INVESTOR ATTENTION AND IPO PERFORMANCE

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ABSTRACT

INVESTOR ATTENTION AND IPO PERFORMANCE

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This study examines the influence of pre-IPO investor attention on short- and long-run IPO returns and post-IPO stock liquidity in an emerging market. Individual investor attention is proxied by both passive and active measures. Passive attention is proxied by a traditional media coverage whereas active attention is proxied by a measure that is constructed from Google search volume (GSV) data. Findings imply that, unlike U.S. market findings, investor attention prior to the IPO date does not have an influence on short-run returns in the Turkish market. The results of the empirical analysis also show that a positive change in GSV before the IPO is associated with higher levels of post-IPO liquidity. Findings further suggest that pre-IPO investor attention may lead to a price pressure on the IPO date that later manifests itself as lower returns during the post-IPO period.

Keywords: Google search volume, investor attention, IPO returns, stock liquidity, emerging markets

ÖZ

YATIRIMCI İLGİSİ VE HALKA ARZ PERFORMANSI

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Bu tez çalışması halka arz öncesindeki yatırımcı ilgisinin halka arz getirileri ve halka arz sonrası gerçekleşen hisse senedi likiditesi üzerindeki etkisini incelemektedir. Bireysel yatırımcı ilgisi aktif ve pasif olmak üzere iki farklı biçimde ölçülmüştür. Yatırımcıların pasif ilgisi geleneksel yönteme uygun olarak basın ve yayın organlarında halka arz edilen şirketle ilgili çıkan haber ve raporların sayısı ile ölçülmüştür. Yatırımcıların aktif ilgisi ise Google arama motorunun halka arz edilen şirketle ilgili yapılan aramalar hakkında sağladığı istatistiklere dayanarak hesaplanmıştır. Yapılan analizlerin sonuçları gelişmiş piyasaların aksine, gelişmekte olan Türkiye piyasasında halka arz öncesindeki yatırımcı ilgisinin ilk gün getirileri üzerinde bir etkisi olmadığını göstermektedir. Bu çalışmanın başka bir bulgusu ise halka arz öncesinde Google arama hacminde meydana gelen artışların halka arzı takip eden dönemde hisse senedi likiditesini arttırdığı yönündedir. Ayrıca, halka arz öncesindeki yatırımcı ilgisinin halka arz sırasında bir fiyat baskısı oluşturabileceği ve bu durumun uzun dönemde düşük getiri performansına yol açabileceği de çalışmada ortaya çıkan bir sonuçtur.

Anahtar Kelimeler: Google arama hacmi, yatırımcı ilgisi, halka arz getirileri, hisse senedi likiditesi, gelişmekte olan piyasalar

To My Parents

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LIST OF ABBREVIATIONS

2SLS	Two Stage Least Squares
AAII	American Association of Individual Investors
AGSV	Abnormal Google Search Volume
ASVI	Abnormal Search Volume Index
BIST	Borsa Istanbul
GMM	Generalized Method of Moments
GSV	Google Search Volume
IPO	Initial Public Offering
NYSE	New York Stock Exchange
SDC	Securities Data Corporation
SVI	Search Volume Index
TSE	Taiwan Stock Exchange
U.S.	United States

CHAPTER 1

INTRODUCTION

The standard finance model assumes that investors in financial markets are rational and unemotional and aim to maximize their expected utility. This assumption seems to be insufficient for explaining some anomalies and fluctuations witnessed in the history of stock markets. The Great Crash of 1929, the 'Tronics Boom of the early 1960s, the Go-Go Years of the late 1960s, the Nifty Fifty bubble of the early 1970s, the Black Monday crash of October 1987, and the Internet or Dot.com bubble of the 1990s are some of the example events with a dramatic change in stock prices that seems to challenge this fundamental assumption (Baker and Wurgler, 2007).

Behavioral finance -broadening finance to include psychological, social, cognitive and emotional factors- introduces a research area to provide explanations for the irrational decisions of investors. Since the 1990s, the field of behavioral finance has become the focus of attention in the finance literature. In this context, behavioral biases have become a popular explanation for a variety of asset-pricing phenomena that are inconsistent with a rational decision-making framework (Cornelli, Goldreich and Ljungqvist, 2006). It is argued that models in which some financial actors are error-prone and not fully rational can better explain some of the anomalies that are observed in financial markets.

