	1.787
p-values	0.000*	0.008*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(2)		-0.504			-0.656		-0.860
p-values		0.004*			0.000*		0.000*
MA(1)	0.798	-0.386		-0.743	1.371	-0.619	-1.830
p-values	0.000*	0.037*		0.000*	0.000*	0.000*	0.000*
MA(2)		0.398		-0.146	0.607		0.901
p-values		0.039*		0.000*	0.000*		0.000*
Variance equation	EGARCH(2/2)	EGARCH(2/1)	GARCH(1/1)	EGARCH(1/2)	GARCH(1/1)	EGARCH(2/2)	EGARCH(1/2)
C	-0.603	0.007	0.000	-0.357	0.000	-1.483	-0.654
p-values	0.025*	0.236	0.001*	0.000*	0.000*	0.000*	0.000*
α1	0.353	0.262	0.099	0.254	0.201	0.168	0.168
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
α2	-0.277	-0.273				0.091	
p-values	0.000*	0.000*				0.000*	
γ1	-0.013	-0.009		-0.067		-0.067	0.027
p-values	0.741	0.855		0.002*		0.000*	0.198
γ2	-0.049	0.000				-0.074	
p-values	0.327	0.992				0.000*	
β1	1.438	1.000	0.897	0.236	0.404	-0.058	0.439
p-values	0.000*	0.000*	0.000*	0.011*	0.000*	0.000*	0.105
β2	-0.503			0.743		0.900	0.494
p-values	0.001*			0.000*		0.000*	0.058
AIC	-5.596	-4.945	-4.377	-4.618	-6.083	-5.425	-5.206
R-square	13%	16%	13%	24%	4%	7%	12%
Residual diagnostics							
Box-Pierce Q test (residuals)							
Q(5)	7.7	0.4	3.9	1.4	1.0	5.0	2.2
p-values	0.052	0.537	0.419	0.491	0.313	0.174	0.137
Q(15)	13.2	11.2	12.1	12.4	5.9	12.0	5.3
p-values	0.430	0.424	0.601	0.413	0.882	0.528	0.914
Q(25)	19.3	22.6	22.5	24.2	12.1	18.7	27.0
p-values	0.683	0.365	0.549	0.339	0.937	0.719	0.172
Q(35)	30.4	41.6	27.3	35.7	18.2	33.0	37.8
p-values	0.595	0.097	0.785	0.298	0.967	0.470	0.187
Box-Pierce Q test (squared residuals)							
Q(5)	1.589	1.317	4.463	2.982	2.712	0.821	0.157
p-values	0.662	0.251	0.347	0.225	0.100	0.844	0.692
Q(15)	19.541	19.254	22.984	7.114	15.416	14.332	1.738
p-values	0.107	0.057	0.061	0.850	0.164	0.351	0.999
Q(25)	34.857	26.328	30.133	14.995	21.879	24.248	2.942
p-values	0.054	0.194	0.180	0.862	0.407	0.390	1.000
Q(35)	43.225	30.133	36.394	19.339	33.117	31.578	4.354
p-values	0.110	0.510	0.358	0.962	0.364	0.538	1.000
ARCH LM test							
p-values	0.993	0.750	0.287	0.528	0.358	0.989	0.997
Normality tests							
Skewness	-0.07	0.31	-0.24	-0.13	-0.66	0.23	-0.54
Kurtosis	4.63	5.10	10.73	9.67	6.72	7.88	10.61
Jarque-Bera	114.69	204.63	2554.78	1899.50	664.79	1024.97	2515.65
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.32: Model selection – South Africa - bad news - analyst coverage < 6

Stocks	SPG	SUI	APK	APK	BSR	BSR	BSR	BAT	COM	DAW	HCI	OMN	ART	EHS	ESR	MST	TSX
Mean equation	ARMA(0/0)	ARMA(2/1)	ARMA(1/1)	ARMA(2/2)	ARMA(2/2)	ARMA(0/0)	ARMA(2/2)	ARMA(0/0)	ARMA(0/1)	ARMA(0/0)	ARMA(0/1)	ARMA(2/2)	ARMA(2/0)	ARMA(1/1)	ARMA(2/2)	ARMA(1/1)	ARMA(1/2)
C	-0.001	0.000	0.000	-0.001	0.000	-0.002	-0.001	0.000	0.001	-0.001	0.000	0.001	0.000	0.000	-0.001	-0.001	-0.001
p-values	0.169	0.802	0.107	0.293	0.664	0.177	0.556	0.845	0.129	0.436	0.802	0.202	0.874	0.995	0.180	0.001*	0.131
INDEX	0.230	0.404	0.159	0.201	0.324	0.508	0.413	0.214	0.227	0.264	0.174	0.258	0.221	0.636	0.484	0.256	0.274
p-values	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
AR(1)		0.645	0.936		-0.021		0.409						0.063	0.851	-0.861	0.561	-0.994
p-values		0.000*	0.000*		0.924		0.008*						0.089	0.000*	0.000*	0.000*	0.000*
AR(2)		-0.134			0.652		-0.419						0.067		-0.976		
p-values		0.000*			0.002*		0.011*						0.048*		0.000*		
MA(1)		-0.557	-0.974		0.009		-0.418		-0.191		-0.078			-0.797	0.855	-0.661	0.752
p-values		0.000*	0.000*		0.970		0.002*		0.000*		0.058			0.000*	0.000*	0.000*	0.000*
MA(2)					-0.576		0.544								0.994		-0.245
p-values					0.013*		0.000*								0.000*		0.000*
Variance equation	EGARCH(2/2)	EGARCH(1/1)	EGARCH(2/1)	GARCH(1/1)	GARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	EGARCH(1/1)	EGARCH(2/2)	EGARCH(2/2)	EGARCH(2/2)	GARCH(1/1)	EGARCH(2/2)		GARCH(1/1)	EGARCH(2/1)	EGARCH(2/1)
C	-0.126	-0.006	-1.488	0.000	0.000	-3.188	0.001	-3.628	-2.971	-0.484	-0.143	0.000	-0.022		0.000	-0.137	-0.492
p-values	0.001*	0.497	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*		0.000*	0.000*	0.000*
α1	0.414	-0.012	0.409	0.194	0.091	0.485	0.270	0.535	0.524	0.270	0.284	0.102	0.342		0.103	0.420	0.413
p-values	0.000*	0.110	0.000*	0.000*	0.001*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*
α2	-0.350		-0.069		0.176	0.285			0.032	-0.220	-0.271		-0.342			-0.254	-0.256
p-values	0.000*		0.111		0.000*	0.000*			0.629	0.000*	0.000*		0.000*			0.000*	0.000*
γ1	0.119	-0.010	-0.087			-0.197		0.036	0.035	0.041	0.026		-0.053			-0.018	0.049
p-values	0.001*	0.000*	0.000*			0.000*		0.262	0.285	0.169	0.210		0.131			0.496	0.154
γ2	-0.154		0.216			0.072			0.124	-0.120	-0.094		0.030			-0.026	-0.091
p-values	0.000*		0.000*			0.011*			0.000*	0.001*	0.000*		0.399			0.318	0.004*
β1	1.072	0.998	0.831	0.621	0.182	-0.066	0.476	0.593	0.055	1.529	1.175	0.839	1.485		0.832	0.996	0.942
p-values	0.000*	0.000*	0.000*	0.000*	0.387	0.135	0.000*	0.000*	0.530	0.000*	0.000*	0.000*	0.000*		0.000*	0.000*	0.000*
β2	-0.082				0.343	0.614			0.569	-0.587	-0.192		-0.488				
p-values	0.502				0.053	0.000*			0.000*	0.000*	0.026*		0.000*				
AIC	-5.134	-5.439	-4.747	-4.991	-5.146	-3.182	-3.111	-5.136	-4.098	-4.888	-5.007	-5.229	-5.271	-4.505	-4.455	-4.872	-3.759
R-square	2%	15%	1%	1%	10%	0%	1%	2%	6%	3%	3%	6%	5%	15%	9%	3%	3%
Residual diagnostics																	
Box-Pierce Q test (residuals)																	
Q(5)	3.3	0.9	4.3	8.4	1.9	10.1	3.3	4.9	6.1	0.6	3.9	7.5	1.8	1.0	2.3	3.1	2.8
p-values	0.650	0.641	0.228	0.136	0.167	0.072	0.068	0.434	0.189	0.988	0.416	0.187	0.619	0.805	0.127	0.373	0.246
Q(15)	13.7	15.8	16.0	13.2	9.5	14.5	10.1	12.4	16.7	6.4	17.9	22.7	7.8	5.8	6.5	20.3	11.3
p-values	0.550	0.202	0.248	0.588	0.572	0.485	0.519	0.646	0.270	0.973	0.210	0.091	0.857	0.953	0.838	0.088	0.502
Q(25)	20.2	31.0	26.2	19.6	13.9	22.1	20.2	21.6	31.8	13.7	23.2	30.9	24.8	16.5	12.3	29.0	17.8
p-values	0.735	0.095	0.291	0.770	0.875	0.629	0.511	0.659	0.131	0.967	0.511	0.191	0.361	0.835	0.930	0.182	0.721
Q(35)	27.7	42.1	29.9	28.7	22.5	34.0	35.3	40.4	46.1	25.4	28.4	40.9	35.2	23.6	21.4	35.9	30.2
p-values	0.805	0.110	0.621	0.766	0.865	0.515	0.272	0.244	0.081	0.882	0.738	0.227	0.363	0.886	0.901	0.336	0.556
Box-Pierce Q test (squared residuals)																	
Q(5)	1.438	3.424	2.583	0.958	1.334	2.104	1.170	0.176	1.614	2.261	2.726	8.698	3.744	0.542	3.565	0.261	1.350
p-values	0.920	0.180	0.460	0.966	0.248	0.835	0.279	0.999	0.806	0.812	0.605	0.122	0.290	0.909	0.059	0.967	0.509
Q(15)	4.696	4.588	7.045	3.322	15.503	3.954	2.403	2.561	8.750	6.883	10.566	16.010	17.533	1.529	10.214	2.173	6.068
p-values	0.994	0.970	0.900	0.999	0.161	0.998	0.997	1.000	0.847	0.961	0.720	0.381	0.176	1.000	0.511	1.000	0.913
Q(25)	7.853	7.019	9.851	4.438	21.723	6.943	4.428	15.030	12.129	9.903	31.624	28.539	27.116	9.772	17.750	4.788	14.140
p-values	1.000	0.999	0.992	1.000	0.416	1.000	1.000	0.941	0.978	0.997	0.137	0.284	0.251	0.993	0.665	1.000	0.896
Q(35)	12.682	9.748	15.558	6.080	29.400	10.842	5.735	24.970	23.218	21.315	36.409	38.205	35.217	10.172	22.102	7.538	20.585
p-values	1.000	1.000	0.996	1.000	0.548	1.000	1.000	0.895	0.919	0.967	0.357	0.326	0.364	1.000	0.880	1.000	0.940
ARCH LM test																	
p-values	0.893	0.450	0.885	0.954	0.657	0.805	0.903	0.989	0.862	0.359	0.618	0.098	0.638	0.843	0.439	0.945	0.987
Normality tests																	
Skewness	0.03	-0.57	-0.75	-0.74	0.04	-1.45	-1.35	0.20	0.53	0.44	0.23	0.19	-0.14	-1.87	-0.13	-0.04	0.41
Kurtosis	8.60	9.64	17.43	20.83	5.56	22.34	20.26	6.34	16.34	7.64	19.70	10.57	5.95	24.50	5.55	32.73	9.13
Jarque-Bera	1337.26	1931.90	8977.87	13642.23	279.71	16304.59	13009.60	482.30	7635.85	949.58	11898.51	2449.66	375.62	20309.73	281.06	37671.47	1629.02
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Table B.32: (continued)

Stocks	DGC	HWN	AFX	HLM	TSX
Mean equation	ARMA(2/2)	ARMA(0/2)	ARMA(1/0)	ARMA(0/0)	ARMA(0/2)
C	-0.001	0.001	0.000	-0.002	-0.001
p-values	0.109	0.000*	0.958	0.017*	0.159
INDEX	0.159	0.115	0.222	0.203	0.161
p-values	0.000*	0.009*	0.000*	0.033*	0.069
AR(1)	-0.110		-0.110		
p-values	0.038*		0.003*		
AR(2)	0.853				
p-values	0.000*				
MA(1)	0.070	-0.114			-0.365
p-values	0.066	0.001*			0.000*
MA(2)	-0.922	-0.147			-0.070
p-values	0.000*	0.000*			0.042*
Variance equation	GARCH(1/1)	EGARCH(2/2)	EGARCH(2/1)	EGARCH(2/1)	GARCH(1/2)
C	0.000	-2.120	-0.438	-0.037	0.000
p-values	0.000*	0.000*	0.000*	0.000*	0.000*
α1	0.159	0.352	0.397	0.308	0.113
p-values	0.000*	0.000*	0.000*	0.000*	0.000*
α2		0.285	-0.296	-0.292	
p-values		0.000*	0.000*	0.000*	
γ1		-0.033	0.037	0.003	
p-values		0.080	0.304	0.926	
γ2		-0.119	-0.023	-0.047	
p-values		0.000*	0.483	0.154	
β1	0.733	-0.075	0.956	0.996	0.028
p-values	0.000*	0.000*	0.000*	0.000*	0.458
β2		0.852			0.698
p-values		0.000*			0.000*
AIC	-4.672	-5.056	-5.498	-4.405	-4.119
R-square	4%	2%	3%	0%	13%
Residual diagnostics					
Box-Pierce Q test (residuals)					
Q(5)	1.1	4.3	1.4	5.4	1.7
p-values	0.297	0.233	0.852	0.368	0.640
Q(15)	12.3	11.7	23.5	9.7	7.6
p-values	0.340	0.551	0.053	0.838	0.868
Q(25)	14.9	17.8	31.3	27.5	24.2
p-values	0.830	0.767	0.147	0.330	0.393
Q(35)	20.2	22.2	40.4	38.9	31.8
p-values	0.932	0.924	0.209	0.297	0.529
Box-Pierce Q test (squared residuals)					
Q(5)	2.070	0.943	3.113	2.491	1.428
p-values	0.150	0.815	0.539	0.778	0.699
Q(15)	7.122	3.554	7.311	6.226	8.014
p-values	0.789	0.995	0.922	0.976	0.843
Q(25)	11.502	7.985	12.716	17.088	16.038
p-values	0.952	0.998	0.971	0.879	0.854
Q(35)	13.192	17.880	17.076	19.806	19.461
p-values	0.998	0.985	0.993	0.982	0.970
ARCH LM test					
p-values	0.929	0.726	0.735	0.487	0.626
Normality tests					
Skewness	-0.20	1.29	-0.39	0.15	0.61
Kurtosis	7.94	15.08	6.92	7.26	6.85
Jarque-Bera	1045.47	6508.24	681.26	777.07	695.00
p-value	0.000*	0.000*	0.000*	0.000*	0.000*

APPENDIX C

EVALUATION OF ALTERNATIVE EXPECTED RETURN MODELS

C.1 Introduction

While deciding on which price formation model to use in order to calculate the expected returns, we considered several alternatives to our extended market model. Two of those alternatives have been suggested to us by the valuable members of our thesis supervisory committee and deserve special attention. While this dissertation did not use those two alternative models, future research may make use of them. Hence, we expand on them in the following sections.

C.2 Multifactor models

Single factor models, such as the market model, are frequently used in event studies of market reaction to firm specific events. The notion is that firm specific news should be reflected in the idiosyncratic component of the returns, ε in the market model. Our thesis supervising committee suggested adding other explanatory variables to the model to reduce the variance of ε, which is attributable to news other than the event in question. An improvement in the accuracy of expected return estimates and power of hypothesis tests was expected with this.

We have tried to implement this suggestion and used daily closing prices of Dow Jones Industrial Index, local 2 year bond rates, US 10 year bond rates, USD cross currency exchange rates, Brent oil price, Volatility Index (VIX) and Baltic Dry Index as explanatory variables besides the local market indices for each country.

Estimating multifactor models with so many variables for 1,002 events is practically impossible to do manually. To evaluate whether multifactor models offer any advantage over our extended market models, we have randomly selected 15 "good news" events in Turkey in order to compare the two models for a smaller sample. Then, we have estimated the multifactor models using Eviews stepwise least squares estimation function. Stepwise regression function allows some or all of the variables in a standard linear regression to be chosen automatically, using various criteria, from a set of variables (Eviews). The full length multifactor model we have tried to estimate is given below. Note that we have restricted the lag length at 2. The best fit models selected by Eviews are given in Table C.1.

$$\begin{aligned} R_{i,t} = \alpha_{i,t} &+ \beta_{1,i}R_{m,t} + \beta_{2,i}R_{VIX,t} + \beta_{3,i}R_{VIX,t-1} + \beta_{4,i}R_{VIX,t-2} + \beta_{5,i}R_{OIL,t} \\ &+ \beta_{6,i}R_{OIL,t-1} + \beta_{7,i}R_{OIL,t-2} + \beta_{8,i}R_{DJI,t} + \beta_{9,i}R_{DJI,t-1} \\ &+ \beta_{10,i}R_{DJI,t-2} + \beta_{11,i}R_{USDTRY,t} + \beta_{12,i}R_{USDTRY,t-1} \\ &+ \beta_{13,i}R_{USDTRY,t-2} + \beta_{14,i}R_{TR2Y,t} + \beta_{15,i}R_{TR2Y,t-1} \\ &+ \beta_{16,i}R_{TR2Y,t-2} + \varepsilon_{i,t} \end{aligned} \quad \text{(C.1)}$$

VIX stands for Volatility Index

OIL stands for Brent oil

DJI stands for Dow Jones Industrial Index

USDTRY stands for US Dollar versus Turkish Lira exchange rate

TR2Y stands for Turkish 2 year local currency government bond

Our results showed that the new variables we have added to the market models have no statistical importance for the dependent variable most of the time. Even when they have any statistical significance, their coefficients are substantially smaller than that of the local market return. This is coherent with MacKinlay's (1997) argument that in a multifactor model the most important factor behaves like a market factor and additional factors add relatively little explanatory power. The R^2 of the multifactor models were higher than the simple and extended market models we have forecasted. However, checking the AIC reveals that the extended market model is a better fit 9 times out of 15. Moreover, possible multicollinearity problems are also avoided using the market model.

Campbell et al. (1996) argues that multifactor models complicate the implementation of an event study and have limited advantages over the simple market model. Başdaş's (2013) review of 75 event studies on Turkish market between 1997 and 2013 reveals that none of those used a multifactor model. Finally, Brown and Weinstein (1985) compared the power of single and multifactor models for detecting abnormal returns. They concluded that there is no appreciable difference between the two.

In light of these evidences, we decided not to employ multifactor models in our study. They are cumbersome to estimate and the benefit of using them seems limited. That said, we think that multifactor models can be useful for index level studies.

Table C.1: AIC and R^2 of multifactor and simple market models[6]

	Multifactor models		Simple market model		Extended market model	
TICKER	**AIC**	**R^2**	**AIC**	**R^2**	**AIC**	**R^2**
YKBNK	-6,449	0,784*	-6,401	0,725	-6,485*	0,761
GARAN	-5,622	0,796*	-5,648	0,767	-5,820*	0,770
GOODY	-5,519*	0,391*	-5,496	0,200	-5,485	0,232
BANVT	-5,234	0,452*	-5,241	0,290	-5,244*	0,351
CLEBI	-5,544*	0,330*	-5,518	0,173	-5,514	0,175
SKBNK	-5,519*	0,714*	-5,517	0,638	-5,506	0,667
ISGYO	-5,772	0,635*	-5,802	0,573	-5,819*	0,608
AKENR	-3,568	0,326	-3,642	0,225	-4,111*	0,372*
AYGAZ	-5,273	0,660*	-5,264	0,565	-5,407*	0,556
DOAS	-5,321*	0,550*	-5,239	0,355	-5,311	0,423
THYAO	-4,864	0,373*	-4,916*	0,246	-4,916*	0,246
SODA	-5,397*	0,359*	-5,384	0,203	-5,381	0,266
TEBNK	-5,333	0,647*	-5,313	0,561	-5,343*	0,591
BRSAN	-4,980*	0,396*	-4,861	0,209	-4,964	0,266
YKSGR	-4,869	0,592*	-4,726	0,380	-4,996*	0,439

[6] Lowest AIC and highest R^2 are marked with *.

Table C.2: Multifactor model estimates for randomly selected stock

Ticker	YKBNK	GARAN	GOODY	BANVT	CLEBI	SKBNK	ISGYO	AKENR	AYGAZ	DOAS	THYAO	SODA	TEBNK	BRSAN	YKSGR
Coefficients															
C	0.001	0.002	0.003	-0.001	0.000	-0.003	-0.003	-0.004	-0.001	0.000	0.003	0.000	-0.004	0.000	0.001
p-values	*0.601*	*0.286*	*0.077*	*0.596*	*0.854*	*0.062*	*0,023**	*0.326*	*0.706*	*0.864*	*0.260*	*0.889*	*0,023**	*0.890*	*0.781*
INDEX	1.415	1.568	0.422	0.711	0.622	1.340	0.734	0.942	0.611	0.663	1.123	0.348	1.220	0.742	1.309
p-values	*0,000***	*0,000***	*0,000***	*0,000***	*0,000***	*0,000***	*0,000***	*0,000***	*0,000***	*0,000***	*0,000***	*0,005***	*0,000***	*0,000***	*0,000***
VIX	-0.010	-0.035		-0.043	-0.021				-0.030		-0.021		0.031	-0.079	0.037
p-values	*0.455*	*0.189*		*0,045**	*0.448*				*0.458*		*0.482*		*0.286*	*0,009***	*0.214*
VIX(-1)		-0.042	-0.074	0.027				-0.113		-0.032		-0.014	0.053		
p-values		*0.119*	*0.051*	*0.231*				*0.241*		*0.238*		*0.462*	*0.065*		
VIX(-2)			0.057						0.075	-0.053	0.036		-0.042	0.058	
p-values			*0.130*						*0.059*	*0,038**	*0.261*		*0.137*	*0.078*	
OIL		0.071	0.063	-0.124		0.078	0.075	-0.256	-0.080	0.153		-0.115	-0.254		0.229
p-values		*0.313*	*0.327*	*0.265*		*0.279*	*0.231*	*0.169*	*0.276*	*0.161*		*0.220*	*0.064*		*0.114*
OIL(-1)		0.071		0.115		-0.083		-0.205	-0.089	0.305	-0.210	-0.245			-0.202
p-values		*0.309*		*0.328*		*0.256*		*0.278*	*0.193*	*0,012**	*0.201*	*0,023**			*0.155*
OIL(-2)			-0.075			0.154			0.126		0.179	-0.138		0.176	
p-values			*0.266*			*0,027**			*0.123*		*0.274*	*0.135*		*0.190*	
DJI	-0.584		-0.091	0.309			-0.241			-0.325	-0.249	0.639			-0.477
p-values	*0,003***		*0.396*	*0.282*			*0,046**			*0.153*	*0.403*	*0,021**			*0.259*
DJI(-1)					-0.441	0.454	-0.172	-0.178	-0.149	-0.282	0.348	-0.228	-0.179		
p-values					*0.172*	*0,036**	*0.245*	*0.282*	*0.092*	*0.174*	*0.298*	*0.367*	*0.328*		
DJI(-2)			0.246	-0.711	0.248		0.146	-0.331		-0.689		0.424			0.647
p-values			*0,021**	*0.051*	*0.341*		*0.404*	*0.097*		*0,002***		*0.122*			*0.230*
USDTRY		0.099		-0.152			0.325	0.262	-0.165	-0.108	-0.517			0.231	
p-values		*0.403*		*0.293*			*0.195*	*0.300*	*0.109*	*0.322*	*0,025**			*0.091*	
USDTRY(-1)					-0.139	-0.176	-0.440		0.326		0.213			-0.203	0.254
p-values					*0.335*	*0.187*	*0.079*		*0,002***		*0.378*			*0.086*	*0.142*
USDTRY(-2)	-0.066			-0.101				-0.305	-0.199	-0.255	-0.299	0.151	0.119		-0.290
p-values	*0.483*			*0.467*				*0.196*	*0,037**	*0,010***	*0.215*	*0.276*	*0.480*		*0.109*
TR2Y	-0.593		-0.350		-0.604		-0.537	0.510		-0.573				0.410	-0.705
p-values	*0.0780*		*0.0621*		*0.2443*		*0.0245*	*0.0902*		*0.0664*				*0.1371*	*0.0729*
TR2Y(-1)		0.148		-0.178		0.629	0.378		-0.372	-0.232				0.485	1.150
p-values		*0.279*		*0.488*		*0,032**	*0.104*		*0,007***	*0.449*				*0.107*	*0,004***
TR2Y(-2)	0.303		0.440	-0.679		0.331	0.265	-0.506	0.208	-0.760	0.852			-0.777	
p-values	*0.293*		*0,029**	*0,028**		*0.176*	*0.098*	*0.165*	*0,030**	*0,018**	*0.219*			*0,004***	

*99% confidence **, 95% confidence **

Table C.2: (continued)

Ticker	**YKBNK**	**GARAN**	**GOODY**	**BANVT**	**CLEBI**	**SKBNK**	**ISGYO**	**AKENR**	**AYGAZ**	**DOAS**	**THYAO**	**SODA**	**TEBNK**	**BRSAN**	**YKSGR**
Coefficients															
US10Y	0.091				0.131	-0.141			-0.080				-0.136		
p-values	*0.157*				*0.114*	*0.193*			*0.084*				*0.061*		
US10Y(-1)			-0.051		0.230	-0.093		0.171	0.069		0.128	0.155	-0.096	-0.072	
p-values			*0.228*		*0,018**	*0.422*		*0.108*	*0.196*		*0.294*	*0,036**	*0.340*	*0.362*	
US10Y(-2)		-0.047	-0.061	0.196			-0.099		-0.088			0.060	-0.111		0.634
p-values		*0.320*	*0.197*	*0,047**			*0.270*		*0.072*			*0.404*	*0.127*		*0,023**
BALTIC	0.081	0.059		0.149	0.219	0.252				-0.076	-0.203		0.120		1.282
p-values	*0.435*	*0.338*		*0.261*	*0,034**	*0,020**				*0.486*	*0.199*		*0.203*		
BALTIC(-1)	-0.376		0.133	0.136	-0.158	-0.138								0.513	-1.498
p-values	*0,009***		*0.088*	*0.297*	*0.121*	*0.204*								*0,034**	*0,008***
BALTIC(-2)	0.422		-0.184					0.087	-0.048					-0.418	0.587
p-values	*0,000***		*0,019**					*0.492*	*0.350*					*0.071*	*0.103*

C.3 Market model with exceptional days as independent variable

Another valuable suggestion we received while trying to decide which price formation model to use was adding the so called "exceptional days" as independent variable to our market model. A similar study was done by Altazli (2014) to estimate multifactor models for the Turkish stock market index BIST30, as well as, for three trading volume based sub portfolios. He used an ARMA(1,1) – GARCH(1,1) model to calculate the one step ahead in sample VaR for BIST30 stocks. The VaR model is intuitively compelling since extremes are endogenously derived from actual price movements. Days on which price movements exceed the VaR in both directions were marked as "exceptional days". The author then estimated a multifactor market model to which he added a dummy variable that takes the value "1" on exceptional days and "0" otherwise. The dummy variable was found statistically significant and had a bigger coefficient than the coefficients of other variables in the model.

Members of our thesis supervisory committee suggested us to add a dummy variable to our market model, too. That way we would be calculating the one-step ahead VaR by taking into account the extreme price movement the day before. We tried this approach but ultimately decided to spare it for future research. The main reason was that the improvement achieved in the simple market model through adding exceptional days looked limited. We applied the exceptional days approach to a sample of 83 good news events in Turkey, to check its advantages over the simple market model. We have used an estimation period of 1000 days which ends 6 days before the event day. Using an ARMA(1,1) – GARCH(1,1) model we have identified exceptional days when the daily returns of the stocks exceeded the 5% VaR. Below graph shows the frequency of exceptional days in the estimation window (number of exceptional days divided by the total number of observations in the estimation window).

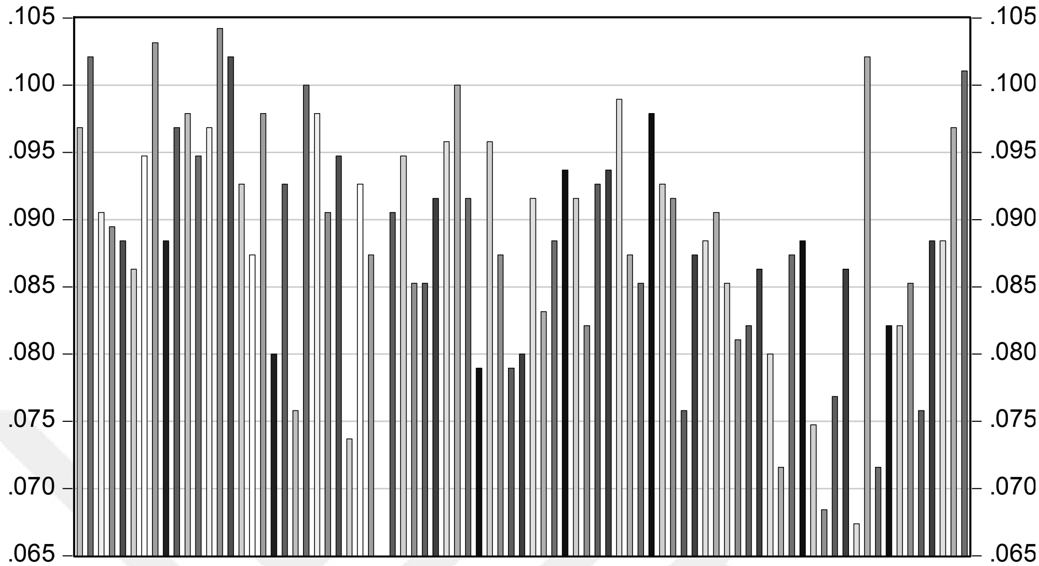

Figure C.1: Number of exceptional days in the estimation period for each of the 83 events in % terms

Then, we estimated the simple market model by adding the exceptional days as dummy variables, just as Altazli (2014) did. Our results showed that exceptional days were statistically significant variables in most of the models. However, their coefficients were substantially lower than that of the index. Hence, the improvement in the explanatory power of the simple market model was limited when exceptional days were added to the model.

Finally, although we left the exceptional days approach outside of the scope of this thesis, we believe that using it at index level studies may be an interesting expansion.

Table C.3: Market model with exceptional days

	Market model with exceptional days								Simple market model	
Event	Coefficients			p values			AIC	R^2	AIC	R^2
	C	Index	Excep. day	C	Index	Excep. day				
Event 1	0.000	1.328	-0.001	0.730	0.000**	0.328	-6.027	72.2%	-6.029	72.2%
Event 2	0.000	1.358	0.004	0.978	0.000**	0.008**	-5.573	78.6%	-5.567	78.5%
Event 3	0.000	1.280	0.002	0.511	0.000**	0.412	-5.303	71.2%	-5.304	71.2%
Event 4	-0.001	0.854	0.011	0.236	0.000**	0.000**	-5.128	41.5%	-5.101	39.7%
Event 5	0.000	0.534	0.006	0.965	0.000**	0.029	-4.794	21.0%	-4.791	20.6%
Event 6	-0.001	0.757	0.009	0.270	0.000**	0.001**	-4.780	34.2%	-4.771	33.4%
Event 7	0.000	0.977	0.012	0.803	0.000**	0.000**	-5.304	41.2%	-5.267	38.9%
Event 8	0.000	1.040	0.008	0.532	0.000**	0.000**	-5.042	64.7%	-5.027	64.1%
Event 9	-0.002	0.809	0.013	0.040	0.000**	0.000**	-4.709	35.9%	-4.685	34.2%
Event 10	0.000	1.008	0.001	0.655	0.000**	0.536	-5.025	52.2%	-5.027	52.2%
Event 11	-0.001	0.842	0.009	0.283	0.000**	0.001**	-4.530	29.8%	-4.521	29.0%
Event 12	-0.001	1.060	0.009	0.194	0.000**	0.000**	-5.328	63.3%	-5.305	62.4%
Event 13	0.000	0.778	-0.001	0.574	0.000**	0.454	-5.270	45.6%	-5.272	45.5%
Event 14	0.000	0.956	0.005	0.671	0.000**	0.015	-4.935	44.7%	-4.931	44.4%
Event 15	-0.001	1.044	0.008	0.168	0.000**	0.000**	-5.494	59.5%	-5.470	58.4%
Event 16	0.000	0.911	0.003	0.786	0.000**	0.078	-5.364	55.7%	-5.362	55.5%
Event 17	0.000	0.714	0.005	0.513	0.000**	0.025	-5.286	41.1%	-5.283	40.8%
Event 18	-0.001	0.769	0.007	0.320	0.000**	0.000**	-5.509	34.3%	-5.490	32.9%
Event 19	-0.001	0.947	0.011	0.091	0.000**	0.000**	-5.010	46.3%	-4.988	45.0%
Event 20	-0.001	0.795	0.008	0.291	0.000**	0.000**	-5.327	45.1%	-5.308	44.0%
Event 21	-0.001	0.785	0.008	0.238	0.000**	0.000**	-5.602	39.8%	-5.585	38.6%
Event 22	0.000	0.731	0.005	0.681	0.000**	0.101	-4.497	25.9%	-4.497	25.7%
Event 23	-0.002	0.810	0.011	0.001**	0.000**	0.000**	-5.395	45.0%	-5.360	42.9%
Event 24	-0.001	0.789	0.011	0.184	0.000**	0.000**	-5.066	41.8%	-5.041	40.1%
Event 25	-0.001	1.047	0.005	0.428	0.000**	0.012	-5.096	57.4%	-5.092	57.1%
Event 26	-0.002	0.752	0.035	0.161	0.000**	0.000**	-3.921	27.0%	-3.852	21.6%
Event 27	-0.001	0.934	0.009	0.143	0.000**	0.000**	-4.889	56.0%	-4.874	55.2%
Event 28	-0.002	0.988	0.016	0.004**	0.000**	0.000**	-5.222	48.8%	-5.163	45.6%
Event 29	-0.001	1.094	0.001	0.661	0.000**	0.588	-4.788	46.6%	-4.790	46.6%
Event 30	-0.001	1.332	0.005	0.231	0.000**	0.011	-5.188	71.9%	-5.184	71.7%
Event 31	-0.001	1.050	0.010	0.182	0.000**	0.000**	-4.706	48.4%	-4.691	47.5%
Event 32	-0.001	0.987	0.009	0.441	0.000**	0.000**	-4.952	35.4%	-4.941	34.5%
Event 33	-0.001	0.851	0.009	0.083	0.000**	0.000**	-5.400	57.1%	-5.379	56.2%
Event 34	0.000	0.918	0.014	0.581	0.000**	0.000**	-5.063	53.1%	-5.019	50.9%
Event 35	-0.001	0.754	0.012	0.299	0.000**	0.000**	-5.219	46.3%	-5.180	44.0%
Event 36	-0.001	0.656	0.007	0.296	0.000**	0.001**	-5.179	34.8%	-5.168	34.0%
Event 37	-0.001	0.717	0.011	0.137	0.000**	0.000**	-5.381	28.9%	-5.349	26.4%
Event 38	-0.001	0.712	0.013	0.306	0.000**	0.000**	-5.028	45.9%	-5.000	44.2%
Event 39	-0.001	1.065	0.020	0.567	0.000**	0.000**	-4.284	37.3%	-4.243	34.6%
Event 40	-0.001	0.692	0.024	0.064	0.000**	0.000**	-4.791	43.9%	-4.705	38.8%
Event 41	-0.002	0.709	0.030	0.001**	0.000**	0.000**	-4.962	39.1%	-4.813	29.2%
Event 42	-0.002	0.624	0.034	0.026	0.000**	0.000**	-4.659	29.4%	-4.524	19.0%
Event 43	-0.001	0.752	0.017	0.064	0.000**	0.000**	-4.980	24.1%	-4.928	19.8%
Event 44	-0.003	1.029	0.031	0.007**	0.000**	0.000**	-4.211	31.2%	-4.133	25.4%
Event 45	-0.001	1.002	0.021	0.128	0.000**	0.000**	-4.509	37.3%	-4.459	33.9%
Event 46	-0.001	1.032	0.011	0.320	0.000**	0.000**	-5.033	39.4%	-5.007	37.7%
Event 47	-0.002	0.846	0.019	0.021	0.000**	0.000**	-4.479	24.9%	-4.437	21.6%
Event 48	-0.001	0.807	0.018	0.489	0.000**	0.000**	-4.342	26.4%	-4.313	24.1%
Event 49	-0.002	1.020	0.008	0.045	0.000**	0.004**	-4.459	38.8%	-4.453	38.2%
Event 50	-0.001	0.996	0.031	0.142	0.000**	0.000**	-4.200	31.7%	-4.111	25.2%
Event 51	-0.002	1.146	0.012	0.028	0.000**	0.000**	-4.533	47.6%	-4.514	46.4%
Event 52	-0.002	0.880	0.021	0.012	0.000**	0.000**	-5.111	32.8%	-5.019	26.2%
Event 53	-0.001	0.636	0.009	0.102	0.000**	0.000**	-5.412	26.6%	-5.392	25.0%
Event 54	-0.001	0.705	0.015	0.158	0.000**	0.000**	-4.845	27.6%	-4.806	24.5%
Event 55	-0.001	0.586	0.009	0.151	0.000**	0.000**	-4.810	22.4%	-4.798	21.3%
Event 56	-0.001	0.904	0.015	0.058	0.000**	0.000**	-4.981	39.1%	-4.936	36.2%
Event 57	-0.001	0.531	0.019	0.289	0.000**	0.000**	-5.286	21.0%	-5.205	14.1%
Event 58	-0.001	1.172	0.007	0.166	0.000**	0.004**	-4.827	54.9%	-4.820	54.5%
Event 59	-0.002	1.034	0.023	0.019	0.000**	0.000**	-4.247	35.0%	-4.198	31.7%
Event 60	-0.001	0.752	0.022	0.066	0.000**	0.000**	-4.727	27.3%	-4.657	21.9%
Event 61	-0.001	0.514	0.040	0.147	0.000**	0.000**	-4.344	22.8%	-4.197	10.3%
Event 62	-0.001	0.934	0.015	0.411	0.000**	0.000**	-4.373	42.8%	-4.353	41.5%
Event 63	-0.002	0.848	0.015	0.032	0.000**	0.000**	-4.694	32.6%	-4.665	30.4%
Event 64	-0.001	0.926	0.023	0.193	0.000**	0.000**	-4.453	24.8%	-4.398	20.3%
Event 65	-0.001	0.896	0.022	0.229	0.000**	0.000**	-4.468	31.8%	-4.417	28.1%
Event 66	-0.003	0.716	0.025	0.006**	0.000**	0.000**	-4.244	14.2%	-4.199	10.1%
Event 67	-0.002	0.585	0.014	0.033	0.000**	0.000**	-4.495	15.6%	-4.472	13.4%
Event 68	-0.002	0.699	0.022	0.093	0.000**	0.000**	-4.309	23.4%	-4.262	19.5%
Event 69	-0.001	0.793	0.027	0.094	0.000**	0.000**	-4.592	20.5%	-4.514	13.9%
Event 70	-0.003	0.474	0.035	0.019	0.000**	0.000**	-3.987	10.2%	-3.922	4.0%
Event 71	-0.001	0.659	0.006	0.099	0.000**	0.013	-4.876	29.9%	-4.871	29.5%
Event 72	-0.001	0.721	0.022	0.127	0.000**	0.000**	-4.843	34.0%	-4.767	28.6%
Event 73	-0.001	0.794	0.012	0.119	0.000**	0.000**	-5.616	41.8%	-5.575	39.3%
Event 74	-0.002	0.936	0.020	0.011	0.000**	0.000**	-4.492	36.6%	-4.443	33.2%
Event 75	-0.002	0.595	0.027	0.046	0.000**	0.000**	-4.648	25.5%	-4.566	19.0%
Event 76	-0.001	0.775	0.008	0.259	0.000**	0.002**	-4.715	31.7%	-4.707	31.1%
Event 77	-0.002	0.828	0.022	0.026	0.000**	0.000**	-4.725	41.0%	-4.662	37.0%
Event 78	-0.001	0.635	0.015	0.266	0.000**	0.000**	-4.701	25.3%	-4.672	22.9%
Event 79	-0.002	0.875	0.030	0.031	0.000**	0.000**	-4.392	30.4%	-4.308	24.2%
Event 80	-0.002	0.743	0.026	0.031	0.000**	0.000**	-4.569	22.6%	-4.482	15.4%
Event 81	-0.003	0.632	0.027	0.032	0.000**	0.000**	-3.807	10.2%	-3.765	6.1%
Event 82	-0.002	0.955	0.023	0.035	0.000**	0.000**	-4.260	27.8%	-4.207	23.6%
Event 83	-0.002	0.815	0.019	0.019	0.000**	0.000**	-4.374	26.5%	-4.333	23.3%

*99% confidence **, 95% confidence **

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