THREE ESSAYS ON MONETARY POLICY IMPLEMENTATION

by

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Abstract

The first chapter, initially, develops an automated system that conducts a content analysis using newspaper coverage to generate a high frequency news-driven sentiment index. The system classifies the news as good, bad or neutral. Then, the chapter investigates the relationship between the sentiment index and the financial markets in Turkey: exchange, stock and bond markets. The findings on the exchange markets show the value of Turkish Lira (TL) against the US Dollar (USD) and the emerging market currencies after controlling for the macroeconomic fundamentals. The findings hint these variables are affective in varying horizons. The US economic fundamentals have immediate impact and positive announcements appreciate the USD whereas the positive Turkish economic figures appreciate the TL in the weekly term. The conclusion on the sentiment index shows the index fails to have a significant impact. The shocks in sub-indices of the sentiment, on the other hand, become significant in a week. Possibly, the portfolio adjustment process is the reason behind the delay of the impact. The significant impact of the sentiment on the stock market appears both in daily and weekly terms. The estimation process of the bond markets fails to produce reliable estimates.

The second chapter investigates the role of interest rate volatility as a monetary policy tool. After the 2008-2009 global financial crisis, there was abundance of liquidity as a result of large-scale quantitative easing programs. As the advanced countries did not recover quickly, the liquidity was channeled to emerging economies, which then attempted to cope with potential side effects of capital flows. The Central Bank of the Republic of Turkey (CBRT) introduced the asymmetric interest rate corridor. This chapter investigates whether interest rate volatility, under the interest rate corridor, can tame capital flows. The results reveal that the average funding rate has a significant impact on capital flows. On the other hand, uncertainty in monetary policy conditions can mitigate capital inflow surges during risk-off periods.

The third chapter examines the impact of complexity of monetary policy communication on financial markets. Central banks' decisions can create volatility in financial markets. In addition, the arguments underlying these decisions can distort the markets. This chapter focuses on the alternatives that central banks can adopt to reduce the volatility of financial markets stemming from their decisions. Postponement of publication and usage of clear language are the options to be tested. The study focuses on the minutes released by the Bank of England. The results imply that these solutions do not provide a panacea for lowering volatility in the stock market, exchange rates or interest rates.

Keywords: exchange rates, fundamentals, real- time data, sentiment, interest rate corridor, interest rate volatility, capital flows, monetary policy, monetary policy committee, financial markets, volatility.

Özet

Birinci bölüm ilk olarak gazete içeriğini tarayarak yüksek frekanslı haber taraflı algı indeksi oluşturan otomatik bir sistem geliştirmektedir. Bu sistem haberleri iyi, kötü ve etkisiz olarak sınıflandırmaktadır. Bu bölüm daha sonra algı indeksiyle Türkiye'deki şu finansal piyasalardaki ilişkiyi incelemektedir: döviz piyasası, borsa ve tahvil-bono piyasası. Döviz piyasalarındaki bulgular, makroekonomik değişkenler kontrol edilerek, Türk Lirası'nın (TL) Amerikan Doları (USD) karşısındaki değerini göstermektedir. Bulgular bu değişkenlerin farklı zaman ufuklarında etkili olduğunu göstermektedir. Amerikan ekonomik temelleri verileri çabuk etkili olmakta ve olumlu haberler USD'nin değer kazanmasına sebep olurken Türkiye ekonomik temel verileri TL'nin haftalık vadede değerlenmesine sebep olmaktadır. Algı indeksinde bulgular bu değişkenin anlamlı etkisi olduğunu göstermekte yetersiz kalmıştır. Ancak indeksin alt kalemleri haftalık vadede anlamlı etkiye sahip olmaktadır. Portföy güncelleme süreci bu etkinin gecikmeli olarak görülmesinin sebebi olabilir. Algı indeksinin borsa üzerindeki anlamlı etkisi günlük ve haftalık vadede görülmektedir. Tahvil-bono piyasalarındaki hesaplama yöntemi güvenilir sonuçlar üretmekte yetersiz kalmıştır.

İkinci bölüm faiz oynaklığının para politikası aracı olarak etkisini incelemektedir. 2008-2009 küresel finansal krizden sonra, miktarsal gevşeme programlarının sonucu olarak likite fazlalığı görülmüştür. Gelişmiş ülkeler çabuk toparlanamadığı için bu likidite gelişmekte olan ülkelere yönelmiştir. Bu ülkeler sermaye hareketlerinin yan etkileriyle mücadele etmeye başvurmuşlardır. Türkiye Cumhuriyet Merkez Bankası (TCMB) faiz koridoru sistemini tanıtmıştır. Bu bölüm, faiz koridoru sisteminde, faiz oynaklığının sermaye hareketlerini kontrol edip edemediğini incelemektedir. Sonuçlar ortalama fonlama faizinin sermaye hareketleri üzerinde anlamlı bir etkisi olduğunu göstermektedir. Diğer yanda, para politikası koşullarındaki belirsizlik riskten kaçış dönemlerinde sermaye girişlerini azaltmaktadır.

Üçüncü bölüm para politikası iletişimi karmaşıklığının finansal piyasalar üzerindeki etkilerini incelemektedir. Merkez bankalarının kararları finansal piyasalarda oynaklığa sebep olabilir. Bu kararların altındaki gerekçeler de piyasaları sarsabilir. Bu bölüm finansal piyasalarda merkez bankası kararlarından kaynaklanan oynaklık etkilerini azaltacak seçenekler üzerine odaklanmaktadır. Duyuruların geciktirilmesi ve yalın bir dil kullanılması seçenekleri test edilecektir. Bu çalışma Bank of England tarafından yayınlanan toplantı özetlerine odaklanmaktadır. Bulgular bu çözümlerin borsa, döviz ve faiz piyasalarındaki oynaklığı azaltma konusunda bir çare üretemediğini göstermektedir.

Anahtar kelimeler: döviz kurları, temeller, gerçek zamanlı veri, algı, faiz koridoru, faiz oynaklığı, sermaye hareketleri, para politikası, para politikası kurulu, finansal piyasalar, oynaklık.

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1. Introduction

Media plays an important role in human life. Different media channels are the primary source of information on not only domestic but also foreign developments. Specifically, newspapers facilitate dissemination of knowledge. Therefore, the data contained in the news may be crucial and the newspapers can be used as an appropriate data source. Many studies employed those data to analyze different economic phenomena. For instance, Baker, et al. (2016) created an economic uncertainty index, Fratzscher (2008) detected the oral interventions on major currencies and Gersl(2006) measured the political pressure on the Czech National Bank using the newspapers.

Macmillan defines the word "sentiment" as "a belief or an attitude towards something"[1]. The content of news may alter the sentiment of the readers. Measuring sentiment is central to evaluate the future course of an economy. As Benhabib, et al. (2015) states, the sentiment of investors affect the financial market prices and the real economy is affected consequently. At this point, first, it is essential to show how the news and the sentiment are related and then investigate the impact of the sentiment on the financial variables.

This study focuses on the relationship between the sentiment and exchange rates, specially. The impact of sentiment on exchange rates is important because the exchange rates can affect the outturns of macroeconomic variables. Inflation rate is, possibly, the foremost indicator example that the exchange rates have the most influential impact. The price of imported goods and services increase as the value of the local currency slides down. Therefore, *ceteris paribus*, the general price level increases which means increasing inflation rate. In economies where price stability is a concern, the fluctuations in the exchange rates should be carefully examined.

[1] https://www.macmillandictionary.com/

The exchange rates have further implications than inflation in an economy. Specifically, the oscillation in the value of a currency determines how the economic variables will evolve. Even though there is no significant impact on the trade flows (Tenreyro (2007)), the higher level of exchange rate volatility increases unemployment (Feldmann (2011)), reduces private consumption (Oseni (2016)) and economic growth (Barguellil, et al. (2018)).

In markets where floating exchange rate regime is adopted, generally, the exchange rates fluctuate as traders possess new information. The frequent changes in the exchange rates may have detrimental consequences in the real and financial sectors in those economies, particularly if their external borrowing is sizable. Identifying the cause of the movements in the exchange rates is important for designing appropriate policy framework to mitigate those unintended consequences.

Following and measuring the new information incessantly may help making accurate forecasts. For this sake, this chapter utilizes newspaper coverage and quantifies the data in the news to generate a high frequency information index. Also, this chapter aims identifying the sources of fluctuations in the foreign exchange rates as well as when they impinge. The main focus of this chapter is the Turkish Lira (TL)/ US Dollar (USD) (henceforth TL/USD) and relative emerging market currencies exchange rates (RER). The paper asks two questions: (i) Do domestic and foreign economic fundamentals and news-driven sentiments drive the exchange rates? (ii) Do these sources have short or long run effects? These questions are important because they shed light on the root of exchange rate movements and when they last. The policy makers can pinpoint the reasons of the fluctuations and forecast the new levels of the exchange rates to design appropriate policies. Moreover, investors can re-adjust their portfolios according to the exchange

rate estimates. The second question is consequential for the policy makers to find out the persistence of the effects.

The answers to the questions are as follows:

(i) Yes, both economic fundamentals and sentiment affect the TL/USD and RER. Positive domestic (foreign) economic fundamentals decrease (increase) TL/USD. Good news on actual and economics appreciates TL whereas politics and foreign news depreciates TL vis-à-vis USD. Also, positive foreign news sentiment depreciates TL against other emerging market currencies.

(ii) The foreign economic fundamentals have short term (daily) effects but the impact persists in the medium term (weekly). Domestic fundamentals have medium term consequences. The news-driven sentiments determine the medium term exchange rates.

The chapter is structured as follows. The Section 2 provides literature review. The Section 3 introduces the variables and the econometric model. Section 4 demonstrates the results and Section 5 concludes.

2. Literature review

One strand of the literature focuses on the impact of pre-scheduled macro announcement on the exchange rates. Evans and Lyons (2005) studies the impact US and German announcements on the USD/Euro exchange rate for the period between April 11,1993 and June 30, 1999. The news arrivals leads to changes in the order flows from customer types. The impact persists in the following days. The change in order flow also affects the prices and the impact on the prices is persistent. Kim (1999) focuses on the value of the Australian Dollar (AUD) vis-à-vis USD,

Deutsche Mark, Japanese Yen (JY), British Pound (BP) and Swiss Franc for the sample January 2, 1985 - April 16,1995. Kim finds AUD depreciates if the current account deficit and unemployment rate are higher than expected. On the contrary, the AUD appreciates if gross domestic product is greater than its expectation. Kim also shows that, on the announcement days, current account deficit, consumer price index (except for the BP/AUD) and unemployment rate announcement escalates the volatility of AUD changes. The results reveal there is little evidence that retail sales reduce the volatility. Cai, et al. (2009) investigates the impact of the US and domestic macroeconomic announcements in the 9 emerging countries (Czech Republic, Hungary, Indonesia, Korea, Mexico, Poland, South Africa, Thailand and Turkey) on the these emerging economy exchange rates. They use high frequency (5-minute interval) exchange rates between January 2, 2000 and December 31, 2006. They show except for the Thailand and Turkey, the emerging country currencies responded in the expected way. They also outline that the exchange rates become more responsive to the announcement in the recent years. Cheung, et al. (2017) shows after the global financial crisis, US macro news become more important. Evans and Speight (2010) studies the Euro exchange rate returns vis-à-vis USD, BP and JY. Prast and de Vor (2005) investigates the underlying reasons of the depreciation of the Euro vis-à-vis USD during the period between April 1, 2000 and September 22, 2000. The real economy news on the US economy and statements/political news on the Euro area are effective. They also show that the investors react asymmetrically to the news. Good political news on the Euro area and the US has significant impacts on the Euro/USD exchange rate. Dominguez and Panthaki (2006) shows the non-scheduled news affect the exchange rates as well as the macro announcements.

Another branch of the literature investigates the importance of the sentiment on economic variables. Elshendy and Colladon (2017) creates a network measure that utilized articles on

business events, tone of the news and Goldstein index– which is available in Global Database of Events, Language and Tone (GDELT). They show the new metric improved the forecast accuracy of Gross Domestic Product (GDP) per capita, business and consumer confidence indices in the 10 major European Union countries. Feuerriegel et al. (2016) conducts an analysis on GBP/USD exchange rate. They find news sentiment shocks explain 11% of exchange rate forecasting error variance and these shocks may lead to overshooting (a situation in which short run depreciation in the exchange rate exceeds it is long run equilibrium) in the exchange rate. Fraiberger (2016), similarly, creates a news based sentiment index to forecast GDP growth for 12 countries. He finds that inclusion of news based sentiment index reduces forecast errors, in compare to an autoregressive model, reduces forecast errors by 9.1%. The inclusion of the index to a model containing consensus forecasts reduces the forecast error by 19%. This finding is amplified when longer horizons are anticipated which hints professional forecasters slowly embed the information contained in the news. Fraiberger's finding is valid across economic cycles. Depending on forecast horizon, during good times the index reduces forecast error by 10-15% whereas in bad times the error reduces by 16-28%.

Another piece of literature focuses on the impact of news on other financial markets. Önder and Şımga-Muğan (2006) studies the stock markets in Argentina and Turkey for the sample during January 1995 – December 1997 and shows economic and politic news affect both the volatility of returns and the trading volume in these markets but to varying degrees. Cakan, et al. (2015) evidences US macroeconomic news reduces the volatility in the emerging stock markets.

Another branch of the literature focused on the sentiment analysis in Turkish. Both Vural, et al. (2013) and Eroğul (2009) classify the film reviews. Kaya, et al.(2012), Türkmenoğlu and Tantuğ (2014) and Yıldırım, et al. (2014) also contribute to the analysis in Turkish.

3. Econometric Model and Variables

This chapter aims creating a sentiment index based on news coverage and investigating the impact of that metric on the value of currency pairs in Turkey, specifically, TL/USD and RER.

One can build such a sentiment index either by doing human reading or using automated reading. Both alternatives have advantages and disadvantages (see Taboada (2016)). Human reading technique is more robust as the reader speaks the language and understand gist of the news. However, there are two important impediments in human reading. One of the obstacles is related to speed of human reading. An adult, on average, can read 300 words per minute[2]. Much news contains greater number of words than average human reading speed. Therefore, it will take too much time if human reads and classifies all the news. Second hindrance is pertained to the consistency of classification. Possibly, due to great time that is devoted to reading, human cannot classify all the news conformably. Moreover, some parts of news may be positive and other parts, on the other hand, may be negative. In such cases, it is not straightforward to decide which part matters more and hence classify accordingly.

The handicap of automated reading is that it does not understand the language of the news. However, the automated alternative is superior to the human reading in these subjects: it is fast and reliable. Therefore, it makes an objective classification. This option is preferable as it allows making objective classification.

It is crucial to teach an automated system how to properly classify the news. There are two options that one can adopt. First option is through machine learning techniques. The coder can supply a training set, which contains already classified excerpts, and let the system learn how the

[2] See https://www.forbes.com/sites/brettnelson/2012/06/04/do-you-read-fast-enough-to-be-successful/#497cebbd462e .

classification is done. Many algorithms, in this process, employ Bayesian probability distribution or logistic regression techniques. After going through the training set, the system builds decision tree possibly depending on the word frequencies. Then, using the probability distribution, the system calculates probability for news to be positive, negative or objective.

It is important to note that the machine learning algorithms are so much dependent on the training set. However, it is possible that the training set does not fully cover all potential wording. When reading unseen texts, the machine learning algorithms will possibly assign 0 probabilities to a class and make a wrong classification. In addition to its content, the size of the training set should be considered. If one wants to construct an extensive training set, it is necessary to add as many excerpts as possible. The required time for the system to learn the set increases as the size of the training set expands. In addition, the computer needs greater memory size and the time devoted to classification soars.

One way to deal with the problems stemming from the training method is to use predefined lexicon. A predefined lexicon contains words as well as the emotions that they arise. Any such thesaurus may include thousands of entities, for example, the word “good”, generally, has a favorable connation. The method utilizing predefined lexicon possibly runs faster (depending on number of words) than the previous technique.

It is important to find an appropriate lexicon. English has the ample of such resources, such as SentiStrength and SentiWordNet, however other languages lack such resources. It is possible to translate the existing lexicons in other languages to the domestic language. However, as Dehkharghani, et al. (2016) suggests, there are two issues to be considered in this approach. First problem is related to the meaning of the translated words. Some of the words may lose their

meaning when translated. For instance, “gönül” word translated to English as “heart/soul/feelings” and it does not have a single equivalent term. Second concern is related to language dependent terms. Such words can be translated but their polarity may not be converted in the same manner. For example “Tanrı” has a positive connation in Turkish whereas “supreme being, God” word has an objective connation.

It is possible to create a lexicon for the analysis as in Loughran and McDonald (2011), Correa, et al. (2017) and Soo (2018). However, it is critical to form constructing a personal lexicon for two reasons. First, it may not be possible to cover all the relevant terms. If there was an attempt, one might have missed some important terms. Second, it is hard to differentiate in different domains. Some words may have positive connation in some domains while have negative in others. “Artmak” (increase) is an example of such words. Even in similar domains, it arouses opposing sentiments. An increase in exchange rates generally perceived as a negative event whereas stock market increase is positive.

Dehkharghani, et al. (2016) creates the first polarity lexicon for Turkish called, SentiTurkNet[3] (STN). It is a domain independent lexicon. STN contains about 15000 synsets, set of synonyms of a word. Table 1 depicts some examples from the original STN lexicon. The first column shows the synset, the second column contains the definition of the synset. The polarity labels of the words appear on the third column and part of speech tags of the synonyms are on the fourth column. The fifth, sixth and seventh columns show negativity, objectivity and positivity scores of the synonyms, respectively. For instance, the synset on the first row, which includes the words "kriz, bunalım and buhran", means a hard period that a society, a foundation or a person goes

[3] SentiTurkNet is available at http://myweb.sabanciuniv.edu/rdehkharghani/files/2016/11/SentiTurkNet.zip.

through. It has a negative polarity and the words in the synset are nouns. Their negativity, objectivity and positivity scores are 0.49, 0.44 and 0.07, respectively.

I edited the original lexicon to efficiently use in the analysis. Some of the synonyms are empty whereas they have Turkish gloss. I removed the blank synsets, where no Turkish correspondence of an English word is available, and left with 13525 synsets. Then, I removed "~leşmek, ~tırmak, ~tirmek, ~tmak and ~çi , ~çı , ~çu , ~çü , ~ci , ~cı , ~cu , ~cü" suffixes as they do not appear in a sentence by themselves.

3.1. Algorithm

It is vital to find the appropriate source for the analysis. There exist many alternatives that can be employed for measuring the sentiment. Questionnaires or surveys, financial indicators, social media and other media channels are among the alternative. Special events can also be used as a sentiment measure. Such events can be associated with better or worse conditions.

Each alternative has drawbacks. Survey type metrics such as confidence indices released by the statistics offices or other firms have low frequency. They are generally published monthly and do not measure the sentiment in a specific time. Moreover, surveys are judgmental and respondents of the survey may hide personal opinion. Instead of questionnaires and surveys, high frequency financial indicators can be used. Global and local financial indicators are available. Generally, as a global indicator, 30-day-ahead expected volatility in the S&P stock market index (VIX) is used as a measure of sentiment. Higher (lower) values of VIX are associated with greater (lesser) of volatility. It may not be a good candidate because in the recent periods when VIX hit almost the lowest values in its history and stayed there stable for some time. Alternatively, Dollar Index

(DXY), which is the weighted average of US Dollar with respect to other currencies, as an alternative for the VIX. Higher (lower) values of DXY imply greater risk in the financial markets. As they measure global inclination, VIX and DXY fail in capturing country specific developments. Exchange rates, credit default swap (CDS) rates and interest rate measures such as Emerging Market Bond Index (EMBI) can be used instead. These indicators may decouple and their peaks and troughs may not be synchronized. Asynchronous movement of these indicators makes them inadequate for picking the time when sentiment improves or deteriorates. For the sample period, for instance, October 2015 - June 2018, the correlation between the EMBI + Turkey and the Turkey 5-year CDS is 0.58, the VIX and the CDS is 0.38 and the VIX and the EMBI is 0.04. As another alternative, social media (especially Twitter) can be used (see, for example, Gorodnichenko, et al. (2018)). However, messages in the social media platforms may be exaggerated through hacking and using fake accounts and boots. This may amplify the improvement or deterioration in the sentiment. Also, social media has its own lingo such as hash tags and emoticons. Its own nature makes the social media a complicated source and these features require special attention. Other media sources such as visual or audio media can be used. As it is not possible to carefully follow the messages in these media, they are not the best candidate. The last group of alternatives includes scheduled events such as Christmas and elections. During those periods, the sentiment may improve. However, even if these examples are easy to identify, all the events may not be objectively pointed

Newspapers, on the other hand, excel among other alternatives for sentiment analysis for three reasons. First, newspapers are read widely. They are still the primary source of information for people and accessible at any time. Newspapers are accessible and updated 7/24. The news flow continuously as depicted in the Figures 1-2. Figure 1 shows the hourly and the figure exhibits the

daily distribution of the news. It is clear that the during late night period news rarely released. Only about 5% of the news is released during 00:00 and 07:00. The density of the news release peaks during the midday. Almost 75% of the news is published during 07:00 and 18:00. The news release becomes rare during nights. The remaining 20% of the news is released during 18:00 and 00:00.

As the Figure 2 suggests, during weekdays the news release rate is almost steady. On each of 5 weekdays, about 15% of the weekly news is released. The rate drops at the weekends and about 10% of the news is released on Saturdays and Sundays.

Second reasons for the newspapers to lead, the news texts are edited so the message in them becomes accessible. They generally do not contain typos or words that may cause ambiguity. Finally, the news are written in positive tone rather than normative. They, generally, inform the reader about the situation, they do not explain what should be. It makes the news objective. Therefore, the message in the news is unbiased.

There are 3 criteria that any source should satisfy to be useful in the analysis. First, the source should be in press for a time. It is necessary for the sentiment index to date back to properly conduct econometric analysis. Second, it is important that the source should be read by many readers. Therefore, the message a news deploys reaches at many readers. The impact of news on the sentiment would be pronounced if more people read the news. Finally, it is important that the archive of the newspaper is accessible through computer and the search engine runs properly.

There are many candidate newspapers for the analysis. However, most of them fail in satisfying all the criteria. Only Milliyet and Dünya newspapers survive the source selection process. As

Dünya newspaper is not sold as much as Milliyet (see the link[4]), I opted for Milliyet even though it is not economics newspaper. It is important to note that the results may be subject to source selection bias.

The investors gather as much information as possible before making decision. They read financial statements, analysis and news about the subject. It would be perfect to ask to them how they fell about news to ideally measure the sentiment. However, it is not feasible to collect all the information. At this stage, I wrote a script in Python that can mimic human reading and automated the news classification. The script converts the non-quantifiable data in the news to a ternary variable. The algorithm of the script follows the logic similar to Baker, et al. (2016). The script runs on a basic premise: good news contains more words that have positive connotation and bad news is full of words with negative implication. The script reads all the words in news in four categories "Siyaset" (politics), "Ekonomi" (economics), "Dünya" (world) and "Gündem" (actual) and assigns the appropriate category depending on the number of positive and negative words.

Figure 3 displays a portion of a news page that the script reads. Among the information that the program searches for are the date and time of the news, headline, first paragraph and body of the news, as well as reader emotions. The first release time of given news is obtained. The news may also include last update time information. However, it is not feasible to get this information, as news may be updated several times after the program first reads. The dashed lines in the Figure 3 highlight useful parts of news.

Once the program locates these parts, it sends the news to TS Corpus[5] (see Sezer (2017)) for morphological analysis[6]. During morphological analysis the TS Corpus, does part of speech

[4] http://gazetetirajlari.com/

(POS) tagging i.e. determines the type of a word in the text. Also, it checks the suffixes and determines the root of the word. As Turkish is an agglutinative language, the suffixes are added to the end of a word and as new suffixes are added the spelling of the root word may change. It is important to pinpoint the root of a word and the suffixes it take when the algorithm reads. As Yıldırım, et al. (2014) says, the correct form of a word matters and identifying it improves the accuracy of classification.

The program reads the output of TS Corpus word by word. The TS Corpus output contains the word, its POS tag, its morphological analysis, its lemma (the root the word) and the correct form of the original word. Figure 4 shows the output of TS Corpus of an excerpt: "2017 yılında iktisadi faaliyet güçlü seyrini sürdürmüştür. Bilançolar sağlamlığını korumuştur.".

It is possible that the news may have typos and hence cannot read the news correctly. In order to circumvent this problem, the script takes the correct form of a word (column titled "Correct Form" in Figure 4) and searches if it exists with same POS tag in the edited STN lexicon. If it does not, the program looks for the root form of the word (column titled "Lemma" in Figure 4) in the lexicon. If none of these forms appear in the lexicon, the program skips the word. If the word exists, it takes the polarity of the word from the STN. If the word is positive, negative or objective, the script assigns +1,-1 or 0, respectively, to each word.

The morphological analysis is crucial at this point. If the word has any negation suffix, the program multiplies the polarity of the word by -1. That is, if a word is positive (negative) and it contains a negation statement, it becomes negative (positive) after multiplication. The objective

[5] The hyperlink of the used tool of the TS Corpus is https://dev.tscorpus.com/postagger/.
[6] I could use Zemberek as an alternative as (for example Eroğul (2009)) however I could not call Zemberek from Python. Also, if I have used Zemberek, it would be harder to determine the correct root form of any given word as it provides all the possible options not only the correct one.

words are not affected if they have any negation suffix. While reading the words, the program ignores the numbers and punctuations as they do not have polarity.

After reading the news, the program counts the number of positive, negative and objective words in any news. It assigns a $direction_t^l$ to each news l on day t such that

$$direction_t^l = \begin{cases} +1, if\ number\ positive\ words > number\ of\ negative\ words \\ 0, if\ number\ positive\ words = number\ of\ negative\ words \\ -1, if\ number\ positive\ words < number\ of\ negative\ words \end{cases}$$

before proceeding to the next news.

It is necessary to emphasize that the non-zero values obtained in the directional classification does not imply that news l consists of all positive or negative words. Almost all the news is dominated by the neutral words. About 80% of the news contains neutral words, 10% is positive and the remaining 10% is negative.

Table 2 represents the result of a reading process of a statement arising positive sentiment. The first column shows the given text whereas the second column displays the part of speech. The correct forms of the words are listed on the third column if there was any typo in the sentence. The root of each word appears on the fourth column. The fifth column lays out the direction of a word if it exists in the STN, +1,-1 or 0. If a word does not exist, the corresponding value of direction is "-". The excerpt has 10 words and 2 commas. The words (lemmas) "2017", "seyrini (seyir)", "sürdürmüştür (sür)" and "korumuştur (koru)" are not in the STN lexicon. "yıl", "iktisadi" and "bilanço" words appear in the lexicon and they have neutral polarity and their values are 0. "faaliyet", "güçlü" and "sağlam" words are the words with positive sentiment. Their values are 1. Therefore, the sample sentence's overall sentiment inclination is positive as the total

value of the words is 3. An example of news which arouses negative sentiment is present on Table 3. The words “kriz” and “zarar” are negative words and hence the sentiment triggers pessimistic feeling whereas other words are neutral.

The primary objective of the script is to create a sentiment index that is useful for explaining economic variables. The script reads through all the news in the archive. However, some of the news may have negligible impact to alter the readers’ attitude. Such news should be omitted as they may be biased and systematically points a certain direction. For instance, the news related to feasts often has positive direction. Including those news shifts the sentiment to positive area around feast periods. Secondly, some of the news may have little pertinence to economics. That news may also lead to the same problem. News related to celebrities or TV series are examples of irrelevant news types.

Peramunetilleke and Wong (2002) and Eddelbüttel and McCurdy (1998) focused on the keywords in the headlines that are closely related to the exchange rates. This alternative of sorting news has two drawbacks. First, the writer of the news may have preferred the words to get take attention. Second, it is possible that even though the news has implication on the exchange rates, the headline may include keywords that are not related to the exchange rates.

To correctly identify the news related to the single currency, Eddelbüttel and McCurdy (1998) defined excluding words. For instance, they used “dollar” keyword to identify the news related to the US Dollar. However, they capture the news that contains the keyword “dollar” even the corresponding currency is not the US Dollar. By defining excluding words, they are able to dismiss the news related to, for instance, Canadian Dollar, Australian Dollar and New Zealand Dollar.

I defined a set of excluding words in a similar logic. I constructed a keyword list by searching through all the news links and determined the concepts. Appendix A shows the word list. There are 3707 keywords. Turkish is an agglutinative language and some suffixes may change the previous character. Moreover, some suffixes produce new characters. It is not straightforward to identify new words. I tried to include as many word variations as possible. It is still possible that I did not cover the full list of keywords. Also, it is possible that the keywords remove some of the relevant news. I omitted the news if the hyperlink of the news includes one of the keywords.

3.2. Accuracy of Program Classification

This subsection provides an evaluation of the accuracy of program classification. It is important to control the accuracy of the classification as human and computer reading may lead to differing results. Ideally, all the readers' attitude towards news should be recorded. However, it is not feasible. Instead, I use the reader responses as measure of how they would have classified the news.

The script also records the reader emotions. The reader may disclose personal feeling about the news by clicking one of the smileys. There are five categorical emotions: "mutluyum", "şaşkınım", "kararsızım", "kızgınım" and "üzgünüm". These emotions respectively denote whether the reader is happy, surprised, undetermined, angry or sorry about the news. The script takes the number of respondents of each emotion; however, later it is possible that more reader respond and the values change.

The script can assign only "positive", "negative" and "neutral" tags. In order to make user responses compatible with the script's classification method, I reduce the number of reader

responses by combining the responses that may have aroused similar feelings. I grouped the "mutluyum" and the "şaşkınım" categories to form a positive category and the "kızgınım" and the "üzgünüm" categories for a negative category. I treat the "kararsızım" category as neutral.

The feature that allows the readers to show their feelings is relatively new and, as I infer from the data, it is available after October 2016. I conduct the accuracy analysis for the news released thereafter. The script coded 102278 news, after the exclusion process the number reduces to 57984. When the sample restricted to start from October 2016, there is 47345news

For the rest of the accuracy analysis, I chose the news that is responded by eligible number of readers. The crucial part of the accuracy analysis is choosing the appropriate news as the readers may prefer not to respond if they perceive the news as unrelated / unnecessary or they may have responded mistakenly or haphazardly. I focused on the news that rated by at least 6 readers. I choose 6 as any response number exceeding 6 assures that at least one of the reader response categories dominates the others. Then, the restricted sample's size reduced to 6497.

Table 4 displays the results of the accuracy analysis. The numbers on the diagonal shows the number of correctly classified news. The readers perceive and the script classifies 2647 news as positive and 1085 news as negative. There is no correctly classified neutral news. It is due to the fact that the readers opt not to respond if they indeterminate on the news. The users responded only 14 of news as neutral ("kararsızım") among 6497 news.

The analysis reveal that the script coded 3732 news correctly, which accounts for 57% of the news. It is possible to increase the accuracy by implementing different methods. For instance, (Türkmenoğlu ve Tantuğ 2014) states the machine learning techniques result in better classification than the lexicon based methods.

3.3. The Impact of Sentiment on Exchange Rates

The economics literature suggests the currencies of the countries where the economic fundamentals are solid should appreciate. However, even though, the exchange rate models that contain macroeconomic indicators may not predict the future course of the exchange rate better than a random walk (see Meese and Rogoff (1983)). The failure of the economic figures to forecast the exchange rates can be overcome by including new variables. For instance, Feuerriegel, et al. (2016) uses sentiment variable to explain the short term movements in the exchange rates. Their finding reveals the sentiment can be the source of fluctuation in the currency rates.

During the last few years, Turkey faced strong economic releases, specially, the GDP and industrial production growth rates outperformed. However, the TL depreciated against the USD at the same time. One of the underlying reasons of the devaluation of the TL would be news aired during the sample period.

The analysis in this section empirically tests the impact of sentiment index on TL/USD. The slide in the value of the TL against the USD may not be specific to Turkey. It is possible that currencies of the countries which are economically similar to Turkey followed the same trend. For the consistency of the analysis, I also tested whether this was valid by using RER[7]. The sample covers the time period between June 4, 2016 and March 21, 2018.

[7] I adopt a similar method proposed in (Özlü ve Ünalmış 2012). Initially, I indexed the exchange rates of emerging market (Brazil, Chile, Columbia, Czech Republic, Hungary, Indonesia, Mexico, Poland, South Africa and South Korea) currencies and TL vis-à-vis USD on June 4, 2018 to 1. Then, I calculated the ratio of the indexed the USD/TL to the average of indexed emerging market currencies.

Financial series may exhibit volatility clustering and variance of error terms may be time varying. Under such cases, in models employing standard ordinary least squares method, even though the estimated coefficients are not biased, the standard error estimates are not efficient. Therefore, the estimation process may yield insignificant results. I utilized Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model (see Bollerslev (1986)) for the econometric analysis to correctly estimate the time varying variance and covariance coefficients.

In the analysis, I assumed that the traders utilize the real time data, the most currently available information (see Orphanides (2001)), and the estimate different specifications of the following model where mean equation is defined as

$$R_t = c + \beta_1 R_{t-1} + \beta_2 US\ composite\ index_t + \beta_3 TR\ composite\ index_t + \beta_4 Sentiment_t + \varepsilon_t \quad (1)$$

and the volatility equation is given as

$$\sigma_t^2 = \omega + \alpha_1 \varepsilon_{t-1}^2 + \alpha_i |US\ composite\ index_t| + \alpha_j |TR\ composite\ index_t| + \alpha_2 |Sentiment_t| + \alpha_3 \sigma_{t-1}^2 \quad (2)$$

R_t is the percent change in the exchange rate on day t , c and w respectively denote the constant terms in the mean and the volatility equations. ε_t and σ_{t-1}^2 denote the residual and the variance on day t , respectively. ε_ts are assumed to follow a normal distribution and the model is estimated using maximum likelihood techniques (see Greene (2003)) using EViews 9.

I employed the wide range of data that can explain the exchange rate movements. Those data consists of domestic and foreign macroeconomic announcements, monetary policies and a sentiment index based on the news coverage.

I choose the US macroeconomic announcements as in Ehrmann and Fratzscher (2005) and Turkish announcements as in Özlü and Ünalmış (2012). Ehrmann and Fratzscher use Money Market Services International and Özlü and Ünalmış use Reuters. As I did not have access to those services, I used Bloomberg and I choose the announcements that are in the intersection of Bloomberg and other data sources.

The economic calendar I obtained from the Bloomberg contained 190 US and 48 Turkish unique announcement items. Some of the items are revisions of previous announcements and special release announcements such as Beige Book. Including all the items increases the number of parameters to be estimated. More parameter estimation would reduce the reliability of findings. That is, the estimates would have greater standard errors and hence the number of insignificant number of estimates increases. Also, it would not be necessary to include all the announcements. As Ehrmann and Fratzscher (2005) states, in an environment with more number of announcements, the investors may consider less number of announcements.

I used trade balance, retail sales advance, inflation rate, industrial production, housing starts, Confidence Board consumer confidence, annualized GDP, change in nonfarm payrolls, unemployment rate and Federal Open Market Committee (FOMC) upper bound rate as US indicators. On the other hand, I selected inflation rate, industrial production, current account balance, trade balance, GDP and monetary policy decisions [8] as Turkish announcements.

Exchange rate is the bilateral value of each country's currencies with respect to others. Direction of the indicators therefore may have opposing impact on the exchange rates. My prior is that

[8] The Central Bank Republic of Turkey employed the interest corridor system. In this system, it used different compositions of funding. The average funding rate was subject to vary. It is not straightforward to define the surprise component in the average funding rate. To conduct the analysis, I used the overnight lending rate between June 21, 2016 and December 20, 2016 and then on late liquidity lending rate as monetary policy measure in Turkey.

positive surprises in the US and negative surprises in the Turkish indicators appreciate the USD while negative surprises of the US and positive surprises in the Turkish indicators appreciate TL.

For the US part, positive surprises in the trade balance, retail sales advance, PPI final demand, industrial production, housing starts, Confidence Board consumer confidence, annualized GDP, change in nonfarm payrolls verify the positive developments in the real economy. Therefore, positive surprises in these indicators should hint appreciation of USD.

Ehrmann and Fratzscher (2005) emphasize, the impact of the price developments depend on how financial market players' perception about how the central bank will respond. If a central bank aims price stability, it will adopt contractionary monetary policy by increasing its policy rate. Therefore, the corresponding currency would appreciate. On the other hand, if the central banks do not pay much attention inflation dynamics, it would refrain from taking an action. In such a case, the local currency may depreciate. However, as both the Fed and Central Bank Republic of Turkey (CBRT) aim price stability, I expect positive surprises in the consumer price index announcements will appreciate both currencies.

I expect positive monetary policy yield to increase in the market or government bond interest rates. Therefore, I presume that a positive surprise in the FOMC decision appreciates the USD.

I presume that positive surprises in the monetary policy, GDP, trade balance and industrial production hint positive developments in the real side of the Turkish economy. Therefore, those releases may appreciate the TL. On the other hand, negative surprise in the current account balance may signal increasing risk and depreciates the TL.

In the initial model, I included all the surprises in the macroeconomic announcements as separate variables. However, I encountered the problem stated in Ehrmann and Fratzscher (2005), the

estimates of the model were not reliable as the estimation procedure failed to improve the maximum likelihood function. If there had been greater number of observations in each series, the estimates would have been more accurate. In order to construct a variables that measures the US and Turkish economic state, I followed another approach offered in the Ehrmann and Fratzscher (2005). I defined ternary variables for the US and Turkish economies. The variables take value of 1 (-1) if there is an announcement that implies appreciation (depreciation) of the local currency. It is possible that there are multiple announcements in a day. In such cases, I summed the standardized values[9] of the each surprise and assign the appropriate value to the indices. These indices became 0 if there was no announcement or the net impact of the all economic announcements is 0. The macroeconomic indicators of Turkey and the US economies on day t are named as $TR\ composite\ index_t$ and $US\ composite\ index_t$, respectively. In the empirical analysis, I will test the hypotheses that

H_0: Positive US macroeconomic surprises depreciate TL or $\beta_2 \geq 0$

and

H_1: Positive TR macroeconomic surprises appreciate TL or $\beta_3 \leq 0$.

$Sentiment_t$ is the news-driven sentiment and it is the sum the directions of all the news released on day t such that

$$Sentiment_t = \sum_l direction_t^l$$

[9] In order to get the standardized values of the surprises, I divided the difference between the actual announcements and the expected value of an indicator to the standard deviation of all the differences of the announcement in the sample.

Therefore, the positive (negative) values indicate mounting good (bad) news. My prior on the $Sentiment_t$ is that as positive news emerge, the TL appreciates. In the empirical analysis, I used the standardized values of the $Sentiment_t$ and its sub-indices on actual, economics, politics and world[10]. I will test the hypothesis H_2:Positive sentiment appreciates TL or $\beta_3 \leq 0$.

The Figure 5 depicts the weekly evolution of the sentiment index over the sample period[11]. It is evident that the index captures the important political, economic, domestic and foreign news. Holland ministry crisis is an example of political event when the index deteriorated. Brexit referendum was an economic event that swung the sentiment index. 15 July, Karlov murder and Reina attack were the domestic developments that led to sharp drops in the sentiment. Finally, the sentiment fluctuated as a response to world events such as US and North Korea conflict, Catalonia referendum, Aqsa mosque siege and Jerusalem siege.

The subject of news matters for the investors and it may alter their perceptions. In order to properly identify the investors' reaction, it may be necessary to group the news (for example, as domestic, foreign, economic or politic news) according to their contents. It is not straightforward to assign news categories manually or automatically. At this stage, I utilize the news classes of Milliyet. There are four news categories, which are "gündem" (actual), "ekonomi" (economics), "siyaset" (politics) and "dünya" (world).

Differentiating the scopes of these groups is crucial for making inference in the econometric analysis. The program initially classifies all the news in the archive. As much news is unrelated, the exclusion process removes some of the news. Then, the remaining news is classified as

[10] This modification does not alter the significance of the variable of interest; however, enables the maximum likelihood algorithm to converge.

[11] I opted for the weekly frequency because the daily index is more volatile and it is hard to distinguish the impact of certain events.

follows: the news in the actual category is, mostly, about terrorist attacks, wars, bomb explosions and operations of security forces. The economics category includes the news on tourism, incentives, employment and constructions. The politics category discloses news of international relations, relationships between political parties and their members. The world category, on the other hand, contains economic, foreign politicians' comments/decisions, European Union relations, attacks in other countries news. The figure 6 displays the evolution of the sub-sentiment indices.

The news in the actual, economics and politics divisions is domestic and I expect any positive domestic news attract the investors and TL strengthens. The foreign news is reported in the world class. I do not form prior belief on this category. The impact of the news in this category depends on the investors' type. Irrespective of the content, positive foreign developments may cause TL to depreciate (appreciate) if the investors are risk averse (lover).

I expect that all the variables to have a significant impact on the volatilities. As efficient market hypothesis indicate, the prices of the financial asset reflect all the accessible information. When new information arrives, prices, therefore, should be adjusted. In such a case, the volatility of the exchange rates should increase. The macroeconomic announcements of Turkish and US economies are published on a determined calendar whereas other news releases are, mostly, unscheduled. My hunch is that investors react to the macroeconomic announcements if the outcome of these variables deviates from the investors' expectations and they respond to news as long as the news broadcasts an unforeseen event. Kim (1999) offers two reasons for volatility escalation. First, the economic models that the investors use may be different. Second, the investors' belief on how the monetary authority responds to announcements may be diverse.

I will test hypotheses $H_3: \alpha_2 \geq 0, H_4: \alpha_3 \geq 0$ and $H_5: \alpha_4 \geq 0$.

4. Results

This section presents the results obtained in the empirical analysis. Table 5 and Table 6, respectively, exhibit the estimates of the mean and the volatility equations. The negative coefficients on Table 6 imply that the TL appreciates whereas the positive coefficients show the TL depreciates against the USD or RER. The positive findings on the Table 7 hints increasing volatility in the exchange rates. The results are mostly in line with my priors. However, some of the variables do not have immediate impact on the exchange rates.

Columns 1-4 of Table 5 present the results of daily analysis where immediate impacts of real time economic fundamental announcements and the sentiment based on newspaper coverage are investigated. Columns 5-8, on the other hand, present the estimates of the weekly analysis where effect of the news on the medium term is studied. In order to properly test the longer horizon impact, the analysis should be conducted using the series with lower frequencies i.e. monthly series rather than weekly or daily series. Nevertheless, it is not straightforward to forward to conduct such an analysis for two reasons. First, in an environment with lower frequency, other elements may interfere with the analysis and it would be hard to control all of them. Second, time frame covered in this study is relatively short. Employing low frequency series would certainly reduce the number of observations. Therefore, the estimates may become unreliable.

The daily analysis results show the only the US composite indicator has a significant impact on the TL/USD and RER. Any positive value of the US economic fundamental announcement appreciates the USD. From second row and columns 1 and, it is evident that each positive US announcement causes an appreciation of USD about 0.17% vis-à-vis TL. One reason would be

related to the health of the US economy. During the sample period, the US economy recovered and the subsequent real sector variables became stronger. As a result, the Federal Reserve adopted tight monetary policy in that era. At the beginning of June 2016, the upper bound of the Federal Funds Rate was 0.50% whereas it reached 1.50% on March 2018. Aktaş, et al. (2018) shows expectation of Fed's tightening policy leads to portfolio outflow from emerging country. Therefore, the Fed's contractionary policy may also be another reason for depreciation of TL vis-à-vis USD.

RER results on the column 2 and 4 reveal the TL depreciates against other emerging market country currencies. An improvement of the US composite indicator leads to a depreciation of TL by 0.11% vis-à-vis other emerging market currencies. Statistical significance of this index underlines that TL depreciates faster than other currencies. One explanation would be related to risk perceptions about the countries included in the sample. Even they follow a similar path; the CDS of Turkey was high compared to other countr CDSs (see Figure 6). Alternatively, similar to Evans and Speight (2010), the group of other emerging countries may be perceived as the competitor to Turkey. Therefore, any positive development in the US economy may be globally interpreted in a way that Turkey will lose its competitiveness to its rivals and TL depreciates against the emerging market exchange rate basket.

Traders' attitude towards surprises in the Turkish fundamentals, the sentiment and sub-indices of sentiment produced insignificant estimates of those variables. These findings do not support my priors. However, they are in line with Cai, et al. (2009). They find Turkish macroeconomic announcements have insignificant effect on the USD/TL. Traders may/can respond to that news in a later period rather immediate. An explanation of such a late impact would be related to the

"liquidity effect" which states the trade may carry on after the release of news so that market participants cover their positions or employ different interpretations (see Payne (2003)).

I test the Payne's justifications. As it is harder to test to latter, I investigate the validity of the first argument. I focus on the bond market and stock market instruments as alternative investment options. The reaction in these markets may propagate the impact on the exchange rate market.

I employ the same setup in the model defined in equations (1) and (2) for the returns in the bond and stock market, respectively, using 2-year bond and Borsa Istanbul's BIST 100 index returns. The maximum likelihood algorithm failed to converge in the 2-year bond returns and I only use BIST 100 index return.

According to the mean equation estimates of the BIST 100 index (see Table 7), the positive developments in the aggregated sentiment index results in increase in the BIST 100 returns. A one standard positive shock in sentiment leads to about 0.15% increase in BIST100 return in daily term and 0,47% in weekly period. The impact of the sub-sentiment indices reveal that this impact is driven by economic sub-sentiment index. Any positive shock in the economic sentiment increases the BIST 100 return by 0,16 and 0,66 in daily and weekly periods, respectively. The results fail to show that other sub sentiment indices have significant impacts on the BIST 100 returns. However, there is little evidence that positive developments of a magnitude of one standard deviation in the actual category boosts the stock index return by 0,30% in a week.

This finding can explain why the sub-sentiment indices have a delayed impact on the TL/USD exchange rate. In Borsa Istanbul, even though the selling orders are completed promptly, the amount corresponding to the selling transaction is transferred to the investors account on two

days after the selling. After this waiting period, the traders may take new positions in the foreign exchange markets. This conclusion supports the Payne's position coverage argument.

The estimates on the BIST 100 volatility estimates show the sentiments on the actual and the politics news escalates the return volatility of the BIST 100 index in a day. One standard deviation improvement in the actual sub-sentiment increases the volatility by 0,26% whereas politics sub-sentiment increases it by 0,13. The shocks in the economics sub-sentiment reduces the volatility by 0,12%. In a week, those impacts disappear and the shocks in the world sub-sentiment reduces the volatility by 1,16%.

Columns 5-8 of Table 5 show the findings on the real time weekly analysis. This segment aims identifying medium term impacts of the economic and news announcements. The outcomes obtained in this part slightly differ from the former results. The impact of the US composite index mounts and Turkish composite index and the sub-indices of sentiment become significant.

The conclusion on the surprises in the US composite indicator still remains the same. From columns 5-7, any improvement in the US composite index causes an appreciation of the USD by about 0.25%. The reaction of the RER to the US macroeconomic announcements is no longer significant. This result implies other emerging market currencies react to the US fundamentals almost equally even though the immediate reaction of TL/USD to the US macroeconomic announcements is great.

The Turkish composite index also became significant (see columns 5-7). Each extra positive surprise in the fundamentals of the Turkish economy appreciates the TL against the USD between 0.30% and 0.36%. The impact of the Turkish composite index is greater than the US composite index. An explanation of this result would be stemming from the biased expectations.

The economic fundamentals of Turkey, possibly, turned out to be better than expectations of those expectations. Turkish macroeconomic announcements still do not have statistically significant impact on the RER (see column 6). Nevertheless, if they turn out to be superior to their expectations, the value of TL improves 0.25% vis-à-vis RER if the sub sentiment indices are included (column 8).

The results fail to show that the sentiment has a significant impact on the exchange rates as columns 5 and 6 reveal. However, the estimates on the column 7 indicate all the sub-indices turned out to be significant. The actual sentiment index has the greatest impact on the TL/USD and its effect the exchange rate is about two times greater than other sub-indices. As this index is contain news mostly related to hazardous, threatening and risky events. It would be convenient to interpret the coefficient of this variable as opposite. One standard deviation (21) decrease in the actual sentiment, i.e. more news containing dangerous phenomena, results in 0.47% depreciation of TL against USD.

The estimate of the politics sentiment indicates an improvement of one standard deviation (17) in this sub-sentiment index devalues TL by 0.25% against USD. This finding is not in line with my prior on the political sentiment. This chapter does not aim making political inferences; however, it is necessary to identify the reason of the divergence. The inconsistency may be due to the discrepancy between how my script classifies news and how investors feel about it. Turkey's rapprochement with Russia in the recent years, possibly, explains this finding. The script encodes, for example, meetings of the leaders these countries as positive; however, investors perceive such developments as negative (see link 2[12], link 3[13] for the commentaries advising

[12] https://www.project-syndicate.org/commentary/turkey-currency-crisis-by-jim-o-neill-2018-08?barrier=accesspaylog
[13] https://www.businessinsider.com/russia-turkey-rapprochement-2016-10

Turkey's alliance with Western countries). Therefore, the Turkish Lira depreciated against US Dollar even though the political news has promising content. It is not straightforward to econometrically test the validity of the argument. However, the figure 8 depicts how the positive political environment between Turkey and Russia and the USD/TL evolved. Possibly, the shaded region in the figure, when there was much positive news and TL depreciated against the USD, drives the findings. The econometric method failed to converge while estimating the impact of the relevant period.

The economic sentiment index also has a significant impact on the TL/USD. An increase of one standard deviation (18) causes an appreciation of TL by 0.20%. The world sentiment index is another sub-sentiment index that has an impact on the TL/USD.

Initially, I did not form any prior on this index. However, the results revealed that an improvement in the world sentiment index appreciates USD. One standard deviation (14) in the foreign news index appreciates the TL by 0.20%. The reasons stated for the US composite index may hold for the world sentiment index. If the positive developments in the US economy are reported in the following days of their releases, risk-averse traders carry on investing in USD.

Having all the sub-indices significant and the aggregate sentiment index insignificant impacts may lead to suspecting that the sub sentiment indices mask the effects of one another. I conducted an F-test to analyze whether the sum of the coefficients is zero. The results fail to show that the total impact is significant (Table 9). Therefore, it is econometrically evident that news in different categories has opposing impacts on the exchange rates.

The estimates on the columns 6 and 8 of the table 5 show the specifications that use the RER. My hunch on the US composite index was that it has a similar impact on the TL and RER. Therefore,

I expect the estimate on the index would have an insignificant impact. The results are in line with the prior belief.

The Turkish composite index is not statistically significant in specification on column 6. However, it becomes significant when sub sentiment indices are included (see column 8). Additional positive surprise in the Turkish economic variables appreciates the TL by 0.26%.

Neither sentiment nor actual, economics and politics sentiment indices are significant in columns 6 and 8, respectively. It is convenient to deduce economic fundamentals matter more than news by having insignificant impact of domestic news and significant result on Turkish economic index. The foreign sentiment index is significant (column 8). One standard deviation (14) increase in the world sentiment slides down the value of TL 0.33% vis-à-vis RER.

The estimates of the volatility equations are displayed on Table 6. The results on the column1-4 show the daily effects and column 5-8 reveal weekly impacts.

The results show there is not enough evidence to conclude the Turkish or US composite indices have significant impacts on the exchange rates. The Turkish composite index is significant in only one specification (column 2), increasing the volatility of the RER by 0.10%, on the other hand the US composite index is significant in none of the models. The reason behind the lack of significance of the variables may be related to the predictability of the economic variables. US macroeconomic announcements are closer to their expectations whereas Turkey announcements differ.

The sentiment indices based on news coverage fail to be statistically significant. The world sub sentiment index has a significant but transitory impact on the RER. One standard deviation (14) increases the volatility of the RER by 0.06%. In the weekly analysis, the sentiment increases the

volatility in the TL/USD exchange rate by 0.34% and only the world sentiment index increases the volatility of the TL/USD by 52%.

5. Conclusion

This study investigates the possible determinants of the value of the TL vis-à-vis the USD and relative exchange rate of emerging market currencies. It focuses on the economic fundamentals and news articles as explanatory variables for the period of June 4, 2016 and March 21, 2018 using a GARCH(1,1) framework.

The paper provides evidence that both economic fundamentals and news-driven sentiments play an important role in exchange rate fluctuations to varying horizons. The US economic fundamentals have immediate (daily) and lasting impacts (weekly) on the TL/USD. The Turkish economic fundamentals are affective in the medium term (weekly). The sub-indices of news-driven sentiments also cause fluctuations in the exchange rates. The results also reveal that these impacts are persistent.

This chapter does not intend to make political inferences. However, the results imply that eliminating terror attacks, keeping the traditional international ties and reporting positive economic news appreciate the TL against USD. As these findings elucidate, deterioration in the sentiment may have inflationary implication. The cost of the foreign products increases as much news with negative content prevails. Therefore, the news may be impediment that the CBRT faces while attempting to reach the inflation target.

The estimates provide little evidence that Turkish economic announcements increase the volatility in the relative exchange rates. In addition, the total index of the news sentiments causes

an improvement in the TL/USD and relative exchange rates. Similarly, there is some evidence that the world sub-sentiment increase the volatility.

The sentiment index can be further improved via content and computationally. The algorithm employed can be refined to account for better negation handling. I used TSCorpus for morphological analysis and it can be upgraded to account for helping verbs and idioms. Also, intensifier words such as “daha” and “en” can be algorithmically implemented. In addition, the STN can be updated to include more words as well as their polarities.

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Table 1: SentiTurkNet Examples

Synonyms	Turkish Gloss	Polarity Label	POS tag	Neg value	Obj value	Pos value
1	2	3	4	5	6	7
kriz , bunalım , buhran	Bir toplumun, bir kuruluşun veya bir kimsenin yaşamında görülen güç dönem	n	n	0,492	0,44	0,068
risk , riziko , tehlike	Zarara uğrama tehlikesi	n	n	0,5	0,432	0,068
devalüasyon	Değer düşürümü.	n	n	0,492	0,44	0,068
sınırlama , kısıtlama	sınırlamak işi	n	n	0,482	0,45	0,068
seminer	Üniversitelerde ve yüksek okullarda öğretim üyesinin yönetimi altında öğrencilerin yaptıkları araştırmalarla ilgili rapor hazırlama, tartışma biçiminde yürütülen grup çalışması, toplu çalışma	o	n	0,06	0,872	0,068
algı , algılama , algılayış	Bir şeye dikkati yönelterek, o şeyin bilincine varma	o	n	0,06	0,872	0,068
ampirik	Bir kurama değil de yalnızca gözleme dayalı, deneye dayal	o	a	0,06	0,872	0,068
simülasyon	Benzetim	o	n	0,125	0,818	0,057
ekonomik , hesaplı	Satın alınabilen, bütçeye uygun	p	a	0,06	0,06	0,88
uyarmak , canlandırmak	Canlanmasını sağlamak, canlanmasına yol açmak	p	v	0,06	0,462	0,478
reform , ıslahat , iyileştirme , düzeltme	Daha iyi duruma getirmek için yapılan değişiklik	p	n	0,06	0,06	0,88

Table 2: Positive Sentiment Example

Word	POS	Correct Form	Lemma	Polarity
2017	Num	2017	2017	-
yılında	Noun	yılında	yıl	0
iktisadi	Adj	iktisadi	iktisadi	0
faaliyet	Noun	faaliyet	faaliyet	1
güçlü	Noun	güçlü	güç	1
seyrini	Noun	seyrini	seyir	-
sürdürmüştür	Verb	sürdürmüştür	sür	-
.	Punc	.	.	-
Bilançolar	Noun	Bilançolar	Bilanço	0
sağlamlığını	Adj	sağlamlığını	sağlam	1
korumuştur	Verb	korumuştur	koru	-
.	Punc	.	.	-

Table 3: Negative Sentiment Example

Word	POS	Correct Form	Lemma	Polarity
Katar	Verb	Katar	kat	0
ve	Conj	ve	ve	-
bazı	Adj	bazı	bazı	0
Arap	Noun	Arap	Arap	
ülkeleri	Noun	ülkeleri	ülke	0
arasında	Noun	arasında	ara	0
yaşanan	Verb	yaşanan	yaşa	-
krizin	Noun	krizin	kriz	-1
,	Punc	,	,	-
Ürdün'deki	Noun	Ürdün'deki	Ürdün	0
ihracat	Noun	ihracat	ihracat	0
sektörlerini	Noun	sektörlerini	sektör	0
milyonlarca	Adj	milyonlarca	milyonlarca	-
dinar	Noun	dinar	Dinar	0
zarara	Noun	zarara	zarar	-1
uğrattığı	Verb	uğrattığı	uğra	-
belirtiliyor	Verb	belirtiliyor	belir	-
.	Punc	.	.	-

Table 4: Accuracy Analysis Results

		User responses			
		Positive	Neutral	Negative	Total
Program classification	Positive	2647	9	1106	3762
	Neutral	151	0	76	227
	Negative	1418	5	1085	2508
	Total	4216	14	2267	6497

Table 5: Mean Equation Estimates

	Mean Equations							
	Daily				Weekly			
	1	2	3	4	5	6	7	8
Variable	TL/USD	RER	TL/USD	RER	TL/USD	RER	TL/USD	RER
Constant	0,0817	0,0564	0,002	0,0235	0,066	0,1856*	0,2572	0,4013**
	(0,0518)	(0,0375)	(0,0832)	(0,0562)	(0,1303)	(0,1098)	(0,1708)	(0,1763)
US composite index	0,1765**	0,1196**	0,1708***	0,1143***	0,2466**	0,1641	0,2624**	0,1449
	(0,0692)	(0,0538)	(0,0624)	(0,0429)	(0,1193)	(0,1403)	(0,1208)	(0,1562)
TR composite index	-0,0576	0,021	-0,0694	0,004	-0,3045***	-0,0454	-0,3647***	-0,2576*
	(0,0730)	(0,0638)	(0,0699)	(0,0582)	(0,0920)	(0,1451)	(0,1133)	(0,1429)
Sentiment	-0,0319	-0,0059			-0,0799	-0,0950		
	(0,0362)	(0,0289)			(0,0969)	(0,1518)		
Actual			-0,0447	0,0011			-0,4737***	-0,1362
			(0,0320)	(0,0240)			(0,1020)	(0,1203)
Politics			-0,0037	0,008			0,253**	0,1246
			(0,0427)	(0,0323)			(0,0984)	(0,1270)
Economics			0,0103	0,0051			-0,2023*	-0,0179
			(0,0395)	(0,0342)			(0,1086)	(0,1650)
World			-0,0175	-0,0372			0,2026*	0,3280***
			(0,0369)	(0,0286)			(0,1036)	(0,1031)
First order lag	-0.0800*	-0,0067	-0,0852*	-0,0042	0,4307***	0,1167	0,3786***	0,3203**
	(0,0513)	(0,0495)	(0,0515)	(0,0494)	(0,0262)	(0,0967)	(0,0582)	(0,1455)

Notes: 1) Standard errors are in brackets and they are (Bollerslev ve Wooldridge 1992) (henceforth BW) consistent. ***, ** and * indicate the estimates are significant at 1%, 5% and 10% level of significance, respectively.

2) Positive values indicate depreciation whereas negative values denote appreciation of TL.

3) There are 466 and 92 observations, respectively, in the daily and weekly analyses.

Table 6: Volatility Equation Estimates

	Volatility Equations							
	Daily				Weekly			
	1	2	3	4	5	6	7	8
Variable	TL/USD	RER	TL/USD	RER	TL/USD	RER	TL/USD	RER
Constant	-0,0049	-0,0042	-0,0075	-0,0731**	-0,4407***	-0,3831	0,313	0,9180
	(0,0425)	(0,0249)	(0,0590)	(0,0298)	(0,1695)	(0,4494)	(0,6131)	(0,8435)
Squared lag of residual	0,1286***	0,1499***	0,1248***	0,1314***	-0,0452	-0,1062***	-0,1404***	0,3090
	(0,0476)	(0,0558)	(0,0439)	(0,0385)	(0,0585)	(0,0287)	(0,0513)	(0,2102)
Lagged Garch term	0,8081***	0,7038***	0,8011***	0,7549***	0,9634***	1,0384***	0,5399	-0,2612
	(0,0612)	(0,0988)	(0,0613)	(0,0538)	(0,0537)	(0,0684)	(0,3343)	(0,4161)
US composite index	0,0086	0,0591	-0,0055	0,017	0,0202	0,0950	0,1875	-0,2774
	(0,0602)	(0,0619)	(0,0596)	(0,0235)	(0,2599)	(0,3960)	(0,3408)	(0,6529)
TR composite index	0,0583	0,1006**	0,06	0,062	0,3578	0,4010	-0,0564	0,2886
	(0,0653)	(0,0499)	(0,0689)	(0,0422)	(0,3089)	(0,3715)	(0,3237)	(0,4027)
Sentiment	0,0277	0,0159			0,3399***	0,1186		
	(0,0326)	(0,0191)			(0,0969)	(0,1298)		
Actual			-0,0069	0,0243			-0,1519	0,0794
			(0,0278)	(0,0237)			(0,1601)	(0,2527)
Politics			0,0009	-0,0033			-0,2276	-0,2699
			(0,0258)	(0,0155)			(0,2038)	(0,3086)
Economics			0,0091	0,0176			0,2736	0,3758
			(0,0248)	(0,0140)			(0,2639)	(0,3237)
World			0,0386	0,0583*			0,5219*	0,0691
			(0,0511)	(0,0322)			(0,2703)	(0,3496)

Notes: Standard errors are in brackets and they areBW consistent. ***, ** and * indicate the estimates are significant at 1%, 5% and 10% level of significance, respectively.

Table 7: BIST 100 Mean Equation Estimates

	Daily		Weekly	
	1	2	3	4
Variable	%Δ BIST100	%Δ BIST100	%Δ BIST100	%Δ BIST100
Constant	-0,0593	-0,1362	0,6655***	0,7013***
	0,0668	0,1116	0,1486	0,1364
US composite index	-0,0968	-0,0603	-0,4676**	-0,161
	0,0834	0,074	0,1928	0,1724
TR composite index	-0,1415	-0,0406	-0,0094	-0,1162
	0,1225	0,1139	0,2202	0,2596
Sentiment	0,1498***		0,4722***	
			0,1628	
Actual		0,0445		0,305*
		0,0549		0,1605
Politics		-0,0039		-0,1212
		0,0648		0,1811
Economics		0,1632***		0,6639***
		0,0575		0,1763
World		0,0194		-0,1993
		0,0475		0,1569
First order lag	-0,1034*	-0,0868	0,1009	-0,0216
	0,0537	0,0553	0,1101	0,1376

Notes: 1) Standard errors are in brackets and they are BW consistent. ***, ** and * indicate the estimates are significant at 1%, 5% and 10% level of significance, respectively.

2) Positive values indicate depreciation whereas negative values denote appreciation of TL.

3) There are 466 and 92 observations, respectively, in the daily and weekly analyses.

Table 8: BIST 100 Volatility Equation Estimates

	Daily		Weekly	
	1	2	3	4
Variable	%Δ BIST100	%Δ BIST100	%Δ BIST100	%Δ BIST100
Constant	0,1504	0,4955*	0,0259	1,8916
	0,1052	0,286	1,4178	2,2949
Squared lag of residual	0,1128***	0,0617	0,3851*	0,2819*
	0,0434	0,041	0,2009	0,1576
Lagged Garch term	0,7505***	0,456***	-0,0492	-0,4169
	0,1056	0,1533	0,2545	0,349
US composite index	-0,0893	-0,406***	2,0808**	1,0335
	0,0921	0,1056	1,0462	1,0571
TR composite index	0,0467	-0,0259	0,3075	1,0248
	0,1364	0,1895	1,1482	0,978
Sentiment	0,0348		0,2977	
	0,0449		0,824	
Actual		0,2609***		1,5706
		0,0697		1,2503
Politics		0,1319**		-0,1488
		0,0627		1,0414
Economics		-0,1202**		-0,069
		0,0607		1,1361
World		0,0013		-1,1614*
		0,0589		0,7042

Note: Standard errors are in brackets and they are BW consistent. ***, ** and * indicate the estimates are significant at 1%, 5% and 10% level of significance, respectively.

Table 9: F-test Results

Test Statistic	Value	Degree of Freedom	Probability
t-statistic	-1.148133	75	0.2546
F-statistic	1.318210	(1, 75)	0.2546
Chi-square	1.318210	1	0.2509

Null Hypothesis: Actual+Economics+Politics+World=0

Figure 1: Hourly Distribution of News

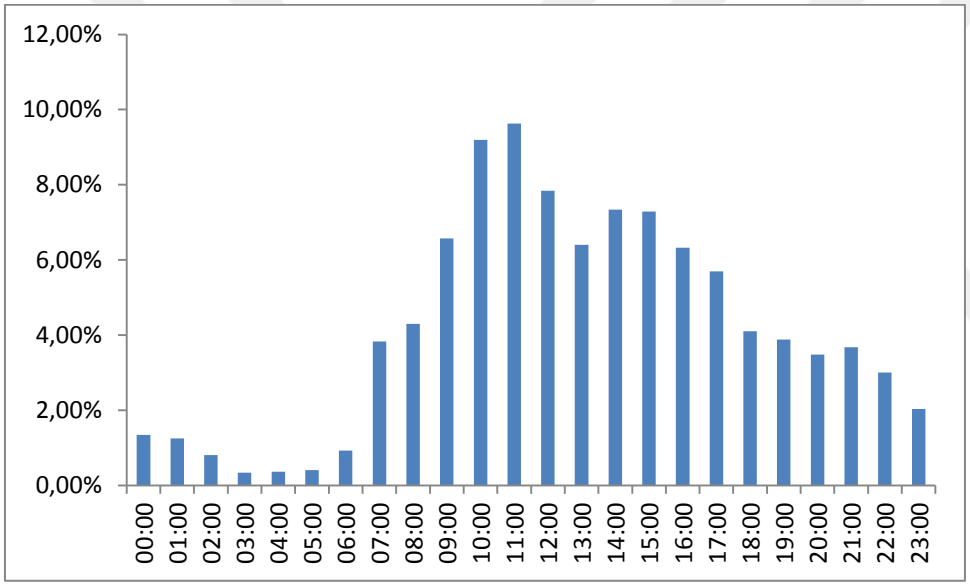


Figure 2: Daily Distribution of News

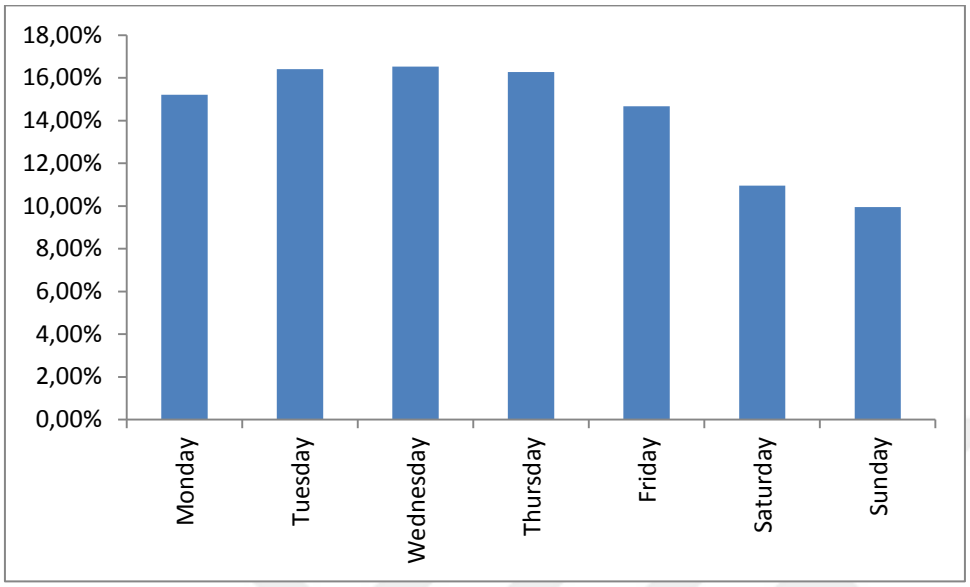


Figure 3: A Sample News Page

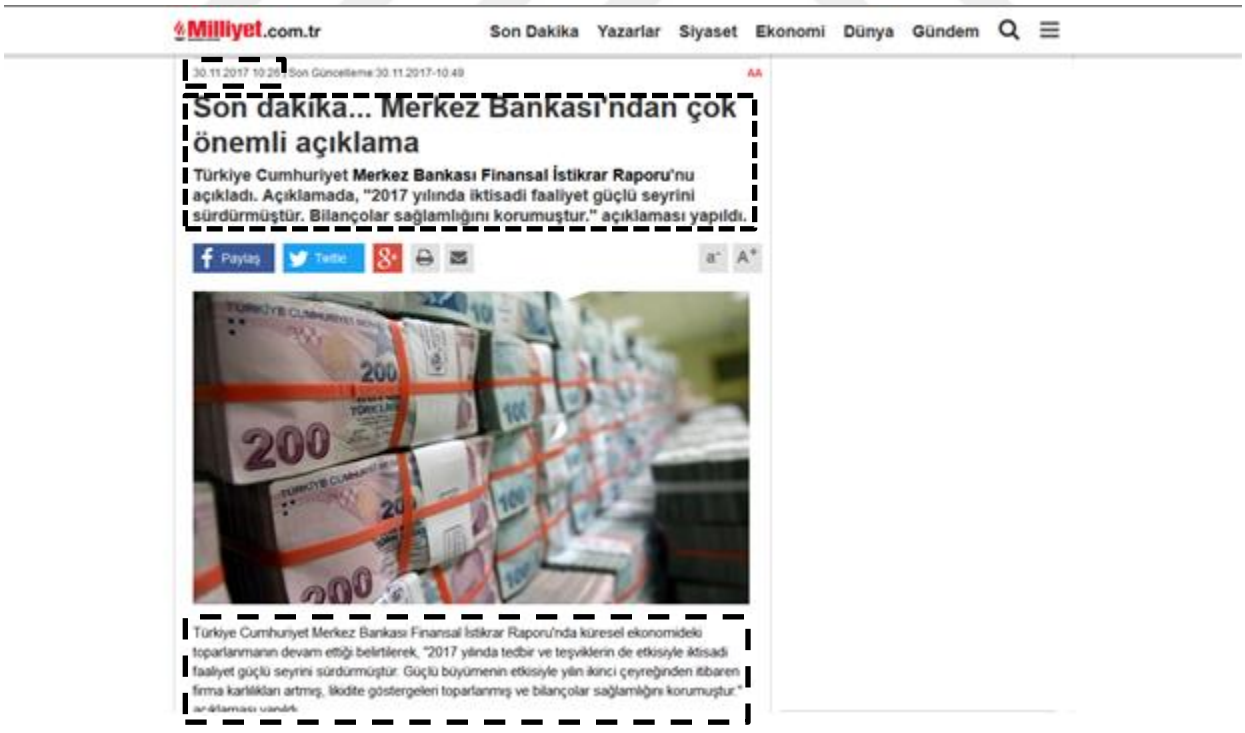


Figure 4: TSCorpus Sample Output

Please remember this study is still under development. Any comments and feedbacks are welcome.

For contact click here.

Word	PosTag	Morph	Lemma	Correct Form
2017	Num	Num	2017	2017
yılında	Noun	Noun+A3sg+P3sg+Loc	yıl	yılında
iktisadi	Adj	Adj	iktisadi	iktisadi
faaliyet	Noun	Noun+A3sg+Pnon+Nom	faaliyet	faaliyet
güçlü	Noun	Noun+A3sg+Pnon+Nom+Adj+With	güç	güçlü
seyrini	Noun	Noun+A3sg+P3sg+Acc	seyir	seyrini
sürdürmüştür	Verb	Verb+Verb+Caus+Pos+Narr+A3sg+Cop+A3sg	sür	sürdürmüştür
.	Punc	Punc	.	.
Bilançolar	Noun	Noun+A3pl+Pnon+Nom	bilanço	Bilançolar
sağlamlığını	Adj	Adj+Noun+Ness+A3sg+P3sg+Acc	sağlam	sağlamlığını
korumuştur	Verb	Verb+Pos+Narr+A3sg+Cop+A3sg	koru	korumuştur
.	Punc	Punc	.	.

New Parse

Figure 5: Evolution of the Sentiment

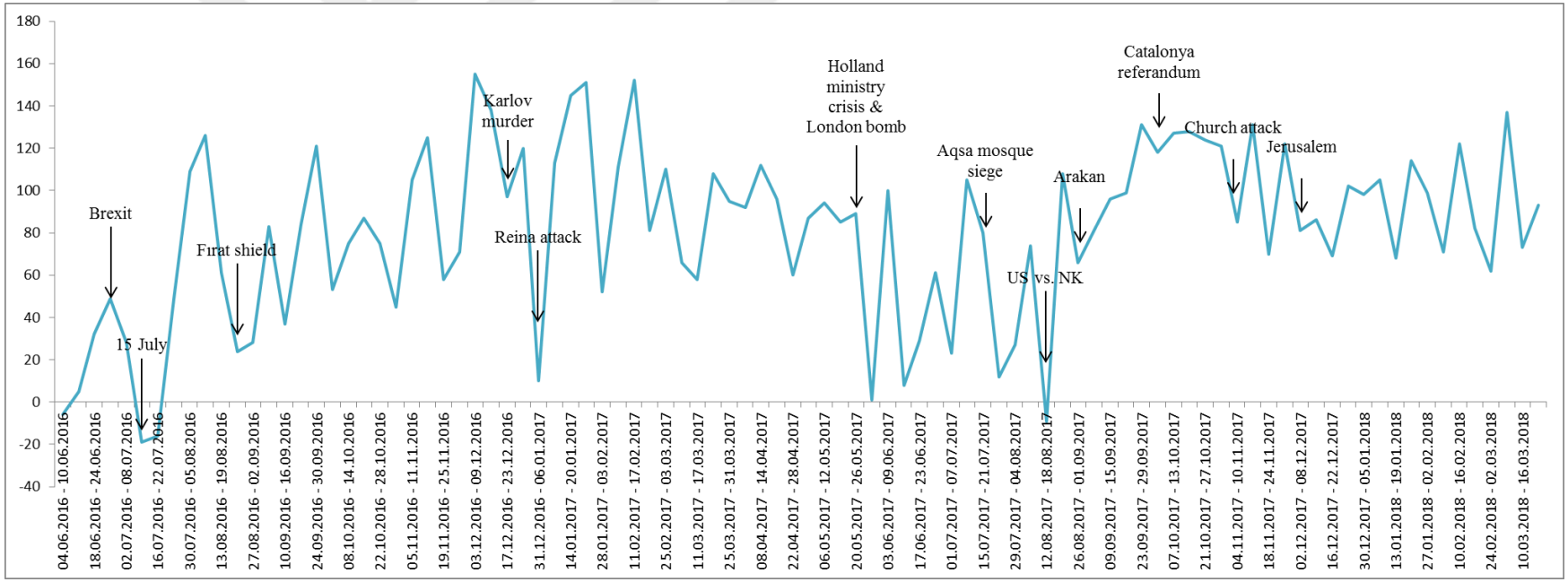


Figure 6: Sub-sentiment Indices

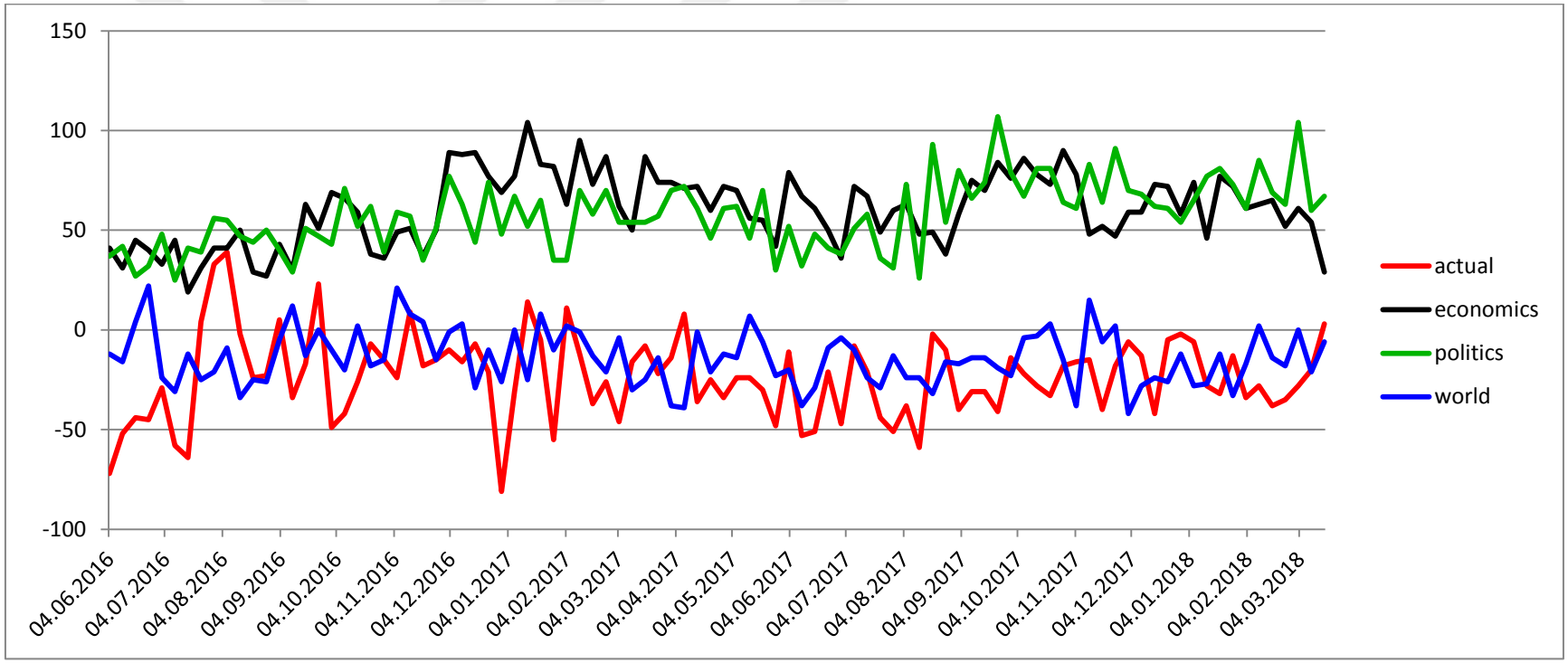


Figure 7: Comparison of CDS

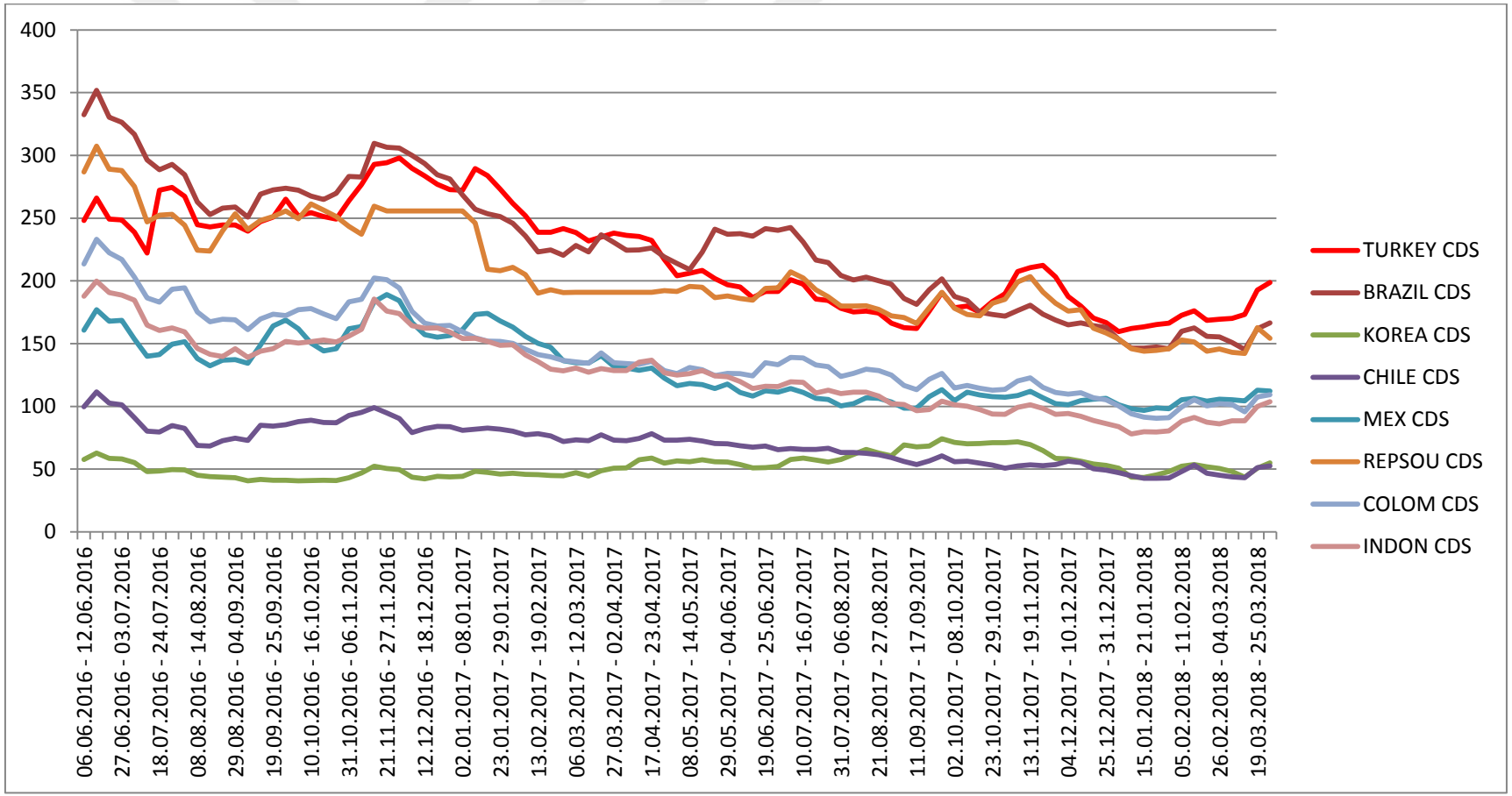
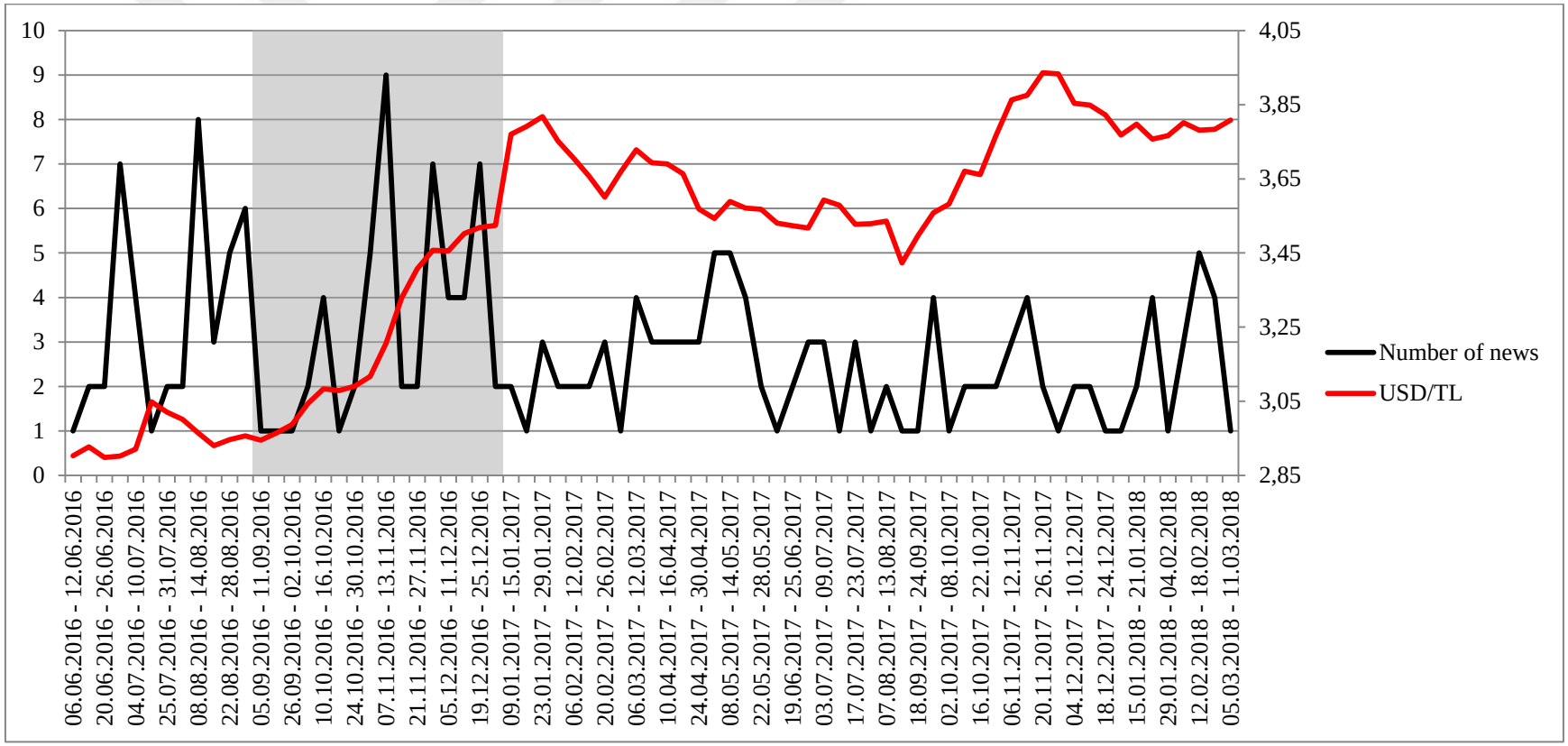


Figure 8: Positive Developments and USD/TL



Appendix A

accident/crime/death/theft/fight

acemi-surucu
aci-cekerek
aci-gunu
aci-kaybi
-aciklarinda-
acik-sacik
acili-aile
acili-anne
acili-baba
acil-inis
acil-servis
aglama-sesi
aglamasina-dayanama
agriyor-diye
ahsap-bina
ahsap-ev
aile-boyu
aile-katliam
ailesinden-gizli
akil-almaz
akilalmaz-olay
akillara-durgun
akillara-durgunluk-veren
alacagini-isteyen
alacak-verecek
aldatan-adam
aldatan-kadin
aldatan-koca
aldatilan
aldatildigini
aldatildigini-iddia-eden
aldatilma
alev-alan
alev-alev
alevler-arasinda
alevlerin-arasi
alev-topu
alkol-al
alkol-koma
alkollu
alkolmetre
alkol-sise
alt-gecid
alt-gecit
altinda-kal
anahtari-evinde
ana-yuregi
-anne-
anne-baba
anne-baba-katili
anne-bebe
anne-kiz
annelerinin-cesedi
annenin-drami
anne-sevgi
annesini
annesinin
annesi-ve-kiz
anne-ve-baba
anne-ve-og
anne-yuregi
apartman-boslugu
apartman-daire
arac-birbirine
arac-carpisti
aracina-carpan
aracini-birakip-kacti
arac-kullanirken
arasinda-karsilikli
arazi-anlasmazligi
arazi-kavgasi
arenaya-cevirdi
ariza-yapinca
arkadasinin-tavsiyesi
asansor
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asiri-doz
asiri-hiz
asiri-surat
asirlik-ceset
asitci
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ask-yasa
atese-verdi
atesin-icindeyiz
atesle-oynayan
atin-kazada-kopan
atlayacaksan-atla
av-tufe

ayakkabilari-cal
aydir-kayip
aylik
ayni-mahalle
ayrildigi
ayrilma-asamasi
ayrilmak-isteyen-esi
ayri-yasadigi
baba-kiz
babalik-testi
babasini
babasini-bulamayinca
baba-ve-ogluna
bacagi-kop
bacasini
bag-evi
bagimli
bagimliligi
bagimlisi
-baglanmis-
baglanti-yolu
baldiz
baltayla
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bas-basa
bas-belasi
basindan-vur
basindan-vurulmus
baskasiyla
baslik-parasi
bassiz-cesed
batan-tekne
bavuldan-cikan
bayiltana-kadar
bayiltip
-bebege-
bebegin
bebegini
-bebek
bebek-katil
belami-versin
benzin-dok
besik-gibi
bicak-cekip
bicakci
bicak-darbesi
bicakla
bicakladi
bicakla-kavga
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bicaklanan
bicaklanarak
bicaklandi
bicaklayan
bicaklayarak
bicaklayip
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bicakli-kavga
bicakli-saldiri
bicak-ve-sopa
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binbir-surat
biraktigi-not
bir-anda
bireysel-silah
birlikte-oldugu
bodrum-kati
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bogazini-kes
bogularak
bogulma-tehlike
bogulma-vaka
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borc-ayibi
-bosadi
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bosanan
bosandigi
bosandilar
bosanma
bosanmak-uzere
boyle-buldular
boyle-caldi
boyle-girdi
boylesi-gorulmedi
boyle-ugurlandi
bugun-cekildi
bulunan-cesed
bulunan-ceset
bulunan-otobus
bunalima-giren
bunu-yapan

burnundan
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-buyu-
buyu-bozma
buyucu
buyuk-tuzak
buyusu
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caldigi
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caldigi-paralari
caldiklari
calinan-altin
calinan-otomobil
calinti-arac
camdan-dus
camura-saplan
cani-koca
canindan-oldu
canli-canli
can-pazari
cansiz-bedeni
cantasi-calinan
carpan-surucu
carpip-kacan
carpisti
carptigi
catidan-atladi
catidan-dusen
cayir-cayir
cekildikten-sonra-olen
cenaze-arabasi
cesedi-aranan
cesedi-bozul
cesedi-bulunan
ceset-alarmi
ceset-bulundu
ceset-cikti
ceset-ihbari
ceset-kokusu
ceset-soku
ceset-torba
cete
ceylan-in-katili
cezaevi-firar
cezaevi-nakil
cezaevinden
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cigligi
ciglik
cikan-tartisma
cilgin-yolcu
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cingene
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cirilciplak
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cocuk-gelin
cocuk-katili
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-cocuklu-
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cocuk-park
cocuk-sahibi
cocuktan-kurtul
cocuk-yasta
cocuk-yuva
coken-bina
cope-atti
cop-kontey
copteki-cesed
copten-gelen-ses
curumeye
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dalga-gec
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damat-adayi
damper
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darp-edilen
darp-etti
davetsiz-gel
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dayak
-dayak-
dayi-dehseti

dedektif
dedikodu
define
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dehset-ani
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dehset-gecesi
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dehset-sacti
delik-desik
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demir-sopa
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denize-atti
denize-dus
denize-giren
denize-uc
denize-uctu
deniz-ortasinda
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dereye-uc
dereye-ucan
ders-calis
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devrilen-tir
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diken-diken
dil-cikar
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dilenen
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dilenmek
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direge-carp
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direksiyon-hakimiyeti
diri-diri
diye-bagirip
doktor-siddet
dolandiran
dolandiri
dost-atesi
dovduler
dove-dove
doven
doverek
dovme
dovuldu
dovulerek
dovup
dunuru
dur-ihtari
dusen-cocuk
dusen-otomobil
dusen-ucak
e5
e-5
ebeveyn
egitim-ucagi
ekmek-parasi
elektrik-akimina
el-fren
elinde-makas
eline-doladigi
elleri-ayaklari
elleri-bagli
el-ve-ayak
emekleye
emniyet-kemeri
en-aci
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eniste
en-yakin-arkadas
erkek-arkadas
erkek-cesedi
erkek-kardes
erkeklerle-gorusuyor
erkekligime-hakaret
erkek-surucu
erkek-yolcu
es-bulma
esi-ile-tartisan
esine-kizdi
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esini-oldur
esini-ve-kizini
esini-ve-oglunu
esini-vuran
esi-oldurulen
esi-ve-ailesini

esi-ve-cocugu
esi-ve-kizi
esi-ve-oglu
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esiyle-tartis
es-katili
eski-damat
eski-es
eski-karisi
eski-koca
eskiya
evden-kac
evde-tek-basina
eve-girdi
evinin-onunde
evinin-yandigini
evi-yanan
evlat-acisi
evlat-edin
evlatlik
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evleri-yanan
evli-ciftin
evli-cikti
evli-cocuklu
evli-kaldi
evli-kizi
evsiz-adam
falci
feci-kaza
feci-olum
feci-sekilde
feci-son
felc-etti
felcli-
fenalas
fena-yakalandi
fenelas
feryad
feryat
fidye
fikra-gibi
freni-bosalan
freni-patla
fren-yerine-gaz
fsm-deki-kaza
fuhus
gasp
gaz-kacagi
gaz-pedali
gaz-sikisma
gece-vardiya
gelin-adayi
gelin-arabasi
gelin-damad
gelin-damat
gelinini
gelin-kaynana
gelinli
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gelin-ve-damat
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genc-kadin
genc-kiz
gercek-aile
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gezmeye-git
gizli-cekim
gole-girmek
gozunu-kirpmadan
gozu-onunde
gozyas
gundur-kayip
gunluk-bebe
gunluk-ev
gunluk-kira
gunubirlik
gupegunduz
haber-alinamayan
hafif-ticari
hafriyat
halat
halde-bulundu
halk-otobus
hamile
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hastanede-skandal
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hatali-serit

hatali-sollama
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havada-dehset
havada-panik
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havuzda-boguldu
havuz-facia
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hirsizlik-yap
hirsizlik-zanlisi
hiz-cezasi
hiz-siniri
hiz-yapan
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hurdaya-dondu
icler-acisi
igrenc-olay
igrenc-tuzak
iki-kuzen
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ilginc-olay
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iliski-yasiyor
ilk-gece
ilkokul-ogrenci
inanilmaz-kurtulus
inatci-surucu
incir-cekirdegi
insaati-coktu
insaatin-catisi
insaattaki-tugla
internet-korsan
internetten
intihara-kalkis
intihar-ed
intihar-et
intihar-etti
intihar-girisimi
intiharinin-arkasi
intihar-susu
intikam-plani
irmaga-dus
isci-servisi
ise-yaramaz
isinmak-isteyen
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isirip
iskelet
iskence
istanbul-trafigi
isten-eve
istinat
istismar
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izdiham
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-kabus
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kacakci
kacak-elektrig
kacak-elektrik
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kacak-fidan
kacak-gecis
kacak-icki
kacak-kazi
kacak-mal
kacak-sigara
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kacak-tohum
kacak-tutun
kacak-viski
kacak-yolcu
kacirmak-isteyen
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kadin-coban
kadin-doktor
kadin-elinde
kadin-etegi

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kadin-surucu
kadin-yolcu
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kafa-atti
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kafasina-koydu
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kalbi-duran
kaldirim
kalpazan
kamyon
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kanala-ucan
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kan-dava
kan-donduran
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kanli-bitti
kanli-hesap
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kapkac
karaya-vurdu
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kardes-kavgasi
kari-koca
karimla
-karisi-
karisini
karisinin
karsidan-karsiya
karsiliksiz-ask
karsiliksiz-cek
-kask
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katil-koca
katil-surucu
katil-zanlisi
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kavga-etti
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kavgasinda
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kavgaya-don
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kavgayi-ayirmak
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kaybeden-aile
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kayinpeder
kayinvalide
kayinvalidesini
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kayip-ceset
kayip-cocuk
kayip-dagci
kayip-genc
kayip-ihbari
kayip-kisinin
kayip-surucu
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kazada-olen
kazada-yaralanan
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kaza-tehlikesi
kaza-tespit
kaza-tutana
kaza-yapan
kazayla
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kazma-sapi
kazma-sopa
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kendisini-oldur
kendisini-yak
kesik-bacak

kesmeyi-dusundukleri
kestigi-agac
kezzap
kilitleyip
kimsesiz
kirbac
kirmizi-isik
kisilik-aile
kiskanc
kiskanclik
kiyiya-vur
kiz-arkadas
kiz-cocugu
kiz-erkek
kizgin-koca
kizgin-yag
kizini
kizini-tufekle
kiz-ismi
kiz-kacir
kiz-meselesi
kiz-yurdu
koca-dayagi
koca-dehseti
kocasi
koca-siddeti
komsunun
kontrolden-cikan
kopan-bacagi
kopan-halat
kopan-kol
koparmanin-cezasi
kopruden-uc
kopya-ceken
korku-dolu
korkuluk
korkulu-ruya
korkunc-infaz
korkunc-intikam
korkunc-olay
korkunc-tuzak
kor-kursun
korkutan
korkutan-olay
korsan-kitap
korsan-servis
korsan-taksi
kovalamaca
kucuk-cocuk
kucuk-furkan
kucuk-gelin
kucuk-kiz
kufur
kulagini-kesti
kule-don
kul-etti
kullanmayi-bilen
kul-ol
kuma-getir
kuma-getiren
kumar
kundaklama
kural-tanimayan
kursun-yagdir
kursun-yagmuru
kus-carp
kuyudaki-ceset
kuzen
kuzenler
-laf-
lanet
lastik-degis
lastik-yakti
levyeyle
-linc-
lisede
liseli
-liseli-
lise-ogrenci
luks-arac
luks-site
madde-bagimlisi
mafya
maganda
magdur
mahsur-kal
makas-at
maskeli
mektubunda-sok
mektup-uzerine
meralarina
merdiven-boslugu
meshur-ol

mesken
meydan-dayagi
midibus
mikser
minibus
mini-eteg
mini-etek
minik-
minik-kiz
minik-yurek
misafirlige
mobbing
motorsiklet-carpan
motorsiklete
motoru-ariza
mucevher-dolu
mucevheri-calinan
mustehcen
musteri-bekle
nehre-dus
nehre-uc
nehri-ne-dusen
-nine-
nisanli-cift
nisanli-genc
nisanlisi
odaya-kapatti
odun-toplamak
oglun-rehin
oglunu
oglu-oldurulen
ogrencilerine
ogrencileri-tasiyan
ogrenci-servisi
ogrencisi
-ogrencisi-
ogrencisiyle
ogrenci-yurdu
okul-bahcesi
okul-disina
okullarin-cevresinde
okul-mudur
okul-onu
okul-servis
okul-yol
oldurdugu-iddia
olduren-anne
olduren-baba
oldurmeye-tesebbus
oldurttu
oldurulen-genc
oldurulen-kadin
oldurup
olenlerin-yakin
olmaz-olsun
olmek-uzere
olu-bulunan
olu-bulundu
olumden-dondu
olumlu-kaza
olum-melegi
olum-notu
olum-patronicesi
olumunun
once-esini-oldurdu
ortalama-hiz
ortaligi-birbirine
otel-odasi
otoban
otobus-carpan
otobusle-carpisan
otobusler-carpisti
otobus-sefer
otobus-soforu
otobusten
otobusun
otomobil-devrildi
otomobile-arkadan
otomobile-carpti
otomobili-duraga
otomobilin-alti
otomobilin-carpmasiyla
otomobilin-uzeri
otomobil-isyerine
otomobil-kamyon
otomobil-menfeze
otomobil-motorsiklet
otomobil-otobus
otomobil-tir
otopark
otostop
oto-yikama
overlok

oyun-parki
oyun-salon
oz-anne
oz-baba
oz-cocuk
oz-kardes
oz-torun
palali
panik-yaratan
para-kasasi
parasiz
park-ed
park-et
park-etme
park-etti
park-halinde
parmak-kop
parmaklik
patronunu-oldur
Pazar-canta
pazarci
pazaryeri
pencereden-dusen
perte-cik
pes-dedirt
peynir-ekmek
pistten-cik
polis-karakolda
polisten-kac
polisten-yardim-isteyen
pompali-tufek
ponzi
popmali
promil
psikolojik-baski
psikolojim-bozuldu
radar-tuzagi
rahat-tavri
rastgele-ates
-ray
raydan-cik
raydan-cikan
refuj
rehber-kopege
rogar
rotar-yap
rota-yap
sac-saca
sah-damar
sahibini-birakip
sahile-vur
sahiline-vuran
sahipsiz-bavul
sahte-altin
sahte-diploma
sahte-doktor
sahte-hakim
sahte-icki
sahte-ilac
sahte-ise
sahte-jandarma
sahte-mesaj
sahte-ogretmen
sahte-para
sahte-parfum
sahte-polis
sahte-raki
sahte-rapor
sahte-sarap
sahte-savci
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sakasi
saka-yap
santaj
sapigi
sapik
saplanan-bicak
sarampol
sarhos
sarma-sigara
saskina-cevir
satirla
sefkat-tokadi
sehrin-gobegi
selami-var
seni-seviyorum
sert-kaya
servisi-devrildi
servis-soforu
sevdigi-kadin
sevdigi-kiz
sevgili
seyir-hali

siddete-ugrayan
siddet-gor
siddet-uygu
siddet-uygulayan
sikayete-giden
sikisan-cocu
sikisan-surucu
silah-ceken
silah-dayadi
silahlar-cekildi
silahla-vurulmus
silahli-kavga
silahli-saka
silahli-saldiri
silahli-sopali
silahli-soygun
silah-ve-sopa
silah-zoruyla
sinif-arkadas
sinif-arkadasi
sinifta-arkadas
sinifta-dehset
sinifta-istemedigi
sinir-krizi
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sir-intihar
sir-olum
skandal-goruntu
soba
sodali
sofore-saldir
sofor-koltugu
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sokaktan-gecen
sokakta-yasayan
soke-eden
soke-ol
sok-etti
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son-yolculugu
sopali
sopali-kavga
sopayla
sopayla-saldir
-soyan
soyguna-direnen
soyguncu
soygun-girisimi
soygunu
soyuldu
soyunma
soyup
sozlu-siddet
suc-makinesi
suctan-aranan
sucustu
sudan-sebep
su-kanali
su-kuyusu
supheli-arac
supheli-canta
supheli-olum
surucusu
tabancayla
taciz
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takla-at
taklit-gida
taninmaz-hale-geldi
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tartistigi
tasla-ezil
tas-ve-sopa
tazyikli
tecavuz
tefeci
tehlikeli-sov
tekel-bayi
tekme
tekme-tokat
tekne-batti
tekne-facia
teknesi
teknik-ariza
tem-bolu
tem-de
tem-gise
temizlik-gorevlisi
temizlik-yap
tem-kenar
tem-otoyol
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terk-edilen

teror-estiren
ters-donen
ters-yolda
ters-yonde-ilerle
ters-yone
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tir-devrildi
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tirin-altinda
tir-kuyrugu
tirla-carpisan
tirmalama
tir-otomobilleri
tokatladi
topraga-gomulu
topraga-ver
torbaci
tore-kurban
torun-ile-anneanne
torunu
torununu
trafige-kapa
trafigi
trafigi-kilit
trafik-ceza
trafik-cilesi
trafik-isik
trafik-kaza
trafik-kazasi
trafik-lamba
trafikten-sikilinca
trafik-yogun
-tren
tren-otobusu
turkiye-nin-kanini
tuyler
tuyler-urperten
ucagin-motoru
ucak-dus
ucak-kapisi
ucak-kazasi
ucakta-rahatsizlanan-yolcu
ucan-balon
ucurum
ugurlama
ugursuz
ulasima-kapandi
ulasim-felc
umrumda-degil
universiteli-
ust-geci
ustgecid
uvey
uygunsuz
uykudaki
uykuda-ol
vahset
vahsice
vefat
vinc
viraj
vitesleri-karistirinca
vucudunda-kursun
vurgun-plani
yabanci-uyruklu
ya-benimle-ol
yakilmis-cesedi
yakilmis-ceset
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yamyam
yanaklarinin-sikilmasi
yanan-araba
yanan-arac
yanan-araci
yanan-bot
yanan-ev
yanan-kamyon
yanan-otobus
yanan-otomobil
yanan-tir
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yangin
yangini
yankesici
yan-kesici
yankeski
yan-keski
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yanmis-kadin
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yarali-halde
yaralilarin-yakin

yardim-edin-notu
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-yasindaki-
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yasli-kadin
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yayaya-carp
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yem-olmak
yenge
yenge-katili
yeni-dogan
yeni-dogmus
yeni-evli
yerinden-bicak
yetistirme-yurdu
yikim-gerginligi
yikmaya-calis
yildirim-can-aldi
yildirim-dusmesi
yildirim-dustu
yildirim-isabet
yildir-kayip
yogun-trafik
yola-sacilan
yol-bakim
yol-calismasi
yol-coktu
yolcu-otobus
yolcu-sayisi
yolcu-tasiyan
yolcu-ucagi
yolcu-ucak
yolcu-vapur
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yoldan-cikan
yolda-yuru
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yol-ortasi
yol-tartismasi
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yolun-karsi
yolun-ortasinda
yolunu-kes
yolu-olmayan
yorgun-mermi
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yuklu-kamyon
yuklu-tir
yuksek-ses
Yumruk
yumruk-at
Yumrukla
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yurek-burkan
yurek-dayanma
yurek-parca
yurek-yak
yurek-yakan
yurt-facia
yurt-odasi
yurtta-kalan
yurttan-kac
yuruyen-band
yuruyen-merdiven
Yuttugu
yuz-kizartici
zehir-tacir
zincirleme-kaza
zincirleme-trafik
Zorba
zorla-evlen
Zula

ancient/mythology/history

abdulhamid
-antik-
antika
antik-kent
arkeolojik
asirdir
asirlardir
bir-zamanlar
candarli-halil-pasa

deniz-kizi
diaspora
efsanevi
gelenek
geleneksel
gizemli
gorenleri-buyu
hanedan
herakles
hitit
hobbit
imparator
kral-midas
lahit
malazgirt
nasreddin-hoca
nazi
padisah
perili-ev
pers-donemi
roma-donemi
sehzade
sehzade
sikke
tarihi-eser
tarihi-kalinti
tarihi-konak
viking
yuzugun-hikayesi
yuzyildan-kalma

animal
ac-kal
ac-kalan
ac-kurt
aga-takilan
ahir
ahirda-tavuk
ahtapot
akrep
akvaryum
alabalik
alageyik
albatros
als-hasta
arap-tay
-ari-
ari-kovan
-arilar-
arilar-basti
ari-uretimi
at-arabasi
at-bas
ates-kuslari
at-kafasi
-ayi-
ayi-saldirisi
-baligi-
balik-av
balina
basibos-at
baykus

bildircin
-bocegi-
bocek
-boga
boynuz
bozkurt
buzagi
canavar
caretta
caretta-caretta
cinekop
cingirakli
cipura
civciv
dag-keci
damizlik
denizana
deniz-ana
denizanasi
devekusu
dev-yilan
dinozor
domuz
dracula
dragon
ejder
ejderha
engeregi
engerek
esegin-isirdigi
-esek-

esek-arisi
esekleriyle
esek-sutu
etcil-hayvan
etlik-tavuk
evde-besle
fare
-fil-
flamingo
fok-baligi
gergedan
geyik
godzilla
goril
guvercin
hamam-bocegi
hamsi
hayvanat-bahcesi
hayvansever
hindi
horoz
hurma
iki-ayagi-kirilan-at
ipek-bocegi
istakoz
istavrit
istridye
kacak-at
kanarya
kangal
kanguru
kaplan
kaplumbaga
karga
karides
karinca
kaz-ciftligi
keci
-kedi
kefal
keklik
kelebek
kene
kertenkele
kilcik
kirpi
kobra
komodo
kopege
kopegi
kopegin
kopek
kopek-baligi
kopek-balik
koye-inen
koyunlar
koyun-sagip
koyunun
kral-kobra
kulucka
kurbaga
-kurt-
kurt-kopegi
kurtlar
kurtlarin-saldir
kurt-saldir
-kusu-
kus-yuvasi
kutup-ayi
levrek
leylek
loch-ness
lufer
manda-sayisi
marti
maymun
mercan
mezgit
midye
muhabbet-kusu
nesli-tehlike-altinda
nesli-tuken
nesli-tukenme
nesli-tukenmekte
olu-kus
ordek
orkinos
orumce
orumcek
otlat
palamut
panda
penguen

petshop
pirana
pitbul
piton
porsuk
romanov
safkan-arap
safkan-at
saka-kusu
salyangoz
sansar
sebek
sevimli-dost
sinegi
sinek
sirtlan
sivrisinek
sokak-hayvan
sokaktaki-hayvan
solucan
soyu-tukenmek
suluk-toplama
surusu
sut-sigir
tavsan
-telef-
telef-ol
tezgahlarda
tilki
timsah
tirtil
vampir
vasak
vatoz
yaban-hayvan
yabani-hayvan
yarali-karaca
yarasa
yaris-ati
yavru
yengec
-yilan-
yilani
yilanin
yilan-korku
yilanlar
yilanli-koy
yilki-at
yumurtlayan
yunus-
yunus-balik

apparatus
ambalaj
anahtarlik
arapca-tabela
ayakkabi-boya
bagaj
bardak
bisiklet
board
boncuk
cakmak
cektigi-bavul
celenk
cipli
damacana
dayanikli-sunta
degirmen
dilek-feneri
dis-firca
dolmakalem
dorse
egzoz
ekmek-bicagi
ekmek-tekne
elektrik-diregi
elektrikli-supurge
elektrik-supurge
elektronik-kelepce
elektronik-sigara
forklift
fotograf
gardirob
gardirop
gece-lambasi
gerdanlik
gozlugu
gozluk
gunes-gozlu
gunes-panel
gunes-sistemi

hamak
havaifisek
havai-fisek
havali-tufek
hava-yastigi
havlu
isitme-cihazi
islak-mendil
is-makinesi
kagittan-ucak
kamera
kamp-sandalye
kanepe
karavan
kavanoz
kepce
klima
klozet
kol-saati
konteyner
kriko
kumbara
kum-torba
kuvoz
lastigi
lastik
lavabo
levha
-makinesi
market-arabasi
maytap
model-ucak
modifiye-arac
mukavva
murekkep
oksijen-maskesi
olta
oyuncak-araba
parasut
paten
pense
peruk
pet-sise
plaka
poset
prezervatif
raptiye
reflektor
romork
sabun
salincak
sampuan
selektor
semsiye
sifon
silikon
siringa
sis-fari
stepne
stres-carki
su-pompasi
tabela
tabut
takograf
tencere
tente
terlik
termos
tornavida
tutkal
ucurtma
ustura
valiz
webcam
yastik
yatak
yazar-kasa
yedek-lastik
yemek-masasi
yeni-nesil-akilli-cep-telefonlari
yivsiz-tufek
yoruk-calgisi
zipkin

astronomy

astroloji
astronomi
astronot
burc
jupiter
mars
mavi-ay

merkur
meteor
nasa
samanyolu
saturn
teleskob
teleskop
tutulmasi
ufo
uzay-araci
uzayli
uzay-tema
yakamoz
gezegen
goktasi
gokyuzu

chemical
aluminyum
aluvyon
ay-tozu
balmumu
bonzai
civa
deterjan
elmas
eroin
esrar
extacy
flakka
fosfat
fosfor
helyum
hidrojen
karbon
kiymetli-
tas
klor
kokain
kolonya
kozmetik
krom
losyon
metan-gazi
morfin
naylon
nitrat
ozon
ozon-deli
parfum
pirlanta
potasyum
protein
sentetik
siyanur
uyusturucu
yanici-gaz
zumrut

disaster
buyuklugunde-
deprem
buyuklugundeki
cekirge-istila
cif-felaketi
deprem-ani
deprem-bolgesi
deprem-guvenligi
deprem-haber
depreminin
deprem-sigorta
deprem-sonrasi
deprem-uyarisi
deprem-uzmani
depremzede
elektrik-kesinti
heyelan
-kesintisi-
maden-kazasi
marmara-depremi
toprak-kaymasi
yanardag

dress
bikini
corap
ic-
camasir
kaftani
mayo
pantolon
takim-

elbise
takunya
tayt
uniforma

environment

atik-varil
atik-yag
cevreci-cift
cevreyi-kirleten
cop-rezaleti
cop-yigini
gunes-enerji
kotu-koku
plastik-atik
yogun-koku

event

akin-et
boat-show
fuar
kep-at
moda-hafta
smart-future-expo

exam/school

acikogretim
acik-ogretim-lisesi
acik-uclu
ales
anaokul
ana-okulu
anasinifi
aof
aol
bos-kalan-kontenjan
bos-kontenjan
butunleme
cuma-gunu-karne
ders-notlari
dgs
eba-kurs
eba-soru-ve-cevap
eba-ya
egitim-yili
ehliyet
ek-tercih
e-mufredat
e-okul
ihtisas-kurs
ikili-egitim
ilk-ders
ilkokul-mezunu
karnesinde-zayif
kpss
kres
kyk
lisansustu
liseye-gecis
lys
matematik
meslek-lise
mezuniyet
oabt
ogrenci-sayisi
okkullarin-acilmasi
okullar-aciliyor
okul-oncesi
ortaokul
oss
osym
osys
ozel-lise
ozel-okul
robert-kolej
sinav
soru-kitapcigi
sosyal-deney
sts-takvimi
taban-puan
taban-ve-tavan
takdir-tesekkur
takdir-ve-tesekkur-belgeleri
tavan-puan
teog
tercih-rehber
tercih-ve-yerlestirme
toefl
tus-
ugur-okullari

universite-tercih
universite-tercihleri
universiteye-giris
yds
ydus
yeni-mezun
ygs
yks
yokdil
yoksis
yuksekogretim
yuksekokul

famous
acun-ilicali
adam-west
adnan-oktar
alaattin-cakici
aleyna-tilki
algi-eke
ali-agaoglu
angeline-jolie
anthony-quinn
ara-guler
arda-turan
arif-sag
asik-veysel
ataturk
atilla-tas
aydin-boysan
aziz-sancar
baris-akarsu
beren-saat
berguzar-korel
bill-gates
birce-akalay
blogger
blog-yazari
bulent-ersoy
bulent-korkmaz
burak-ozcivit
buse-terim
buse-varol
cagatay-ulusoy
cakal-carlos
canan-erguder
canan-karatay
celebrity
cem-yilmaz
cevat-babuna
ceyda-duvenci
ceylan-timuroglu
chris-brown
cilgin-sedat
deniz-seki
dunyaca-unlu
ebru-gundes
ece-vahapoğlu
eda-ozerkan
emrah-karaduman
emrah-serbes
enes-batur
erdal-besikcioglu
erdal-tosun
erhan-celik
escobar
esra-erol
fadil-akgunduz
fahire-kara
fahriye-evcen
fatih-altayli
fazil-say
filiz-aker
filiz-tacbas
first-lady
gamze-ozcelik
gamze-topuz
gulben-ergen
hakan-altun
halit-akcatepe
halit-ergenc
haluk-levent
harun-kolcak
hazal-kaya
hulya-avsar
hulya-kocyigit
ibrahim-tatlises
ilke-ozyuksel
irem-derici

jeff-bezos
kadir-dogulu
kadir-inanir
kardashian
kemal-dogulu
kemal-uzun
kenan-ece
kenan-imirzalioglu
kerem-bursin
kerimcan-durmaz
kimdir
kivanc-tatlitug
koray-avci
lady-gaga
leonard-cohen
lerzan-mutlu
madonna
mahmut-tuncer
mete-yarar
metin-hara
mina-basaran
muge-anli
mustafa-armagan
nihat-dogan
nuray-hafiftas
nurgul-yesilcay
nuri-bilge
nur-yerlitas
okan-bayulgen
onur-ozbizerdik
ozan-dogulu
ozcan-deniz
ozlem-tekin
picasso
pierre-loti
pistorius
prenses-diana
rasim-ozan
recep-sert
robert-de-niro
rockefeller
ruzgar-cetin
sener-sen
serdar-ortac
seyma-subasi
sezen-aksu
sinan-cetin
sinem
songul-karli
sukru-kizilot
tarik-akan
tarkan
tayfun-talipoglu
temel-kotil
timur-acar
umit-kantarcilar
unlu-aktor
unlu-is-adami
unluler
unlulere-sok
unlu-model
unlu-restoran
unlu-sanatci
unlu-sarkici
unlu-sunucu
unlu-yildiz
unlu-yonetmen
usta-yazar
usta-yonetmen
van-gogh
vatan-sasmaz
volkan-konak
warren-buffet
yesim-salkim
yilmaz-morgul
yusuf-islam
zeki-muren
zuckerberg

fruit/plant

agaca-cikti
agac-buda
agac-devrildi
agac-kabuk
agac-kes
agac-sevgisi
amazon-orman
anason
antep-fistigi
asiri-su

asirlik-cinar
asirlik-zeytin
at-kestanesi
avakado
aycicegi
biber
bitki-evi
bitki-top
bogurtlen
botanik
bozkirin-ortasi
bugday
burun-yagi
can-erik
ceviz
-cilegi
cilegin-rengi
cilek
ciris-bitkisi
dalbasti
damla-sakizi
dofralik-zeytin
domates
endemik-bitki
fasulye
feslegen
fidan-dikimi
findik
gemlik-zeytini
goji-berry
gubre
gubresi
hasadi-basladi
hasat-zamani
ihlamur
-incir-
incir-agaci
ispanak
kabak-cekirdegi
kanola
karadut
karanfil
karpuz
kavun
kayisi
keciboynuzu
kereviz
kestane
kinoa
-kivi
kivi-
kuru-incir
kuru-sogan
kuru-uzum
kuskonmaz
kuzugobegi
lavanta
limon
mandalina
manisa-uzum
mantar
maydanoz
narenciye
nohut
orkide
ortu-alti
palm-yagi
pamuk
pancar
papaz-erigi
patates
patlican
pirinc
polen
portakal
propolis
resif
saman
sarimsagi
sarimsak
sarmasik
sera
sezonun-ilk
sifa-depo
siyez
stevia
super-meyve
sus-bitki

susuz-tarim
tarihi-cinar
tarim-ilaci
termal-sera
topraksiz-sera
topraksiz-tarim
turfanda
turk-kirazi
-uretici
-ureticisi
-ureticisi-uzum-asmasi
yapragi
yas-uzum
yerli-muz
yesil-erik
yonca-tarlasi
zeytinlik

illness/health/organ/medicine

agri-kesici
aids
akcigeri-patladi
akil-hastane
akli-denge
alerji
alzhaimer
alzheimer
ameliyat
anestezi
anoreksiya
antibiyotik
apandisit
aspirin
astim-krizi
atesli-hastalik
bakteri
bas-agrisi
bel-fitigi
beyin-sivi
bobregi
bobrek
bogaz-agrisi
botoks
brezilya-kalca
cicek-hastaligi
colyak
curuk-dis
curuk-rapor
damar-genis
depresyon
dilsiz
dis-agrisi
diyabet
diyaliz
diyet
dna
dogal-sifa
dogurgan
dogurmak
doku-buyumesi
down-sendrom
dudak-silikon
dunyaya-gelen
eczaci
embriyo
emzirme
ender-gorulen
enfeksiyon
engelli
epilepsi
estetikci
fobi
gargara
gebelik
gerizekali
geri-zekali
girtlak
gorme-engelli
guatr
guruldayan
gurultu-kirli
-hastalari-hastaligi
-hastasi-hastaya-umut
hemsire
hepatit
hiv
hydroseed
ic-organ

ilik-nakli
isitme-engelli
kafa-nakli
kalp-atisi
kalp-damar
kalp-kriz
kanser
kan-ver
karin-agrisi
karninda
karnindaki
karnindan-cikti
kas-hasta
kasinan
kasinti
kemoterapi
kilo
kilo-verdi
kirim-kongo
kisirliga
kizamik
klonla
kolera
konusup-yurume
kronik-hasta
kuduz
kurtaj
kus-gribi
losemi
menenjit
metabolizma
mide-agrisi
mide-kucultme
midesinden
migren
mr-cihaz
nargile
obez
oksuruk
olumcul-hasta
olumcul-virus
omurilik
organ-nakli
organ-ticareti
otizm
ozel-hastane
panik-atak
pansuman
pedofil
popo-kaldirma
protez
psikiyatr
psikolog
rahatsizligi
rahatsizlik
regl
rontgen
ruh-ve-sinir
sabah-sporu
sac-ekimi
safra-kese
sagir
saglikli-beslenme
saglikli-yasam
sahte-estetik
salgin
sarihumma
sari-humma
seker-hastasi
sezaryen
sigara-icme
sigarayi-birakma
sigarayla-savas
sindirim
sitma
sitma-asi
sizofren
sma-hasta
soguk-algin
soguk-alginligi
soluk-borusu
stent
suni-teneffus
sunnet
tedavi-gor
tedavi-goren-hastaya
tekerlekli-sandalye
testis
tomografi
tuberkuloz
tumor
tup-bebek
umit-oldu

unutkan
uyku-ilaci
uyurgezer
vegan
veremli
virus
yanlis-igne
yapisik-ikiz
yemek-borusu
yogun-bakim
yuz-nakil
yuz-nakli
yuzuk-parmagi
zaturre
zehir
zehirlenen
zehirlenme-vakasi
zehra-nin-iyilesmesi
zika-virusu

magazine
-alkis
cekici
en-havali
evlenecek
evleniyor
evlenme
evlilik
giyim-tarzi
guzel-kiz
guzellik
luks-hayat
luks-otomobil
luks-taksi
luks-tasarim
luks-yat
makyaj
manken
modaci
moda-ikonu
nikah
opusmek
sac-model
sosyete
sosyetik
ustsuz
yakisikli

meal/drink
anzer-bali
aroma-verici
at-eti
baklava
bardak-cay
-bira-
cag-kebabi
cennet-camuru
cig-sut
cikolata
cips
corbaci
dondurma
donerci
down-cafe
down-kafe
ekmek-arasi
enerji-icecegi
enerji-icecek
ezine-peynir
fastfood
fast-food
fistik-ezme
gastronomi
gazoz
gofret
gravyer
hamur
helva
jelibon
kadayif
kafe
kafeterya
kahvehane
kahve-kopu
kandil-simidi
kaynak-su
kebap
ketcap
kofte

kokorec
kumanya
kunefe
kuru-fasulye
kuruyemis
kuru-yemis
lahmacun
limonata
lokanta
lokum
maden-suyu
makarna
makaron
mangal
meyve-suyu
nisasta
nusret
nutella
padisah-sofralarinin
pekmez
pestil
pide
pide-fiyatlari
pilav
pilic-bud
pismis-tavuk
pizza
pogaca
recel
renkli-icecek
safran
salep
sandevic
sandvic
simit
sokak-sut
soya-kiymasi
-sut-
sut-cift
tandir-atesi
tarhana
tavuk-doner
tavuk-eti
tereyagi
testi-kebabi
tost
tursu
tutsulenmis
uzum-suyu
veda-yemegi
viski
yeme-icme
yumurta-kabuk
zeytinyagi

mine/stone/jewelry

granit
grizu
hazir-beton
ilginc-tas
jeotermal
maden-ocagi
mermer
-mermer-
mozai
mozaik

other

10-marifet
360-derece
aclik-grev
aclik-siniri
altin-fiyati
altin-fiyatlari
altin-gun
altin-haftaya
altinin-grami
altinin-ons
arsa-fiyatlari
asiret
asker-balik
atasoz
bal-dudak
balkon
banyolugu
baraj-golu
barajlardaki-doluluk-orani
baraj-su
basini-acti
baski-hata

berdel
beton-blok
beton-mikseri
beton-pompasi
biyonik
borsa-gune
borsa-gunu
borsa-haftaya
borsa-istanbul-gune
borsa-istatnbul-haftaya
bos-magaza
buzdagi
buz-dagi
caca
cefakar
cep-yakiyor
ceyrek-altin
cigir-acan
cinsiyet
civil-civil
cozulen-buz
dag-bas
dagin-zirvesi
dekorasyon
demir-iskele
deniz-mavisi
deniz-suyu
deniz-yatagi
dev-gemi
dolarda-dusus
dolar-dusuyor
dolar-fiyat
dolar-fiyati
dolar-gune
dolar-haftanin-son-gununde
dolar-haftaya
dolar-tl
dolar-ve-euro
dolar-yeni-gun
dolar-yukseliyor
duvar-yazi
emoji
enerji-kimligi
en-uzun-yasayan
en-zeki
en-zengin
erotik
espri
ev-hapsi
ev-yapimi
ezber-boz
falez
fantezi
feminist
fetih
filesiz
fonksiyon
foseptik
fotografi
garajinda
genc-beyin
genelev
gobek
gocuk
gozu-mavi
gram-altin
gram-fiyat
gulizar
gulle-dolasiyor
gunun-karesi
hatira-fotografi
hava-araclari
hava-degisim
havuz-modeli
hayalet
hayati-degisti
ikircikli
ilk-matbaa
imece
inanilmaz-kesif
insaat-hali
insaat-kazisi
insaat-malzeme
ip-uzerinde
irkci
is-basvurusunda-bulunan
is-gorusmesi
islahevi
islak-imza
islek-cadde
israfi
izmarit

kabile
kapali-ring
kerpic
kesif-ucagi
kiraathane
kitap-okuma
kitap-okuyan
konut-satildi
konvoy
kot-fark
koyun-nufusu
kus-pislemis
kus-pisligi
kuyrugu
kuyrugun-sonu
kuyruk
kuyruk-olustu
lazim-olur
lezbiyen
lgbt
lojman
luppe-altin
lutfen
makbuz
maketten
maskara
mavi-yumurta
memlekete-donmek
merakla-bekle
metre-uzunlugunda
metro-kazisi
metropolis
metruk
mezar
mezbaha
moldovali-gelin
mucize
muvekkil
nafaka
new-york-borsasi
nudist
otel
ozcekim
oz-cekim
ozel-motif
pastane
patenci
patenli
patpat
porno
protokol-tribun
refakatci
reklam
rengarenk
renkli-sayfa
renk-renk
romantik
ruya
sadik-musteri
sanal-ortam
sanal-tavuk
saniye
santimetre
santiye
sarj
sehir-efsanesi
sehir-hayati
sehrin-stresi
seks
selfie
sex
seyyar-satici
siber
siber-saldiri
sifresini
sifresiz
siir
simula
sit-alani
sms
sondaj
statlardan-sonra
striptiz
su-altinda
su-aritma
su-borusu
su-deposu
sulak-alan
sulama
sulama-kanal
sulama-kanali
sunroof
supermarket

surat-teknesi
surpriz-kesif
sus-havuz
susuzluk
sut-parasi
suya-kavus
su-yalitim
suyun-alti
sweatshirt
swinger
taksi-duragi
tamirhane
tarlada-calismak
tdk
tek-teker
temel-kazisi
terasta
titan
tonton
trafo
traktor
trambus
tramvay
travesti
turkuaz
tuvalet
tv-kulesi
ucak-bileti
urun-bandi
ustun-zekali
uyku-modu
vagon
vakit-gecirmek
veresiye
villa
vpn
wc
wifi
yamac
yanlis-yikama
yatay-kovan
yemek-yap
yemin-toreni
yem-karma
yillik
yuksek-gerilim-hatti
yukselisle-basladi
yuz-tutmus
zindan
zombi

religious

abdest
alevi
allah
azrail
basortu
bas-ortulu
budist
cami
cennet-cehennem
cubbe
cubbeli
din-adam
din-kadin
-dua
duasini-yaparken
ezan
fazilet
fitre
hac
haram
helal
hirka-i-serif
hristiyan
hutbe
icazet
iftar
ilahiyat
imam
islamiyet
islamofobi
kabe
kerbela
kuran-kursu
mezhep
minare
muezzin
muska
musluman
namaz

namaz-vakitleri
patrik
sadaka
selamun
-serif-
seyh
seytan
tapina
tekke
teravih
tesettur
tespih
tevrat
turban
turbe
umre
vahiy
yahudi
yehova
zekat

science

bilimadam
bilim-adam
bilim-dunyasi
bilim-insan
cern
einstein
felsefe
halil-inalcik
hawking
ilber-ortayli
isik-yili
karatay
kuantum
manyetik
muhendislik
muthis-bulus
nobel
ortayli
rasathane
sosyolog
tubitak
yapay-zeka
yasar-nuri-ozturk

services

112

acente
adil-kullanim-kotasi
aile-hekim
aile-nufus-kayit
akbil
alo-evlat
alt-ust-soy
arac-muayene
arac-sahipleri-dikkat
arac-sahiplerine
arac-sicil
arac-sorgulama
arac-tescil
arasi-direkt
askerlik-yer
avcilik-belgesi
bakici-ilanı
bedelli-askerlik
bilinmeyen-numara
bimer
bordro
btk
business-class
carsi-izni
cop-taksi
e-devlet
egm
elektronik-kayit
emekli-maasi-hesaplama
eski-nufus-cuzdan
evlerde-kullan
gbt
gss
hgs
il-ici-ve-iller-arasi
is-guvenligi
ispark
istanbulkart
istenmeyen-mesaj
itaksi
itfaiye
kac-arac

kadrolu-esek
kamulastirma-bedeli
karekod
kare-kod
kasko
katiplik
kimlik-fotokopi
kimlik-kart
kuru-temizleme
marmaray
masaj
metrobus
metro-sefer
mhrs
miras-kalan
miras-sorgulama
nasil-olacak
nasil-oldu
nasil-pisirilir
nasil-vurulur
nasil-yandigini
nasil-yapilir
nedir
ne-kadar
neler-var
ne-olur
ne-pisirsem
nerede-oy
ne-zaman
ogs
ova-koruma
pafta
parsel
pedikur
pomem
rayli-sistem
saat-kacta
sabika-kaydi
sehir-hatlari
seyahat-guvence
sgk
sicil-belgesi
sorgulamasi
soyagaci
soy-agaci
ssk
staj
tarifesi
temassiz
yemek-kart
yeni-kimli
yeni-kimlik
-yenileme-
zorunlu-trafik

special day/period

10-kasim
14-subat
15-tatil
19-mayis
1-mayis
23-nisan
29-ekim
30-agustos
3-aylar
adli-tatil
anneler-gunu
arac-kuyrugu
arefe-gunu
arife-gunu
ask-mesaji
-asure-
av-sezonu
av-yasagi
babalar-gunu
balayi
bayramda
bayram-donus
bayrami
bayram-kaza
bayram-mesajlari
bayram-oncesi
bayram-tatili
bazi-yollar
bekarliga-veda
beyaz-geceler
bu-yollar
cadilar
cemre
cevre-gunu
Cuma-gunu
cuma-mesajlari

dogum
dolunay
donus-cilesi
donus-yolculugu
donus-yolu
dunya-gunu
ekinoks
en-anlamli
en-guzel-anlamli
en-mutlu-gun
hangi-tarih
hicri-yilbasi
kac-gun
kadinlar-gunu
kadir-gecesi
kandili
kandil-mesajlari
karne-tatili
kina-gecesi
kis-gundonumu
kis-saat
kis-turizm
kis-uykusu
kurban-bayrami
kurban-fiyatlari
kurban-kes
kurban-kesim
kurbanlik
kurban-Pazar
kurban-satis
mevlid
nevruz
nevruz
noel
ogretmenler-gunu
onuruna
ortacag
oruc
ramazan
ramazan-ayi
ramazan-bayrami
referandum-gundem
resmi-tatil
saatler-geri
saatler-ileri
sahur
secim-takvimi
secmen-liste
secmen-sorg
sevgililer-gunu
somestir
somestr
super-ay
tatil
tatil-basladi
uc-aylar
ucretsiz-tatil
yariyil-tatil
yaz-saat
yaz-tatili
yeni-yil
yilbasi
yilbasi-mesajlari
yildonumu
yil-donumu
yili-kutlaniyor
yili-ni-kutluyor

sports

akrobat
avlanma
balik-yakaladi
basaksehir
basket
beyzbol
boks
boksor
box
budo
bursaspor
canor-macgregor
chapecoense
dagcilar
dag-gezisi
dag-yuruyusu
doping
drift
dunya-kupasi
efsane-yuzucu
en-yasli-dagci
euro-2016

fenerbahce
floyd-maywheather
formula
futbol
galatasaray
go-kart
gokhan-gonul
golf
guresci
hali-saha
hipodrom
kaleci
karsi-takim
kaya-tirmanicisi
kaya-tirmanisi
kenan-sofuoglu
kick-boks
lebron-james
macgregor
maracana
maywheather
micheal-phelps
milli-okcu
milli-sporcu
muhammed-ali
naim-suleymanoglu
nasuh-mahruki
ninja
olimpiyat
plates
rafting
reiki
ridvan-dilmen
rovesata
sampiyon
samuray
satranc
semih-sayginer
snowboard
sporcu
spor-salonu
super-bowl
tanju-colak
voleybol
yaris-araba
yoga
yuzme-dersi
yuzmek-icin
yuzucu

tech/art/job/device

3d-yazici
ac-dc
ahsap-usta
ahsap-yuzuk
akilli-ev
akilli-saat
akilli-telefon
akulu-araba
aritma-kuyusu
aritma-tesis
atanamayan
atm
avukatin-unuttugu
bakkal
balikci
balikci-tekne
balik-kanca
bankamatik
barmen
basarili-kadin-ornek-oldu
battaniye
bebek-arabasi
besici
bestekar
beyaz-yakali
bicerdover
bijon
bileyici
bulasikci
camasir-makine
camasir-sepeti
canak-anten
cayci
caydanlik
cekme-halati
cekyat
ceo
cicekci

coban
cobanlar
cobanlik
cocuk-bakmak
cocuk-gelisim
cop-atan
cop-ayristirma
copcatan
cop-kova
corapci
davulcu
dede-mesle
doodle
drone
exclusive
fotografci
galeri
garson
gecim-kayna
genc-ciftci
genc-dahi
gitarist
gprs
gundelikci
hamallik
hazine-avci
heykeltiras
heykeltras
hobi
hostes
hurda-parca
insansi-robot
kabin-memuru
kantinci
kasap
kasiyer
kaybolmaya-yuz-tutan
kesifci
koleksiyoner
komedyen
kuafor
kusaktir
kuyumcu
lastikci
mahkeme-baskani
marangoz
mobilyaci
mobilya-yapim
mona-lisa
mucid
mucit
paha-bicilmez
pazaryeri-boncuğu
postaci
ressam
sanat
semercilik
sergi-ac
spiker
taksici
taksi-sofor
tornaci
usta-eller
ustasi
zabita

tourism

aborjin
anitkabir
ataturk-kultur-merkezi
ayasofya
ayder-yaylasi
belgrad-ormani
bogaz-manzara
camlica-kule
deniz-keyfi
doga-rehberi
dogayla-ic-ice
dunya-turu
efeler-diyari
efsaneler-adasi
esek-adasi
everest
eyfel-kulesi
fethiye
gezip-toz
golet
-golu-
gondol
gun-bati
guneslen
halikarnas

hamam
himalaya
kapadokya
kaplica
kartepe
kartpostal
kayak-keyfi
kayak-merkezi
keops
kibele
koy-hayati
kus-cenneti
magarasi
manastir
mavi-tur
milli-park
mostar
mumya
muze
muzesi
obruk
palandoken
pansiyon
pearl-harbor
piknik
piknikci
piknik-yolu
plaj
porsuk-cayi
sahiller-doldu
sahil-yolu
sahra-col
sarnic
selale
sezlong
sosyal-tesis
sumela
tas-ev
tatil-cennet
tatilciler
tatil-icin
tatil-koyu
tatil-merkezi
tatil-rezervasyon
tatil-yapan
tatil-yogunlugu
tekne-turu
tendurek
tropik
truva
turizmci
uludag
yayla-ev
yaz-kampi
yaz-turizm
yedigoller
yoresel
ziyaretci-akini

trademark
airbus
amazon
anadolujet
android
apple
aras-kargo
aselsan
audi
avea
bayer
bimeks
bmw
boeing
booking
borajet
borusan
boyner
burberry
burger-king
carrefour
chrysler
coca-cola
concorde
defacto
de-facto
derin-tarih
die-welt
digiturk
duster
facebook
fiat
ford

galaxy
garanti-bankasi
gazprom
general-motors
google
greenpeace
guinness
hepsiburada
honda
hummel
ikea
instagram
ios
iphone
kizilay
koza-altin
kraft
marks-and-spencer
marmarabirlik
mavi-jeans
mazda
mcdonald
media-markt
mercedes
metro-turizm
migros
milliyet-com-tr
n11
neo
nestle
netflix
nokia
onur-air
opel
pegasus
periscope
peugeot
photoshop
polisan
polnet
popeye
porsche
prada
ptt
qatar-airways
rolce-royce
rolls-royce
samsung
seker-pilic
siemens
sisecam
sivas-bicagi
snapchat
spacex
starbucks
teknosa
tesla
thy
time-dergi
tjk
toshiba
toyota
tripadvisor
trivago
tupras
turkcell
turkish-cargo
turk-telekom
tweet
twitter
unesco
unicef
unilever
usak-halisi
verizon
vodafone
volkswagen
volvo
vosvos
vw
walmart
walt
whatsapp
who
yahoo
yandex
yapi-kredi
youtube
zomato

tvrelated/entertainment/music/game/show/lottery

3-adam
adi-efsane
aile-arasinda
aktris
arka-sokaklar
ask-laftan-anlamaz
asla-vazgecmem
atv
at-yaris
baba-candir
babamin-gunahlari
babam-ve-ailesi
bahis
bahisci
bahsis
bana-sevmeyi-anlat
banker-bilo
behza-c
ben-bilmem-esim-bilir
beni-affet
best-model
beyaz-show
bir-cihan-fatihi
bir-fikrin-mi-var
bir-garip-ask
bodrum-masali
bollywood
-bolum
bolumunde
bum-bum
bu-sehir-arkandan-gelecek
buyuk-ikramiye
canli-yayin
carkifelek
cekilis
cember-aci-intikam
cember-aleyna-nin-son-gunu
cember-evimdeki-yabancilar
cember-oyunu-bozuyorum
cesur-ve-guzel
chanel
-ci-
circque
cirque-du-soleil
cizgi-roman
cocuklar-duymasin
dance-of-the-hillary
dans
-de-yarin-gundem
dirilis-ertugrul
disko
-dizi-
dizisi
dj
donme-dolap
dublor
dugun
eglence-mekan
eglencesi
eglence-sinirlari
ekip-sahane
en-cok-izlenen
en-cok-kazandiracak
endemol-shine
en-guzel
erik-dali
fashion
fazilet-hanim
fenomen
festival
-fi-
film
final-bolumu
fox
fragman
gala-gece
game-of-thrones
games-of-thrones
gazino
gece-kulubu
goz6
guldur-guldur
gulduy-gulduy
gulumse-yeter
-guzeli
haberturk
halk-ozan
hangimiz-sevmedik
hanim-koylu
hayat-bazen-tatlidir
hayatimin-aski
hayat-sirlari
heidi

hip-hop
hollywood
icerde-
iceride
icimdeki-firtina
ilk-bolum
isimsizler
istanbullu-gelin
iste-benim-stilim
izdivac
izlenme-rekoru
jet-sosyete
kadin-dizisi
kalbimdeki-deniz
kanal-d
kanatsiz-kuslar
kanit-ates-ustunde
kara-sevda
kazi-kazan
kedicik
kim-milyoner-olmak-ister
kiralik-ask
kirgin-cicekler
kismetse-olur
klarnet
klasik-araba
klasik-arac
klasik-otomobil
klavye-delikanlilari
konser
kurtlar-vadisi
loto
lunapark
maskeli-5-ler
maskot
mehter
miss-turkey
miss-world
muhtesem-yuyil
muhtesem-yuzyil
muzik
muzisyen
narcos
nerdesin-birader
no-309
nolur-ayrilalim
n-olur-ayrilalim
odul
o-hayat-benim
okey
on-gosterim
on-numara
oscar
o-ses-turkiye
oyuncu
palyaco
paramparca
pavyon
payitaht
-pi-
piyango
pokemon
popstar
popstar
poyraz-karayel
radiohead
radyo
recep-ivedik
red-kit
reyting-sonuc
rihanna
rio-karnaval
rising-star
rock-n-roll
rus-model
sahane-damat
saklambac
san-egitimi
sans-dil
sans-oyun
sans-topu
sarki
sen-anlat-karadeniz
sevda-kusun-kanadinda
seven-ne-yapmaz
seviyor-sevmiyor
sezon-finali
show-tv
simpson
sinema
siyah-beyaz-ask
siyah-beyaz-ask
sky

snow
solist
son-bolum
sosyal-medya
sosyetik-ev-kadinlari
stand-up
star
star-trek
stil-avcilari
super-kahraman
survivor
tanburi-ali-efendi
tarzan
tatli-intikam
televizyon-yildiz
tiyatro
tombala
trt
trtworld
turku
turkucu
-tv-
tv8
tv-yildiz
ufak-tefek-cinayetler
umuda-kelepce-vurulmaz
var-misiniz-yok-musunuz
vatanim-sensin
ver-elini-ask
video
video-oyunu
walking-dead
westworld
yarisma
yayin-akisi
yeni-bolum
yetenek-sizsiniz
yildizlarin-altinda
yuvamdaki-dusman

wheather

afrika-sicak
agustos-sicagi
akom
alabora
ana-yollar
aniden-bastir
araclari-surukledi
ara-yollar
asiri-sicak
asiri-soguk
asiri-yagis
baharin-mujde
beklenen-kar
beklenen-yagmur
beyaza-buru
beyaza-burundu
bu-gece-ve-yarin
bunaltan-nem
bunaltici-nem
bunaltici-sicak
buz-gibi
buz-kesti
buzlanan
buzlanma
buzlu-su
buz-parcasi
buz-pist
buz-tut
buz-tuttu
cehennem-sicagi
cig-alarmi
cig-alti
cig-dus
cig-dusmesi
cig-engeli
col-sicagi
col-sicak
da-kar
-da-yarin-gundem
de-kar
dereler-tasti
dere-tasti
dere-yatagi
dolunun-verdigi
dolu-vuran
dolu-vurdu
dolu-yagisi
donarak
donarak-ol
dondurucu

dondurucu-soguk
donmak-uzere
egitime-bir-gun-ara
egitime-kar
eksi-en-yuksek-sicaklik
eriyen-asfalt
feribot-sefer
firtina
gizli-buz
gokkusagi
gorus-mesafesi
hafta-sonu-yanacak
hava-durumu
hava-kir
havalar-isindi
havalar-sogu
hava-nasil
hava-sicakligi
hava-sicakliklari
havasiz
hava-soguyor
hissedilen-sicaklik
ibb
ido
iett
iklim-degisikligi
iklimlendirme
ilk-defa-kar
ilk-kar
istanbullular-dikkat
kar-alarmi
kar-altinda
kara-teslim
kar-bekleniyor
kar-bekleyen
kar-engeli
kar-eriyince
kar-esareti
kar-etki
kar-firtinasi
kar-geliyor
kar-geri
kar-hapsi
karin-erimesi
kar-kalin
kar-kapi
kar-kureme
kar-kutlesi
karla-kapli
karla-mucadele
karli-yol
kar-mahsur
kar-manzarasi
kar-maskesi
kar-nedeniyle
kar-surpriz
kar-tatili
kar-ulasimi
kar-uyarisi
kar-var
kar-ve-tipi
kar-ve-yagmur
kar-yagacak
kar-yagdi
kar-yagisi
kar-yagmur
kar-yerini
kar-yogun
kasirgasi
-kasirgasi-
kavurucu
kavurucu-sicak
kirli-hava
kis-gunesi
kis-lastigi
kis-manzara
kis-ortasi
koyu-yuttu
koy-yolu
kutup-soguk
kuvvetli-ruzgar
kuvvetli-yagis
lapa-lapa
lodos
mart-kari
meteoroloji
metoroloji
nemden-bunalan

nem-yuzde
nisan-kari
okullar-tatil
okullar-yarin
poyraz
rekor-sicagi
saganak
saganak-yagis
sagnak
seferleri-durdu
-sel-
sel-aldi
sele-kapilan
sel-felaketi
sellerde
sel-sulari
sel-uyarisi
sel-vur
serin-hava
serinlemek
serinlemek-icin
sibirya-sogugu
sibirya-soguk
sicak-gun
sicak-hava
sicaklik-artiyor
sicakliklar
sicaklik-rekor
sicakta
sicaktan-bunal
sicaktan-kacan
sicaktan-kavrul
sicak-uyarisi
siddetli-ruzgar
siddetli-soguk
siddetli-yagis
siddetli-yagmur
sifirin-alti
sis-etkili
soguk-hava
sogukta
soguktan-donan
su-baskin
su-baskini
sular-altinda
sular-cekil
sularin-yuksekligi
suruculer-dikkat
su-seviyesi
su-solu-cukur
tasan-dere
tatil-etti
tatil-oldu
-ta-yarin-gundem
termometre
-te-yarin-gundem
toz-bulutu
tsunami
vapur-sefer
-yagis-
yagis-nedeni
yagmur-alarmi
yagmur-bekleniyor
yagmur-duasi
yagmur-geliyor
yagmurluk
yagmur-nedeniyle
yagmur-sel
yagmur-uyarisi
yagmur-yaginca
yalanci-bahar
yarin-okullar
yazdan-kalma
yazin-sicagi
yilin-en-sicak
yogun-kar
yogun-sis
yogun-tipi
yollar-kapandi
yuksek-kesim
yuksek-nem

work
epilasyon
escort
eskort
ev-hanim
fahise

hayat-kadin
jigolo
kirtasiye
konsomatris
li-kadin
li-kadinlar
lu-kadin
metres
playboy
spotcu
terzi
vale
zuccaciye

Chapter 2: An Evaluation of Interest Rate Volatility as a Monetary Policy Tool in Turkey

1. Introduction

After the 2008-2009 global financial crisis, advanced economies implemented loose monetary policies. Central banks in advanced economies lowered policy rates to unprecedented levels; additionally, they started large-scale asset purchase programs to stimulate growth in their economies. However, the recovery was not quick. The prolonged recovery, coupled with extremely loose monetary conditions, led to a great amount of capital flows, especially in the form of portfolios, to emerging economies.

Financial integration of developing countries has increased over the years. Financial integration comes with higher risk-sharing, efficient allocation of capital and wider technology transfer. Financial integration of emerging and developing countries provided more portfolio investment opportunities for the residents of the advanced countries (see Dell'Ariccia et al. 2008).

Even though financial integration of emerging countries brings several benefits, capital inflows should be carefully examined. As capital flows may cause overheating in the economy, appreciation of the local currency, credit booms and asset bubbles (see Ostry et al. 2011), appropriate policy designs should be implemented. In order to cope with the potential problems stemming from capital flows, both advanced and emerging countries took precautionary steps.

Ostry et al. (2011) classify the conventional tools available to policymakers as prudential regulations and capital controls. Prudential regulations can be divided into foreign exchange (FX)-related and other measures. FX -related measures depend on the currency rather than the residency of parties. Such measures are mainly imposed on financial institutions, particularly banks. Commonly, there are limits on banks' open FX positions (as a ratio of their capital), investment in FX assets and restrictions on FX lending. Other prudential measures are

generally aimed at lowering systemic risk by restricting lending growth. These measures include maximum loan-to-value ratio, domestic credit growth limits, asset classifications and provisional rules, sectorial limits on loan concentration, dynamic loan-loss provisions, and counter-cyclical capital requirements. On the other hand, capital controls prevent residents and non-residents from making capital transactions. Taxes on flows from non-residents, unremunerated reserve requirements on capital flows, and limits or bans on such flows are examples of capital controls. Aysan, Fendoğlu, and Kılınç (2014b) state even though restrictions can mitigate risks resulting from capital flows theoretically, these measures do not work in practice as market participants bypass the control if controls are set on only one part of transactions. They emphasize the need for more general macroprudential policies to be effective.

In addition to conventional measures, the global financial crisis augmented existing tools. For instance, central banks in advanced economies, such as the Swiss National Bank and Denmark's National Bank, implemented negative interest rate policies to prevent capital flow (Arteta et al. 2016).

Turkey experienced some of the aforementioned problems after the crisis. As Kara (2012) states, starting from mid-2009, Turkey experienced fast-paced growth owing to domestic demand whereas its trading partners did not. In fact, domestic and external demand conditions decoupled. Specifically, capital flows due to the second round of quantitative easing policies implemented in advanced countries intensified the decoupling tendency. Capital inflows led to over-appreciation of the Turkish Lira and propelled domestic credit usage. As a result, foreign trade and current account balances worsened. Increasing current account deficits and deterioration in the quality of capital inflows made the Turkish economy vulnerable to swings in global risk appetite. As evidenced by the previous crises episodes, sharp declines in economic activity are synchronized with sudden stops of capital flow. This observation

emphasizes the necessity of building resilience to abrupt changes in global risk appetite as well as the need for a flexible monetary policy approach.

The Central Bank of the Republic of Turkey (CBRT) aimed at reducing the undesired consequences of capital inflows and outflows through liquidity management. To this end, the CBRT introduced a new policy framework of an asymmetric interest rate corridor (IRC). Under this framework, the CBRT effectively used two interest rates, overnight borrowing and lending rates, in addition to its policy rate and weekly repo rate. If capital inflows surged, the CBRT reduced the overnight borrowing rate so as to defer the capital. On the other hand, during larger outflows, the CBRT increased the overnight lending rate. However, the magnitude of the change was not symmetric around the repo rate. Kara (2012) emphasizes that under the asymmetric interest rate corridor, the CBRT could use the uncertainty in the average funding rate as a policy tool. This is because the corridor allowed the effective policy rate to be set somewhere within the corridor on a given day, without giving any prior information to market participants about where the rate would be set. This uncertainty not only allowed the CBRT to take quick decisions in response to rapid changes in risk appetite but also discouraged capital inflows when risk appetite was high.

In this study, I investigate whether the new policy framework, IRC, served the purpose of steering foreign capital. I investigate whether the volatility of the short term interest rate has any impact on the capital flow and when it becomes important.

This chapter is structured as follows. Section 2 reviews the literature. Section 3 explains the interest rate corridor framework. Section 4 outlines the data and methodology employed. Section 5 provides results obtained in the empirical analysis and Section 6 concludes.

2. Literature Review

Ferreira and Laux (2009) show that countries benefit from financial openness and capital flow is predictive for GDP growth. Less developed countries benefit more from such flows. Erduman and Kaya (2016) investigate how the determinants of bond flows evolved after the crisis. They show that the interest rate differential is the most important pull factor, together with the inflation rate. Global liquidity is the most important push factor. Global risk appetite and risk perceptions have small and stable effects. Fratzscher (2012) states that during the crisis, common global factors ("push" factors) were primarily responsible for capital flow, whereas during 2009-2010 country-specific conditions ("pull" factors) were dominant in global capital flows. Jinjarak, Noy, and Zheng (2013) study changes in capital control regime in Brazil in 2008-2011. They found no evidence that tightening the controls was effective in reducing the magnitude of capital inflows.

a. Interest Rate Corridor

In a traditional "symmetric" interest rate corridor, the central bank can provide short term liquidity to banks that lack liquidity or borrow from ones that have an excess of liquidity. The range between the overnight lending and borrowing rates forms the interest rate corridor. The CBRT also holds a quantity auction of weekly repo to inject funds into banks.

The overnight market interest rate is as important as these interest rates. The CBRT can affect the overnight market interest rates by making daily adjustments in the quantity of weekly repo auctions. Therefore, the short-term market interest rates are set within the interest rate corridor. Under this framework, the width of the interest rate corridor determines the range that the short-term market interest rates can attain (Kara 2012).

Even though this mechanism was present in the traditional interest rate corridor system, the new framework has two unique dimensions:

1. In the traditional framework, the difference between the short-term average funding rate and the market interest did not matter. In the new framework, these interest rates can diverge. This divergence enables the CBRT to affect credit and exchange rate channels separately; and
2. In the previous system, the Monetary Policy Committee (MPC) revised the short term average funding rate in monthly meetings. The new system allows the MPC to rapidly adjust the average funding rate on a daily frequency in response to changing global risk appetite (see Kara 2012).

Binici, Kara, and Özlü (2016) explain how the CBRT sets the average funding rate in the interest rate corridor system. Generally, policy rates represent monetary policy stances of central banks. However, under the asymmetric interest rate corridor system, it is not straightforward to figure out the monetary stance of the CBRT as it used multiple interest rates as monetary policy tools.

Figure 9 depicts a simple interbank rate setting process (Binici, Kara, and Özlü 2016). The supply and demand curves represent the required short-term supply and demand in the system. The financial institutions needed liquidity and the CBRT was a net supplier for banks' demand for funds.

The vertical axis shows the official rates of the CBRT. The MPC revises these rates at monthly intervals. The CBRT lends funds through overnight and weekly lending auctions. The CBRT is permitted to decide on the amount of liquidity to provide through these channels. The overnight borrowing rate represents the interest that the CBRT pays on deposits.

The supply of funds curve shows the quantity of funds that the CBRT provides at each interest rate level. The CBRT financed banks mainly through the overnight lending rate and

weekly repo rate for a long period within the new framework. The weekly repo rate is lower than the overnight lending rate and the MPC determines how much liquidity to provide at this rate. The remaining demand of the banks is supplied through the overnight lending rate. Therefore, the supply curve has a stepwise shape.

The demand curve is downward sloping and it depicts how much funds banks are willing to borrow at different interest rate levels. The banks demand more funds as they become cheaper. If the borrowing rate falls below the central bank's borrowing rate, there would be indefinite demand. Therefore, the demand curve flattens at the central bank's borrowing rate and the borrowing rate sets the lower boundary.

The equilibrium interest rate and quantity of funds occurs at the point where the supply of funds and demand for funds curves intersect. The CBRT can relocate the equilibrium point either by changing the interest rates or the amount of liquidity. The CBRT can implement a tight monetary policy stance by shifting the supply curve up or to the left. On the other hand, an easy monetary policy stance can be achieved by decreasing the policy rates or shifting the supply curve to the right.

The shaded area in Figure 9 shows the composition of funding. It represents how much the central bank provided through overnight and weekly lending rates as well as the average funding rate. The average funding rate is the ratio of the shaded area to total funding. Basically, it is the weighted average interest rate of funds that the CBRT supplied to the system.

Figure 10 depicts how the interest rate corridor evolved in the following period. The gray area shows the upper and lower limits of the interest rate corridor. The overnight lending rate and overnight borrowing rates limit the upper and lower bands of the interest rate corridor,

respectively. The market interest rates are formed within this range. The red line draws the weekly repo rate and the blue line shows the average funding rate.

The CBRT may change the bands of the interest rate corridor depending on capital flows. If capital inflow surges, the CBRT reduces the lower band so as to defer capital inflow. In the case of capital outflow surges, the CBRT increases the upper band (see Alper, Kara, and Yörükoğlu 2013).

The CBRT stated (see CBRT 2015) that the bands of the asymmetric interest rate corridor were to be narrowed as a simplification strategy against persistent volatility decline after the global normalization process in the monetary policy framework in mid-2016. The stated goal was a return to the symmetric corridor. Moreover, they cut the upper band of the corridor in subsequent monetary policy meetings. However, at the beginning of 2017, they abandoned the simplification process and increased the overnight lending rate. Also, the operational framework was slightly modified. From then on, the CBRT additionally employed the late liquidity window as a necessary liquidity management tool in the event of unhealthy pricing behavior in the foreign exchange market that could not be justified by economic fundamentals (see CBRT 2017). The late liquidity window lending rate was higher than the overnight lending rate. Therefore, the average funding rate lay above the interest rate corridor in 2017.[14]

There are some papers within the literature which study the effects of the interest rate corridor. Küçük et al. (2014), for example, state that the spread between the Borsa Istanbul overnight repo interest rate and the CBRT average funding rate was wider and more volatile. Aysan, Fendoğlu, and Kılınç (2014a) show that after the implementation of the interest rate

[14] Binici, Kara, and Özlü (2016) state that the CBRT funded primary dealers at a rate between the overnight lending and weekly repo rates. Even though the inclusion of this rate changes the shape of the supply curve, it does not alter the main monetary transmission mechanism. Therefore, they omitted the funding rate for the primary dealers. Since the beginning of 2017, the CBRT has employed additional liquidity tightness measures and used the late liquidity window lending rate for funding. Due to similar reasoning, I omitted the late liquidity window lending rate.

corridor, Turkey became less sensitive to global factors. Aysan, Fendoğlu, and Kılınç (2014b) demonstrate that the interest rate corridor helped smooth fluctuations in the supply of foreign funds and reserve option mechanisms, which enable banks to hold some fraction of their required reserves in gold or FX terms, helping to contain movements in the demand for foreign funds. Binici, Kara, and Özlü (2016) further show that effective rates were more relevant than official rates for monetary policy transmission. Overall, the overnight interbank rates played a key role in the pricing of loans and deposits.

3. Data and Methodology

This section introduces the model and data used in the analysis. In this study, I aim to measure the effects of the level and volatility of the average funding rate on capital flows to Turkey after controlling for other possible determinants.

As capital flow measures, previous studies (see Erduman and Kaya 2016; Fratzscher 2012; and Jinjarak, Noy, and Zheng 2013) employed Emerging Portfolio Fund Research data, which is not publicly available. Other researchers (see Ferreira and Laux 2009; and Kiendrebeogo 2016) utilized data from the US Department of Treasury. The shortcoming of this dataset is that it is limited only to the US, ignoring flows from other economies. I could alternatively use monthly portfolio flows in the balance of payments statistics. However, it would be beneficial to use high frequency data to identify the causal relation between the asymmetric interest rate corridor variables and capital flows. To this end, I employed the Weekly Securities Statistics, which is released by the CBRT, as a capital flow measure.

In the empirical analysis, different specifications of the model

$$PF_t = C + \beta_1 PF_{t-1} + \beta_{VIX} VIX_t + \beta_{US\ Slope} US\ Slope_t + \beta_{IP} IP_t + \beta_{CPI} Inflation\ Rate_t +$$
$$\beta_{TL/USD} Exchange\ Rate_t + \beta_{EMBI\ TR} EMBI_t + \beta_{TR\ Slope} TR\ Slope_t +$$
$$\beta_{Ave.Fund.Rate} Average\ Funding\ Rate_t + \beta_{Std.Fund.Rate} Std.Fund.Rate_t + \varepsilon_t \quad (3)$$

are estimated in a regression framework.

Here, PF_t denotes the portfolio flows to Turkey during week t. It measures the weekly net investment position of non-residents in government and corporate bonds as well as stock shares in Turkish markets (in million $). Non-residents include banks abroad, foreign branches of domestic banks, other financial institutions (such as portfolio management companies, insurance companies and leasing companies), private sector companies and real persons. Figure 11 shows the historical path of the portfolio flows. Positive values indicate how much non-residents purchased, whereas negative values indicate how much they sold of Turkish assets. As Figure 11 depicts, non-residents predominantly hold government bonds (red line) then stocks (blue line). Corporate bonds (green line) are a new security type and have been traded since 2015. Corporate bonds are the least traded security type.

It is clear in Figure 11 that portfolio flows are very volatile and there are sudden reversals. The portfolio flows to Turkey was high before mid-2013. After this period, both global and domestic developments reduced the amount of flows to Turkey.

Determinants of capital flows to a country are mainly categorized in two groups: push factors and pull factors (Calvo, Leiderman, and Reinhart 1993). Push factors are common global conditions whereas pull factors are country-specific factors.

As push factors, I included two measures. First, I used the VIX index as a risk assessment of investors. VIX is a forward looking variable that measures 30-day implied volatility in S&P 500 index options. Higher values of VIX hints at increasing risk perceptions in the future.

Investors are more likely sell off risky assets if they perceive a higher risk in the future. Therefore, I expect the coefficient of the VIX to be negative, ($\beta_{VIX} < 0$).

As a second push factor, I used slope of the US yield curve, which is the difference between ten-year and three-month government bond rates, to control for the effects of overseas monetary policy.[15] If the US monetary policy tightens, the spread increases. The US assets are valued more highly if the US monetary policy tightens. Investors' opportunity costs when they hold Turkish Lira-dominated assets increase. Hence, they would sell Turkish Lira-dominated assets. This variable would have a negative impact, ($\beta_{US\ SLOPE} < 0$).

I employed macroeconomic, financial and risk indicators of Turkey as well as monetary policy measures of CBRT as pull factors. Industrial production (IP) and consumer price indices (CPI) are included as macroeconomic indicators.[16, 17]

Fluctuations in the IP can be associated with gross domestic product (GDP) cycles. I preferred IP figures to GDP indicators as GDP data is published infrequently and with considerable delay. The IP series is volatile, and there are sudden reversals in the level stemming from formal holidays and seasonal effects (see Figure 12). I opted for working day and seasonally-adjusted series of IP in order to eliminate possible misleading signals. A higher industrial production level possibly hints at higher GDP growth prospects. If investors perceive better growth prospects, they can invest in Turkey either for the long-term or short-term. Therefore, IP figures can have a positive impact on capital flows, ($\beta_{IP} > 0$).

[15] Additionally, I included asset holdings of the Federal Reserve (Fed) and the European Central Bank (ECB). However, these central banks publish their balance sheets at different frequencies. The Fed publishes its balance sheet weekly whereas the ECB publishes monthly. Hence, I have excluded these series.
I also employed the slope of the German yield curve as a measure of monetary policy conditions in the Euro area. The German and US yield curves are highly correlated, thus I omitted the former.

[16] Even though expectations of the CPI index were present, expectations of working day and seasonally-adjusted IP series were not available in Bloomberg for the whole period. Therefore, I used levels of these indices rather than surprise components.

[17] I used month-over-month percent changes in the IP and CPI series on the corresponding week.

A higher inflation rate may call for tighter monetary policy; interest rates would remain high until the monetary policy decisions show effects. Turkish financial markets attract investors during this period. Therefore, a higher inflation rate may attract more capital flow, ($\beta_{CPI} > 0$).

The Turkish Lira (TL)/US Dollar (USD) exchange rate is also included as foreign investors' return depends on this exchange rate. Depreciation of the TL against the USD diminishes investors' return on investment in USD terms. Therefore, if the TL weakens, due to either higher risk or other factors, investors will sell off TL dominated assets to stop their losses, ($\beta_{TL/USD} < 0$).

I used the Emerging Market Bond Index for Turkey (EMBI TR) as a risk measure of Turkey. This index increases if there are concerns about geopolitical, financial or economic conditions in Turkey. Investors would sell off TL dominated assets to reduce the risk to their portfolios, ($\beta_{EMBI\,TR} < 0$).

I included the slope of the Turkish yield curve. The slope of the yield curve reflects how financial market players assess the future monetary policy path. The yield curve steepens if the interest rates for longer horizons are expected to be higher than the short horizon interest rates. I use the difference between the ten-year government bond rate and the average funding rate.[18] If investors expect higher interest rates, they will channel their portfolios to Turkey, ($\beta_{TR\,SLOPE} > 0$).

The main objective of this paper is to examine the success of the interest rate corridor on channeling foreign capital flows to Turkey. As interest rate corridor measures, I included the weekly average of the average funding rate and the weekly standard deviation of the average funding rate.

[18] I could not construct the slope of the Turkish yield curve as the US yield curve since three-month government bond rates are not available for Turkey.

If CBRT anticipates that a negative shock will hit Turkey, the MPC will increase the funding cost of the TL in order to stop sudden capital outflow. In the event of a negative shock, the CBRT can decrease the average funding cost to attract more capital. More foreign capital would flow to or remain in Turkey if the TL becomes costlier, ($\beta_{Ave.Fund.Rate} > 0$).

However, the CBRT blurs the monetary policy environment by making frequent adjustments to the average funding rate. Kara (2012) emphasizes the importance of uncertainty in the average funding rate as a policy tool. The degree of uncertainty depends on the width of the corridor and perception of the short-term interest rate. Therefore, it is likely that if the average funding rate swings, investors cannot correctly form expectations about the future course of monetary policy in Turkey and will leave Turkish markets. I used the standard deviation of the average funding rate to quantify uncertainty in monetary policy and I expect ($\beta_{Std.Fund.Rate} < 0$).

C is constant and PF_{t-1} is the autoregressive component of order 1 of the dependent variable. ε_t represents the residual term at time t and is assumed follow a normal distribution with mean 0 and variance σ_t.

I used weekly averages of the financial series and average funding rate.

4. Results

This section presents the results obtained in the empirical analysis. Table 10 displays the estimated regression results of equation 3. The first column shows the variable names, the second column lists the expected signs of the variables whereas the third to sixth columns show the estimated coefficients.

Different specifications of equation 3 are estimated for the period January 10, 3011 to March 6, 2017. The estimates generally have the expected signs. The specification in column I

includes the average funding rate, column II includes the standard deviation of the average funding rate in addition to other control variables. Column III employs all variables and the column IV extends to risk-off periods.

The average of the funding rate has the expected sign and it has a statistically significant impact on capital flows. Its estimates are stable across specifications. It is evident that the CBRT can guide capital flow by adjusting the average funding rate. Keeping other variables constant, an increase of 1% in the average funding rate results in an extra weekly amount of a quarter of a million USD portfolio flows to Turkey (see column I, row 4).

The standard deviation of the funding rate is not significant (see column II, row 5). It implies that investors do not fear uncertainty regarding the monetary policy rate. This finding falls short of providing evidence for the usage of interest volatility as a monetary policy tool (see Alper, Kara, and Yörükoğlu 2013). Even though the estimate of this variable is insignificant, it does not imply the redundancy of the interest rate volatility. Impacts of other developments may mask the effect of the interest rate uncertainty.

The estimates of macroeconomic variables (IP and CPI) seem to be stable across models (see column I-II row 3 and column I-II row 2, respectively). However, they are not statistically significant. Nevertheless, this does not mean that those series have a negligible impact on capital flows.

It is evident that portfolio flows to Turkey are closely related to risk perceptions about Turkey. The estimates of the EMBI TR index show that each unit increase in this index is associated with a portfolio outflow amount of close to 40,000 USD. The impact is relatively small when compared to the effect of other variables. However, there are large, sudden spikes in this index which may result in greater total outflow.

The TL/USD exchange rate is an important determinant of capital flows. According to the results in column I, if the TL depreciates by one Lira against the USD, there will be loss of around 640,000 USD portfolio flows per week. To some extent, a slowdown in the portfolio flow can be attributed to gradual depreciation of the TL after mid-2013 (see Figure 13).

Monetary policy expectations both in Turkey and the US are significant. They have the expected signs. Their impacts are directly comparable and the portfolio flows are more sensitive to changes in the US yield curve slope. The impact of the US yield curve is about two times higher than the Turkish yield curve. An increase of one percentage point in both the Turkish and the US yield slopes result in an increase of 22,370 USD capital inflows (column I row 9) and 55,380 USD capital outflow (column I row 8), respectively.

Finally, risk appetite seems to matter for portfolio investors. Investors sell off TL dominated assets when global risk appetite decreases (VIX increases) and possibly revert to safe assets such as US Treasury bonds. If VIX increases by one point, on average, investors sell about 200.000 USD worth of Turkish assets.

a. Probing the Limits

As pointed in Kara (2012) and Alper, Kara, and Yörükoğlu (2013), short-term interest rate volatility can scare foreign short-term capital investors. The CBRT used volatility as a tool to turn off capital inflows during times when the risk appetite was high. However, they did not differentiate when the risk appetite was high or low. Different from Alper, Kara, and Yorukoglu (2013), I particularly focus on periods when the risk appetite is low. In this subsection, I investigate whether interest rate volatility matters for risk-averse investors.

Investors' risk assessment changes over time. The political or economic state, central bank decisions and firm news can alter how investors perceive risk. It is possible to categorize the ups and downs of risk perception as "risk-on" and "risk-off" periods depending on risk

appetite. Investors purchase risky assets, such as stocks, when risk appetite is high (risk-on periods) whereas they prefer safe assets, such as gold and US Treasury bonds, when they are risk-averse (risk-off periods).

If global risk perceptions deteriorate, foreign investors leave Turkish financial markets. As a result, the Turkish Lira depreciates. The CBRT may increase the average funding rate to avoid depreciation of the TL.

The VIX is a widely used measure of risk assessment. However, determining the risk-on and risk-off periods using the VIX is not straightforward. One solution can be to determine a threshold value that separates these periods. There are two drawbacks to such a static definition. First, it is not easy to find a common or objective threshold value. Second, even if there were such a critical point, it may not be sufficient to capture all high-risk periods. The gray bars in Figure 14 and Figure 15 depict the risk-off periods according to such a static definition. Figure 14 shows the risky periods when the VIX value is greater than 30, whereas Figure 15 in the bottom panel shows a critical value of VIX that exceeds 20. As is evident, there are fewer periods when a lower level is used. However, both definitions fail to find any risk-off periods during mid-2012 and mid-2014. In May 2013, for instance, the Fed mentioned tapering for the first time and financial markets swung.

Alternatively, I preferred a dynamic method to spot risk-off periods. I used the same methodology as De Bock and de Carvalho Filho (2013) in which risk-off periods were identified such that the VIX exceeded its three-month backward-looking moving average by 10%. Figure 16 depicts the VIX and risk-off periods.

I constructed a dummy variable for risk-off periods taking a value of 1 if the weekly average of VIX exceeded its 12-week backward looking moving average by 10% and interacted with the average funding rate and the standard deviation of the funding rate.

The last column of Table 10 presents the results of this risk-off period analysis. As the results in column IV indicate, the interest rate corridor provided sufficient room for the CBRT during risk-off periods. The average of the funding rate is still efficient during risky times; by increasing the average of the funding rate, the CBRT helped keep capital in the domestic market. However, increasing volatility in the funding rate scares foreign investors. During risky periods, the investors leave the Turkish financial markets and uncertainty in the monetary policy environment accelerates the selling-off process. A 1% increase in the standard deviation of the funding rate leads to 800.000 USD portfolio flows leaving the Turkish markets.

5. Conclusion

In this study, I investigated whether the interest rate corridor can be used for guiding foreign portfolio flows in a regression framework. I focused on the period between January 10, 2011 and March 6, 2017. In general, portfolio flows to Turkey depend on the average of the funding rate. However, uncertainty in the monetary policy conditions propels portfolio outflows during risk-off periods.

The results in this study suggest that the average of the funding rate, rather than the volatility, matters for non-residents. During global risk-off periods, on the other hand, the volatility of the average funding rate has an impact. The findings reveal that higher volatility can be associated with greater capital outflow in risk-off episodes. The impact of the volatility is about three times larger than the effect of the average funding rate if both increase by the same amount.

The finding for the low-risk appetite periods suggests that the recent simplification attempt of monetary policy by the CBRT is a helpful decision. As the Fed and the ECB switch to tighter monetary policy stances, global liquidity conditions will dry out and risk appetite will decline.

Therefore, by adopting a symmetric interest corridor, and hence reducing monetary policy uncertainty, the CBRT can help accelerate capital inflows. This study can be extended to long-term investments such as foreign direct investments.

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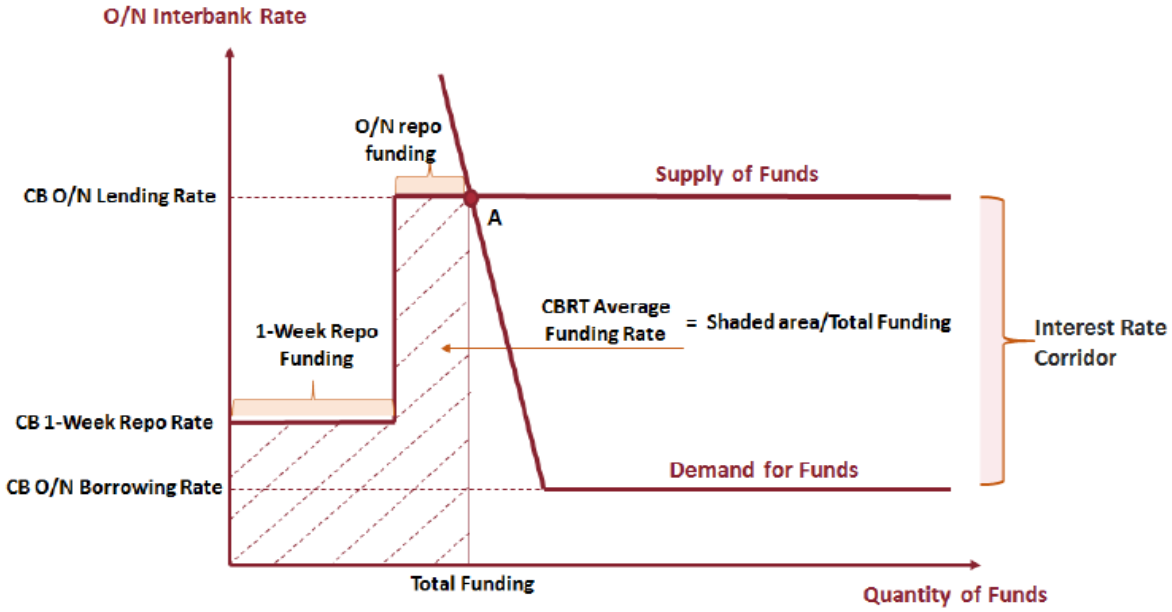
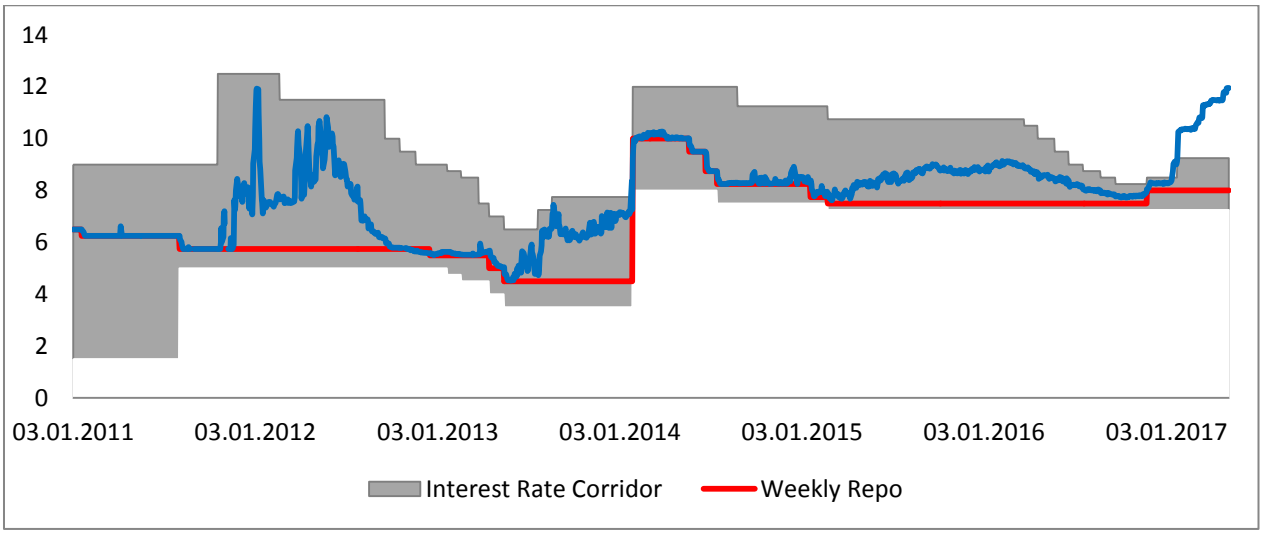
Figures