Much of the irrational behavior in financial markets is argued to be triggered and motivated by investor sentiment. As defined by Baker and Wurgler (2007), investor sentiment is "a belief about future cash flows and investment risks that is not justified by the facts at hand." Sentiment and aggregate stock returns have been studied heavily since 1980s. In the more recent litrature, the question is about measuring investor sentiment and developing methods for quantifying its effects

rather than showing whether investor sentiment has an effect on stock prices (Baker and Wurgler, 2007).

Indeed, in the recent academic literature there are many measures developed to proxy for the investor sentiment. Burghardt (2010) classifies sentiment measures in research and practice into three groups; namely survey-based, market-data-based and meta measures. Survey-based measures are simply constructed by asking explicit questions to market participants to extract their opinion about the market. Sentix Investor Sentiment Index, American Association of Individual Investors (AAII) Sentiment Survey, UBS/Gallup Surveys and Michigan Consumer Sentiment Index are few examples of such survey-based measures. Market-data-based approaches assume that some market data such as mutual fund flows, dividend premium, closed-end fund discount, equity share in new issues, IPO (Initial Public Offering) volume and first-day returns serve as proxies for investor sentiment. Another category involves meta-measures that do not simply rely on pure information but draw conclusions about investor sentiment from available information. In a widely cited study, Baker and Wurgler (2006) develop a meta-meausurethat is a composite index of sentiment. Since there is no perfect proxy that is not subject to any controversy, Baker and Wurgler choose the practical approach of developing a composite index. This index is based on the common variation in six underlying proxies for sentiment, namely the closed-end fund discount (Lee, Shleifer and Thaler, 1991), NYSE share turnover (Baker and Stein, 2004), the number and average of IPO first-day returns (Ritter, 1991), the equity share in new issues (Baker and Wurgler, 2000) and the dividend premium (Baker and Wurgler, 2004). This composite sentiment index of Baker and Wurgler (2006) is widely acknowledged and used in recent academic studies. McLean and Zhao (2014), Larrain and Varas (2013), Mian and Sankaraguruswamy (2012), Spyrou (2012), Stambaugh, Yu and Yuan (2012) are examples of studies that adopt Baker and Wurgler's (2006) index as a proxy for measuring investor sentiment. The U.S. sentiment index of Baker and Wurgler (2006) is further extended to measure the sentiment of international markets by Baker, Wurgler and Yuan (2012).

Another subject discussed regarding the investor sentiment is whose sentiment is trying to be captured. Institutions appear to interpret the available information better than retail or individual investors due to experience and a number of other advantages over individuals, such as access to private information and ability to monitor (Field and Lowry, 2009). Institutional investors are less likely to be subject to sentiment as they are regarded as being sophisticated and more informed. On the other hand, by intuition, uninformed and inexperienced individual investors are more likely to be subject to psychological biases and irrational behavior and thus guided by sentiment-induced decisions. Tetlock (2007) argues that sentiment predicts especially large and persistent declines in the returns of small stocks, suggesting sentiment measures views of individual traders, who own a disproportionate fraction of small stocks. In the case of IPOs, it is also assumed that overenthusiasm among retail investors may explain high first-day returns and low long-run returns (Ritter and Welch, 2002).

Another aspect of the sentiment discussion is investor attention. As discussed in Da, Engelberg and Gao (2011), retail investor attention and retail investor sentiment are positively related for two reasons. First, attention is necessary to generate sentiment. For a retail investor to develop a sentiment about a financial event, such as a forthcoming IPO, s/he has to first allocate attention to the IPO. Thus, increased investor attention is likely to lead to stronger sentiment. Second, retail investors, as sentiment traders, are more likely to suffer from behavioral biases. Due to this intertwined relationship, investor attention also has become a popular topic in the recent academic literature.

This study aims to measure individual investor attention and observe its effect on both short- and long-run IPO performance in the emerging stock market of Turkey. The persistence of investor attention following the IPO is also questioned by examining the post-IPO stock liquidity. Previous studies mainly focus on the developed U.S. and European markets. This study extends the existing literature to include the emerging Turkish stock market. As stated by Güner, Önder and Danışoğlu Rhoades (2004), in an emerging market like Turkey, information

acquisition and processing constitute a higher cost for investors as information is reflected in the prices in a relatively longer time. Also, in such emerging markets where market efficiency is low, attention by retail investors can explain irrational and extreme disruptions in prices by influencing the distribution and processing of information (Fang, Jiang and Qian, 2014). Thus, the Turkish stock market offers an interesting platform to observe the impact of retail investor attention on IPO performance. Also, with its rapid growth among emerging markets Turkey has been one of the most noteworthy countries (Şenyüz, Yoldaş and Baycan, 2014). In this regard, Turkey offers an intriguing area to investigate the influences of investor attention.

This study focuses on the Turkish stock market, namely Borsa Istanbul (BIST), which is the platform gathering all the exchanges operating in the Turkish capital markets under one umbrella[1]. In the year 2010, the trading volume of BIST generated by domestic individual investors was 84% (Fung, Demir, Lau and Chan, 2015). This percentage also supports the idea that Turkish stock markets offer an appropriate setting to study the attention of especially retail investors.

Following Ding and Hou (2015), the level of Turkish individual investors' attention is measured through the use of both active and passive attention proxies. The results of this study report that, unlike the U.S. market findings, investor attention prior to the IPO does not have any influence on short-run IPO returns in the Turkish market. The other findings of this study reveal that a positive change in active attention before the IPO is associated with higher levels of post-IPO liquidity. Findings further suggest that pre-IPO investor attention may lead to a price pressure on the IPO date that later manifests itself as lower returns during the post-IPO period.

The rest of this thesis is organized as follows: Chapter 2 highlights the literature on traditional and non-standard investor attention proxies and their applications in the IPO setting. Chapter 3 details the construction of attention measures and the IPO sample. The methodology and models are presented in Chapter 4. The results of the

[1] See http://www.borsaistanbul.com/

empirical analyses are presented and discussed in Chapter 5. Finally, Chapter 6 concludes with the findings of the study.

CHAPTER 2

THE OVERVIEW OF INVESTOR ATTENTION

2.1. Traditional Proxies for Investor Attention

As stated in Kahneman (1973) there is a limit to the attention that can be paid to any task at any time. Similarly, investors have limited attention to allocate between different options when making financial decisions. How scarcity of attention affects investor behavior in financial settings is a popular research area. Kumar and Lee (2006) argue that retail investors adopt "attention-based trading" by concentrating less on the process of analyzing investment decisions.

As in the case of investor sentiment, measuring investor attention offers an area of research introducing challenges. Barber and Odean (2008) argue that it is not possible to develop one direct and perfect measure since it would require daily measurement of investor attention retrospectively. Therefore, they develop an indirect measure concentrated on three proxies which are considered to capture attention: "news", "unusual trading volume" and "extreme returns". Seasholes and Wu (2007) state that stocks experiencing broad news coverage, grand returns and high trading volume in the Shanghai Stock Exchange catch individual investors' attention. These investors with evoked attention tend to engage in trading activity and even purchase stocks that they have not owned prior to the events grabbing their attention.

Fang and Peress (2009) draw attention to the vast reach and widespread use of newspapers as a mass media tool. They argue that particularly retail investors use newspapers to obtain information. In terms of broad usage and reach, it is reasonable to consider news articles as a proxy for measuring investor attention. Liu, Sherman and Zhang (2009) state that investor and market attention in general urges

media attention. Media is likely to report events that are newsworthy and striking attention. Thus, news has been considered to be a common proxy for measuring investor attention. In Reese's study (1998), references in newspaper articles are used to proxy for the investor attention paid to a particular firm. Reese suggests that there are two reasonable explanations of media citing a company in news articles. First, there may be considerable investor attention already generated for that particular firm. Second, the company may be coming out with a situation worth mentioning, which eventually leads to investor interest.

Barber and Odean (2008) discuss that prominent news catch investors' attention, guide their beliefs and eventually lead to a number of investors engage in trading activity which is more than usual. Barber and Odean (2008) present an example from the Midday Call show that airs on CNBC. When a particular stock is mentioned during the Midday Call, trading volume in this stock increases almost immediately within the minute of mention (Busse and Green, 2002). Hou, Peng and Xiong (2009) also use trading volume as a proxy for investor attention since "…active trading involves investors' attention…" The correlation between attention and trading activity is discussed in the Hou, Peng and Xiong study (2009). They argue that when an investors allocate less attention to a particular stock, they are less likely to engage in that stock's trading activity. Similarly, when a stock grabs investors' attention, the likelihood of trading for that stock increases. On the basis of this likelihood, Chemmanur and Yan (2009) further use trading volume as a proxy for the measurement of investor attention. Gervais, Kaniel and Mingelgrin (2001) also state that as trading volume increases, the visibility of that particular stock increases leading to a greater number of investors allocating their attention to that stock. Another study using trading volume as a proxy for attention of investors is Lin, Wu and Chiang's (2014). They show that investor attention enables the spread of information from financial analysts across investors.

Barber and Odean (2008) also argue that when there is news disseminating information into the market about a company and causing a significant price move in that company's stocks, it will also grab the attention of investors. It is stated that

both news and resulting abnormal one-day returns are likely to be noticed by market participants. Thus, “extreme one-day returns” can be considered as a proxy for measuring investor attention. Consistent with the findings of Barber and Odean (2008), Yu and Hsieh (2010) show that both retail and institutional traders in the Taiwan Stock Exchange (TSE) pay attention to the stocks experiencing unusual one-day returns.

Advertising expense is another common proxy for measuring investor interest. Based on the fact that attention is a “scarce cognitive resource”, advertising is a useful tool to attract individual investors’ attention (Lou, 2014). According to Lou (2014), increased advertising urges retail investors to engage in trading activity. It is argued that when the amount of advertising is increased, the number of buy orders placed by retail investors also increases. Similarly, Grullon, Kanatas and Weston (2004) provide evidence in their study that more advertising generates or increases familiarity with the firm in question by capturing the attention of not only retail investors but also institutional investors. In this context, they state that increasing the advertising budget also increases the firm's recognition and thus the ownership by both individual and institutional shareholders.

Chemmanur and Yan (2009) use the number of financial analysts who cover a company’s stock as a proxy for measuring investor attention. They argue that as the coverage by financial analysts broadens, the company’s visibility and recognition among investors increase by catching their attention. In the Mola, Rau and Khorana study (2013), it is stated that analysts are effective in guiding investor attention to particular stocks. Accordingly, it is showed that the loss of analyst coverage is followed by a decrease in investor interest in the stocks in question. Barber et al. (2001) consistently state that investors give value to analyst recommendations and follow them when making trading decisions. They argue that investors would engage in buying activity when analyst make positive announcements regarding particular stocks. Conversely, they would be selling the stocks when there is a negative valuation by analysts.

2.2. Using the Internet for Attention Measurement

There is already a wide literature that focuses on measuring the interest of investors; however, Da, Engelberg and Gao (2011) argue that previous proxies do not provide a direct measurement. For example, they claim that in order to be able to measure investor attention by counting the news articles it must be made sure that investors truly read those articles. Since there is no possible way of being certain about investors reading related articles in newspapers, they state that news can only serve as an indirect proxy for investor attention. In the Da, Engelberg and Gao study (2011), it is also argued that other proxies such as trading turnover may be motivated by factors other than investor attention. Since these proxies may be affected by not only investor attention but also other factors, it is claimed that they should be considered as indirect ways of measuring attention of investors.

Instead of these indirect measures Da, Engelberg and Gao (2011) suggest a direct proxy for measuring investor attention. Taking into account the widespread Internet usage, they use the "aggregate search frequency" offered by Google as a direct measurement tool.

After the World Wide Web became publicly available in 1991, a new era began in information acquisition. In approximately 25 years, the Internet has changed the way individuals access, gather and process information about any subject. The emergence and development of the Internet make huge volumes of information about any field accessible from anywhere at any time. This gives rise to the description of the Internet as "the information superhighway" by Rubin and Rubin (2010). Nowadays, individuals refer to the Internet about almost every subject as an initial information source.

The Internet also has widespread usage among participants in financial markets. While institutional investors mainly consult terminals that offer financial data services and trading platforms, individual investors are the principal users of the Internet for trading purposes (Da, Engelberg and Gao, 2011). Consistently, Ding and Hou (2015) suggest that individual investors use the Internet for drawing and

processing information prior to engaging in trading activities. They argue that the Internet offers an uncostly way to obtain information for retail investors.

Barber and Odean (2001) state that the Internet offers a different platform where investors can reach extensive data and make trading decisions generally without the necessity of consulting third parties such as brokerage firms. Since there is often no third party involved, the Internet can serve as a good and direct proxy for measuring individual investor attention. In this context, