MARKET REACTION TO RIGHTS OFFERING ANNOUNCEMENTS IN THE TURKISH STOCK MARKET

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ABSTRACT

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This study examines the market reaction to rights offering announcements in Turkey. Even though the topic is extensively studied in the finance literature, there is still research going on for emerging markets. The first part of this study measures market reaction to rights offering announcements for six different information arrival dates. The results are significantly negative except for the case of the announcement of the rights offering period. Additionally, the sample is divided into two sub-periods as before and after the 2001 crisis. The results show that there is a significant difference in market reaction and this difference is attributed to the change in economic policy after the 2001 crisis. The second part of the study examines the determinants of this market reaction and the findings suggest that bonus issues are positively related and there is also evidence that firms time their equity issues. The third part analyzes the long term performance of equity issuing firms in two subgroups as financial and non-financial firms. The results provide evidence of a negative performance and this finding is consistent with the results of previous studies.

Keywords: Rights Offering, Seasoned Equity Offering, Pecking Order Theory, Information Asymmetry, Event Study

ÖZ

TÜRK HİSSE SENEDİ PİYASASINDA RÜÇHAN HAKKI KULLANIMI DUYURULARINDA OLUŞAN PİYASA TEPKİSİ

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Bu çalışma İMKB'deki rüçhan hakkı duyurularına piyasanın verdiği tepkiyi incelemektedir. Bu konu finans literatüründe geniş ölçüde çalışılmış olsa da gelişmekte olan piyasalardaki araştırmalar hala devam etmektedir. Rüçhan hakkı sürecinde altı farklı olay günü mevcuttur. Bu olaylardan her birinde piyasaya bilgi ulaşır. Bu çalışmanın ilk bölümünde bu altı farklı olay günündeki piyasa tepkisi ölçülmüştür. Sonuçlar, bu tepkilerin, biri haricinde olumsuz olduğunu göstermiştir. Buna ek olarak, örneklem 2001 krizi öncesi ve sonrası olmak üzere iki alt gruba bölünmüştür. Sonuçlar, bu iki alt grup arasında istatistiksel olarak anlamlı bir fark olduğunu ortaya koymuştur. Bu fark, 2001 krizinden sonra hükümetin izlemiş olduğu ekonomik politikaya dayandırılmıştır. Çalışmanın ikinci kısmında ise piyasa tepkisinin belirleyicileri incelenmiştir. Bulgular, bedelsiz sermaye artırımı ile birlikte yapılan rüçhan hakkı duyurularının market tepkisi ile pozitif bir ilişkide olduğunu ve şirketlerin rüçhan hakkı duyurularında zamanlama yaptığını göstermiştir. Üçüncü kısımda sermaye artırımına giden firmalar finansal ve finansal olmayan olmak üzere iki alt gruba bölünmüştür ve literatürle tutarlı biçimde uzun vadeli performanslarının olumsuz olduğunu ortaya konmuştur.

Anahtar Kelimeler: Rüçhan Hakkı, İkincil Halka Arzlar, Hiyerarşi Teorisi, Bilgi Asimetrisi, Olay Çalışması

To my family

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CHAPTER 1

INTRODUCTION

1.1 Capital Needs of Firms

A firm is a dynamical phenomenon. It evolves through time. During its evolution, it may need to raise capital for some reasons such as financing new investment opportunities, paying its debts or changing its capital structure. As financial markets develop and regulations are better set, capital needs of firms are met by different methods. These financing methods can roughly be classified as internal and external. In internal financing, as the name suggests, firms' own earnings of its business processes are used to raise capital. In external financing, firms fulfill their capital needs from outsiders. External financing can be of the form debt or equity. There are mainly two types of equity offers. A firm can go public by making an initial public offering (IPO) and start to be traded in the stock market. Or, a firm may have already gone public and makes an equity offering which is called "Secondary (Seasoned) Equity Offering (SEO)". The type of equity offers that are subject of this study is seasoned equity offerings.

1.2 Capital Structure and Related Theories

One of the important corporate decisions is the amount of debt and equity of a firm and this phenomenon is simply called capital structure. It is an important factor that determines the value of a firm. There are some important capital structure theories in finance literature. An essential one is Modigliani and Miller [39] which states that the firm value is irrelevant of the capital structure. The theory was too simplistic to be applied to reality. Five years later, Modigliani and Miller [40] found that taking corporate taxation into consideration helps to understand the empirical evidences. This theory simply says that firms should only use debt to increase capital since it helps to create tax shielding. After two simplistic theories, a more realistic theory emerged. It is static trade-off theory which simply states that there is a trade-off between tax shields and bankruptcy costs. More debt results in more tax advantage but it also increases bankruptcy or financial distress costs. So, there is an optimum capital structure for firms and they choose capital raising methods in order to stay at optimum.

This study will be based on a different theory called "Pecking Order Theory". It is developed by Myers [41]. This theory explains the order of firms' financing choice order. According to the

theory, firms deplete their internal resources in the first place to raise capital. If a firm still needs financing, it uses external financing in the order of debt and equity. The basic difference of this theory from static trade-off theory is that firms' capital decisions are not based on staying at optimum but to follow an order among different alternatives. In a theoretical framework, the reason behind this order is explained in detail in Myers and Majluf [42] and Myers [41]. The key points are summarized as follows. First, external financing has explicit costs such as administrative and underwriting. Moreover, the issued securities are underpriced. Security underpricing and those explicit costs may lead the firm not to issue so that positive NPV (Net Present Value)[1] projects are forgone. Second, if the asymmetric information between the managers and shareholders is large in terms of security overvaluation, the managers try to issue a security that creates less asymmetry. In other words, the manager issues safer securities such as debt. The word "safe" here means that no asymmetry related to managers' insider information. As a result, the dilution of true value of existing shares will be minimized. To put in other words, managers do not issue equity but debt in case the shares are undervalued. If the shares are overvalued, the manager may take advantage of overvaluation by issuing equity. However, the investors may be aware of the overvaluation and they, who are supposed to know Pecking Order Theory, pose a negative reaction resulting in share price decline, which decreases the firm equity value. In conclusion, the theory states that firms are forced to follow the order of internal financing, debt and equity to fulfill their capital needs and maximize shareholder wealth.

There are other generally accepted explanations for negative stock price reaction to equity issues. First one of them is based on Jensen's free cash flow theory [45]. According to Jensen's theory, equity offerings supply managers with more free funds which can be used inefficiently such as investing in negative NPV projects or overinvesting and wasting by managers. However, debt is like a commitment to the creditors so overall organizational efficiency will be higher to pay back these future commitments. The more free cash to managers, the more agency costs will there be. As a result, market reacts negatively to equity offerings. The second is the study by Miller and Rock [37] in a theoretical framework. They argue that equity offerings may be perceived as less than expected internal funds or profitability, and this leads to a negative market reaction. A last and an old theory by Scholes [48] tries to explain negative market reaction to equity issues by price pressure hypothesis. It basically states that if the demand curve of equity of a firm has negative slope, then the supply by additional equity will decrease the value of existing shares. This idea, in fact, is at a conflict with the idea that there are perfect substitutes of a firm's securities in the capital markets. To put in other words, price pressure hypothesis assumes that security returns, or risk-return characteristics, cannot be replicated by other capital market instruments.

[1] NPV of a project is today's value of its cash flows discounted at an appropriate discount rate.

1.3 Pecking Order Theory and Turkey

There are many studies that argue the validity of the Pecking Order Theory. These studies do not have the same findings. They will be stated and examined in the literature review part. The distinct part of this study from the other studies is that Turkey is a developing economy and has incomplete financial markets. Istanbul Stock Exchange was established in 1986 and it can be considered as a new stock market. As of 31 December 2010, S&P[2] and of May 2010, Dow Jones[3] classify Turkey as an emerging market. However, most of the studies are carried out in financially developed markets. The main distinction of Turkey is that there is not a developed bond market so the firms use bank credit extensively for debt financing. Related to this issue, inflation rates in Turkey ran high for many years. The high inflation rates resulted in high interest rates. There was also a political instability due to frequent government changes until 2002. There were nine different governments (some with coalitions) between 1994 and 2001, and just two (the same political party) between 2002 and 2011.[4] Moreover, ongoing budget deficits were financed by frequent high interest debt issues of the governments. Therefore, interest rates became higher and these conditions discouraged banks to supply long-term credit to the firms[21]. However, the new government started an economic policy to struggle with high inflation rates and it proved to be useful and caused interest rates to decline.

The financing alternatives of firms in Turkey are restricted due to the above mentioned issues. The firms are somehow bound to raise capital by equity issues. This fact can be observed in Figure 1.

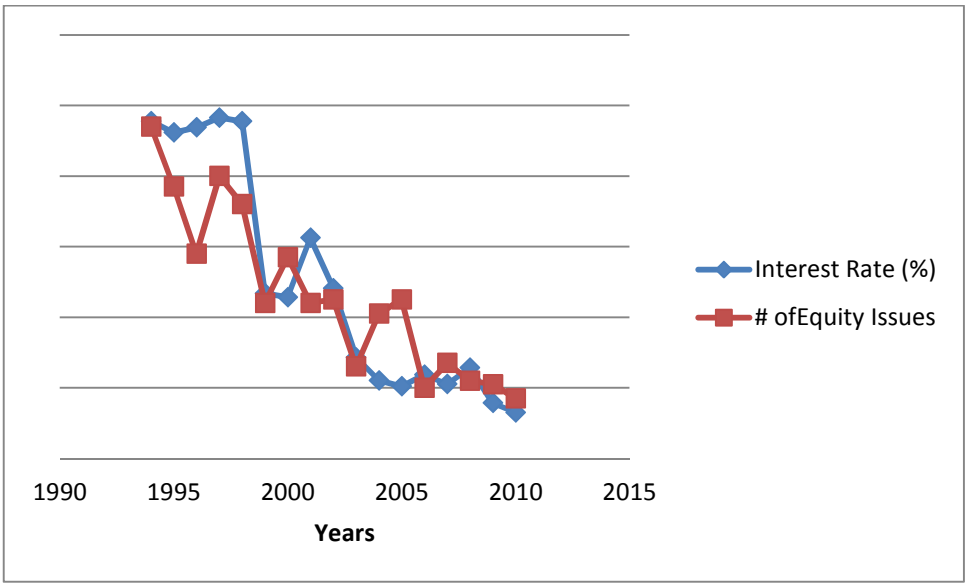

Figure 1 Time Series Data of Interest Rates and Number of Equity Issues

[2] The S&P Global Broad Market Index 31 December 2010; p.2.
[3] Dow Jones Total Stock Market Index May 2010.
[4] See http://www.tbmm.gov.tr/hukumetler/hukumetler.htm (in Turkish)

As it can be seen from Figure 1, the number of equity issues decline as the interest rates decline. As a result of declining interest rates and economic stability, the banks are more inclined to lend money to firms. Hence, the firms prefer borrowing from the banks instead of issuing equity in this bank-based economy. This is an evidence of the argument about the relation between interest rates and equity issues in Turkey. As a result, the investors may not perceive the equity issues in Turkey as a negative signal about the firms' future prospects. In contrast, the reaction may be positive since the market may think of that the firm issues equity to finance positive NPV projects. It is also essential to point out some specific features of Turkish stock market. First, a distinctive feature of Turkish market is that rights offering[5] is the dominant[6] method to issue equity like of Europe markets. Compared to seasoned equity offerings, rights offerings, by nature, cause less information asymmetry between the managers and shareholders. The reason can be explained as follows. The rights are directly issued to the existing shareholders. However, in seasoned equity offerings the new shares are issued to public. Since the existing shareholders are more informed about the firm, this should lead to less information asymmetry. Issuing equity through a rights offering is the mandatory for Turkish firms and for firms in many other European countries which have bank-based financial systems instead of a market-based system. Second, there is no subscription price in a rights offering and, as a result, underpricing is not possible on the part of the issuer. This feature is important in testing the Pecking Order Theory. An adverse selection problem arises when the firm issues equity. The firm may have very profitable projects and may set the subscription price at a discount in order to guarantee the success of the issue but investors may perceive this discount as an overvaluation signal. However, as a result of no subscription price, such an overvaluation signal is not possible in the Turkish market as Adaoglu [2] suggests.

[5] Rights offering is an equity issue method which gives the existing shareholders the right to buy newly raised capital on a pro rata basis.
[6] Private placements are also used.

CHAPTER 2

LITERATURE REVIEW

The literature review part is organized into three separate parts. The first part provides an overview of the literature related to the tests of market reaction to equity offerings. The second part presents studies that analyze the determinants of market reaction. The third part summarizes studies that focus on the long-run stock performance of equity issuing firms.

2.1 Literature Review for Market Reaction

This part is not only a literature review but also a discussion of possible explanations to market reactions in different markets. The discussion starts with US markets and moves onto the non-US markets such as Europe and Asia.

After the theoretical foundations of Pecking Order Theory, many studies are conducted to test it empirically. A study before Myers [41], White and Lusztig [57] found empirical evidence that announcement of rights issue causes negative stock returns. Just after the Pecking Order Theory is established in 1984, a study by Mikkelson and Partch [36] revealed that market reaction is statistically negative for common stock and convertible debt issues. Moreover, average reaction to preferred stock and straight debt issues is insignificant. These findings are consistent with the Pecking Order Theory since those two issue types are not safer than direct debt and the reasons are attributed to the reasons of information asymmetry between investors and managers. Masulis and Korwar [36] also have supporting results since the market reaction is found to be negative and there is evidence that firms issue equity after stock price run-ups. Therefore, one can conclude that managers take advantage of overvaluation. Asquith and Mullins [4] have the same evidence after controlling for industrial and public firms. Likewise, Denis [15] documented negative announcement abnormal returns both for shelf and non-shelf offerings[7]. Shyam-Sunder and Myers [50] compared the static trade-off model and the pecking order independently by empirical tests. Both capital structure models are validated independently. However, in a joint model in the same study, pecking order theory showed a greater statistical power.

[7] In a shelf offering, the firm registers some amount of new securities to be issued but does not necessarily issue all in one time.

There are studies in the framework of Miller and Rock [37]. The study by Jensen, Solberg, Zorn [26] indicates that firms set their dividend policy in a way that they prioritize internally generated funds to raise capital for investment opportunities. A similar argument is shown by Allen [3] by confirming a negative correlation between past profitability measures, or dividend policy, and current debt levels in Australian market. These studies show that firms do not raise capital by equity unless they signal positive prospects. However, Denis [16] showed that even the firm has high growth prospects and profitable investment opportunities; market reaction to equity offerings appears to be non-positive. In addition to this finding, Jung, Kim and Stulz [27] found that equity issuing firms with profitable investment opportunities experience less negative abnormal returns compared to the firms with poor investment opportunities. Nevertheless, the reaction by the market is negative for both as the Pecking Order Theory suggests.

There is a high volume of research about the market reaction of equity issues. Some studies examine market reaction by controlling for underwriter certification. They question why firms do not use rights offering even the flotation costs are lower. Eckbo and Masulis [17] examine the reasons of disappearing rights issues in US market. They address the adverse selection problem in offering method choice. In their study, they found significant negative abnormal return to rights offering announcements even after controlling for the offer method. A similar study examining the offering method choice [51] in UK market reveals that, no matter the offering method, two day average abnormal return is negative around the rights announcement day. Gajewski and Ginglinger [19] revealed that rights offerings in France also result in negative two day average excess returns for stand-by rights[8] and uninsured rights[9]. Similarly, Kabir and Roosenboom [28] found gradually increasing negative reaction in Dutch market.

After all negative market reaction findings, one can ask the question “Why do firms issue equity, then?” and “Is the market correct about the equity issuing firm?” The studies in the literature do not all agree with the validity of Pecking Order Theory. Probably not only being the only two studies, Viswanath [55] and Helwege and Liang [22] argue that firms may deviate from Pecking Order Theory. The stated reason is that the managers may not want to miss the chance of profitable future projects and they make their decisions based on the trade-off between the dilution of issuing equity and NPV of the project. The empirical evidence is given by Helwege and Liang [22] in the framework of firms issuing equity after making initial public offering.

[8] A type of agreement that obliges the underwriter to buy the unsold shares
[9] In this type of agreement, the underwriter is not obliged to buy the remaining shares.

From the results of most studies, it can be inferred that market reacts negatively to equity offerings. The widely used explanation is based on Pecking Order Theory. The common thing in those studies is that they were carried out in US market which can be considered as the most developed capital market. As a matter of fact, there is not any significant research about market reaction to equity offerings in US after 2000. However, the researchers started to examine non-US markets such as European markets and emerging markets. The results are quite different from US market. One of the researches conducted in European market is the study of Bohren et.al. [9] SEOs in Oslo Stock Market are examined in the framework of offering choice between stand-by underwriting and uninsured rights. Average two-day announcement period abnormal return is found to be positive for uninsured rights and very small negative (-0.23%) but insignificant in stand-bys. Another study by Bigelli [8] from another European country, Italy, concludes that the overall market reaction to rights issues is positive in Italian stock market but it is not significant. However, it is significantly positive when the firm makes the offering together with stock dividend. The researcher calls it quasi-split effect. The same argument is presented in Berglund et al. [9] for the Finnish market with a finding of positive abnormal return for rights offering together with stock dividends. Continuing from European markets, the study by Muradoglu and Aydogan [43] reveals that the market reaction to equity offerings is dynamic in Turkey. By examining different sub-periods between 1988 and 1994 they conclude that the market reaction becomes significantly positive as the market matures and information dissemination improves. The sample period does not coincide with this study's sample period. Still, it is a strong evidence for positive market reaction in Turkey. In addition to this study, Adaoglu [43] shows that the market reaction to right issues with bonus issues are significantly positive and they are negative when there is no bonus issue together with the offering. Bonus issue case is elaborated in the second part of literature review. Another study by Tsangarakis [54] from Greece market found positive market reaction to rights issues. Greek market is similar to Turkish market in the sense that right offering is the conventional method of issuing equity and there is not a developed bond market in both countries. Furthermore, the researcher explains the positive reaction by ownership concentration which decreases the severity of asymmetric information.

The studies about seasoned equity issues are not restricted to US and European markets. There exist studies in Asia and Pacific region. One of them is the study by Kang and Stulz [29]. Their findings differ from US market. The market reaction is positive to overall equity type issues and also positive for rights offerings. The reasons are explained through market characteristics such as market inefficiency, deregulation effects, bubble economy and corporate control mechanisms. The market reaction is found to be negative in New Zealand market by the study of Marsden [35], more negative in underwritten offerings as an evidence of adverse selection problem. Again in the framework of underwriting status, the Australian market reaction is found to be negative

for all underwriting status[5]. Negative market reaction to rights offerings also holds in Hong Kong market, which is examined by Ching et al[14].

There is one more important market that deserves special consideration. It is the Chinese market. There is still central planning in Chinese economy and there are many restrictions in equity issues. Until 2001, Chinese firms could only use rights offering and still today the firms should sustain, as a rule, Return of Equity (ROE)[10] of 10% for 3 years prior to the equity offering. The total number of rights to be issued is also regulated. In such an environment, it is really hard to issue equity so market reacts positively to equity issuing firms that can overcome these restrictions. Therefore, market believes that the firms is profitable and secure enough to issue equity. These Chinese regulations somehow decrease the severity of asymmetric information between the investors and the managers. The discussion is supported by the study Wang et al. [56] by showing positive abnormal return around the ex-rights date. Different from the study of Wang et al. [56] found negative cumulative abnormal returns around the ex-date. However, they documented that equity issuing firms on average outperform market portfolio for the subsequent 180 days. Again, a recent study by Shadid et al. [49] shows that the price reaction is negative on the event day but it can be considered as an adjustment since abnormal returns are positive prior to three days of the announcement. This can be an evidence of information leak before the announcement. A very recent study by Paskelian and Bell [45] shows that the market reaction is positive around the ex-date and the reason is based on the Chinese regulations in equity issues.

In the literature, it may be observed that the market reaction to rights offering is mostly positive and the reaction to seasoned equity offerings is negative. However, this cannot be attributed to the difference of these two equity issuing methods. The reason is that seasoned equity offerings commonly take place in developed markets whereas rights offerings are carried out in relatively undeveloped markets. There is also good deal of research that compares these two methods in the same country. However, there is again not a clear-cut answer since both the methods have its own different characteristics such as uninsured rights or stand-by agreements which are related to the contract between the underwriter and the firm. As a result, the reaction is not distinguished as rights offerings or seasoned equity offerings.

To sum up, market reaction to equity offerings are negative in relatively developed markets such as US, UK, France, Italy, Australia and New Zealand. The reaction is positive in relatively less developed markets or markets having different institutional settings such as Norway, Finland, Greece and Japan. Chinese market is special in terms of its equity issue requirements so one can observe positive market reaction in Chinese market. Mostly related to this study, Turkish market

[10] An accounting ratio and a measure of profitability that is equal to Net Income after Tax/Shareholder equity.

reaction to equity issues are found to be positive in former two studies as this study also proposes.

2.2 Literature Review for Determinants of Market Reaction

This part of the study examines the literature for determinants of market reaction. It is convenient to examine them in separate parts.

Offer Size

Most of the research in the literature proved that size of offer has a negative impact on market reaction. Slovin et al. [51], Bohren et al. [9], Balachandran et al. [5], Marsden [35], Masulis and Korwar [36], Asquith and Mullins [4] and Gajewki and Ginglinger [19] showed the negative effect of offer size. Mikkelson and Partch [36], Denis [15] and Kang and Stulz [29] did not find significant correlation between abnormal returns and offer size in their cross-sectional regression analyses. Apart from these studies, Adaoglu [2] showed that offer size has positive effect on abnormal returns for rights offerings with bonus issues and found no statistically significant effect for rights offerings without bonus issues. In fact, in Adaoglu [2] the market reaction was reported to be positive. Therefore, a greater offer in size would lead to a more positive reaction.

Debt Ratio

Chen and Chen showed that cumulative abnormal returns of low debt ratio firms are lower to their higher debt ratio counterparts. However, the situation reverses after the announcement. The same study also uses debt ratio change which is a function of current debt ratio and offer size. They found that the firms experiencing more change in debt ratio outperform, in terms of cumulative abnormal returns, the ones with less change in debt ratios. Tsangarakis [54] reported no significance of debt ratio in cross sectional regression analysis. Kang and Stulz[29] also do not detect any statistically significant effect of debt ratio. Masulis and Korwar [36] documented negative relation between leverage change and abnormal return.

Firm's Stock Volatility

Eckbo and Masulis [17], Masulis and Korwar [36] found that stock volatility has negative effect in abnormal returns of public firms. The effect is insignificant in industrial firms. Denis [15] found that the relation is negative in shelf offerings and insignificant in non-shelf offerings. Balachandran [5] has detected no significant relation between the determinant and the market reaction. Tsangarakis [54] and Denis [16] found positive relation between the abnormal return and stock volatility.

Abnormal Stock Return Before the Issue

The literature quite agrees on the effect of stock run-up before the equity issue. Eckbo and Masulis [18], Bohren et al. [9], Masulis and Korwar [36] and Gajewski and Ginglinger [19] documented a negative effect of the determinant on abnormal returns. Marsden [35] did not detect any effect of stock price run-up before the issue. Denis [15] found positive effect for shelf offerings and negative for non-shelf offerings. Asquith and Mullins [4] showed that the effect is positive. However, compared to other studies, their stock run-up period is too long with 11 months. This could have biased their findings.

Market Return Before the Issue

The literature is not rich in examining this variable. A prominent research is done by Tsangarakis [54] and reported a positive relation between abnormal returns and market return preceding the offering. Likewise, Masulis and Korwar [36] documented positive relation. Bigelli [8] and Kabir and Roosenboom [28] (using Gross Domestic Product (GDP) as a proxy) found no significant result.

Simultaneous Bonus Issues and Dividend Payment After the Issue

The literature does not extensively mention about simultaneous bonus issues. However, Adaoglu [2] showed a significant distinction for the Turkish market. Simultaneous bonus issues and dividend payments lead to positive market reaction. Balachandran et al. [5] documented no significant effect on the abnormal returns in Australian market. Muradoglu and Aydogan [43] mention the frequent dividend payment around ex-rights date by the Turkish firms but they do not examine the effect explicitly.

Issue Frequency

The issue frequency is another determinant that is not extensively studied in the literature. Masulis and Korwar [36] did not report significant effect. Loughran and Ritter [32] found negative effect associated with issue frequency. Different from this study, their finding was for long-run abnormal return determinants.

Some Other Notable Determinants in the Literature

Firm size can be an important determinant since large firms generally have more dispersed ownership structure and it is hard to announce the equity issue to the shareholders [51]. There is another possible explanation for the firm size effect. Small firms are not traded very frequently and announcements are rare. When there is an announcement about the firm, market reacts positively since the small firm is marked to the market [29]. On the other hand, large Turkish firms, compared to small firms, are generally trusted in terms of auditing and management. In other words, they have a reputation and this may alleviate the adverse selection problem between

the investors and managers. Firm size is not as commonly used as other determinants in explaining the market reaction. In the literature, market value of firm equity is generally used for firm size. There are 6 identified studies in the literature. Slovin et al. [51], Tsangarakis [54], Balachandran et al. [5] found that firm size does not explain the variation in abnormal retursn. On the other hand, Kang and Stulz [29], Eckbo and Masulis [17] documented that firm size has negative impact on market reaction.

Subscription discount is an extensively discussed determinant of market reaction. However there is not a subscription price for the rights offerings in Turkish market. The rights coupons are traded according to some other rules in rights offering market. To attract the investors to the equity issue, firms discount the price of offering. An adverse selection problem arises since a great discount may be perceived as doubt about the success of the issue while a discount is a chance to be able to buy the shares at a bargain price. Eckbo and Masulis [17], Bohren et al. [9], Marsden [35], Tsangarakis [54] found no siginificant effect of subscription price discount. While Slovin et al. [51] and Balachandran et al. [5] reported negative effect, Chen and Chen and Kabir and Roosenboom [28] documented positive effect.

Book to market ratio[11] (B/M) can be used to capture undervaluation or overvaluation of a stock. A value over one may indicate undervalued stock and a value below one may indicate overvalued stock. However, it should be used with care since assets of companies in some particular industries can be extremely low (high), which causes B/M ratio to be low (high). However, it may not be an indication of overvaluation (undervaluation). Since managers' tendency to issue overvalued equity is important in Pecking Order Theory framework, B/M ratio can be used to test the Pecking Order Theory. An interesting discrepancy exists in the literature about the market to book ratio[12] (M/B) and B/M ratio. Firms with high M/B ratio are considered to have growth opportunities so the market is expected to react positively to equity issues of these firms. However, a high M/B ratio implies a low B/M ratio which implies overvaluation of the stock. It is known that market reacts negatively to overvaluation signal. It is not chosen to be used in this study as a result of this discrepancy. As the explanation suggests, Bayless and Jay [6] and Llorca and Ugendo found more negative long-run abnormal return for the firms having lower B/M ratio. On the other hand, Balachandran et al. [5] documented no significant effect. For the M/B case, Kabir and Roosenboom [28], Ching et al. [14] and Denis [16] found no evidence on the effect of M/B ratio on the abnormal returns.

[11] Book to Market Ratio= (Book Value of Firm) / Market Value of Firm
[12] Market to Book Ratio is the reciprocal of Book to Market Ratio

Ownership structure plays an important role for the market reaction. In a firm with concentrated ownership, the information asymmetry is expected to be less since the shareholders can monitor the firm better. This rationing may not hold in non-rights equity offerings since the ownership of existing shareholders would dilute. Supporting this argument, Balachandran et al. [5] and Gajewski and Ginglinger et al. [19] reported positive correlation between abnormal return and concentrated ownership. Bohren et al. [9] does not find any significant correlation of concentrated ownership but they report positive effect of insider ownership on the abnormal returns. On the other hand, Marsden (2000) and Slovin et al. [35] documented no statistically significant finding about concentrated ownership and institutional ownership respectively.

2.3 Literature Review for Long-Run Stock Performance of Equity Issuing Firms

The literature of long-run stock performance generally discusses on the basis of methodologies that should be applied to measure the abnormal long-run stock performance attributed to an event. The literature is not very rich about the possible explanations of long-run performance of equity issuers but the methodological aspects of measuring abnormal stock returns. In this part, the results of some studies will be given.

Equity issuing firms' worse post issue stock performance is documented by Loughran and Ritter [33] both for IPOs and SEOs. Another study by Loughran and Ritter [32] also shows that abnormal stock price performance of firms conducting seasoned equity offerings is negative. Spiess and Affleck-Graves have similar findings after controlling for many variables such as industry, offer size and book to market ratio. Rangan [47], Teoh et al. [53] and Brous et al.[11] all documented the negative long-run abnormal return. Cai [13] documented the same fact for Japanese rights issues. In the UK Market, Abhyankar and Ho [1] found negative long-run abnormal return after rights offerings. Pastor-Llorca and Martin-Ugedo [46] also documents negative stock price performance after rights issues in Spain. Like Spanish market, French market shows negative long-run abnormal returns, particularly for firms that use the proceeds of the new equity to finance new projects [24]. A recent study by Nhu and Timo [44] showed the negative abnormal return for Finish stock market. Almost all of these studies use a matched portfolio approach to measure long-run abnormal returns. On the other hand, Mitchell and Stafford [38] found no evidence of negative long-run abnormal returns after accounting for cross-correlations between the abnormal returns. In addition, Brav et. al. [10] shows that underperformance is sensitive to the method of abnormal return measurement and identifies the stock underperformance for small size firms. Similarly, Eckbo et al. [18] does not document post-issue underperformance. Bayless and Jay [6] found negative post-issue stock performance by applying a comparison period approach. As can be seen, many of the studies reported negative long-run stock performance. However, there are also studies that contradict those findings and

those studies use different methods to measure the abnormal returns. As stated, these methodological differences will be discussed in related section of the methodology part of this study.

CHAPTER 3

DATA AND METHODOLOGY

This chapter is devoted to the description of the sample data and methodology used in the study. Before starting to explain the details of the data and the methodology, it is appropriate to provide brief information about the rules and regulations for seasoned equity offerings in Turkey.

3.1 Rules and Regulations for Seasoned Equity Offerings

The regulatory body of capital markets in Turkey is the Capital Markets Board of Turkey (CMB). The most distinct feature of seasoned equity offerings in Turkey is that the firms are required to offer the use of preemptive rights to their existing shareholders when the firms decide to issue additional equity shares. These preemptive rights give the existing shareholders the right to buy newly raised capital on a pro rata basis. In other words, a firm whose shares are already being traded on the stock exchange cannot issue additional equity to the public directly and it is required to first ask its existing shareholders for additional capital. This is also a common rule in most of the European countries. Occasionally, the firms can also sell new shares through private placements[13] to foreign investors or they can use a combination of private placement and rights offering by restricting the rights of existing shareholders. A publicly traded company listed on the ISE is required to follow the procedure outlined below in order to conduct a seasoned equity offering.

First, the equity issue decision is discussed at the Board of Directors (BOD) meeting. If the BOD decides to issue additional equity, the decision is reported to the ISE and the ISE announces this information in its daily bulletin. Second, depending on the capital definition of the firm, this decision may have to be approved at the shareholders' meeting. According to the regulations, a firm in Turkey can operate under two different types of capital definitions. The first one is "primary capital." With this type of capital definition, firms need to hold a shareholders' meeting in order to approve the equity issue decision of the BOD. After the shareholders' meeting, the decision is made public in the ISE daily bulletin. The second capital definition is "authorized

[13] In private placements, the equity offering is made only to a small number of large investors such as banks and mutual funds.

capital." Firms operating under the authorized capital definition do not need to hold a shareholders' meeting. However, these firms have an authorized capital limit that they cannot exceed by additional equity. If the planned equity issue is expected to exceed the limit, then the firms must first apply to the CMB for an increase in their capital limit. The limit increase does not need to be exactly the same amount as the additional equity. The firms operating under primary capital do not have such a limit. After the second step, the remaining procedure is the same for both types of firms. As a third step, firms apply to the CMB in order to register the newly issued equity. The applications of the firms are made public through the weekly bulletins of the CMB. The firms may also use their websites, if applicable, in order to announce the application to the CMB. After the application, CMB examines the registration statement of the firm and can ask for additional documents or request the firm to clear up any obscure points in the registration and financial statements. After analysis of the documents, the CMB approves the equity issue if the firm fulfills the requirements put forward by the regulations. After the approval, the firm registers the equity issue with the "Trade Registry" and it is announced in the "Trade Registry Newspaper." After this registration, the firm announces to the public the details of the rights offering such as the dates during which the rights can be used, the proportion of the newly issued capital to the existing capital, the addresses at which the rights can be used and stocks can be bought, etc. This announcement appears in the ISE daily bulletins. The firms can also advertise about the offering through newspapers, TVs and the internet. Once the rights usage period is over, the firms announce information about the unsold portion of the newly issued shares –if any– and the dates during which these unsold shares can be bought by the public. This announcement is also made in the ISE daily bulletin and the firms can also advertise about it in the newspapers, TVs and the internet. The firm may also decide to cancel the sale of the unsold portion of the shares. As a last step, an announcement about the results of the rights offering is made in ISE daily bulletin. Additionally, there is not an ex-rights day. The owner of the share at the start of the offering period has the right to buy the extra shares. When the legal procedure for rights offerings in Turkey is analyzed, it is seen that there are a number of points in time at which brand new information about the firm's additional equity issue reaches the market. In order to capture the market's reaction to the arrival of new information, this study focuses on six important dates:

1. Board of Directors meeting
2. Shareholders meeting (if the firm operates under primary capital)
3. Application to Capital Markets Board of Turkey
4. Approval from Capital Markets Board of Turkey
5. Announcement of the rights offering to the public
6. Announcement of the unsold portion

These dates correspond to the time at which the announcement regarding the event is made and not the time at which the event takes place. For instance, the first date is the day on which the announcement regarding the BOD meeting is made public in the ISE daily bulletin.

The first five dates represent the evolution of the rights offering. In each date, the firm completes a step and advances to the actual rights offering event. Therefore, there is new information arrival in each step and these dates can be used separately to test the market's reaction. At the last step, the unsold portion of the issue is disclosed to the public and the market is expected to react to this information since it is an indicator of the success of the equity issue.

3.2 Data Sources and Event Days

The main sources for determining the six event days are the CMB Weekly Bulletins and the ISE Daily Bulletins. More recent events can be found at the Public Disclosure Platform (KAP).

As a first step in data collection, firms that went through rights offerings are determined from the ISE database. Next, the six event dates are determined for each rights offering completed during the 1994 – 2010 period. The ISE Daily Bulletins can be reached electronically. The CMB Weekly Bulletins are also available electronically after 2000. However, for the sample years prior to 2000, the CMB Weekly Bulletins are available as hardcopy only. These hardcopy bulletins are generally published on the last day of the week. The event or announcement dates for the ISE and CMB bulletin news are taken as the dates on which these bulletins are published either electronically or as hardcopy.

In addition to the event dates, information on several company and issue characteristics are collected from the websites of ISE and KAP. The firm size, market return before the issue, abnormal stock return before the issue and the firm's stock volatility are calculated by using the stock prices obtained directly from the ISE. These prices are adjusted for dividends and stock splits. Information on the remaining variables is obtained by examining the "Company News" section of the ISE website. The data sources are summarized in Tables 1 and 2.

Table 1 Data Sources for Event Days

Data Type	Source	Date (Event Day 0)
BOD Meeting	Company News	ISE Daily Bulletin Publication
Shareholders Meeting	Company News	ISE Daily Bulletin Publication
CMB Application	CMB Weekly Bulletin	CMB Weekly Bulletin Publication
CMB Approval	CMB Weekly Bulletin	CMB Weekly Bulletin Publication
Rights Announcement	Company News	ISE Daily Bulletin Publication
Unsold Rights Announcement	Company News	ISE Daily Bulletin Publication

Table 2 Data Sources for Company and Issue Variables

Data Type	Source
Firm Size	ISE Stock Price Data
Issue Size	Company News
Debt Ratio	Financial Statements
Stock Volatility	ISE Stock Price Data
Abnormal Stock Return	ISE Stock Price Data
Market Return	ISE Index Data
Bonus Issue	Company News
Dividend After Issue	Company News
Issue Frequency	Company News
Unsold Rights	Company News

3.3 Data Description

The firms conducting rights offerings are obtained from ISE database. In addition, the Company News section on the ISE website was also scanned since there are some rights offerings that are not found in the equity offerings database of ISE. Data availability caused many problems during the data collection phase of the study, and, therefore, the following filters were applied to the dataset:

- If the company news of the firm is not available in the database, the offering is discarded.

- If the company stock prices on the required dates are not available, the offering is discarded.
- If the company is conducting a rights offering after its IPO such that the estimation period is not long enough for the analyses, it is discarded. This also helps to avoid the confounding event effect of the IPO.
- If the board of directors meeting of the offering is not identified, the BOD event (event 1) is discarded.
- If the company shares are traded on the Watch List Market of the ISE, the offering is discarded since being on this market may imply problems about market efficiency.
- If the board of directors meets more than once to change the issue size, the first meeting is taken as the event day.
- If the right offering is combined with a private placement of equity to foreign investors, it is discarded in order to avoid the problem of confounding events.
- If the offering is conducted simultaneously with a capital decrease, it is discarded in order to avoid the confounding event effect.[14]

These restrictions yield a total of 762 rights offerings between 1994 and 2010. Taking the year of the BOD meeting as the year of offering, Table 3 presents the breakdown of the sample by years.

Table 3 Number of Rights Offerings By Year

Year	# of offerings	Year	# of offerings	Year	# of offerings
1994	94	2000	57	2006	20
1995	77	2001	44	2007	27
1996	58	2002	45	2008	22
1997	80	2003	26	2009	21
1998	72	2004	41	2010	17
1999	44	2005	45		

[14] A confounding event is an event whose effect coincides in time with the effect of the event under investigation; e.g. two simultaneous corporate decisions in a board meeting.

Table 4 Descriptive Statistics – Determinants of Market Reaction

	Mean	Median	Min.	Max.	Std. Dev.
Offer Size	145.10%	89.00%	2.00%	11200.00%	483.40%
Debt Ratio	0.5971	0.6403	0.000122	3.0198	0.3419
Remaining Shares	8.31%	1.00%	0.00%	100.00%	19.73%
Abnormal Stock Return Before Issue	0.01068	-0.00153	-0.59836	1.00398	0.12555

Table 5 Characteristics of Firms in the Sample

	Percentage
Banks	13.65 %
Mutual Funds	11.81 %
Firms issuing bonus issues	59.71 %
Firms paying dividend after the issue	15.35%
Firms issuing equity more than one in a year	39.63 %

Tables 4 and 5 provide information about the statistical properties of the sample. Approximately 25 % of the sample consists of banks or mutual funds and 60 % of equity issues are conducted together with a bonus issue. Additionally, the average issue frequency of firms is high in the sample since it is observed that 40% of the issues are the second or third issues of the same firm in the same year. For continuous variables, the standard deviation and dispersion is high for each variable.

3.4 Short-Term Market Reaction

This study aims to answer two main research questions. The first question is about the direction of the market reaction to rights offering announcements. Finance literature asserts that firms operating in developed capital markets follow a pecking order in their choice of financing [41]. The "pecking order hypothesis" says that when there is a need for capital, internal sources of funds will be exhausted before the firm uses external financing. The hypothesis further states that if the firm has to raise external financing, debt financing will be preferred over external equity. The reason for this ordering is that managers of the firm will not want to dilute the ownership of existing shareholders when the firm is undervalued. When this ordering is known to the investing public, the choice of financing by firms provides an important signal about the future prospects of the firm, especially in markets with severe information asymmetry. In such an environment, the announcement of a stock offering by a mature firm that has financing alternatives is taken as a signal that the firm's prospects as seen by its management are not bright since only in the case of overvaluation are the managers expected to prefer equity financing

[42],[36]. Therefore, by analyzing the direction of the market's reaction to rights offering announcements, this study provides a direct test of the pecking order hypothesis.

As a second research question, the event study methodology employed in this study allows a direct test of whether the Turkish stock markets can be characterized as semi-strong efficient since the timing and magnitude of the market's reaction is analyzed by the use of this methodology. According to the Efficient Markets Hypothesis by Fama , a market with semi-strong efficiency is one in which security prices reflect all publicly available information. This implies that the market immediately reacts and security prices adjust as new information arrives to the market. In this study's framework, six previously defined events represent the six distinct points in time during a rights offering at which new information arrives in the market. By analyzing the market reaction at these six different event dates, the study provides evidence regarding the test of market efficiency in the Turkish stock markets. The next section provides the basics of the event study methodology employed in the study.

3.4.1 Event Study Methodology

One way to test the validity of the pecking order hypothesis is to examine the reaction of the market to announcements of seasoned equity offerings. The hypothesis states that since managers are expected to raise external equity only when they think that the firm's shares are overvalued, a decision to issue additional shares is interpreted by the market as a negative signal about the future prospects of the firm. Consequently, when the firm announces its decision to issue new equity, a negative share price reaction is expected as a response to the announcement. The expectation that there is going to be an announcement effect has an important implication for market efficiency, as well. The efficient markets hypothesis implies that the market is expected to react to the decision to issue new equity when information about the seasoned equity offering reaches the market for the first time. The event study is a widely used statistical method to make an inference about the average effect of an event on the stock price (or firm value) of a corporation. The event can be a corporate event such as mergers and acquisitions, initial public offerings (IPO), seasoned equity offerings (SEO) or rights offerings. The events are not restricted to corporate events. It can also be market-specific or macroeconomic events such as trading restrictions, new regulations, interest rate announcements, political disclosures or even a crisis. The event study is carried out by analyzing the returns generated around the event dates. As a first step in the event study, a time window is constructed around the event day. This window can be short (e.g. a window of three days including the day immediately before the event, the day of the event, and the day immediately after the event) or long (e.g. several days/weeks prior to and following an event day) depending on the nature of the research question on hand. As the second step, an abnormal return is calculated for the stock in question during this event window.

Abnormal Return = (Realized Return During the Event) – (Expected Return in the Absence of Event)

A more formal definition of this return is given in Equation (1).

$$AR_{it} = \varepsilon_{it} = r_{it} - f(r_{it}) \tag{1}$$

In this equation, ε_{it} is the abnormal return (AR_{it}) of security i at time t, r_{it} is the realized return of security i at time t and $f(r_{it})$ is the expected return of security i at time t in the absence of the event. In this context, abnormal return is the return that is believed to be generated as a result ofthe event under consideration. The realized return, as the name suggests, is the observed return of the security during the event period. The expected return in the absence of the event has to be calculated again based on the realized return on the security; however, this time, a time window that does not include the event is chosen in order to determine the "normal" return that would be expected from the security when the effect of the event is not present.

The AR_{it} represents the security's abnormal return at a specific point during the event window. Sometimes, the market may continue to react to the event over several days; therefore, it may be worthwhile to also look at the cumulative abnormal return over a time horizon from within the event window. The definition for the cumulative abnormal return is given in Equation (2).

$$CAR_{iT} = \sum_{t=1}^{T} AR_{it} \tag{2}$$

In this equation, AR_{it} denotes the abnormal return of security i at time t, and T represents the length of the time horizon over which the CAR is calculated.

One important issue that needs to be addressed in event studies is the fact that for most cases, the specific event in question is not the only factor that affects the return of the security over the event window. At the same time that the event is happening, the security prices may also be expected to react to the arrival of other economic information such as changes in interest rates, inflation rates, global economic indicators, exchange rates or political news. These effects should be accounted for in the calculation of abnormal returns in order to isolate the effect of the event under consideration. For this purpose, it is necessary to utilize a return model that would reflect the effect of all these other factors. Some of the models that are commonly used in the event study literature are presented below.

Mean Adjusted Model

$$AR_{it} = \varepsilon_{it} = r_{it} - k_i \tag{3}$$

In this equation, k_i is the average return of security i estimated over a sample period. The model is too simplistic since the security return is naively assumed to have a return equal to its mean

regardless of any market-wide or economy-wide effect. There is also no risk adjustment for security i.

Zero-One Model (Market Adjusted Model)

$$AR_{it} = \varepsilon_{it} = r_{it} - r_{mt} \tag{4}$$

In this equation, r_{mt} is the market return at time t. The model assumes that security i's expected return at time t is the market return at time t. A broad index return can be used as a proxy for the market return. This is also a naive model and its assumption regarding the equality of the stock return and the market return is quite unrealistic.

Capital Asset Pricing Model (CAPM)

CAPM is a financial equilibrium model. It assumes that security returns can be modeled as a combination of the risk-free return and a risk premium. The abnormal return over the event window would be calculated as follows:

$$AR_{it} = \varepsilon_{it} = (r_{it} - r_{ft}) - \beta_i (r_{mt} - r_{ft}) \tag{5}$$

In this equation, r_{ft} is the risk-free rate in the market at time t and β_i is a coefficient measuring the systematic risk of security i, and $(r_{mt} - r_{ft})$ represents the average market risk premium.

Multi-Factor Models

These models are the generalizations of CAPM. For instance, the following equation presents the definition of the abnormal return within the context of the the Fama-French 3-factor model :

$$AR_{it} = \varepsilon_{it} = R_{it} - \alpha_{it} - \beta_{im} R_{mt} - \beta_{iSMB} SMB_t - \beta_{iHML} HML_t \tag{6}$$

In this equation, R_{it} and R_{mt} denote the excess return of security i and excess return of market portfolio over the risk-free rate at time t, respectively. SMB_t is the excess return of the portfolio of small capitalization firm stocks over the portfolio of large capitalization firm stocks at time t and HML_t is the excess return of the portfolio of high book-to-market ratio firm stocks over the portfolio of low book-to-market ratio firm stocks. α, β_{iSMB} and β_{iHML} are the coefficients estimated by linear regression. This model is a more generalized model accounting for the response of security prices to market return and two other risk variables (size and book-to-market). The abnormal return can be calculated based on a more generalized version of the multi-factor model as well:

$$AR_{it} = \varepsilon_{it} = r_{it} - \alpha_{it} - \beta_{i1} F_{1it} - \beta_{i2} F_{2it} - \beta_{i3} F_{3it} - \ldots - \beta_{in} F_{nit} \tag{7}$$

In this equation, there are n different risk factors that explain the return of security i.

Industry-Adjusted Return Model

A variation of the zero-one model is the industry-adjusted abnormal return model. In this model, the common factors that affect security prices are represented by an industry index.

$$AR_{it} = \varepsilon_{it} = r_{it} - r_{st} \tag{8}$$

In this equation, security i belongs to industry s and r_{st} is the return of industry index s at time t. This model is also simplistic. However, compared to the zero-one model, it is more realistic since the expected return of the security is measured by its corresponding industry's realized return.

Matched Portfolio Model

Another expected return model groups the securities in the market according to the common factors that are believed to affect their returns. First, portfolios are formed from firms with similar attributes. The similarity of the firms may be determined based on a percentile ranking. The firms in the portfolios may carry equal weights or market-value-based weights. As a second step, a firm's "normal" expected return is calculated as the average return of the portfolio excluding the firm itself. Figure 3 presents an illustration of this grouping.

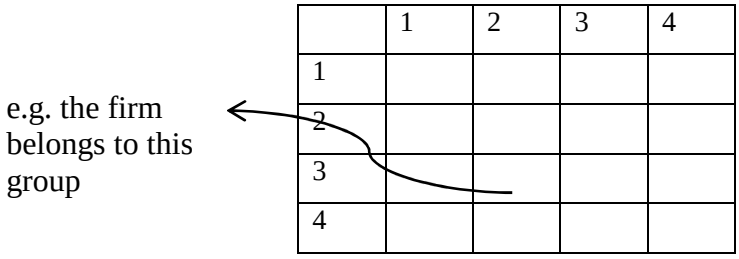

Figure 2 Illustration of matched portfolio

In this case, there are two factors that are used to group firms into percentiles. The figure groups the securities into quartiles in each factor. For instance, the factors can be chosen as the market capitalization and the book-to-market ratio. The abnormal return on the security is calculated in the following manner.

$$AR_{it} = \varepsilon_{it} = r_{it} - f_t(i) \tag{9}$$

In this equation, $f_t(i)$ denotes the return of the matched portfolio of security i at time t. As in all expected return models, there is a proxy problem in this method. In the context of rights offering events, if the issuing and non-issuing firms differ systematically by a common factor that is not reflected in the matched portfolio, biases will emerge.

Standard Market Model

$$AR_{it} = \varepsilon_{it} = r_{it} - \alpha_i - \beta_i r_{mt} \quad (10)$$

This model is used by Brown and Warner [12] in order to measure the "normal" expected return of a security to use as part of the event study methodology. The idea is to estimate α_i and β_i by regressing security i's return over the market return during a period where the effect of the event is not present. While β_i reflects the effect of market-related factors, α_i accounts for those factors that are not accounted for by the market return. This model resembles the CAPM but the returns are not excess returns over the risk-free rate and there is an α_i in this model. As can be seen from the Equation (10), when α_i is zero and β_i is equal to 1, it reduces to the zero-one model.

3.4.2 Model Selection

In this study, the standard market model and the zero-one model are used. The other models are ignored either because of data availability problems or the difficulty of determining the industry for companies that operate in several lines of business. Furthermore, Brown and Warner [12] show that the market model and the market-adjusted model perform better than other models. In this study, a simulation analysis is carried out and these two models indeed provide the highest statistical power and accuracy in detecting abnormal returns. In order to use these two selected models, a proxy for the market return is needed. The ISE-100 index is used as the market proxy in this study. ISE-TUM is a more comprehensive index than ISE-100. However, this index is not available throughout the sample period. Hence, ISE-100 is used to in order to be consistent across the sample period.

The market's reaction to the six events is tested on a daily basis. Let AR_t denote the abnormal return at day t. Let day 0 denote the event date. The abnormal returns are calculated and tested for statistical significance for day 0, day +1 and day +2. In addition, cumulative abnormal returns are calculated between days 0 and +2 in order to address the possibility that the market's reaction to the event may take longer than one day to complete. The returns are calculated based on the closing prices on each day. The ISE daily bulletins are published following the close of the market every day. Therefore, when there is an event on day 0, information about this event is made public through the bulletin after the market closes on that same day. Accordingly, the market is expected to react to this information on the following day (day +1) when the market opens again. In this study, abnormal and cumulative abnormal return calculations also include day 0 since it is believed that the shareholders who have a large percentage ownership in the firm may be monitoring the firm closely, and, hence, they may have access to information leakage a few hours earlier before the information is announced in the bulletins As a result, they may be expected to trade on the basis of this information before the market closes on day 0. .

When the zero-one model is used, it is trivial to measure the abnormal return and it is equal to the difference between the firm's realized daily stock return and the realized daily ISE-100 index return. When the market model is used to calculate the abnormal returns, first it is necessary to estimate the parameters of the market model. There are several issues that need to be addressed before these parameters can be estimated. First, the period of estimation must be determined. While some studies use a post-event period for estimation, some use a pre-event period. The reason for choosing a post-event period is that the firm's leverage changes after the equity issue and this change may affect the α and β estimates of the market model. By the same token, it can be argued also that such longer-term effects of rights offerings can cause biased estimates for the parameters. A pre-event period is used in this study to estimate the parameters of the market model.

The second issue to decide about is the length of the estimation period. In the literature, a 250-day period is commonly used to estimate the parameters of the market model. A problem arises for Turkish firms in determining the length of the estimation period. Some firms use rights issues very frequently. Issue frequency is also considered as a determinant of market reaction. As a result of these frequent rights offerings, some estimation periods overlap with the period used to measure the long-run stock performance of the same firm. A statistical analysis is conducted on the number of days between the announcements of the firms that conduct rights offerings more than once in a given year. The benchmark announcement day is taken to be the BOD meeting event. Descriptive statistics are presented in Table 6.

Table 6 Descriptive Statistics for the Number of Days between Announcements of the Same Firm

N	Min	**Q1**	**Median**	**Q3**	**Max**	**Mean**
266	69	253.75	320	364	442	304.75

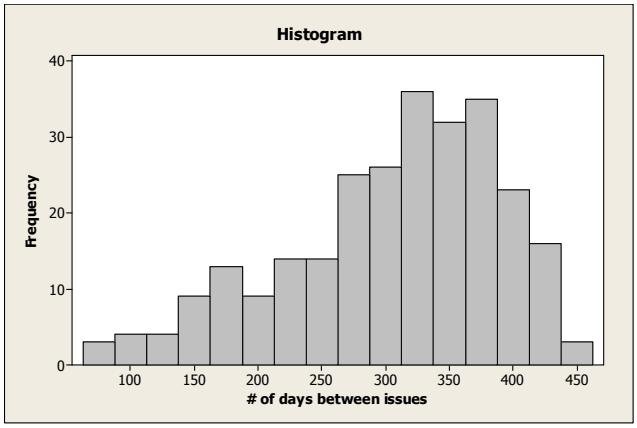

Figure 3 Histogram of the variable "number of days between issues"

As can be seen in Figure 3, the number of days between BOD meeting events is concentrated between 300 and 400. Quartile 1 (Q1) is 253.75 days and it is used to determine the estimation period.. Roughly, 253.75 days corresponds to 36 weeks and 180 business days. The 20 days that immediately precede the event day are used to calculate the determinants of "abnormal stock returns before the issue" and the "market return before the issue." As a result, the remaining 160 days between days -180 and -20 are used as the estimation period for the market model parameters. It should be noted that with such estimation period, about 67 issues are exposed to the confounding long-term effect. It is possible to either decrease the number of these firms by shortening the estimation period or to exclude these firms altogether. However, excluding these firms from the sample would present a tradeoff between decreasing the bias of the confounding long-term effects and decreasing the number of data points used in the estimation. Therefore, in order to keep as many firms in the sample as possible, the estimation period is kept between days -180 and -20.In later analyses, market timing and security's abnormal return before the issue are tested to be among the potential determinants of market reaction; therefore, as discussed above, the estimation period ends on day -21. The remaining 20 days are used to measure the abnormal return before the issue. Assuming the event day is marked as 0, the exact estimation period is defined between days -180 and -21. The same estimated parameters are used to calculate the "normal" expected return for each of the six events. The assumption is that the firms start the process of equity issue on the event day of board of directors meeting. If the estimation is done for each distinct event, this approach can result in biased estimators since the firm is in a period of equity issuance since the estimation periods for the other events would overlap with the previous events' estimation period. As future work, the equity issues that are subject to the confounding event bias caused by not only other equity issues but also other events that are documented to lead to a market reaction, such as dividend payments, should be discarded from the data set.

3.4.3 Construction of Hypotheses

After deciding about the procedure for calculating abnormal returns, the next step is determining about the tests of market reaction to the events. As discussed previously, the expected return model is in the following form:

$$r_{it} = f(r_{it}) + \varepsilon_{it} \tag{11}$$

In this equation, r_{it} is the realized return of security i at time t, $f(r_{it})$ is the return of security i at time t estimated by a model, and ε_{it} is the error of return estimation of security i at time t. ε_{it} is assumed to be normally distributed with mean 0 and variance σ^2 ($\varepsilon_{it} \sim N(0, \sigma^2)$). Taking the expectations of both sides of Equation (11) and using the linearity of the expectation operator, the equality of $E(r_{it})=f(r_{it})$ is obtained. This equality implies that with a normal distribution, the

expected value of ε is 0. The variance of ε is assumed to be caused by firm-specific events, such as rights offerings that are not accounted for by the "normal" return-generating model. As a result, the first null hypothesis to test is about the mean of the error terms (or the abnormal returns). If the rights offering event is not a factor that affects the security's price, then the mean of the error term (abnormal return) should be equal to 0. If this null hypothesis is rejected, then it can be concluded that the rights offering event is a factor that gets priced in the market. . Formally, let μ denote the population mean of abnormal returns caused by rights offering announcements. Then, the relevant hypotheses are written as follows:

H_0 : μ = 0 (Market does not react to announcements)

H_1 : μ ≠ 0 (Market reacts to announcements)

3.4.4 Hypothesis Testing

This study uses the "t test" and the "sign test" for testing the hypotheses constructed in the previous section.

3.4.4.1 The t-test

This is the most commonly used statistical test in equity offerings event study literature. It is a parametric test and the results can be interpreted for the magnitude of the reaction as well. The test statistic is calculated as follows:

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} \tag{12}$$

In this equation, $\bar{x}$ is the sample average of the variable under testing, μ is the mean to be tested, n is the number of data points and s is the sample standard deviation which is calculated as follows:

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2} \tag{13}$$

In this setup, if each x_i is independently and identically normally distributed, then the test statistic t has a student's t distribution with degrees of freedom equal to n-1. Therefore, in order to carry out this test, it is necessary to assume that the abnormal returns caused by announcements are i.i.d (independently identically distributed). This can be justified by applying normality tests to the data. If tests confirm normality, then the t-test can be used to test the hypotheses. In this study, the Jarque-Bera goodness-of-fit test [23], the Lilliefors normality test [31] and the Q-Q plot graphical test are used to test the normality of the abnormal return data.

3.4.4.2 The Sign Test

The sign test is a non-parametric test. It does not assume that the data come from any specific distribution. In other words, it is a distribution-free test. It is generally used for data that do not follow a normal distribution. It constructs a hypothesis for testing the median, not the mean, of the sample since the data points are typically discrete. Testing the median instead of the mean only assumes that the distribution is symmetric. Even if the underlying distribution is not symmetric, the objective of the test is to identify the central tendency of the data and using the median serves this purpose. The method can be described as follows.

First, define the following variables.

$$X^{+} = \begin{cases} 1 & if\ abnormal\ return > 0 \\ 0 & otherwise \end{cases}$$

$$X^{-} = \begin{cases} 1 & if\ abnormal\ return < 0 \\ 0 & otherwise \end{cases}$$

$$X = \max(X^{+}, X^{-})$$

$$n^{*} = X^{+} + X^{-}$$

These variables count the number of positive and negative abnormal returns but ignore the zeros. Since it is very unlikely to have an abnormal return of zero, n^{*} is expected to be equal to n. Among the positive and negative abnormal returns, the one with higher frequency is taken as the X variable. Next, by using the binomial distribution with parameters p=0.5 and n=n*, the probability of observing a value greater than or equal to X is calculated. In this test, the null hypothesis is that the said probability is equal to 0.5. The test is two-sided since the null hypothesis is constructed as a strict equality and deviations in both directions are accounted for by the test statistic. Next, the probability of observing a value greater than or equal to X is multiplied by 2 and this becomes the p-value of the test. If the p-value is high, it means that observing a value greater than or equal to X is highly possible under the null hypothesis and the null hypothesis cannot be rejected. However, if the p-value is low, then the null hypothesis is rejected and this would imply that the probability of observing a value greater than or equal to X is small. For large sample sizes, it is possible to use the approximation of the binomial distribution to the standard normal distribution. With a large sample, z is standard normally distributed; X is binomially distributed with parameters n equal to the number of data points and p equal to 0.5.

$$z = \frac{X - 0.5n}{\sqrt{0.25n}} \qquad (14)$$

3.4.5 Estimating the Parameters of the Market Model

As previously stated, the market model can be expressed as follows.

$$y_{it} = \alpha_i + \beta_i r_{mt} + \varepsilon_{it} \tag{15}$$

In this equation, y_{it} is the return of security i at time t, r_{mt} is the market return at time t, ε_{it} is the error term, and α_i and β_i are the parameters to be estimated for security i. The returns are calculated on a continuously compounded basis. In other words, the raw daily stock returns (DR) are transformed into continuously compounded returns (CCR) by a logarithmic conversion.

$$\mathrm{CCR} = \ln(1 + \mathrm{DR}) \tag{16}$$

The widely used method for estimating the α_i and β_i is the ordinary least squares method (OLS). This method is explained in detail in the methodology part of the determinants of market reaction.

3.5 Determinants of Market Reaction

After the analysis of the market's reaction to rights offering announcements, this study aims to identify those factors that affect the direction and magnitude of this reaction. Based on the literature survey presented in the previous chapter, there are several variables that are hypothesized to influence the market's reaction to information about a company's decision to issue additional equity through a rights offering. Some of these variables represent characteristics of the equity issue itself and some of them are related to the characteristics of the issuing firm.

The first variable is the issue size (IS) and it is included in the model to examine whether the market reaction changes when the firm attempts to raise funds that would account for a relatively larger portion of its existing equity size. This variable is calculated as the ratio of the number of new shares being offered to the number of shares outstanding prior to the rights offering. Issue size is extensively used in the literature for explaining the market reaction. It has a significance in terms of testing the pecking order theory. First, as the offer size gets larger, firms are perceived to signal better future prospects and existing shareholders have to pay a greater amount to subscribe to the offering. Such a large offer size may disrupt the shareholders' existing portfolios and, in addition, they may not be able to afford such an increase. Hence, the success of the offer may become questionable. Such an implication may lead to a negative reaction by the market. From the information asymmetry point of view, if shareholders think that managers are trying to capitalize more on the firm's overvalued stock, then the negative reaction may be expected to be even greater as the issue size gets larger. According to Miller and Rock [37] a larger offer size may be a sign of greater deficiency in internal funds and cash flow. Another explanation comes from the price pressure hypothesis of Scholes [48]. If the demand curve of the shares of a firm is

downward sloping, then supply of new shares will cause the price to decline. All these arguments imply that a negative relationship should be expected between the issue size and market reaction.

The second variable is the debt ratio (DR) and it is calculated as the ratio of total debt to total assets. Debt ratio is an indicator of financial leverage a firm uses. It has advantages and disadvantages for the firm. The advantage is that the shareholders' return on equity turns out to be higher since the firm makes profits with less equity. However, the firm becomes riskier since creditors may claim their debts and the firm may face bankruptcy if it cannot make the repayments. As previously discussed, market reaction is based on the capital structure theories and debt ratio is, in fact, one of the most important quantitative indicators of the capital structure. In the context of market reaction and equity issues, debt ratio is considered to be an essential determinant. As the pecking order theory suggests, firms use equity financing only as a last resort. If the debt ratio of a firm rises substantially, it can have negative signals for the firm. First, the firm starts to bear financial distress and bankruptcy costs. Second, market may perceive the high debt ratio as a negative signal since it implies that the firm has depleted its internal resources and reached its borrowing limit. An equity issue in such a situation may carry negative information about the current capital structure and future prospects of the firm. By the same token, firms may deliberately choose to use less debt in normal times-i.e. maintain a reserve borrowing capacity- so that debt financing can be used in the event that some especially good investment opportunity comes along in the future. Following this argument, it is expected that the market may not necessarily respond negatively to this justified choice of equity. Alternatively, the wealth redistribution effect [54] is may also provide an explanation for negative market reaction to equity issues. When the firm issues equity, its debt ratio decreases and the debt becomes less risky. As a result, the required rate of return for debt decreases and this leads to a higher market value of debt. This increase comes at the expense of the existing shareholders. This may cause the price of the share to decline.

Publicly held firms are required to disclose their financial statements on a quarterly basis. Among these, the second quarter and fourth quarter statements are audited by independent agencies. The debt ratios of the equity issuing firms are taken from the last independently audited balance sheet published before the BOD meeting. For example, if the meeting is announced on the 7th of August, the debt ratio associated with this rights offering is calculated based on the balance sheet dated June 30th. If that balance sheet is not available, the closest available balance sheet is used to calculate the debt ratio. When the sample company is a financial institution, its debt ratio may be naturally high (in the case of banks) or naturally low (in the case of mutual funds). In order to account for this pre-existing discrepancy among the debt ratios of sample companies, dummy variables are used. These dummies are calculated as follows:

$$\text{Debt Ratio for Banks (DRB)} = \begin{cases} 1.\text{DR} & \text{if the firm is a bank} \\ 0 & \text{otherwise} \end{cases}$$

Development banks are excluded from bank group since they do not take deposits and their debt ratios are not necessarily high.

$$\text{Debt Ratio for Mutual Funds (DRF)} = \begin{cases} 1.\text{DR} & \text{if the firm is a mutual fund} \\ 0 & \text{otherwise} \end{cases}$$

The third determinant of market reaction is hypothesized to be the firm's stock return volatility (SD). Stock volatility is a measure of the firm's riskiness. As a result, it may affect the magnitude of market reaction to a corporate event such as an equity offering. According to Balachandran et al. [31] and Masulis and Korwar [36], it is a sign of firm quality. Low stock volatility implies less information asymmetry between the firm and the investors. Investors are better informed about the investments of the firm. High-growth firms that are at their developing stages especially have greater stock volatility. More volatile stock price implies more risk. In the case of rights offerings, existing shareholders are expected to buy more of these risky stocks. Hence, they may require greater expected return, and this may cause the stock price to decline [54]. The stock volatility is estimated from the daily stock returns of the firm between event days -20 to -1, as the literature suggests It is simply the sample standard deviation of 250 daily returns. It is calculated as Equation (13) suggests.

The next variable is the abnormal stock return before the issue (ABS). This variable is expected to capture the firm's choice of timing for the offering in terms of its own performance. If the firm is doing well and it issues equity, then the market may perceive this as a signal that the firm has a profitable investment opportunity. In other words, equity offering is not chosen a result of a deficiency in internal funds or free cash flow but in order not to miss a very profitable investment opportunity. At the same time, according to the pecking order theory framework, the market may suspect that the stock is overvalued since the stock price abnormally increases before the issue as a result of earnings management with the firm's return on assets and return on equity[15]. In the literature, it is criticized that firms do earnings management before seasoned equity offerings in order to give a feeling that the firm is doing well [53], [47] . Lucas and McDonald [34] discuss the pre- and post-offer stock price behavior in a theoretical framework and they conclude that firms issue equity to benefit from overvaluation. As a result, the stock price is expected to exhibit a drop following the issue.

After estimating the parameters of the market model as described in section 3.3.5, the abnormal return of the stock is calculated for days -20 to -1 via the formal definition of abnormal return

[15] Manipulation of accounting measures legally

described in Equation (4) and Equation (10). The average abnormal return between -20 and -1 is calculated and it is expressed as percentage.

Another variable used to capture the timing of the equity offering is the market return before the issue (MR) and is calculated for the period between days -20 and -1 as the average return of these 20 days. As discussed previously, firms time their additional equity issues in terms of stock price run-ups. It is also possible to time it according to the market. In a bullish market environment, the market reaction may turn out to be positive since the economy does well and the market may perceive the equity offering as a signal of good investment opportunities available to the firm.

The next variable, simultaneous bonus issues (BON), is a dummy variable and accounts for the existence of a possible confounding corporate event. If the firm simultaneously announces stock dividends or an equity increase through internal resources following the BOD meeting, this variable takes value 1 and it is equal to 0 otherwise

$$\text{BON} = \begin{cases} 1 & \text{if the firm makes bonus issues alongside rights} \\ 0 & \text{otherwise} \end{cases}$$

For the Turkish market, Adaoglu [2] shows that firms issuing rights without bonus issues[16] are generally in a tight cash position and the market reacts negatively to such an announcement. However, firms that give bonus issues simultaneously with the rights offering may also receive a positive market reaction if the offering is perceived to increasing trading liquidity since the number of shares increases even more with simultaneous bonus issues. Such a liquidity increase explanation does not have a lot of empirical support. Alternatively, if there is a positive reaction, this is typically attributed to the better performance of the firm that is signaled through the bonus issues.

The dividend payment after the issue (DIV) variable is another a dummy variable and accounts for the effect of another confounding corporate event. If the firm declares cash dividends following the rights offering, the dummy variable takes a value of 1 and it is equal to 0 otherwise.

$$\text{DIV} = \begin{cases} 1 & \text{if the firm announces cash dividend payments after the rights issue} \\ 0 & \text{otherwise} \end{cases}$$

A practice commonly observed in the Turkish market is that the firms use the proceeds of rights offerings to make dividend payments. This is a negative signal about the firm's cash position since it is having to issue external equity in order to be able to pay the dividends.

[16] This kind of equity issues are financed by internal resources such as a revaluation fund or stock dividends. Investors do not inject external funds to the firm.

The issue frequency (RO) variable is another dummy variable and takes the value of 1 if the same firm has made another rights offering during the 12-month horizon preceding the BOD meeting date of the offering under consideration.

$$\mathrm{RO} = \begin{cases} 1 & \text{if the firm issued equity during the previous year} \\ 0 & \text{otherwise} \end{cases}$$

Although not extensively discussed in the literature, frequent equity issuing may result in a negative reaction from the market. Frequent issuing may be perceived as a negative signal about the cash position of the firm since it may imply that the firm is not generating enough cash from its operations and it has also used up its borrowing capacity.

The last variable hypothesized to be one of the determinants of market reaction is the unsold rights (UR) and is calculated as the ratio of the nominal (par) value of unsold shares to the total nominal value of the shares issued. There is no literature that tests the effect of unsold shares on abnormal returns. In fact, a similar effect is examined in the literature via shareholder take-up (the percentage of rights used) or subscription variables before the issue. Slovin et al. [51] and Balachandran et al. [5] both find a positive effect of shareholder take-up on the abnormal returns. In Turkey, information about the shareholder take-up is not announced. Therefore, the announcement of the unsold portion of the issue may serve as a proxy for the information about the shareholder take-up. Accordingly, this study examines the effect of this variable when the remaining shares are offered to the public. This variable may be used as a measure of the equity issue's success as well. When the information about the amount of unsold shares is disclosed, the market may react negatively if the unsold portion is high. This shows the degree of investor confidence about the future prospects of the firm and if shareholders do not exercise their rights, they may choose to accept dilution[17] in their ownership percentages rather than investing more in the firm.

3.5.1 Regression Analysis

For each of the six announcements, a separate regression model is estimated with the announcement's abnormal return as the dependent variable and the above mentioned determinants as the independent variables. For each unique rights offering, the magnitude of the determinants is the same for all six regressions. Also, some determinants are not included in the regressions for all announcements. For example, the dummy variable for the payment of dividends following the rights announcement is included in the regression for events 5 and 6 only since the dummy is about an announcement that takes place right before event 5. Likewise, by

[17] Some of the consequences of stock dilution are decreased ownership, voting power and earnings per share.

definition, the percentage of unsold rights variable is included only in the regression model for event 6. Table 7 presents the regressors used in each event model.

Table 7 Determinants Used for Each Event Day

	IS	DR	DRB	DRF	SD	ABS	MR	BON	DIV	RO	UR
1	✓	✓	✓	✓	✓	✓	✓	✓		✓	
2	✓							✓		✓	
3	✓							✓		✓	
4	✓							✓		✓	
5	✓							✓	✓	✓	
6	✓							✓	✓	✓	✓

3.6 Measuring Long-Run Stock Performance

As the third part of the study, the long-run return performance rights offering firms is analyzed. As discussed in the literature review chapter, there are some methodological issues that need to be addressed before the long-run performance can be measured. In this study, these issues are addressed following the study by Kothari and Warner [30].

3.6.1 Biases and Methodology for Long-Horizon Event Studies

The unbiasedness of the estimated parameters in the expected return model is even more important in long-term event studies compared to short-term studies. For instance, in a short-term event study, a bias of Δb in the market return coefficient will bias the abnormal return just by a magnitude of $1x\Delta bx\Delta r$ for a horizon of one day; however, the same bias is equal to n $nx\Delta bx\Delta r$ as the number of days gets longer..

The choice of the estimation period is also critical in long-term event studies. In the literature, usually a pre-event estimation is not recommended for long-horizon event studies. There are various reasons for this and some of these arguments are valid for the case of seasoned equity offerings as well. First, since a firm changes its capital structure by conducting the rights offering, its riskiness also changes and that leads to a simultaneous change in its beta coefficient in the market model. Hence, it may not be appropriate to estimate the market model parameters by using a pre-event time window. Second, the events under analysis may be preceded by a period of extreme stock performance. For instance, if the estimation period coincides with a period of overvaluation, the managers may try to take advantage of this by issuing additional equity, and using that pre-event period as the basis for parameter estimation would generate

biased estimates. In light of such complications, a post-event period estimation is better suited to long-term event studies.

Another difficulty with long-term event studies is the choice of expected return model is. Standard market model is a good choice for short-term event studies but this model requires the estimation of parameters based on a pre-event window. Since such estimation is not appropriate for the long-term studies, two alternative specifications are used for the expected return model.

Buy-and-hold Abnormal Return (BHAR)

The BHAR is another method used to measure abnormal returns. The expected return model in this method is the matched portfolio model whose details are given in event study section. The formal definition of the BHAR is as follows:

$$BHAR(0,T) = \prod_{t=0}^{T}(1+R_{it}) - \prod_{t=0}^{T}(1+R_{nt}) \tag{17}$$

In Equation (17), R_{it} is the return of security i and R_{nt} is the return of the matched portfolio associated with security i. This calculation assumes that investors earn the abnormal return by holding the security between time 0 and T. If the time horizon is longer than one year, each period can be taken as one month. If the investment horizon is shorter than one year, each period can be taken as a week. The BHAR approach may be a more realistic measure of abnormal return since investors usually balance their portfolios weekly or monthly. In alternative calculation of the BHAR, the matched portfolio can be replaced by a matching firm with characteristics closest to that of the issuing firm. The matched portfolio also can be replaced by the market return and a sector return since the aim is to proxy the return of the security.

Jensen's Alpha Approach

In this approach, a portfolio is constructed with the firms conducting the event. The return of this portfolio can be calculated as equally weighted or value weighted. After the portfolio formation, the portfolio return is regressed on factors consistent with CAPM, Fama-French or other asset pricing models. The intercept of the regression is interpreted as the abnormal return earned by the firms. Firms in the portfolio are updated for each time point since the investment horizon, for example 12 months, does not start and end at the same time for each firm. As an example, the approach is formulized in the CAPM framework as below.

$$R_{pt} - R_{ft} = \alpha_{pt} + \beta(R_{mt} - R_f) + \varepsilon_{pt} \tag{18}$$

In Equation (18), R_{ft} is the risk free rate, R_{pt} is the portfolio return, R_{mt} is the market return at time t and α_{pt} is the abnormal return of the issuing firms at time t. One weakness of this approach is that some periods may include more firms compared to other periods but each period will be equally weighted while testing the abnormal return. This kind of an aggregation can bias the test results.

Even if the model specification is assumed to be correct, there are two important points to be accounted for while applying hypothesis testing. These are the skewness and cross-correlation of abnormal returns. First, abnormal returns are assumed to be independent. This may not be the case since the calendar time of the events overlap in long-horizon. This overlapping results in correlation among abnormal returns since some economy-wide factors or sector-wide factors are not priced in the expected return model. This cross correlation is not crucial in the short-run analysis since the abnormal returns do not overlap as much as the long-run returns. A rough calculation is carried out below to show the effect of cross-correlation. Assume that the variance of N firm's abnormal returns (σ^2) and the correlation between the firms (ρ) are the same. Then,

$$\sigma(\rho) = \sqrt{\frac{1}{N}\sigma^2 + \frac{N-1}{N}\rho\sigma^2} \tag{19}$$

If independence is assumed, in other words, if ρ is assumed to be zero, then the magnitude of the bias will be,

$$\frac{\sigma(\rho)}{\sigma(0)} = \sqrt{1+(N-1)\rho} \tag{20}$$

This bias will cause the test statistic to be larger than its true value. As a result, the null hypothesis of no abnormal return can be rejected incorrectly.

Second, abnormal returns are assumed to be normally distributed. However, long-term abnormal returns are shown to be right-skewed since the stock price may decrease at most by 100 % but increase infinitely. As a result, the normality assumption may not be valid for the long-term returns. Kothari and Warner [30] state that the skewness problem arises due to the cross-correlation between returns. Moreover, they argue that as the sample size grows, this skewness bias will diminish as a result of the central limit theorem stating that the sum of a large number of independent random variables is approximately normally distributed. Hence, if the cross-correlation is somehow disregarded, the problem of cross-correlation and skewness is solved simultaneously.

3.6.2 A Bayesian Approach to Measure Abnormal Return

Before going into the details of the approach, it is appropriate to give some brief information about Bayesian statistics. Contrary to the frequentist method, the Bayesian method treats the estimated variables as stochastic (or having a probability distribution) rather than deterministic. For instance, in a regression framework, one can use the maximum likelihood method to estimate the parameters and the estimated parameters are deterministic in the sense that they are scalars. In Bayesian statistics, a distribution function is estimated for all the parameters. The Bayesian methodology, in fact, comes from the very simple Bayes' Rule in probability theory. Let θ denote

the variables to be estimated and y denote the data used for estimation. Bayes' Rule simply says the following,

$$p(\theta \mid y) = \frac{p(y \mid \theta)\, p(\theta)}{p(y)} \tag{21}$$

In Equation (21), the point of interest is p(θ|y). This term is interpreted as the answer to the question of what we know about the parameters of the model, given the data that are assumed to explain the model. p(θ|y) is called the posterior density and p(y|θ) is called the likelihood function and can be interpreted as the probability of observing the data given the parameters. The OLS regression is a good example of this probability. In the OLS method, the regression parameters estimated in such a manner that the probability of observing the data is maximized. p(θ) in Equation (21) is called the prior density of the parameters. It represents the prior belief about the parameters to be estimated. If p(y) is omitted, the relationship can be written as follows:

$$p(\theta \mid y) \propto p(y \mid \theta)\, p(\theta) \tag{22}$$

In Bayesian literature, it is interpreted that the posterior is proportionate to likelihood times the prior. In other words, the posterior is the combination of prior beliefs about the parameters and the data conditioned on these parameters. After finding the posterior distribution of the parameters, one can get inference about any function of the parameters as shown below.

$$E\left[g(\theta) \mid y\right] = \int g(\theta)\, p(\theta \mid y) d\theta \tag{23}$$

In Equation (23), g is any integrable function of θ. Sometimes, the above quantity is intractable by analytical methods. In other words, the above integral does not have a closed form solution because of p(θ|y). In such a situation, Monte Carlo (MC) simulation methods are used. One of the widely used MC simulation methods is Gibbs Sampling (GS).

Gibbs Sampling

Gibbs sampling is a Markov Chain Monte Carlo (MCMC) method used to predict the posterior density in a Bayesian setup. The Monte Carlo simulation takes random draws from a distribution, say p(θ|y), and estimates E[g(θ)|y]. The density function may be not in a well-known form so it is not possible to make draws from this unknown distribution. However, it is often easy to make draws from the distributions of a parameter conditioned on other parameters. A simple example is the best way to explain the method.

Let the joint posterior have two variables θ_1 and θ_2. Let y denote the data as before. Bayes' Theorem says that $p(\theta_1, \theta_2|y)=p(\theta_1|y, \theta_2)p(\theta_2|y)$. Suppose a random draw is made from $p(\theta_2|y)$ and call it θ_2^0. In this case, making a draw from $p(\theta_1| \theta_2,y)$ conditioned on the draw θ_2^0 is equivalent to making a draw for θ_1 from $p(\theta_1, \theta_2|y)$. Calling this draw θ_1^1, one can apply the same procedure for θ_2 and come up with $\theta^1=[\theta_1^1, \theta_2^1]$. The procedure can be extended beyond two variables and

it can be repeated many times and the draw can be used to make an inference for the Equation (23). This method is called a Markov Chain since the draws are conditioned only on the last draws of the parameters but not the history of the draws. Like in every simulation process, there is a warm-up period for the MCMC simulation as well. Generally, a 10% warm-up period is appropriate. The draws in the warm-up period are discarded since it is assumed that the system has not reached steady-state yet. Discarding these draws is also important since one needs initial values to start the Gibbs sampling. Determining a warm-up period also decreases the results' sensitivity to initial values. In addition, sometimes the kernel of the distribution of the parameters conditional on other parameters may not be known. In this situation, a variation of GS, called Griddy Gibbs Sampling is used [52].

Griddy Gibbs Sampling

As the name suggests, this method uses grids to find an empirical distribution of the conditional distributions. Suppose one searches an empirical distribution for $p(\theta_i|\theta,y)$ where θ is the vector of parameters excluding θ_i and y is the data. It is sufficient to know $p(\theta_i|\theta,y)$ up to a proportionality in order to achieve this objective. Let this function be denoted by $f(\theta_i)$. First of all, an educated guess is needed around which the grids are constructed. The median or the mean from the data can be used as this starting point. Let the points that construct the grid be $\psi=(\psi_1, \psi_2,\ldots, \psi_k)$. Let $f(\psi_i)=w_i$. The normalized density at point ψ_i can be written as follows:

$$d_i = w_i / \sum_{j=1}^{k} w_j \tag{24}$$

In fact, a discrete distribution is used to estimate the continuous distribution. In the next step, a cumulative distribution function (cdf) is constructed from this discrete distribution. Since the real density is continuous, the densities of other points should be determined. A linear interpolation is useful for this purpose.

An example is useful for illustration. Table 8 shows an empirical distribution constructed with six grids centered at 0.

Table 8 Numerical Example Data for Griddy Gibbs Sampling

ψ_i	w_i	d_i	cdf(F(ψ))
-3	0.08	0.04	0.04
-2	0.28	0.14	0.18
-1	0.42	0.21	0.39
0	0.44	0.22	0.61
1	0.42	0.21	0.82
2	0.28	0.14	0.96
3	0.08	0.04	1

Below is the cumulative distribution function linearly interpolated for the in-between values.

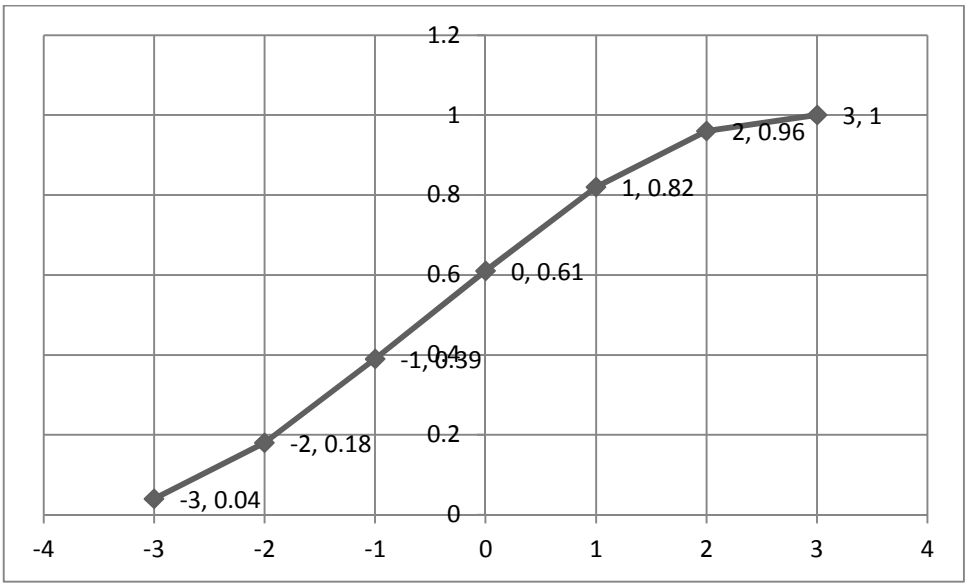

Figure 4 Example cdf using Griddy Gibbs Sampling

In above figure, the vertical axis represents the weights of the points at the horizontal axis. The points in between are linearly interpolated by the help of tip points so that the weight of a point in a grid is calculated as follows:

$$F(\psi) = F(\psi_{i-1}) + \frac{F(\psi_i) - F(\psi_{i-1})}{\psi_i - \psi_{i-1}}(\psi - \psi_{i-1}) \tag{25}$$

In Equation (25), ψ belongs to the interval $[\psi_{i-1}, \psi_i]$. After the density is constructed, empirical inverse cdf should be evaluated so that sampling can be done by the draws from a uniform distribution between 0 and 1. Let F denote the empirical cdf and let k be a random draw from a uniform distribution [0,1]. Then, $F^{-1}(k)$ corresponds to a draw from $p(\theta_i|\theta,y)$. It is shown in Tanner [32] that increasing the number of grids accelerates the convergence to the posterior distribution. There are adaptive grid approaches during sampling to change the uniform grid

length, number of grids and center point of grids. For example, the number of grids can be doubled at every fixed number of iterations. Furthermore, the mean is calculated and the center of the grid can be changed accordingly in each iteration. This is important since a better approximation is needed around the mean. For this purpose, one can decrease the length of grids around the mean to obtain a better approximation.

3.6.3 Model Construction for Long-Run Abnormal Returns

As mentioned previously, the cross correlation between abnormal returns and the skewness of the returns make it difficult to measure the abnormal returns. A pre-event estimation biases the parameters so the market model cannot be used in long-horizon returns. The model presented below attempts to overcome these difficulties. The cross-correlation is caused by the factors that are not priced in the expected return model. This correlation is expected to be the highest within the firms in the same industry. Hence, the firms should be grouped according to their industries. They are also grouped according to the calendar time of long-horizon returns. As discussed previously, a period of 35 weeks is decided to be taken as the long horizon. The firms are sorted from the latest to the earliest of their event 6 day (the end of the rights offering). Afterwards, the first firm's event day is taken as the reference day and the last firm of the group is determined as the firm event that takes place approximately 35 weeks prior to the first firm's event. Other groupings are possible, but, no matter which method is used, the overlapping of calendar times will never be perfect. The number of firms conducting rights offerings is very small in some calendar years. Grouping them according to the industries may result in very few offerings in a group. As a result, it is decided that the grouping is done according to financial and non-financial sectors in order to have a sufficient number of firms in each group for each year.

The returns are calculated on a weekly basis for the firms and for the market index. The ISE-100 is used as the proxy for the market index. The event date is taken as event 6 defined earlier for the short-term abnormal returns. If event day 6, which is the day of announcement of remaining shares, is missing then the event date is assumed to be the last day of the rights offering period.

Let the number of firms in the group be N. The long-run is taken as 35 weeks, considering the issue frequency of the firms in the Turkish market. The return model is as follows:

$$y_{it} = \beta_{i0} + \beta_{i1} r_{it} + v_{it} \tag{26}$$

In Equation (26), y_{it} is the return of firm i during week t, r_{it} is the market return during week t, β_{i0} and β_{i1} are the market model parameters of firm i and v_{it} is the residual of the market model and is normally distributed with mean 0 and variance σ_i^2. Writing this model as a Seemingly Unrelated Regression (SUR) setup, one obtains the following system of equations.

$$
\begin{aligned}
y_{1,1} &= \beta_{01} + \beta_{11} r_{1,1} + v_{11} \\
y_{1,2} &= \beta_{01} + \beta_{11} r_{1,2} + v_{12} \\
&\vdots \\
y_{1,35} &= \beta_{01} + \beta_{11} r_{1,35} + v_{1,35} \\
&\vdots \\
y_{i,j} &= \beta_{0i} + \beta_{1i} r_{i,j} + v_{i,j} \\
&\vdots \\
y_{N,35} &= \beta_{0N} + \beta_{1N} r_{N,35} + v_{N,35}
\end{aligned}
\tag{27}
$$

This set of equations can also be written in the following compact form.

$$Y = X\beta + V$$

where

$$\beta = [\beta_{01}, \beta_{11}, ..., \beta_{0i}, \beta_{1i}, ..., \beta_{0N}, \beta_{1N}]^T$$

$$
X = \begin{bmatrix} X_1 & 0 & 0 & 0 \\ 0 & X_2 & 0 & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & X_N \end{bmatrix} \qquad X_i = \begin{bmatrix} 1 & r_{i,1} \\ 1 & r_{i,2} \\ \vdots & \vdots \\ 1 & r_{i,35} \end{bmatrix}
$$

$$
V = \begin{bmatrix} V_1 \\ V_2 \\ \vdots \\ V_N \end{bmatrix} \qquad V_i = \begin{bmatrix} v_{1,i} \\ v_{2,i} \\ \vdots \\ v_{35,i} \end{bmatrix} \qquad \forall i = 1, ..., N
\tag{28}
$$

In Equation (28), V is assumed to have a multivariate normal distribution with mean 0 and covariance Σ, where Σ is a 35N-by-35N covariance matrix. At this point, it is appropriate to define Σ in a different manner. As Griffiths [20] argues, there is a critical issue in finding the inverse of Σ which has the following form:

$$
\Sigma = \begin{bmatrix} \sigma_{11}^2 & \sigma_{12}^2 & ... & \sigma_{1N}^2 \\ \sigma_{21}^2 & \sigma_{22}^2 & ... & \sigma_{2N}^2 \\ \vdots & \vdots & \vdots & \vdots \\ \sigma_{N1}^2 & \sigma_{N2}^2 & ... & \sigma_{NN}^2 \end{bmatrix}
\tag{29}
$$

In Equation (29), each σ_{ij}^2 is a 35x35 matrix whose entries are all σ_{ij}^2 (covariance between security i and j) . An inverse does not exist for Σ. Let Σ^* be defined as follows:

$$
\Sigma^* = \begin{bmatrix} \sigma_{11}^2 & \sigma_{12}^2 & ... & \sigma_{1N}^2 \\ \sigma_{21}^2 & \sigma_{22}^2 & ... & \sigma_{2N}^2 \\ \vdots & \vdots & \vdots & \vdots \\ \sigma_{N1}^2 & \sigma_{N2}^2 & ... & \sigma_{NN}^2 \end{bmatrix}
\tag{30}
$$

In Equation (30), each σ_{ij}^2 is a scalar denoting the covariance between securities i and j. The inverse of Σ in the SUR setup is defined as follows:

$$\Sigma^{-1} = \left(\Sigma^{*}\right)^{-1} \otimes I_{35} \tag{31}$$

In equation (31), I_{35} is a 35x35 identity matrix. The multiplication is called the Kronecker product. The correlation coefficient (ρ) is the same among all the securities. In this case, the following can be written:

$$\Sigma^{*}(i,j) = \begin{cases} \rho\sigma_i\sigma_j & if \quad i \neq j \\ \sigma_i^2 & if \quad i = j \end{cases} \tag{32}$$

In Equation (32), β is 2N-by-1, X is 35N-by-2N, each X_i is 35-by-2, V is 35N-by-1, and each V_i is 35-by-1. The residuals are assumed to have a common correlation ρ, which represents the cross-correlation between the abnormal returns. As a result, the exact likelihood function is a multivariate normal.

$$L(V \mid \Sigma, \beta) = \left(\frac{1}{\sqrt{2\pi}}\right)^{35N} |\Sigma|^{-\frac{1}{2}} \exp\left(-\frac{1}{2}(y - X\beta)^T \Sigma^{-1}(y - X\beta)\right) \tag{33}$$

In Equation (33), |Σ| denotes the determinant of Σ. As discussed previously, it is sufficient to write the densities up to proportionality. The likelihood function can be represented as follows:,

$$L(V \mid \Sigma, \beta) \propto |\Sigma|^{-\frac{1}{2}} \exp\left(-\frac{1}{2}(y - X\beta)^T \Sigma^{-1}(y - X\beta)\right) \tag{34}$$

The priors should also be specified. The priors for β's are constructed as follows:

$$\beta \sim N(\overline{\beta}, S_\beta)$$

$$p(\beta) = \left(\frac{1}{\sqrt{2\pi}}\right)^{2N} |S_\beta|^{-\frac{1}{2}} \exp\left(-\frac{1}{2}\left(\beta - \overline{\beta}\right)^T S_\beta^{-1}\left(\beta - \overline{\beta}\right)\right) \tag{35}$$

In Equation (35), the means are obtained from the weekly OLS regressions of 35 weeks in the pre-event period. Variances are obtained by squaring the difference of pre-event and post-event period (35 weeks) OLS beta estimations. The pre-event estimation period is taken as 35 weeks before event 1 and post-event estimation period is taken as 25 weeks after event 6. This estimation of variances results in the representation of pre- and post-event periods together. It incorporates to the model the uncertainty of β after the event. S_β is represented as a diagonal 2N-by-2N matrix assuming no correlation between the β's. More formally, it can be represented as follows:

$$\beta_{pre} = \left(\overline{\beta_{01}}, \overline{\beta_{11}}, \overline{\beta_{02}}, \overline{\beta_{12}}, ..., \overline{\beta_{0N}}, \overline{\beta_{1N}}\right) \tag{36}$$

$$\beta_{post} = \left(\overline{\beta_{01}}, \overline{\beta_{11}}, \overline{\beta_{02}}, \overline{\beta_{12}}, ..., \overline{\beta_{0N}}, \overline{\beta_{1N}}\right) \tag{37}$$

$$d = \overline{\beta}_{pre} - \overline{\beta}_{post} \tag{38}$$

$$S_\beta(i,j) = \begin{cases} d_i^2 & if \quad i = j \\ 0 & otherwise \end{cases} \tag{39}$$

In Equation (36) and Equation (37), β_{pre} and β_{post} represent the β estimates of pre-event and post-event periods respectively and d is the entry-wise difference vector of these two estimations. Since it is assumed that there is no correlation between β's, each β can be written separately. However, for the sake of compactness and computational complexity, the draw is made once from a multivariate distribution. These priors are regarded as one of the best priors one can have about the parameters of the market model. The remaining priors are for the standard deviation of residuals in the market model and the correlation coefficient of the residuals.

$$\log(\sigma_i) \sim N(\overline{\sigma_i}, s_{i\sigma}^2) \tag{40}$$

$$p(\sigma_i) = \frac{1}{\sigma_i \sqrt{2\pi s_{i\sigma}}} \exp\left(-\frac{1}{2} (\ln \sigma_i - \overline{\sigma_i}) s_{i\sigma}^{-1} (\ln \sigma_i - \overline{\sigma_i}) \right) \quad \forall i = 1,\ldots,N \tag{41}$$

A log-normal distribution is specified to guarantee the positiveness of σ's. The mean of the prior is calculated as the logarithm of the estimated σ from the pre-event 35-week OLS regression. The estimation is done by calculating the sample standard deviation of error terms obtained from the OLS regressions. Likewise, in the determination of the variance of the posterior for β, the difference of the pre-event and post-event σ is calculated. The value is squared and its exponential is calculated:

$$\overline{\sigma_i} = \log(\sigma_{ipre}) \tag{42}$$

$$d_{i\sigma} = \log \sigma_{ipre} - \log \sigma_{ipost} \tag{43}$$

$$s_{i\sigma}^2 = (d_{i\sigma}^2) \tag{44}$$

The last prior to be specified is the common correlation coefficient:

$$\rho \sim Un(p^*, 1) \quad p^* > -1/(N-1) \tag{45}$$

$$p(\rho) = \frac{1}{1 - p^*} \tag{46}$$

The restriction on ρ^* is to guarantee the positive semi-definiteness of the covariance matrix. The proof can be found in Brav [10]. ρ^* is be chosen as 0 in application since the prior belief is that the security returns are positively correlated within the group. Assuming the independence of the priors, one can construct the posterior distribution as follows:

$$p(\beta, \sigma, \rho \mid y) \propto L(V \mid \alpha, \beta, \sigma, \rho) p(\beta) \prod_{i=1}^{N} p(\sigma_i) p(\rho) \tag{47}$$

Before explicitly writing the proportionality, it is appropriate to define the prior distributions up to proportionality:

$$p(\beta) \propto \exp\left(-\frac{1}{2}\left(\overline{\beta}-\beta\right)^T S_\beta^{-1}\left(\overline{\beta}-\beta\right)\right)$$

$$p(\sigma_i) \propto \frac{1}{\sigma_i}\exp-\frac{1}{2}\left(\frac{\left(\log\sigma_i-\overline{\sigma_i}\right)^2}{s_{i\sigma}}\right) \quad \forall i=1,...,N \tag{48}$$

$$p(\rho) \propto 1$$

The constants are omitted in the priors since it is enough to write up to proportionality. In Equation (48), β denotes the vector for each firm's parameters and the corresponding S's are diagonal matrices. The entries are associated with the standard deviation of priors and they are expressed as vectors for compactness of notation. ρ is proportionate to 1 since the density of uniform distribution does not include the random variable itself. For the sake of compactness, Σ can be written as Σ=SRS where R is the correlation matrix and S is a diagonal matrix of standard deviations. The last component to define is the conditional distributions up to proportionality.

$$\beta \mid \sigma,\rho \propto \exp\left(-\frac{1}{2}\left(\left(\overline{\beta}-\beta\right)^T S_\beta^{-1}\left(\overline{\beta}-\beta\right)+\left(y-X\beta\right)^T\Sigma^{-1}\left(y-X\beta\right)\right)\right) \tag{49}$$

$$\rho \mid \beta,\sigma \propto \left|R\right|^{-\frac{1}{2}}\exp\left(-\frac{1}{2}\left(y-X\beta\right)^T\Sigma^{-1}\left(y-X\beta\right)\right) \tag{50}$$

$$\sigma_i \mid \beta,\rho,\sigma \propto \sigma_i^{-36}\exp\left(-\frac{1}{2}\left(\frac{\left(\log\sigma_i-\overline{\sigma_i}\right)^2}{s_{i\sigma}}+\left(y-X\beta\right)^T\left(\Sigma\_cond\right)^{-1}\left(y-X\beta\right)\right)\right) \quad \forall i=1,...,N \tag{51}$$

The proportionality written for σ_i and the covariance matrix are both conditional on the remaining σ's. The term σ_i^{-36} needs an explanation. Since R does not include any σ, it is omitted. As a result, $|\Sigma|$ reduces to $|S^2|$. Matrix S is a 35Nx35N diagonal matrix:

$$diagonal\left(S^2\right)=\left(\underbrace{\sigma_1^2,\sigma_1^2,...,\sigma_1^2}_{35\,times}\underbrace{\sigma_i^2,...,\sigma_i^2}_{35\,times},...,\underbrace{\sigma_N^2,...,\sigma_N^2}_{35\,times}\right) \tag{52}$$

It is a known fact that the determinant of a diagonal matrix is the product of the entries of its diagonal entries. Since distributions are written up to proportionality, only the associated σ remains. When the conditional distributions are examined carefully, β|σ, ρ can be transformed into a kernel of a known distribution:

$$\left(\left(\overline{\beta}-\beta\right)^T S_\beta^{-1}\left(\overline{\beta}-\beta\right)+V'\Sigma^{-1}V\right)=\left(\beta-\mu^*\right)^T\sigma^{2*}\left(\beta-\mu^*\right)+C$$

where

$$\sigma^{2*}=\left(S_\beta^{-1}+X^T\Sigma^{-1}X\right)^{-1} \quad \mu^*=\sigma^{2*}\left(S_\beta^{-1}\overline{\beta}+X^T\Sigma^{-1}y\right) \tag{53}$$

$$C=y^T\Sigma^{-1}y+\overline{\beta}^T S_\beta^{-1}\overline{\beta}-\left(\mu^*\right)^T\left(\sigma^{2*}\right)^{-1}\mu^*$$

By the help of the above transformation, the following can be written:

$$\beta \mid \sigma,\rho \propto \exp\left(-\frac{1}{2}\left(\beta-\mu^*\right)^T\left(\sigma^{2*}\right)^{-1}\left(\beta-\mu^*\right)\right) \tag{54}$$

The above expression is obviously the kernel of a multivariate distribution:

$$\beta \mid \sigma, \rho \sim N\left(\mu^{*}, \sigma^{2^{*}}\right) \tag{55}$$

It is important to have a known distribution at least for β since the sampling procedure will be easier and computational time will decrease. For the remaining variables σ and ρ, Griddy Gibbs sampling (GGS) will be used to estimate the empirical distributions. For ρ, the grids are constructed around the average value of the sample drawing of ρ's. For example, if the first draw is 0.1 and the second draw is 0.3, then the grid construction is done around 0.2. As a result of numerical instabilities (singular matrices), the grids are constructed between 0.01 and 0.99. The grid length is determined according to the following law:

$$grid\,length = 2 * \min\left(\left(average\rho - 0.01\right), \left(0.99 - average\rho\right)\right) / number of\ grids \tag{56}$$

This is required in order to avoid the grids becoming less than 0.01 and greater than 0.99. The grid length for σ's is calculated as follows:

$$grid\ length = 2 * \left(average\,\sigma - 0.01\right) / number\ of\ grids \tag{57}$$

Since it is required that σ should be greater than 0, such a grid length is determined around the mean.

In order to start the sampling, number of grids, number of iterations, center of grids and initial values should be determined. The number of grids is chosen as 50 and the number of iterations is 600. The first 100 iterations are considered as the warm-up period and are discarded. The center for ρ is 0.5, and the center for σ is determined by $\bar{\sigma}$ .The initial values for each variable are taken to be the mean values of their corresponding prior distributions. For instance, the initial value of β_{01} is the β_{01} estimated during the pre-event period and is assumed to be the mean of the corresponding posterior. The sampling order will be β, ρ and σ. At the end of each iteration, there will be a draw from each variable. Σ will be used to make 4 draws for the errors. The draw is made from a normal distribution with mean 0 and covariance matrix Σ. The averages of these error drawings are used, meaning, errors are simulated as well. As a result of these calculations, a total of 500 returns are generated. For each of these 500 draws, expected buy-and-hold returns are calculated for each firm by compounding the returns. Next, these 500 returns are averaged in order to find the expected return for each firm. The difference between the realized buy-and-hold return and the expected buy-and-hold return yields the abnormal return of the firm. As a result, the abnormal returns are free of cross-correlation and skewness biases. After obtaining these abnormal returns, it is possible to carry out the procedure for the short-term event study as well.

The above derivation and method looks like a good estimation for the abnormal returns. However, there are a number of numerical instabilities caused by the inverses and the Kronecker products involved in the derivation. Hence, this method did not lead to any usable results. Therefore, it is decided to simplify the model such that it still involves the ideas like cross-

correlation and the idea of amalgamating the pre-event and post-event betas in the market model but has far less numerical problems.

3.6.4 A Similar yet Simpler Method

The method to reflect the cross-correlation between the returns is to construct a covariance matrix that captures the correlation between the errors of the market model for each firm for the same period across the calendar time. After the construction of this matrix, one needs to simulate errors as explained in the previous section. In this simpler model, the covariance matrix is constructed by the help of errors in the pre-event (35 weeks prior to event 1) and post-event (35 weeks after event 6) market model estimation. Next, these errors are used to estimate the variance-covariance matrix of the return errors. The covariance estimation between two errors is done as follows:

$$q_{jk} = \frac{1}{N-1}\sum_{i=1}^{N}\left(x_{ij} - \mu_j\right)\left(x_{ik} - \mu_k\right) \tag{58}$$

In Equation (58), x_{ij} is the i^{th} error of firm j, x_{ik} is the i^{th} error of firm k, q_{jk} is the covariance between firm j and k and μ_j and μ_k are the arithmetic averages of errors of firm j and k, respectively. After the construction of the covariance matrix, the procedure for error simulation is similar to the previous method. 1000 iterations are used to have more reliable figures since there is not a computational time constraint for this method.

The second step is to find betas in order to find the expected returns. The betas should contain information both from pre-event and post-event estimation. The simplest way is to calculate the convex combination of betas as follows:

$$\beta_{new} = \alpha\beta_{pre} + (1-\alpha)\beta_{post} \tag{59}$$

It is obvious that this model is not as detailed as the Bayesian approach but it carries the fundamental ideas of the previous model and it is not that complicated. The results are presented in the last part of Results and Analyses Chapter.

CHAPTER 4

RESULTS AND ANALYSIS

This chapter is organized into three sub-sections. The first part presents empirical evidence regarding the short-term market reaction to rights offering announcements. The second part provides the results of the analysis on the determinants of this short-term reaction. Finally, the third section gives information about the long-term market reaction to rights offering announcements.

4.1 Short-Term Market Reaction

As explained in the methodology chapter, six days are chosen during the rights offering process in order to test the short-term market reaction to the announcements regarding the offering. In addition, a distinction is made for years and the data are separated into two different groups. The first group consists of the offerings conducted between years 1994 and 2001 and the second group consists of the offerings conducted between years 2002 and 2010. The distinction is based on the economic stability achieved after the implementation of an inflation targeting program adopted by the Turkish government.. Moreover, two different abnormal returns are constructed, one for the event day (day 0) and the other for the cumulative abnormal return (from day 0 to day +3). These abnormal returns are calculated based on the Market Model and the Zero-One Model. Hence, a total of 24 different statistical tests are carried out.

As discussed in the methodology section, t-test and sign test are used to test the main hypotheses regarding abnormal returns. One of the assumptions of the t-test is that the data should be normally distributed. None of the data pass the normality tests (Jarque-Bera, Lilliefors) except for the day 0 abnormal return and the cumulative abnormal return of event 2 between years 2002 and 2010 for both models. This is a somewhat expected result since the number of data points is 10 and such a number is very small to carry out a normality test. Moreover, there were no statistical outliers in the data set. These outliers could have been caused by extraordinary firm specific events other than equity issue events and they would have been excluded from analysis since they would have caused the standard deviations to be high and the power of the tests to be low.

The second test is the sign test and since it is a non-parametric test it does not require any previous distribution assumption about the data. The results are shown separately in the following two tables. Table 9 shows the results with the t-test and Table 10 shows the results with the sign test.

Table 9 Average Abnormal Returns and Results of t-test

AR denotes the average % abnormal return on the event day (day 0). CAR represents the average % cumulative abnormal return from day 0 to day+3. Highlighted figures mean statistical significance at 5 % level.

		Market Model		Zero-One Model	
		AR	**CAR**	**AR**	**CAR**
Event-1: Board of Directors Meeting					
ALL	**%**	-0.200964241	-1.332158676	-0.18759401	-1.288263194
	p-value	0.255207697	0.000027235	0.27957540	0.000033704
1994-2001	**%**	-0.202385486	-0.872812027	-0.21386852	-0.882850848
	p-value	0.341355600	0.032711748	0.29996642	0.026592153
2002-2010	**%**	-0.198220143	-2.219051050	-0.13494508	-2.100629379
	p-value	0.530477104	0.000006599	0.67139295	0.000013999
Event-2: Shareholders Meeting					
ALL	**%**	0.059940357	-0.786785401	0.05087367	-0.959355875
	p-value	0.885116678	0.236522336	0.90016618	0.143144035
1994-2001	**%**	0.179886539	-0.844736908	0.12118440	-1.110050769
	p-value	0.702822661	0.253728004	0.79294897	0.126501735
2002-2010	**%**	-0.699718793	-0.419759186	-0.39442760	-0.004954874
	p-value	0.247484118	0.766751050	0.49481813	0.997280337
Event-3: Application to CMB of Turkey					
ALL	**%**	-0.220678105	-0.742508454	-0.31082322	-0.704174202
	p-value	0.104927892	0.005597517	0.02344237	0.008372049
1994-2001	**%**	-0.235151897	-1.077424750	-0.33674953	-0.982031736
	p-value	0.176567169	0.001359887	0.22137760	0.687728291
2002-2010	**%**	-0.193015835	-0.102417462	-0.26127294	-0.173133740
	p-value	0.371686391	0.816781729	0.22137760	0.687728291
Event-4: Approval from CMB of Turkey					
ALL	**%**	0.023300315	0.043563812	0.00338287	0.107161727
	p-value	0.866191521	0.872036328	0.98069730	0.690099438
1994-2001	**%**	0.204973087	0.628573865	0.16593183	0.656507779
	p-value	0.251089691	0.076263706	0.36076536	0.064637828
2002-2010	**%**	-0.323912125	-1.074505594	-0.30728019	-0.942746750
	p-value	0.128861756	0.006888568	0.14874294	0.014551395
Event-5: Announcement of Rights Offerings					
ALL	**%**	0.85698338	3.066728336	0.78784902	2.955834791
	p-value	0.00000000	0.000000000	0.00000399	0.000000010
1994-2001	**%**	1.170267478	3.824052916	1.04697673	3.656240726
	p-value	0.000000086	0.000000026	0.00000192	0.000000188
2002-2010	**%**	0.2533090227	1.607422125	0.28852985	1.606206432
	p-value	0.3491859598	0.019389859	0.27606573	0.017111301
Event-6: Announcement of Unsold Portion					
ALL	**%**	-0.313130155	-0.987862065	-0.27782532	-0.865653400
	p-value	0.030932834	0.000233946	0.05408917	0.001276856
1994-2001	**%**	-0.314225273	-0.837737225	-0.26064643	-0.725508854
	p-value	0.089682133	0.018540561	0.15684905	0.042787313
2002-2010	**%**	-0.311009449	-1.278580010	-0.31109239	-1.137044425
	p-value	0.178129922	0.000880823	0.17511236	0.002605196

Table 10 Median Abnormal Returns and Results of Sign Test

AR denotes the median % abnormal return on the event day (day 0). CAR represents the median % cumulative abnormal return from day 0 to day+3. Highlighted figures mean statistical significance at 5 % level.

		Market Model		Zero-One Model	
		AR	**CAR**	**AR**	**CAR**
Event-1: Board of Directors Meeting					
ALL	**%**	-0.3113987986	-1.362029326	-0.329616868	-1.5406616216
	p-value	0.0325699827	0.000001449	0.0140919930	0.0000000066
1994-2001	**%**	-0.1922916508	-0.999026835	-0.270114774	-0.9907858541
	p-value	0.3486166720	0.006477763	0.1168380501	0.0017105368
2002-2010	**%**	-0.4215202304	-2.210021860	-0.399306291	-2.2680592053
	p-value	0.0217536153	0.000010664	0.0484722644	0.00000002862
Event-2: Shareholders Meeting					
ALL	**%**	0.0051121796	-0.431318222	-0.168213768	-1.2525677318
	p-value	1.0000000000	0.294266104	0.774848422	0.1050420037
1994-2001	**%**	0.1529205575	-0.332593614	0.039881769	-1.3210649744
	p-value	0.6817425059	0.411910073	0.837556070	0.1001733304
2002-2010	**%**	-0.5323408246	-1.441696043	-0.469047759	-0.2618810026
	p-value	0.3017578125	0.607238769	0.118469238	1.0000000000
Event-3: Application to CMB of Turkey					
ALL	**%**	-0.2652985563	-1.107577532	-0.319097153	-1.0956081815
	p-value	0.0011903230	0.000000016	0.000540785	0.0000000007
1994-2001	**%**	-0.2400113481	-1.403460744	-0.297442645	-1.2346342798
	p-value	0.0090607613	0.004259162	0.001233049	0.0007925123
2002-2010	**%**	-0.3185212533	-0.669426558	-0.362669901	-0.7126213402
	p-value	0.0090607613	0.004259162	0.001233049	0.0007925123
Event-4: Approval from CMB of Turkey					
ALL	**%**	-0.1265748691	-0.520644734	-0.166710487	-0.5347230540
	p-value	0.1778319586	0.005044557	0.026317860	0.0119766425
1994-2001	**%**	-0.0338751068	-0.214857644	-0.120275460	-0.3082577576
	p-value	0.8573200803	0.472050646	0.529183301	0.4720506467
2002-2010	**%**	-0.3381233890	-0.757799694	-0.439983062	-0.8881696410
	p-value	0.0467693197	0.000192838	0.004259162	0.0012330495
Event-5: Announcement of Rights Offerings					
ALL	**%**	0.2294911411	1.312710598	0.116060398	1.0736044547
	p-value	0.1107125144	0.000090405	0.425161064	0.0000136139
1994-2001	**%**	0.6021242503	1.655569024	0.534380374	1.6075805394
	p-value	0.0042456482	0.000007907	0.039866600	0.0000033781
2002-2010	**%**	-0.2398166807	0.538708624	-0.275288781	0.3864970280
	p-value	0.2386650808	0.664200161	0.153753073	0.3522362191
Event-6: Announcement of Unsold Portion					
ALL	**%**	-0.6591298137	-1.498034088	-0.662644426	-1.5203415933
	p-value	0.0000000284	0.000000000	0.0000236318	0.0000000000
1994-2001	**%**	-0.6132996677	-1.402291901	-0.489700523	-1.6415579389
	p-value	0.0003486756	0.000000313	0.0127839087	0.0000048296
2002-2010	**%**	-0.7618925436	-1.634814533	-0.822217661	-1.4094255020
	p-value	0.0000077281	0.000004254	0.000201881	0.0000003351

There are a number of conclusions drawn from these tables. First, the shareholders' meeting is not an event that results in abnormal returns. This finding is valid for both the t-test and sign test. The possible explanation is that many firms do not hold a shareholder meeting because they

operate on a primary capital definition. There are only 110 shareholders' meetings among the 762 rights offerings analyzed in total. Another possibility is that the shareholders' meetings are usually held only to meet regulatory requirements and it is the BOD meeting where the rights offering decision is taken.

Except for some events, CARs seem to have more significance than the corresponding ARs. This can be considered as evidence that the market does not react quickly to the news and the information gets incorporated into prices gradually and in a less than efficient manner. The zero-one model and the market model produce similar results and the sign of the abnormal returns and the statistical significance of the results are more or less the same for both models.

Another important observation is that the BOD meetings cause a significant and negative abnormal return regardless of the model and the statistical test used. Especially, the three-day CARs are more negative than -1 %. On the contrary, on event day 5 (announcement of rights offerings) CARs and ARs are either not significantly different from 0 or positive above the +1% level and they are even close to +3 % in the market model. The situation reverses when time approaches to the last event, the announcement of unsold rights. In the Turkish rights offerings, it is common to have some portion of the rights offering unsold during the rights offering period. The significant negative market reaction to this announcement implies that investors perceive an overvaluation in the stock since some of the shareholders do not use their rights to buy the extra shares. Event 2 (CMB application) and Event 3 (CMB approval) result in negative or no abnormal returns in general.

There is really an important and consistent observation in the above figures. Between years 1994 and 2002 the abnormal return figures are always higher than the abnormal returns in years between 2002 and 2010. As discussed before, these two classes are constructed according to the stability conditions in the Turkish macroeconomic environment. As it is hypothesized, the abnormal returns in period 2002-2010 are lower than the abnormal returns in period 1994-2001 regardless of the model and statistical test used. This difference is attributed to the interest rates prevailing during the two periods and the political and economic stability that leads to a safer economic environment in which banks are more willing to provide long term credit to the companies. In such an environment, the Pecking Order Theory seems to hold in Turkey. Below Tables 11 and 12 show the results of the two sample t-test and median test to support the difference between these two sub periods.

Table 11 Mean difference test applied to sub-periods 1994-2001 and 2002-2011

The difference is the latter period minus the former period. AR denotes the difference in mean % abnormal return on the event day (day 0). CAR represents the difference in mean % cumulative abnormal return from day 0 to day+3. Highlighted figures mean statistical significance at 5 % level.

		Market Model		Zero-One Model	
		AR	**CAR**	**AR**	**CAR**
Event-1:	**%**	0.00417	-1.34624	0.07892	-1.21778
Board of Directors Meeting	**p-value**	0.99127	0.03342	0.83502	0.04947
Event-2:	**%**	-0.87961	0.42498	-0.51561	1.10510
Shareholders Meeting	**p-value**	0.24632	0.78917	0.48270	0.49683
Event-3:	**%**	0.04214	0.97501	0.07548	0.80890
Application to CMB of Turkey	**p-value**	0.87914	0.07896	0.78505	0.13950
Event-4:	**%**	-0.52889	-1.70308	-0.47321	-1.59925
Approval from CMB of Turkey	**p-value**	0.05718	0.00138	0.09054	0.00228
Event-5:	**%**	-0.91696	-2.21663	-0.75845	-2.05003
Announcement of Rights Offerings	**p-value**	0.00816	0.02142	0.02705	0.03355
Event-6:	**%**	0.00322	-0.44084	-0.05045	-0.41154
Announcement of Unsold Portion	**p-value**	0.99131	0.39652	0.86359	0.42639

Table 12 Median difference test applied to sub-periods 1994-2001 and 2002-2011

The difference is the latter period minus the former period. AR denotes the difference in median % abnormal return on the event day (day 0). CAR represents the difference in median % cumulative abnormal return from day 0 to day+3. Highlighted figures mean statistical significance at 5 % level.

		Market Model		Zero-One Model	
		AR	**CAR**	**AR**	**CAR**
Event-1:	**%**	-0.22923	-1.21100	-0.12919	-1.27727
Board of Directors Meeting	**p-value**	0.48437	0.00710	0.62322	0.00738
Event-2:	**%**	-0.68526	-1.10910	-0.50893	1.05918
Shareholders Meeting	**p-value**	0.25026	0.91676	0.58918	0.70154
Event-3:	**%**	-0.07851	0.73403	-0.06523	0.52201
Application to CMB of Turkey	**p-value**	0.93462	0.07226	0.76419	0.20571
Event-4:	**%**	-0.30425	-0.54294	-0.31971	-0.57991
Approval from CMB of Turkey	**p-value**	0.14080	0.01429	0.17816	0.02410
Event-5:	**%**	-0.84194	-1.11686	-0.80967	-1.22108
Announcement of Rights Offerings	**p-value**	0.00330	0.00382	0.00867	0.00547
Event-6:	**%**	-0.14859	-0.23252	-0.33252	0.23213
Announcement of Unsold Portion	**p-value**	0.96888	0.66547	0.83967	0.80579

As can be seen from above tables, the difference between the two sub-samples is statistically significant especially for CARs and on event days 1,5 and 6. This difference is attributed to the declining interest rates which is the result of the new governments' program designed to combat high inflation rates.

In summary, there is no reaction for the shareholders' meeting and the reaction is negative in general for each event except for event 5 when the abnormal return is positive. This positive return may be attributed to the extra demand caused by investors who exercise their rights. CARs

being more significant than ARs show that the market reaction to the news is quite slow. The most important finding is the difference between the abnormal returns of the two sub-periods. The period 1994-2001 has less negative reaction or more positive reaction than the period 2002-2010 depending on the event day.

4.2 Determinants of Market Reaction

As can be seen from Tables 9 and 10, the cumulative abnormal returns are significant for the all events except for the Shareholders Meeting. In this part of the study, the cumulative abnormal returns are regressed against the relevant determinants for each event day. The relevant determinants are given in Table 7. The results of the regressions are presented in Table 13.

The adjusted R-squares suggest that the proposed variables have the highest explanatory power for the abnormal returns of events 1 and 5In the remaining regressions, the determinants fail to explain the variability in the abnormal returns. In the event day 1 regression, the sign of the issue size (IS) is positive but in the event day 5 regression, this determinant is significant with a positive sign. When Tables 9 and 10 are examined, it is seen that event 1 has negative abnormal returns and event 5 has positive abnormal returns. However, these findings are not very consistent since if the shareholders are content with the offering, their reaction should be positive for a greater issue size and vice versa.

Market return before the issue (MR) is another determinant that is statistically significant. Its sign is consistent with the a priori expectations. When the market is bullish, shareholders assess the equity issue as a sign of good investment opportunities that the firms are trying to finance. The simultaneous bonus issues variable (BON) is also significant and positive in event 1 and event 5 regressions. The sign is again consistent with the a priori expectations since firms announcing bonus issues together with the rights offering are perceived by the investors to be financially sound companies.

The dividend payment after the issue (DIV) variable also turns out to be statistically significant. However, the sign of the variable is not the expected sign. It is hypothesized that making a dividend payment will result in a negative market reaction since the firm would be perceived to be using the proceeds of rights offerings to make the dividend payments. The positive reaction implies that shareholders may not be aware of the relationship between the dividend payments and the equity issue or it may not be the case that the equity issue is conducted to pay the dividends.

Interestingly, the determinants about the debt ratios are not significant in any of the regressions. One reason may be the fact that debt ratios should be considered on an abnormal basis. In other

words, each firm's debt ratio should be considered relative to the industry average or relative to its normal debt. Firm's stock volatility (SD) is another variable that is not significant. It may not have provided a good measurement of information asymmetry and firm quality.

Table 13 Regression Results for the Determinants of Market Reaction

Int. denotes the intercept of the regression. Highlighted figures mean statistical significance at 95 % level. Highlighted figures show that determinants have effect on the cumulative abnormal returns in each event day.

	Int.	IS	DR	DRB	DRF	SD	ABS	MR	BON	DIV	RO	UR	Ad.R-sq.
Event-1: Board of Directors Meeting													0.08036
Value	-0.02439	0.00426	-0.01073	-0.00776	-0.01528	-0.24541	-0.19913	0.13673	0.03562		-0.01878		
t-stat	-2.30517	2.63387	-1.10133	-0.67160	-0.21395	-1.52694	-0.69639	3.61945	5.49912		-1.07117		
p-value	0.02144	0.00863	0.27113	0.50206	0.83064	0.12722	0.48641	0.00032	0.00000		0.28446		
Event-3: Application to CMB of Turkey													0.00560
Value	-0.00346	-0.00037							0.00146		-0.01084		
t-stat	-0.72840	-0.67938							0.26676		-1.97807		
p-value	0.46660	0.49711							0.78973		0.04829		
Event-4: Approval from CMB of Turkey													0.00396
Value	-0.00617	0.00025							0.00856		0.00283		
t-stat	-1.28745	0.45443							1.54841		0.50927		
p-value	0.19834	0.64965							0.12194		0.61071		
Event-5: Announcement of Rights Offering													0.05570
Value	0.02874	-0.00626							0.02458	0.01141	-0.01381		
t-stat	3.29980	-6.14710							2.39801	0.80849	-1.35028		
p-value	0.00101	0.00000							0.01673	0.41906	0.17733		
Event-6: Announcement of Unsold Portion													0.00849
Value	-0.01047	-0.00072							-0.00458	0.01677	0.00221	0.01240	
t-stat	-1.88809	-0.50057							-0.79759	2.06614	0.38349	0.81201	
p-value	0.05942	0.61683							0.42538	0.03918	0.70147	0.41706	

Abnormal stock return before the issue (ABS) also turns out to be insignificant. Shareholders may not assess this variable in their reaction or the measurement period and method are not appropriate for capturing what the shareholders price in the market. It may be the fact that shareholders look at the market as a whole but not the firm individually while showing their reaction and that is the reason why this variable is not significant. Issue frequency (RO) is also not significant in any of the regressions. This finding suggests that shareholders do not care whether the firm conducted an equity issue in the previous year. At first glance, Unsold Portion (UR) seemed to be a good determinant for the reaction. However, it turns out to be statistically insignificant as well.

Since the R-squareds are quite small in the estimations, a Generalized Partial Model (GPLM) may also be considered for modeling the abnormal returns rather than analyzing the correlation between the explanatory variables and the abnormal returns. Below is a very brief description of the GPLM. However, it is only considered as an extension to this work.

$$E(Y \mid X, T) = G\left\{X^T \beta + m(T)\right\} \tag{60}$$

In Equation 60, G (link function) and m can have any functional form.

Another advanced method is Multivariate Adaptive Regression Splines (MARS). It is a method that takes into account the possible non-linearity between the explanatory variables and the abnormal return. It is roughly characterized as follows:

$$E(Y \mid X) = \sum_{i=1}^{n} c_i B_i(X) \tag{61}$$

In Equation 61, B(X) is called the base function where B(X)'s have different non-linear forms.

To sum up the results for the determinants, many of the variables, except issue size, market return before the issue, simultaneous bonus issues and dividend payment after the issue, are significant. Among the statistically significant variables, issue size findings are not consistent with the a priori expectations in terms of the sign of the parameters. Market return before the issue, bonus issues and dividend payment are the three determinants that turn out to have a significant effect on the abnormal returns. Moreover, they are explainable in a manner that is consistent with the a priori expectations.

4.3 Long-Horizon Abnormal Returns

In this part, the long-term abnormal returns are analyzed by controlling for the firm type. The sample firms are grouped into two categories as financial and non-financial. The betas are calculated by taking the convex combination of pre-event and post-event betas and the abnormal returns are analyzed for different combinations of beta values. In addition, some of the abnormal

returns are categorized as outliers if the absolute value of the abnormal return exceeds 100%. The importance of discarding these outliers is discussed in section 4.1. The analysis procedure in this part of the study is the same as the analysis of short-run market reaction. In order to apply the t-test, one has to justify the normality of the data. The results show that most of the data in each subgroup fail the normality test. The following tables summarize the findings about the buy-and-hold abnormal returns.

Table 14 Average Long-Horizon Abnormal Returns and Results of t-test

The figures are in % and are for 35-week buy-and-hold abnormal returns

		All	Financial	Non-Financial
α=0.00	**%**	-14.759856	-12.36133	-16.403001
	p-value	~0	~0	~0
α=0.25	**%**	-15.556850	-16.43216	-15.022331
	p-value	~0	~0	~0
α=0.50	**%**	-14.509991	-16.79989	-12.625497
	p-value	~0	~0	~0
α=0.75	**%**	-12.166054	-14.80979	-11.170757
	p-value	0	0	~0
α=1.00	**%**	-9.4881643	-14.65425	-5.8275336
	p-value	~0	~0	0.0392850

Table 15 Median Long-Horizon Abnormal Returns and Results of Sign Test

The figures are in % and are for 35-week buy-and-hold abnormal returns

		All	Financial	Non-Financial
α=0.00	**%**	-8.4963403	-6.300819	-9.5115147
	p-value	~0	~0	~0
α=0.25	**%**	-13.018452	-13.363990	-12.704656
	p-value	~0	~0	~0
α=0.50	**%**	-13.392003	-12.901420	-12.093882
	p-value	~0	~0	~0
α=0.75	**%**	-11.538950	-11.882530	-11.152162
	p-value	~0	0.0008492	~0
α=1.00	**%**	-8.4529669	-9.667006	-8.0792495
	p-value	0.0005889	0.017239	0.0317227

It is clear from the tables that, regardless of the firm type and the α value, long-horizon buy-and-hold abnormal returns are significantly negative. These findings are in line with the previous literature. In many different markets, long-run abnormal returns were found to be negative. The figures are large in absolute value terms so the results are tolerant to small possible biases and approximations. In other words, the reaction would be negative even with the approximations.

Changing α does not provide any logical pattern for abnormal returns. The procedure is applied in order to take into account the fact that the parameters to measure the expected returns should carry information both from pre-event and post-event estimation periods. It is not very evident but in many cases financial firms have more negative abnormal returns than non-financial firms except for the case of α=1. There may be some explanation for this evidence. Financial firms mainly include banks and mutual funds. These firms generally do not need extensive amount of funds for new investments compared to non-financial firms. Therefore, the equity issue decision may be perceived as an effort by managers to exploit overvaluation in the stock rather than an effort to secure financing for new investments.

The abnormal returns are calculated again without the beta change and covariance matrix information. The results are shown in Table 16 below.

Table 16 Results of Abnormal Return Tests without beta change and covariance matrix

		All	**Financial**	**Non-Financial**
t-test	**%**	-9.7048818	-13.4541459	-7.4096593
	p-value	~0	~0	0.0087569
Sign Test	**%**	-9.2752582	-9.3091453	-9.1921245
	p-value	0.00096858	0.0138878	0.0272484

As can be observed from the table, the results a do not change significantly. The covariance matrix seems to play an important role in the non-financial firm returns, changing the abnormal returns from -7.41 % to -5.83 %. An interesting observation is that the skewness in abnormal returns is high in both the financial and non-financial companies. Furthermore, they are in opposite direction. However, when all firms are aggregated, the skewness decreases significantly. This is true in both cases, with and without the covariance matrix. This may be an indication that the skewness bias discussed in section 3.6.1 may not be due to the cross-correlation of firms' abnormal returns. For an extension to the analysis of the long-run performance of equity issues, the abnormal returns of each sector can be modeled as a copula. Such modeling would make it possible to examine the dependence structure, if any, among the abnormal long-run returns of different sectors.

To conclude, the abnormal returns are significantly negative regardless of the combination of past and pre-event periods or the incorporation of covariance . In addition, financial firms have higher abnormal returns and this finding be attributed to a better chance of exploiting overvaluation.

4.4 Summing up the Results

Short term market reaction is negative in most of the tests except on event day 5 which is attributed to an increase in the demand for the stock as a result of shareholders exercising their preemptive rights. Moreover, on the shareholders' meeting day, the market reaction is not different from zero. In general, cumulative abnormal returns are more significant and more negative than the event day abnormal returns. This can be considered an evidence of market inefficiency. The market model and the zero-one model produce the same results in terms of the signs of market reaction. An important result is that during the political and economic stability and lower interest rate periods in Turkey, the market reaction becomes more negative compared to the previous years' abnormal returns.

For the determinants of market reaction, market return before the issue, simultaneous bonus issues and dividend payment after the issue turn out to be statistically significant in the models. Among those determinants, the sign of dividend payment after the issue is not as expected. Issue size is another variable that is significant. However its sign in different event days are not consistent with the hypotheses. Hence, many of the determinants fail to explain the abnormal returns.

The long-term abnormal return after the issue is also negative. The results are robust for different estimation methods and for different types of firms (financial versus non-financial).

CHAPTER 5

CONCLUSION

The main aim of this study is to test the market reaction to seasoned equity offerings in Turkey between 1993 and 2010. As the Pecking Order Theory suggests, when there is a need for financing, firms use their internal resources in the first place. If internal sources are insufficient, the firms prefer to borrow first and use additional equity issues only as a last resort. This theory simply implies the following. If a firm issues equity, the market reaction will be negative since the firm is perceived to have depleted its internal resources and external debt opportunities. Moreover, it may also be a signal that the managers are trying to take advantage of an overvaluation in the stock price. In light of these propositions, market should react negatively to an equity issue. In Turkey, issuing equity is done via preemptive rights offering, which is an equity issue method that gives the existing shareholders the right to buy newly raised capital on a pro rata basis. The rights offering procedure consists of six distinct steps in Turkey and new information is signaled to the market in all these steps. Since Turkey is an emerging market and a developed bond market does not exist, it is hard for Turkish firms to use debt as a source of financing with bank loans being the only debt financing alternative. Moreover, prevailing high interest rates and political instability during more than half of the sample period may have forced firm to raise capital in the form of equity. Hence, the pecking order theory may not be valid for the Turkish market.

The event study methodology is used to measure the market reaction and the results show that the market reaction is indeed negative to rights offering announcements in Turkey as the Pecking Order Theory suggests. An important observation is that the market reaction is more negative during the 2002-2010 period when the interest rates are lower and political and economic stability is higher. This is evidence that market reaction depends on economic conditions. In addition, cumulative abnormal returns turn out to be more significant than event day abnormal returns. This finding implied that the market is slow in terms of reacting to news.

In the literature, there are many determinants that are tested in order to explain the market reaction to equity issues. The determinants that are tested in this study are issue size, debt ratio, stock volatility, abnormal return before the issue, market return before the issue, simultaneous bonus issues, dividend after the issue, issue frequency and unsold rights. Among these

determinants, market return before the issue and simultaneous bonus issues are able to explain the abnormal returns in a linear regression framework. Market return before the issue turns out to be positive which means that shareholders react positively to the rights offering in a bullish market environment. Simultaneous bonus issues variable is also positive in sign which suggests that firms signal good prospects for the future by bonus issues. Issue size and dividend payments after the issue fail to have explanatory power even though they are statistically significant.

It is a challenge to come up with an unbiased statistical model in order to measure the long-term market reaction. In the light of the literature, a Bayesian model is constructed but it failed to provide any meaningful result due to high numerical instabilities. Therefore, a simpler approach that takes into account the cross correlation between the returns and the changes in the parameters of the market model is followed. The results show that the long-term abnormal returns are negative in the Turkish stock market after controlling for the firm type as financial and non-financial. That is an expected outcome when one considers the negative short-term reaction. Furthermore, financial firms' abnormal stock returns are more negative compared to those of the non-financial firms. This result is attributed to the fact that non-financial firms do not need extensive amount of new funds to carry out new investments. Hence, the market perceives rights offering as an exploitation of the overvaluation in the stock price.

For further study, the abnormal returns can be measured by other means of asset pricing models that generate the normal returns. For instance, time varying means and time varying volatilities can be modeled using stochastic methods. Also, stochastic volatility can be incorporated in expected return models. The parameters of such models can be fitted by using advanced time series models such as ARMA or GARCH. The estimation period for the parameters can be shortened or extended. For the determinants of the market reaction, other variables can be included in the analysis. Particularly, ownership concentration is a good candidate since it can be used a measure of potential information asymmetry between shareholders and managers. When the ownership concentration is high, the monitoring effects are supposed to decrease the information asymmetry. For the Bayesian model, after getting through numerical instabilities, expert opinions about the market risk of the equity issuers can be incorporated into the priors of the firm characteristics such as market risk and firm specific volatility. Furthermore, the firms can be grouped into industries rather than being grouped as financial and non-financial. Since shareholders may react differently for equity issues in different industries. The analysis of long-term abnormal returns can be done by many possible statistical models that try to minimize the possible biases.

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