Figure 9: Average Funding Rate



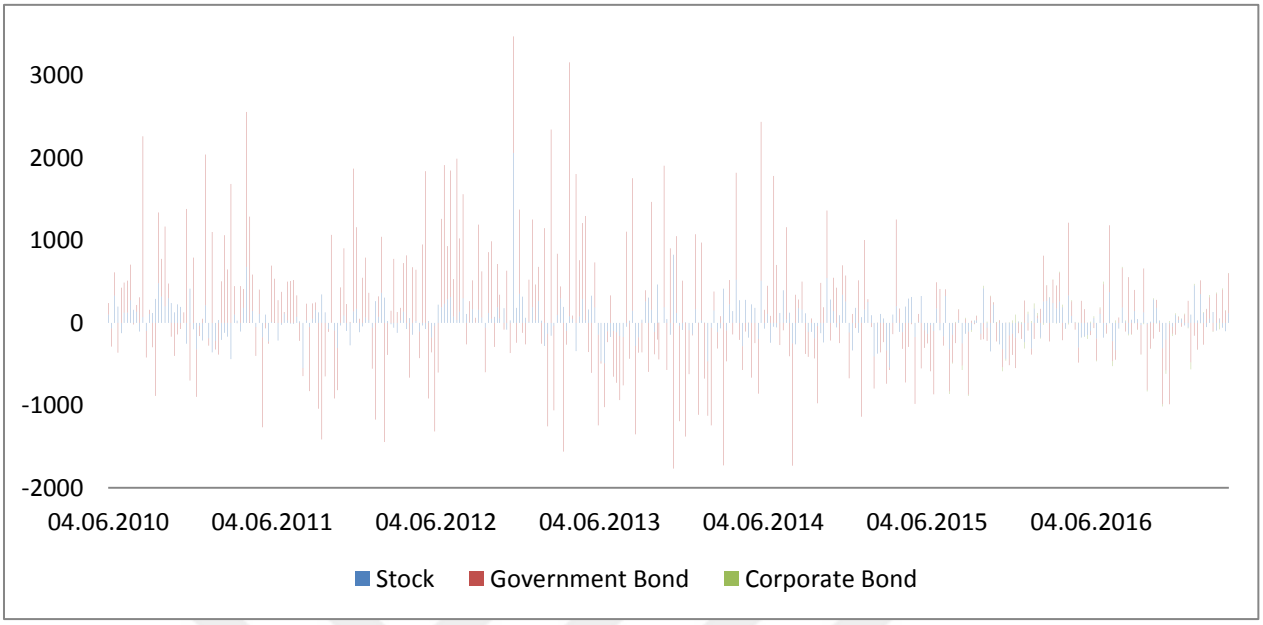
Source: Binici et al (2016)

Figure 10: Interest Rate Corridor



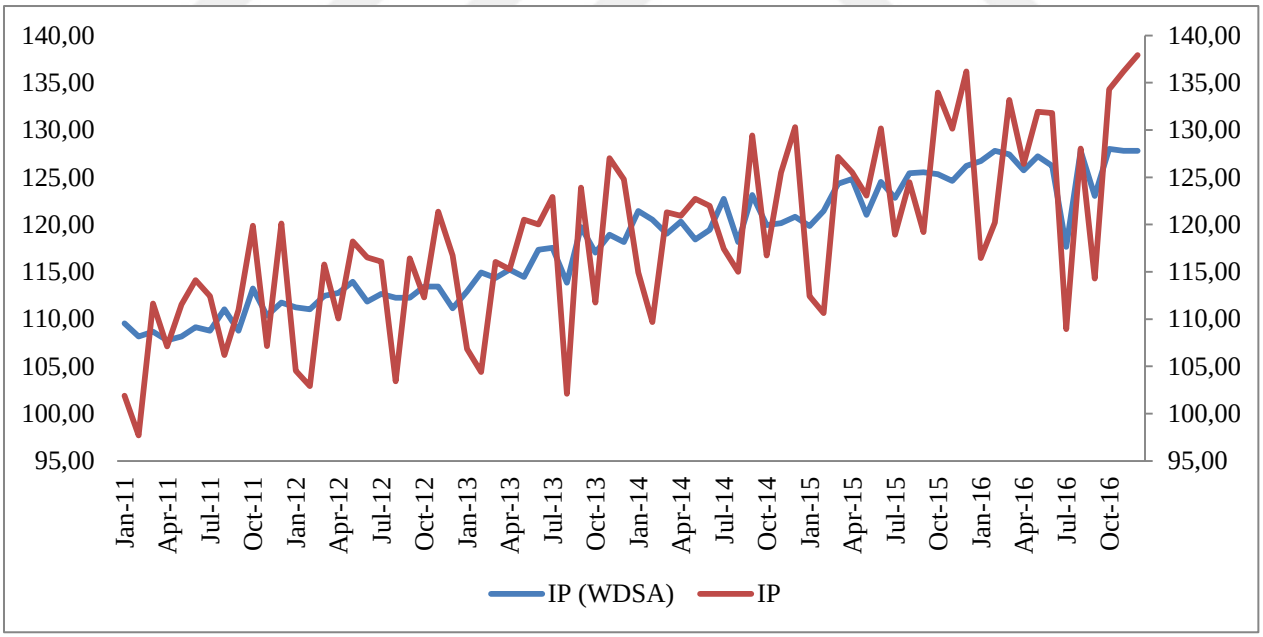
Source: Turkey Data Monitor

Figure 11: Non-Residents' Holding of Securities



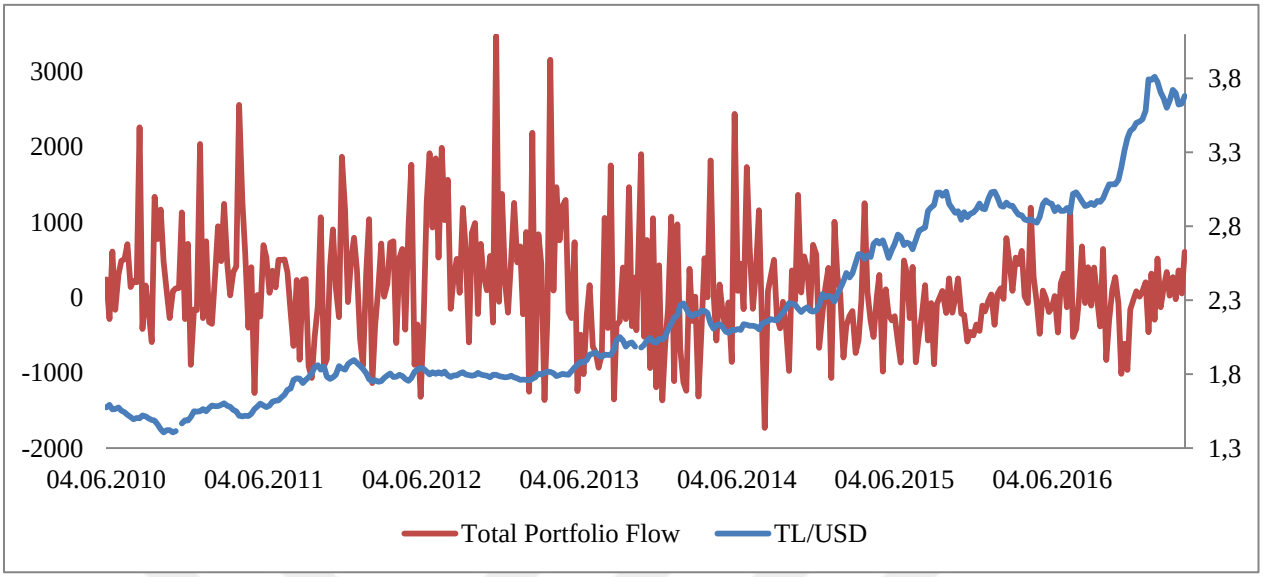
Source: Turkey Data Monitor

Figure 12: Industrial Production



Source: Turkey Data Monitor

Figure 13: Capital Flows vs. USD/TL



Source: Turkey Data Monitor

Figure 14: Risk Off

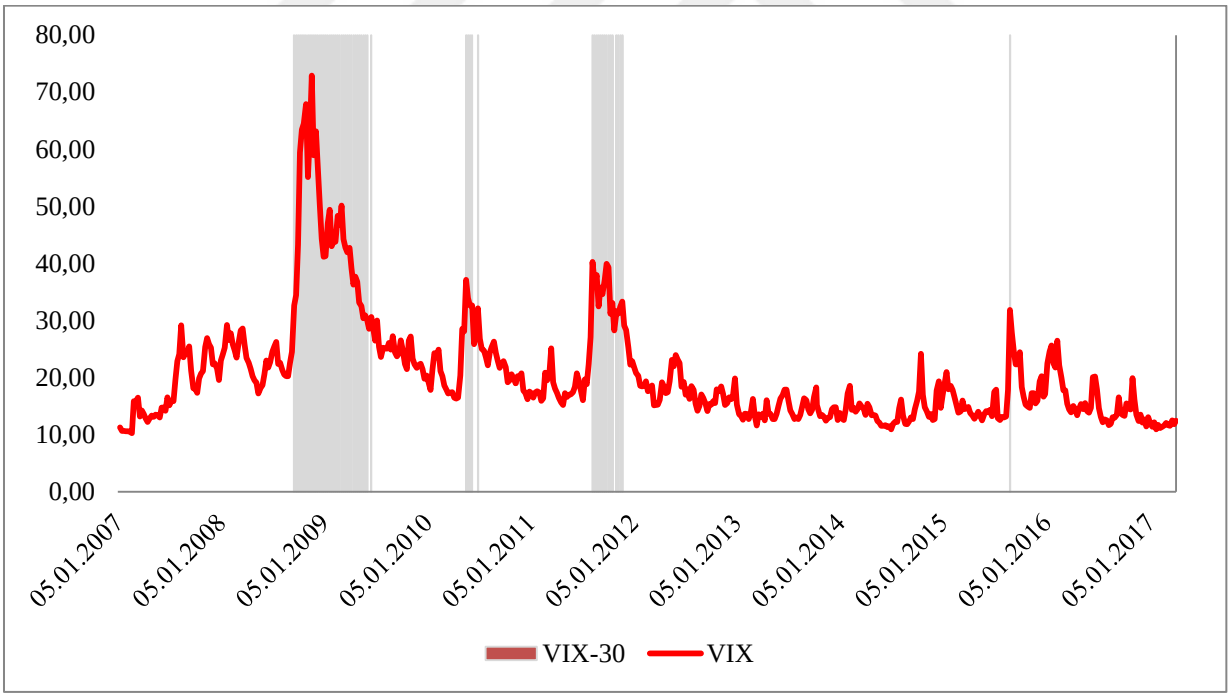


Figure 15: Risk Off

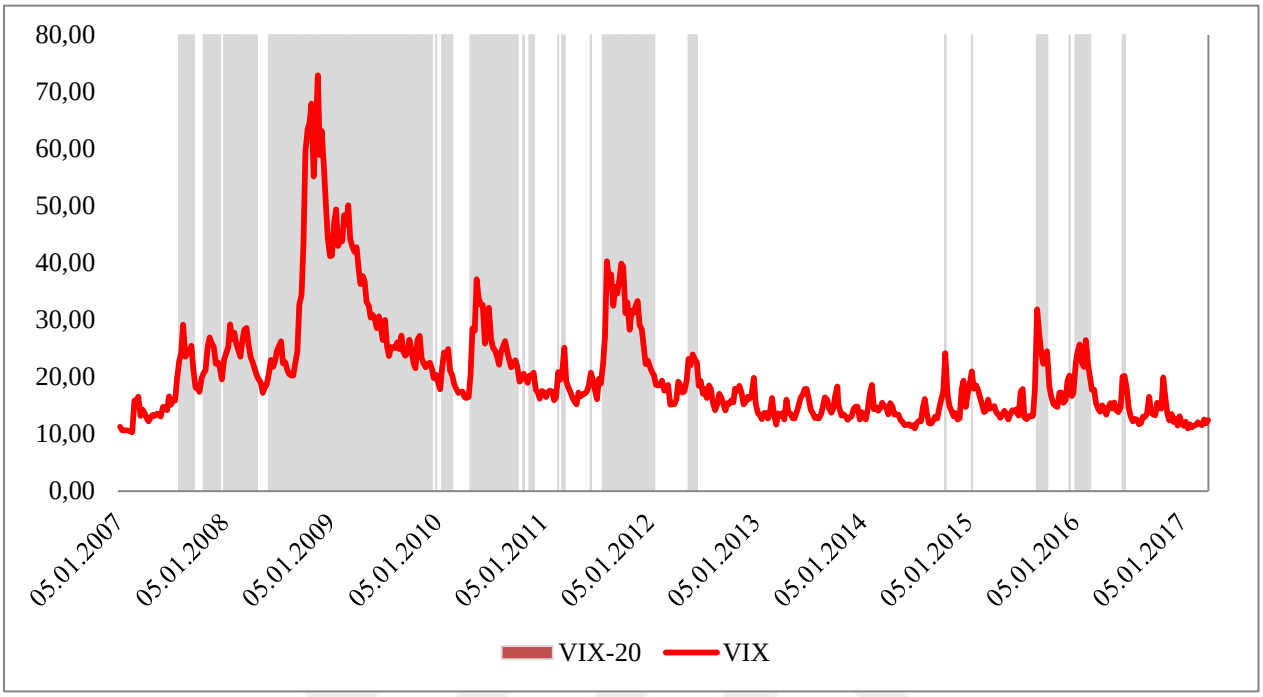
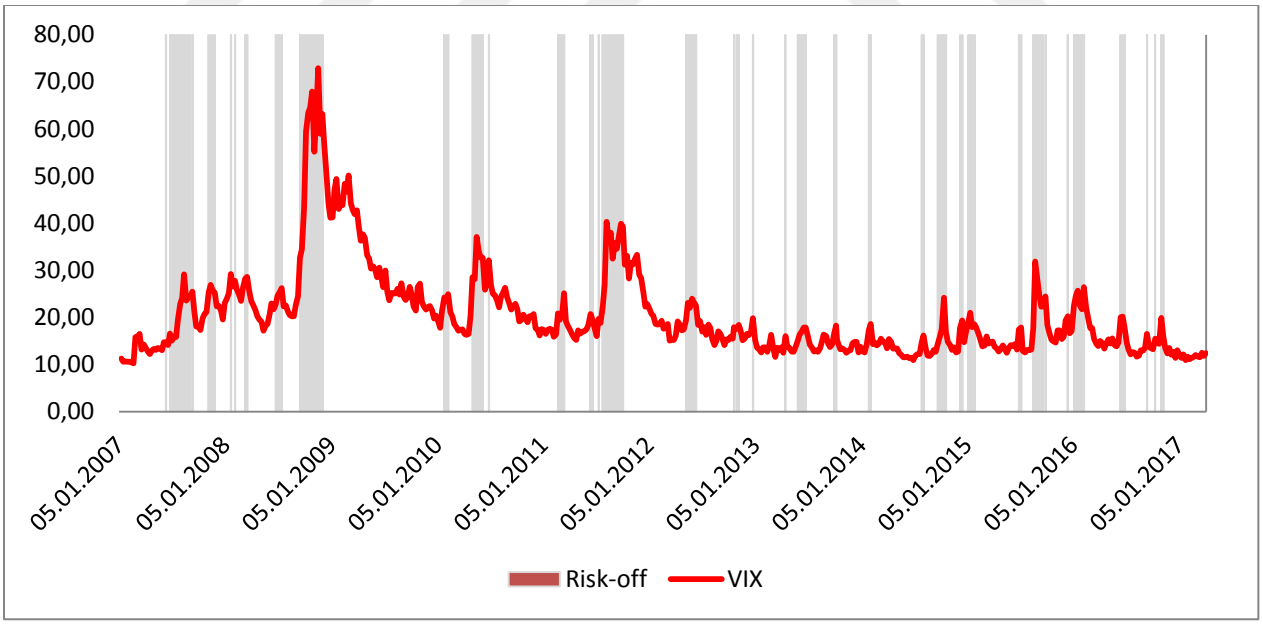


Figure 16: Dynamic Risk-off



Tables

Table 10: Regression Results

Variable	Expected Sign	I	II	III	IV
Constant (million $)		1,8875***	2,1057***	1,9058***	1,7359***
		(0,4294)	(0,4333)	(0,4313)	(0,4405)
Consumer Price Index (MoM Δ%)	+	2,8030	2,5247	2,4823	0,8421
		(8,0147)	(8,5040)	(8,0525)	(7,8420)
Industrial Production (MoM Δ%)	+	3,9637	3,8569	4,0045	3,8527
		(3,4967)	(3,4873)	(3,5048)	(3,4346)
Average of Funding Rate (%)	+	0,2442***		0,2468***	0,2378***
		(0,0684)		(0,0680)	(0,0644)
Stdev. of Funding Rate (%)	-		-0,1672	0,0032	0,1895
			(0,2844)	(0,2641)	(0,2831)
EMBI TR	-	-0,0039***	-0,0005	-0,0039***	-0,0042***
		(0,0012)	(0,0013)	(0,0014)	(0,0014)
Exchange Rate (TL/USD)	-	-0,6411***	-0,3962***	-0,6431***	-0,5803***
		(0,1323)	(0,1182)	(0,1403)	(0,1386)
US Yield Slope (%)	-	-0,5538***	-0,2919***	-0,5601***	-0,5316***
		(0,1127)	(0,1053)	(0,1103)	(0,1058)
TR Yield Slope (%)	+	0,2237***	-0,0071	0,2269***	0,1984***
		(0,0666)	(0,0425)	(0,0691)	(0,0664)
VIX	-	-0,0176**	-0,0189**	-0,0191**	-0,0078
		(0,0070)	(0,0089)	(0,0078)	(0,0110)
AR(1)		-0,0641	-0,0390	-0,0631	-0,0816
		(0,0717)	(0,0726)	(0,0723)	(0,0711)
Average Fund Rate*Risk off	+				-0,0196
					(0,0177)
Standard deviation Fund Rate*Risk off	-				-0,7966*
					(0,4376)
R-squared		0,1234	0,0903	0,1244	0,1431

Dependent variable: Weekly net position in debt, stock and corporate bond flows
Sample: 1/10/2011-3/6/2017
Observations: 316
Standard errors are in parenthesis. The standard errors are Newey-West standard errors.
***, ** and * represents statistical significance at 1%, 5% and 10%, respectively.

Chapter 3: Do Minutes Create Volatility? The Case of UK Financial Markets

Introduction

In the past, central banks used to conduct monetary policy in secret. They did not announce policy decisions and shared less information on monetary policy. However, central banks are becoming more transparent. Central banks provide arguments for policy decisions, economic outlook and risks and their expectations, as well as views of individual members through speeches or reports as an integral part of transparency.

Since the 1990s, monetary policy implementation has shifted globally from secrecy towards greater transparency. The reason behind this trend is the perception that transparency can improve policy effectiveness (see Woodford, 2003). The Bank of England (BoE) followed this trend, becoming one of the most transparent central banks in that it shares more information on monetary policy. Chadha and Nolan (2001) stated that the United Kingdom (UK) took the following steps to improve the transparency of monetary policy: (i) monetary policy is carried out by an independent central bank with explicit policy objectives; (ii) monetary policy committee (MPC) meeting dates are announced in advance; (iii) decisions made by the MPC are announced in a timely fashion; (iv) minutes and voting records of MPC meetings are published; and (v) forecasts of intermediate targets, along with underlying assumptions, are regularly published.

While greater central bank transparency purportedly increases policy effectiveness, there may be significant drawbacks as well. First, the widespread availability of information can result in volatile interest rates. Second, authorities may successfully adopt counter-cyclical policies by keeping information secret (see, for example, Chadha and Nolan 2001).

Most central banks publish minutes after the preceding monetary policy meeting. These minutes may contain information on financial markets, developments in domestic and

international markets, inflation dynamics, economic outlooks, policy decisions and voting records (Gerlach-Kristen 2004; Horvath 2012).

As Jung (2016) states, central banks publish minutes with comprehensive information on the monetary policy committee decision making process for a number of reasons. First, regulatory mandates force central banks to make this information available. Second, the publication of these types of information increases transparency. Third, central banks signal openness. Fourth, disagreement by monetary policy committee members may hint at future policy decisions. Finally, the minutes explain the internal decision making process and may lead to effective internal discussion.

Table 11 provides comparative information about the release schedule of central banks' minutes. As is evident, the number of meetings per annum differs between central banks. Also, central banks differ in their preferences for publishing the minutes and the timing of publication. Even though many of the central banks publish minutes, some refrain from publishing voting records.

El-Shagi and Jung (2015) mention three ways in which sharing information through minutes may cause setbacks. First, the public may be reluctant to gather information from sources other than the minutes when forming their expectations. This may handicap the forward looking evaluation of central banks. Second, as Weber (2010) also argued, while it is beneficial to share the different views of committee members on economic outlook, sharing divergent views on monetary policy may not be beneficial, at least in the short run. Third, the monetary authorities may hesitate to express dissent if they do not want to be recorded and publicly offer a defense of their reasoning.

Previous studies have measured the transparency of central banks through their operational framework and publications. For instance, central banks are more transparent if they

announce meeting dates in advance, disclose decisions, or publish minutes and forecasts. However, as Jansen (2011a) stated, if the central banks employ vague communication, they are not completely transparent. Bulir, Cihak and Jansen (2013) additionally emphasize the possibility of losing clarity when drafts are translated from another language to English. The minutes released by the BoE do not suffer from this problem.

In this paper, I investigate the effects of the minutes released by the BoE after monetary policy meetings on the volatility of the stock index, exchange rates and fixed income securities. I focus on the BoE minutes for two reasons. First, the publication schedule of the minutes has changed. In October 1998, the monetary policy committee decided to publish the minutes on Wednesday of the second week after the meeting. As of August 2015, the committee began to publish the minutes and decisions on Thursdays. Second, the language employed in the minutes has evolved over time. The old minutes were easy to comprehend whereas the more recent ones are vague. My hypothesis is that central banks may negate the effect of the minutes on volatility by postponing the publication or using clear language. I measure the volatility by using a GARCH(1,1) model (see Bollerslev 1986).

Central banks do not favour macroeconomic volatility. As volatility of the financial variables explain macroeconomic fluctuations (see Nakagawa and Osawa (2000), they would not prefer the volatility in the financial series. It is evident, specifically after the global financial crisis, they rigorously explain their decisions and the future course of the monetary policy so as to minimize swings in the financial markets.

Even though Reeves and Sawicki (2007) evidenced that financial volatility increases when minutes are published, their study do not provide suggestions on how central banks communicate through minutes if they aim reducing the volatility emanating from the minutes.

This study diverges from the previous one by focusing on the possible methods serving for this purpose.

Literature Review

In this section, I provide a literature review on the effects of central bank communication on financial market volatility.

Reeves and Sawicki (2007) investigated whether communication of the Bank of England have an incremental impact on the volatility of financial markets. They considered the following communication types: minutes of the monetary policy meetings, inflation reports, speeches given by members of the monetary policy committee and testimony given to the House of Commons Treasury Committee after inflation reports. Their findings on minutes are suggestive of increased volatility in the financial markets. This impact is pronounced on short sterling futures and government forward rates. Their results regarding minutes are robust when intraday data is employed. Further, the results obtained from using intraday data provide evidence that inflation reports escalate volatility in the short sterling futures and long gilt futures. The difference in the impact of inflation reports between the daily and intraday data may hint that some information in the inflation reports may be overshadowed by other news during the day.

Dissent among monetary policy committee members is one measure by which information in the minutes can be evaluated. Gerlach-Kristen (2004) and El-Shagi and Jung (2015) defined *skew* as a measure of disagreement among members in the monetary policy committees. The *skew* represents the difference between the average of members' preferred policy rate and the bank rate set at the current meeting.

Gerlach-Kristen (2004) showed *skew* helps to predict the next rate decision by the bank. Voting records may not offer additional information to market participants who have access to the same information as the monetary policy committee. In such a case, voting records may not be helpful in predicting the next rate decision. However, her findings are robust to inclusion of the market participants' expectations, which are measured through the slope of the yield curve and price of interest rate futures. Finally, she tested whether there is useful information in voting records. If so, the voting records convey news to market participants; market interest rates and the price of interest rate futures then respond accordingly. The *skew* has a significant effect on the 3-month and 12-month rates, as well as the price of the interest rate futures. Overall, Gerlach-Kristen's findings suggest that publication of voting records increases transparency of monetary policy and hints at future policy stances.

El-Shagi and Jung (2015) focused on the impact of minutes for a longer period of time (1998-2014). This study showed that MPC minutes provide useful information when markets form expectations based on future monetary policy movements.

Jung (2016) showed interest rate disagreement among the Federal Open Market Committee (FOMC) members signaled future policy rate (federal funds rate) changes not only for the next meeting but also for distant meetings. Similar to previous studies, he employed the ordered probit technique. According to his findings, skew derived from the final votes of all members does not provide evidence for policy rate changes. On the other hand, the skew derived from votes of Reserve Bank Presidents and non-voting members can predict upcoming rate changes. He also showed rate change is persistent and previous meeting decisions hint at upcoming changes. However, his findings are not robust when market expectations are included.

Horváth, Šmidková and Zápal (2012) focused on the inflation-targeting central banks of five countries: the Czech Republic, Hungary, Poland, Sweden and the United Kingdom. In all cases, voting records were informative about forthcoming rate changes. Their results are robust if market expectations are included. Also, the results hold for the pre-crisis period.

Chadha and Nolan (2001) studied how interest rate volatility evolved under different monetary policy regimes in the UK. They investigated the volatility in three-month Sterling London Interbank Offer Rate (LIBOR) returns. They provided evidence of lowering unconditional variance through time. According to their findings, during the period of May 1997-May 1999, the time varying volatility increased on the days of interest rate changes. This effect is not persistent, however.

Jansen (2011b) delved into the clarity of Alan Greenspan's speeches, focusing on the Humphrey-Hawkins testimonies given by Greenspan. He investigated whether Greenspan, in fact, "mumbled with great incoherence" and concluded that Greenspan adopted more vague language than his predecessor, Paul Volcker, and the clarity of his testimonies declined over time. Nevertheless, this result is not robust when data on gross domestic product and inflation are included.

Bulir, Cihak and Jansen (2013) also focused on the clarity of communication, examining central bank communications on inflation. They focused on seven inflation-targeting central banks: Banco Central de Chile, the BoE, the Bank of Thailand, the Czech National Bank (CNB), the European Central Bank (ECB), the National Bank of Poland and Sveriges Riksbank. According to their results, communication clarity differs across central banks. Any single model or variable fail to explain the variations in clarity. Also, there is no common timely trend. Additionally, they provided evidence that the global financial crisis resulted in a deterioration of clarity. Moreover, they reported that one to two additional years of education

are required to comprehend communications from the National Bank of Poland, Sveriges Riksbank (Riksbank) and the BoE.

Bulir, Cihak and Jansen (2014) examine how the clarity of inflation reports affected market volatility. They focused on publications of the CNB, ECB, Riksbank and BoE. They provide evidence that before the financial crisis and during its early period the clarity of inflation reports had an impact. However, this finding is not robust in the period after the crisis.

Analyzing the minutes released by the Bank of Japan, the Riksbank, the BoE and the Fed, Jansen and Moessner (2016) evidenced that disagreement among policy makers increases the file sizes of the minutes. The clarity of the minutes, however, is not affected by the dissent.

Data, Model and Method

In this section, I will explain the data, model and method employed in the empirical analysis. I focused on the question of whether the publication of the minutes increases market volatility. If so, what are the alternatives for the central bank to negate this effect? I tested the efficacy of postponed publication and clear language.

The monetary policy committee (MPC) of the BoE consists of nine members (four internal and five external members) and meets regularly to set the bank rate. They reach a decision by simple majority rule. Before August 2016, the MPC met twelve times per year; this was changed to eight meetings per year in September 2015. Even though the minutes of MPC meetings were previously published after a delay of some weeks, recently the BoE has begun to publish the minutes and decisions promptly. The minutes contain the votes of individual MPC members, which are disclosed by the BoE to enhance the accountability of members (Gerlach-Kristen 2004). Prior to October 1998, dissenting members of the MPC categorically

stated their preference as an increase or decrease of the bank rate in these meetings, but since then members have indicated the exact level of their preferred bank rate.

Differences in views of MPC members may arise due to two reasons. First, members may obtain private information on an optimal policy rate from a variety of sources; this difference may explain the discrepancy of individual votes (see Gerlach-Kristen 2008). Second, Riboni and Ruge-Murcia (2008) state that policymakers may fail to reach a consensus and change the status quo due to possible future disagreement.

In order to test whether writing clearly understood minutes or delaying the publication time of the minutes reduce volatility in financial indicators, I adopted a Generalized Autoregressive Conditional Heteroskedasticity (GARCH) of order (1, 1) (see Bollerslev 1986).

In the empirical analysis, I estimated different specifications of the following GARCH (1,1) model where the mean equation is defined as:

$$y_t = c + \beta_{lag} y_{t-1} + \beta_{skew} skew_t + \beta_{policy}\, policy\ shock_t + \beta_{rate\ diff.} rate\ differential_t + \beta_{\Omega}\Omega_t + \varepsilon_t$$

and the variance equation as:

$$\sigma_t^2 = c + \beta_1 \varepsilon_t^2 + \beta_2 \sigma_{t-1}^2 + \alpha_{skew}|skew_t| + \alpha_{policy}|policy\ shock_t| + \alpha_{minute} minute_t + \alpha_{rate\ diff.} rate\ differential_t + \alpha_{grade} grade_t + \alpha_{delay} delay_t + \alpha_{vix} VIX_{t-1} + \alpha_{\Omega}|\Omega_t|$$

where c is the constant term, ε_t is the residual term and σ_t^2 is the conditional volatility on the day t . ε_t is assumed to have a normal distribution with mean 0 and variance σ_t. The model is estimated using maximum likelihood techniques. I focused on the time period of January 4, 2005 to November 3, 2016. I considered several financial market indicators as dependent

variables on the day t , y_t. I employed daily log differences of FTSE 100 index as the stock market index, British Pound (GBP) / US Dollar (USD), GBP / Euro (EUR), GBP/ Swiss Franc (CHF) and GBP / Japanese Yen (Yen) as exchange rates. I used the daily difference of yields of two-year, five-year and ten-year government bonds.

In the model, I used minutes-related variables and macroeconomic variables as control variables. For minutes-related variables, I used the publication event of the minutes, $minute_t$, disagreement among MPC members, $skew_t$, clarity of the minutes, $grade_t$, and publication delay of the minutes $delay_t$. These variables are defined as follows:

I defined a dummy variable, $minute_t$, taking the value of 1 on the days when minutes are published. The minutes include the views of MPC members and the bank rate set at the corresponding monetary policy meeting. As I have already included those measures in the mean equation, I omitted $minute_t$ from the mean equation. However, financial market players may not employ all of the information contained within the minutes, which may lead to higher volatility. I expect $\alpha_{minute} > 0$.

Another minutes-related variable $skew_t$ is a possible signal for the future monetary policy preference of the MPC (see Gerlach-Kristen 2004). Positive values of $skew_t$ may be a precursor to tight monetary policy conditions in the future. *Ceteris paribus*, it would lower the return on the stock market, appreciate the GBP against other currencies and increase the yields of government bonds. Therefore, in the mean equation, I expect $\beta_{skew} < 0$ for the stock market and $\beta_{skew} > 0$ for exchange rates and government bond yields. In the variance equation, I presumed that financial market players become confused about the future course of monetary policy and cannot employ all of the information found within the minutes. This would lead to higher volatility in the financial indicators (stock market performance, exchange rates and bond yields). Thus, I expect $\alpha_{skew} > 0$ for all the financial indicators. I

took the absolute value of this variable because I believe that volatility is affected by the size of the $skew_t$ rather than its sign.

Similar to previous studies (e.g. Gerlach-Kristen 2004), I defined the unweighted measure of disagreement among MPC members at the meeting held at t , $skew_t$, as

$$skew_t = \frac{\sum i_t^j}{n} - i_t$$

where i_t^j represents the appropriate level of the interest rate according to the member j [19], i_t is the bank rate set at the meeting t and n shows the number of members attending the meeting.

Positive values of the $skew$ reveal that a minority of the members voted for a higher interest rate than the bank rate, whereas a negative value shows some of the members voted for a lower interest rate. The larger the proportion of MPC votes for different appropriate interest rates, the larger the deviation from the bank rate will become. In line with previous studies, I assumed the structure of the monetary policy formulation does not systematically change as new members are appointed. That is, preferences of newly appointed MPC members do not significantly differ from their predecessors when determining the bank rate. Also, they are not biased towards tight or loose monetary policy.

Figure 17 shows the evolution of the $skew$ .The $skew$ floated between -11 and +11 basis points (bp) in the sample. This means that the members of the MPC, on average, favored 11 bp lower or higher than the bank rate set at the meeting. Also, it is evident that disagreement was common before the financial crisis. In 58 of the MPC meetings, at least one of the MPC members was discontented with the bank rate. However, dissenting members' votes do not diverge too widely. The dissenting votes generally deviated 25 basis points from the bank

[19] Votes are available on the Bank of England website.

rate. From 2009 on, there was less disagreement possibly due to fact that the bank rate had already hit very low levels and there is less room for bank rate changes.

One of the things I investigated in this study is whether clarity of communication is useful in lowering financial volatility. Jansen (2011a) states that if central banks communicate clearly, financial markets can easily discern the message. This reduces uncertainty and hence lowers volatility.

I employed an objective measure for textual clarity. I adopted the method developed in Kincaid et al. (1975). They identified sentence and word lengths as good predictors of clarity. They propose that longer sentences or words reduce the readability of a text. Moreover, more years of education are required to comprehend the message. They formulated the relation between the length and education as

$$Grade = 0.39 * \frac{\#\ of\ words}{\#\ of\ sentences} + 11.8 \frac{\#\ of\ syllables}{\#\ of\ words} - 15.59\ .$$

Here, $\#\ syllabless, \#\ words$ and $\#\ sentences$ represent the number of syllables, words and sentences, respectively.[20]

Bulir, Cihak and Jansen (2014) gave three simple examples to underscore the importance of sentence and word length. First, if a central bank publishes a report containing only the sentence "We think inflation will be below two percent next year," 4.8 years of education are required to comprehend the text. Second, when the central banks adds one more syllable by replacing the verb "think" with "expect", the necessary grade level jumps to six years. Finally, a central bank can elongate the latter sentence by using the phrase "over the next twelve months" instead of "next year." This increases the required grade level to 6.7 years.

[20] I downloaded all of the minutes in PDF format and converted them to doc files via http://pdf2doc.com/tr/. I removed the decision summary and annex sections. I also deleted section and paragraph breaks. Finally, I used MS Word 2010 to obtain the Flesch-Kincaid grade level.

Figure 18 shows how the necessary grade level has changed through time. Before 2004, the required grade level floated around 13.5 years. Then there was a decline until 2008, going as low as 11 years. In the aftermath of the crisis, the grade level followed an increasing trend, reaching almost 16 years of education. According to Jansen (2011b), a possible explanation of the recent increase in grade level would be that as central banks become more transparent and provide more technical information on monetary policy, the communication may become more complicated, hence the readability score declines (and the required grade level increases).

The clarity of the minutes may be important for financial market players and may result in swings of the price of financial assets, whether as an increase or decrease. Therefore, I expect higher values of the $grade_t$ (bad communication) to be associated with higher volatility in financial asset prices. I expect $\alpha_{grade} > 0$.

Lastly, I defined a time variable to represent the publication period of the minutes: $delay_t$. Before the August 2015 meeting, the BoE published the minutes around two weeks after the corresponding meeting. Following this date, the minutes are published simultaneously with the monetary policy meeting decision. The $delay_t$variable takes the value of 1 if the minutes are published after two weeks and 0 otherwise. The information in the minutes may become out of date if the BoE postpones publication and its impact on the financial markets is reduced. I expect $\alpha_{delay} < 0$.

The decision of the MPC meeting can deviate from analysts' expected outcome. I defined the difference between the MPC decision and the analysts' expectation as $policy\ shock_t$. If the bank rate is higher than the market expectation, it is positive. According to the efficient market hypothesis, financial markets employ all the information. Since there is a discrepancy between these rates, financial markets will adjust accordingly. Similar to the effect of $skew_t$,

the stock market index may fall, whereas GBP strengths and government bond yields increase. Also, as a result of the adjustment process, volatility of financial measures may increase. I expect $\alpha_{policy} > 0$.

I also included macroeconomic conditions of the UK. Monetary policy makers closely watch these aggregates as they provide evidence about the economic state of the UK. Therefore, the financial markets incorporate the information revealed with these figures. As the financial prices embed the expectations, I used the difference between the expectations of analysts and outturn of the macroeconomic data to create surprise. Ω_t contains the set of surprises on the day t . Ω_t is constructed as:

$$\Omega_t^j = \begin{cases} actual_t^j - expected_t^j, if\ actual_t^j \neq expected_t^j \\ 0, otherwise \end{cases}$$

where $actual_t^j$ denotes the outturn and $expected_t^j$ represents the expected value of the macroeconomic figure j on the day t . Therefore, the j^{th} element of the Ω_t takes the value of the surprise if it is non-zero and takes the value of 0 if the surprise of figure j is 0 or there is no release of the economic figure.

The Office for National Statistics publishes many economic figures. However, how important all these figures are for financial market traders is not trivial. In order to choose the ones that may matter for the traders, I used Bloomberg's relevance score index of the figures. I opted for the figures in the highest quintiles.[21]

The Ω_t then consists of the following economic figures:

- Gross Domestic Product (GDP)

[21] I used ECO UK command in the Bloomberg terminal to get the economic figure release calendar of the UK. Then, I sorted the figures according to the relevance score index and picked the unique ones. The figures in the highest quintile are represented with four out of four bars.

- Industrial Production (IP)
- Jobless Claims (JC)
- Retail Sales (RS)
- Nationwide House Price (HP)
- Mortgage Approvals (MA)
- Consumer Price Inflation (CPI).

The surprise of these aggregates may affect both the return and the volatility of the financial variables. Positive surprises in the GDP, IP, RS, HP, MA and CPI are harbingers of increasing aggregate demand and price levels. In order to alleviate inflationary pressures, the MPC may implement a tight monetary policy in the future. Therefore, I expect lower returns in the stock market, appreciation of the GBP and a hike in government bond returns in the mean equation. On the other hand, a positive surprise in the JC points to an increased unemployment level. Therefore, demand conditions may weaken and price levels may reduce. In this case, the MPC would implement an easy monetary policy. In the mean equation, I expect higher returns in the stock market, depreciation of the GBP and a cut in the government bond returns. I included the absolute values the surprises in the volatility equation as, similar to Kohn and Sack (2003).

In addition to minutes-related variables and macroeconomic aggregates, I used the VIX index as a global volatility measure, VIX_{t-1}. The VIX index measures the risk assessment of investors. VIX is a forward-looking variable that measures 30-day implied volatility in S&P 500 index options. Higher values of VIX hints at increasing risk perceptions in the future and I expect $\alpha_{vix} > 0$. The perceived risk may be transmitted from the US stock market to other financial variables and financial markets in other countries. Using the same time index for the

dependent variable and the VIX may lead to a reverse causality problem since time zones differ across the US and the UK. In order to avoid such a problem, I lagged the VIX by one day.

Following previous research (see for instance Fratzscher 2008), I embedded the interest rate differential to model exchange rate returns. The exchange rate specifications also control for the interest rate differential between the UK vis-à-vis the US, Eurozone, Switzerland and Japan. As a measure of market interest rate, I employed the three-month London Interbank Offer Rate (LIBOR) of GBP, USD, CHF and YEN. If the uncovered interest rate parity holds, I expect $\beta_{rate\ diff.} > 0$.

As it is hard to deduce the reason for a higher interest rate, *a priori*, I do not form expectations about the sign of the coefficients of the interest rate gap in volatility, $\alpha_{rate\ diff.}$. A higher interest rate may be a result of, for instance, geopolitical instability. In such a case, I expect the volatility of the GBP to increase. On the other hand, the effects of a higher interest rate spread stemming from strong economic fundamentals may vary widely to either direction and are thus not considered.

Finally, I used US financial measures to account for monetary policy stance and financial developments overseas. In the exchange rate specifications, I included a USD Index. The USD Index increases as the USD appreciates against a basket of currencies of trading partners of the US. Then, I expect the coefficient of the USD Index to have a negative impact on the mean equation. As this index swings, I also expect to see a positive impact on the volatility equation. In the government bond specifications, I used the return on ten-year US government bond as a monetary policy measure. Alternatively, I could have used the Federal Funds Rate (FFR). However, after the global financial crisis the FFR almost reached the zero lower bound and stayed near that for a long period of time. The ten-year government bond return, on the

other hand, reacted promptly to changes in the current stance or hints about a future policy stance. If the US ten-year government bond rate increases, the financial market traders would sell assets which are dominated in other currencies and switch to USD dominated assets. In the government bond specifications, I expect to see a positive impact of the US ten-year government bond rate. I also presume that changes in this rate increase the volatility in the UK government bond returns.

Results

This section explains the empirical results. Table 12 presents the estimates of the mean equation, whereas Table 13 shows the volatility equation results.

The policy rate surprise and the disagreement among MPC members (as measured by the skew) do not have significant impacts. For the surprise components, a possible explanation for the lack of significance would be that financial market participants interpret the existing economic conditions similarly to MPC members. Disagreement among members may be due to the fact that they may have publicized their opinions about the bank rate beforehand.

The results of the mean equation are mostly in line with the priors.

The GBP appreciates against other currencies if the interest rate differential increases. The effect is significant on the GBP/EURO exchange rate, while there is a shortage of evidence of a similar impact on other exchange rates. The GBP appreciates two pence (pc) if the interest rate discrepancy between the GBP LIBOR and EURO LIBOR increases by one basis point (bp). This finding may imply that the GBP and EURO are close substitute currencies and financial market players switch to the GBP in order to profit from higher interest rates.

The USD Index has significant effects on exchange rate returns even though the signs alternate across exchange rates. In line with my expectation, the GBP depreciates against the USD. The impact is almost one to one; the GBP depreciates 0.95 pc after the Index increases

by one point (p). There is a similar impact on the GBP/YEN exchange rate. The GBP/YEN exchange rate decreases by 30 pc. The impact on geographically closer currencies is opposite that of the USD and YEN. The GBP appreciates against the EURO and CHF by approximately 0.36 pc and 0.25 pc, respectively.

There is strong evidence that US monetary policy matters for the UK. The yield curve of the UK government bonds shifts upward in line with the US ten-year government bond rate. The UK yield curve gets steeper. As a response to an increased amount of 10 bp in the US ten-year government bond rate, the UK two, five and ten-year government bond rates increase by about 30 bp, 46 bp and 46 bp, respectively.

The macroeconomic surprises also have the expected consequences on financial indicators. The GBP appreciates and the government bond rates increases if the GDP, IP, retail sales and CPI figures are better than expected. This consequence is also in line with my priors, as positive surprises in these figures hint at a tight monetary policy.

Surprises in the house prices and jobless claims do not affect a wide range of the financial series. As a response to an increase of 100 bp in the national house price surprise, the GBP/Yen increases by 27 pc and UK five-year government bond rate increases by 115 bp. The jobless claims count surprise has a modest impact on the GBP/Yen exchange rate. The GBP depreciates against the Yen by 1.6 pc if the jobless claims count surprise increases by 1000.

The volatility equation estimates slightly differ from my presumptions.

A somewhat counterintuitive finding is that disagreement among MPC members reduces volatility in the UK two-year government bond rates. Volatility of the government bond return decreases by about 2.8 bp as a response to a 10 bp disagreement among MPC members.

Volatilities of the GBP/USD and GBP/YEN exchange rates decline if the interest rate difference between the GBP and respective currencies increase. The effects are almost equal in size. The volatilities in both exchange rates fall by three pc if the interest rate gap increases by 100 bp.

Developments in the US financial markets create volatility in the UK financial markets. The volatility of the UK two and five-year government bond rates increase as the US ten-year government bond increases. The response of the UK five-year government bond rate is much higher than the response of the UK two-year government bond rate. As the US ten-year government bond rate increases by 100 bp, volatilities in the UK two and five-year bond rates increase by 2.5 and 82 bp.

There is strong evidence that the volatility of the US stock market is transmitted to the UK five-year government bond market. If the VIX increases by one p, it boosts the volatility of the UK five-year government bond returns by 0.48.

The macroeconomic surprises have alternating impacts. Positive GDP, IP, and retail sales surprises reduce the volatility of five-year bond returns. On the other hand, positive surprises in the jobless claims counts increase volatility in this security. Better than expected jobless claims counts, retail sales and nationwide house prices surprises reduce volatility in the short-term bond market. A positive jobless claims counts surprise results in a decline of volatility in the UK stock market. Among the macroeconomic surprises, the count of mortgage approval surprise has a significant impact on the most number of financial variables. Positive surprises in the count of mortgage approval reduce the swings in the UK stock market and exchange rates. Nonetheless, this surprise has an alternating impact on the UK yield curve. It increases volatility in the short tail and reduces volatility in the long tail of the yield curve.

I tested two alternatives that BoE could use to reduce the volatility in the financial variables: postponement of publication and usage of clear language. However, the results fail to provide enough evidence for those options to be used as solutions.

Conclusion

This paper examines whether the BoE can negate the incremental effect of the minutes on financial volatility. The paper empirically tested two options for this goal: (i) postponed publication and (ii) clear language.

In this study, I used daily data. As Bulir, Cihak and Jansen (2014) stated, high-frequency data would enable one to identify the causal relation between minutes-related variables and financial volatility. However, for an economic policy perspective, it may be helpful to control the long-term effects.

Due to the similar reasons noted in El-Shagi and Jung (2015), information in the minutes may not be helpful. First, markets may not employ the information to its full extent. Second, the minutes may not provide more information than the markets' own assessment and other official central bank communications. Finally, the minutes provide assurance to markets despite the possibility of deterioration of the communication channels.

This chapter fell short in providing evidence on whether delaying the publication of the minutes or adopting clear communication in the minutes reduces financial volatility. One possible explanation may be that UK financial market participants are well aware of the information in the minutes and ignore when and how the information is communicated. Nevertheless, the options I tested above may still be effective if adopted by other central banks.

The model employed in this part can be extended in the following dimensions. First, forward guidance may be included. Forward guidance is a conditional commitment (Jung 2016).The

BoE made two forward guidance announcements; one on August 7, 2013 and the other on February 12, 2014. In the first announcement, the BoE declared "The Committee intends at a minimum to maintain the current highly stimulative stance of monetary policy until economic slack has been substantially reduced, provided this does not entail material risks to either price stability or to financial stability." When the unemployment rate reached the threshold of 7%, they issued the statement that "When Bank Rate does begin to rise, the appropriate path so as to eliminate slack over the next two to three years and keep inflation close to the target is expected to be gradual. The actual path of Bank Rate over the next few years will, however, depend on economic developments." Even though some members of the MPC may dissent, as long as the conditions of the forward guidance are met, disagreement among members may not affect financial markets. Second, as of September 2015, the BoE announced that the MPC will only meet 8 times per year. As meetings become rarer, information in the minutes may be more valuable and financial market participants may attach more weight to the information contained. Therefore, any small piece of information could cause greater fluctuations in the financial markets. Hence moving the sample period to a more contemporary era may increase the size of coefficient estimates.

Table 11: Comparative Information on Central Bank Minutes

Central Bank	Meetings (per year)	Published minutes	Publication lag (in weeks)	Published voting record
Bank of Canada	8	No	No	No
Bank of England	12	Yes	2	Yes
Bank of Japan	14-19	Yes	3 to 4	Yes
European Central Bank	8	Yes	4	No
US Federal Reserve	8	Yes	3	Yes
Norges Bank	6	No	After 12 years	Yes
Reserve Bank of Australia	12	Yes	2	No
Swedish Riksbank	6	Yes	2	Yes
Swiss National Bank	4	No	No	No

Source: El-Shagi and Jung (2015)

Table 12: Mean Equation Results

Dependent Variable	UKX	USD	EURO	CHF	YEN	GOV 2	GOV 5	GOV 10
Period	1/04/2005-11/03/2016	1/05/2005-11/03/2016	1/05/2005-11/03/2016	1/05/2005-11/03/2016	1/05/2005-11/03/2016	1/04/2005-11/03/2016	1/04/2005-11/03/2016	1/04/2005-11/03/2016
Observations	2993	2991	2991	2991	2991	3077	3077	3077
C	0,0122	-0,0066	-0,0245	-0,0579	-0,0366	0,008	-0,0258	-0,1949***
	0,0212	0,0134	0,0152	0,0431	0,0288	0,0515	0,0573	0,0689
Skew	249,1675	-16,8798	11,5196	-1,4536	166,7973	1042,38	-27,8113	-78,0366
	238,4937	83,6378	96,834	109,3713	122,0024	737,7838	624,2331	799,765
Policy Shock	0,6408	-0,0421	0,0294	0,1246	0,1271	1,6296	1,8288	0,7872
	0,4988	0,1722	0,1845	0,194	0,3065	1,0488	1,5635	2,0119
Interest Rate Differential	-	-0,0101	0,0234*	0,0166	0,006	-	-	-
		0,0171	0,0123	0,0151	0,0088			
USD Index	-	-0,9507***	0,3582***	0,2486***	-0,3057***	-	-	-
		0,0278	0,0287	0,0392	0,0452			
US 10 Year Bond	-	-	-	-	-	29,8839***	46,2078***	45,0358***
						1,3175	1,4958	1,8013
GDP Surprise	-54,4454	163,0683***	169,36***	204,5855***	211,1523***	664,9774***	764,5102***	337,0784
	69,6148	21,8622	21,5163	30,8757	34,5537	170,263	72,0479	249,9106
IP Surprise	-27,4235*	17,4283***	20,9509***	20,5757***	20,5047**	120,87***	143,5146***	107,5173**
	16,6086	5,519	7,2229	7,7238	8,4364	34,8639	37,9867	43,7075
Jobless Claims Surprise	-0,001	-0,0003	-0,0006	-0,0008	-0,0016**	-0,0005	0,0013	-0,0007
	0,0011	0,0005	0,0007	0,0009	0,0008	0,0032	0,0044	0,0076
Retail Sales Surprise	-14,8081	18,7418***	25,0215***	24,2557***	11,2533	104,2875***	142,4743***	129,9019**
	9,9343	3,0016	3,9527	5,2529	7,9682	35,1704	5,404	52,4741

House Prices Surprise	24,6417	10,5029	9,8003	11,2607	26,1398**	70,6021	115,063**	135,4569
	17,3062	6,968	6,2732	8,2406	11,7999	47,4429	56,9265	96,1287
Mortgage Approvals Surprise	-0,009	0,006	-0,003	-0,0002	-0,006	0,02	0,008	0,04
	0,005	0,009	0,002	0,003	0,004	0,084	0,118	0,03
CPI Surprise	-42,4068	68,1208***	88,2422**	78,6021	83,4046	1125,295***	1249,175***	882,3076***
	48,2352	25,1049	41,2903	69,7544	53,5755	203,201	188,5251	262,3412
AR(1)	-0,0056	0,0017	0,0087	-0,0014	0,0245	-0,0744***	-0,107***	-0,1588***
	0,0269	0,0292	0,025	0,0413	0,0314	0,0232	0,0199	0,0243
R-squared	0,0044	0,4697	0,1165	0,0351	0,0469	0,1522	0,2368	0,2910
Adjusted R-squared	0,0011	0,4676	0,1129	0,0312	0,0430	0,1491	0,2341	0,2885
S,E, of regression	1,1974	0,4475	0,5093	0,7520	0,8532	4,3708	4,3969	4,3291
Sum squared resid	4275,2680	596,3820	772,4552	1684,0970	2167,6400	58552,1600	59255,1400	57442,5500
Log likelihood	-4933,5110	-1967,5160	-2275,6580	-3779,6650	-3836,1860	-8100,3820	-8508,5000	-9098,7810
Akaike info criterion	3,3147	1,3364	1,5424	2,5481	2,5859	5,2840	5,5492	5,9329
Schwarz criterion	3,3689	1,3986	1,6046	2,6103	2,6481	5,3408	5,6061	5,9898
Hannan-Quinn criter,	3,3342	1,3587	1,5648	2,5705	2,6083	5,3044	5,5697	5,9533

Table 13: Volatility Equation

Variable	UKX	USD	EURO	CHF	YEN	GOV 2	GOV 5	GOV 10
C	1,2334***	0,1711***	0,2194*	0,559***	0,6407***	0,0433	-4,5071***	18,0828**
	0,3819	0,0585	0,1328	0,1265	0,2442	0,0839	0,9661	7,2333
RESID(-1)^2	0,1384***	0,1465**	0,1294**	0,1285*	0,1507	0,0112**	0,0743***	0,0588
	0,0347	0,0682	0,0573	0,0694	0,0936	0,0049	0,0263	0,0584
GARCH(-1)	0,5494***	0,5676***	0,5322*	0,5973***	0,5499***	0,9882***	0,4279***	0,5081**
	0,1419	0,1427	0,282	0,1169	0,1394	0,0062	0,0755	0,2135
Skew	-0,0013	-0,0003	0,01	-0,0007	0,01	-278832,9***	-54718,4	0,0037
	50039,93	8023,239	13050,01	35077,75	25579,77	76408,2	280146,9	843116,1
Policy Rate Surprise	-0,0061	-0,0024	-0,0124	-0,0055	-0,0198	0,3478	10,6974	-0,013
	0,7293	0,1134	0,1497	0,5355	0,3624	0,9376	8,684	16,0619
Interest Rate Differences		-0,0302**	-0,0209	-0,004	-0,0314*			
		0,015	0,014	0,0354	0,0173			
USD Index		-0,0153	0,0015	-0,021	-0,0769			
		0,0716	0,1301	0,3202	0,2063			
US 10 Year						2,5604**	82,1431***	-0,068
						1,2884	15,4325	30,1893
MINUTE	-0,0484	-0,0123	-0,006	-0,0346	-0,0389	-0,4937	-10,1817	-0,0678
	2,3625	0,634	0,8982	3,136	1,8687	4,5717	19,6522	48,497
MINUTE*GRADE	-0,0475	-0,0078	-0,0061	-0,0256	-0,0315	0,0901	1,0853	-0,3465
	0,1549	0,0417	0,0588	0,2152	0,1254	0,3139	1,0336	3,2172
MINUTE*TWO_WEEK	-0,0427	-0,0134	-0,026	-0,0318	-0,0295	-0,8891	-1,9533	-0,0447
	0,4523	0,1478	0,1954	0,3472	0,2636	0,6334	13,1718	11,5944
VIX	-0,0045	-0,0007	-0,0018	-0,0002	-0,0021	-0,0018	0,4798***	-0,093
	0,0074	0,0019	0,0019	0,0039	0,0062	0,0027	0,0862	0,0954
GDP Surprise	-0,0041	-0,0017	-0,01	-0,0036	-0,01	20563,02	-148258,6***	-0,01
	18427,05	1526,709	1769,03	7747,393	4621,29	28547,61	19090,78	229121,7

IP Surprise	-0,0003	-0,0001	-0,0007	-0,0002	-0,0009	-6,0611	-246,3655**	-0,001
	36,8042	5,1977	6,7038	21,9384	19,5634	93,6405	107,5877	480,148
Jobless Claims Surprise	-0,044***	-0,0004	0,002	-0,018	-0,008	-0,2**	0,6**	0,3
	0,017	0,0055	0,014	0,011	0,01	0,1	0,3	1,2
Retail Sales Surprise	-0,0002	-0,0001	-0,0009	-0,0003	-0,0009	-110,6567**	-298,1824***	-0,0011
	41,2055	2,6451	4,1663	22,1672	12,5306	55,066	20,304	494,1767
House Prices Surprise	-0,02	0,0041	0,26	-0,01	0,33	-39508,42***	-14184,2	0,45
	3320,4	801,0209	593,23	2933,35	2466,44	8145,29	43469,02	120385,2
Mortgage Approval Surprise	-0,0203***	-0,0025***	-0,0027***	-0,0098***	-0,0076***	0,04**	0,25	-0,26***
	0,0013	0,0003	0,0004	0,0015	0,0012	0,02	0,23	0,04
CPI Surprise	-0,01	-0,0023	-0,0031	0,0014	-0,01	64093,51	43790,97	-0,02
	11914,72	2005,288	6433,898	25834,85	13114,96	42929,75	117574,9	247429,1

Figure 17: Disagreement among MPC Members

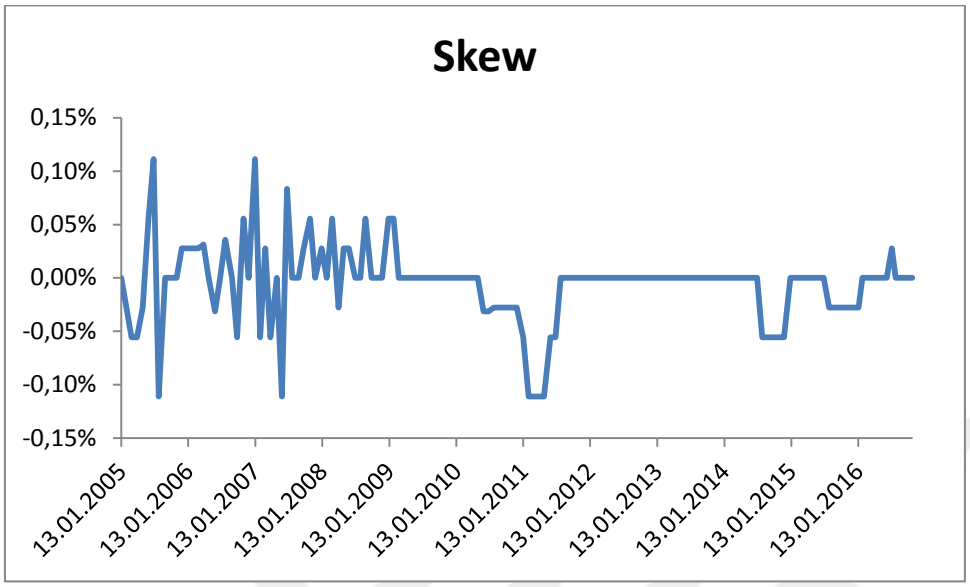
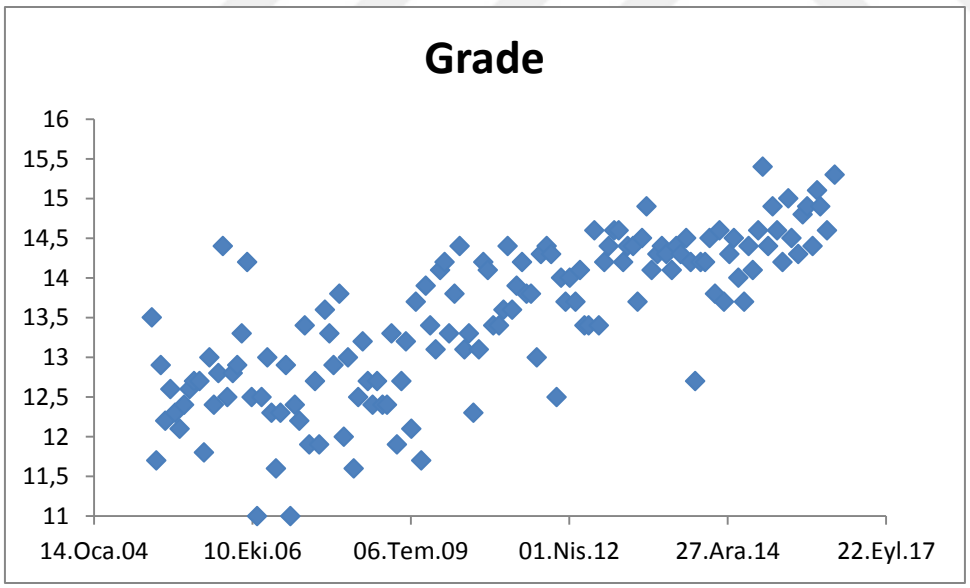


Figure 18: Grade Level



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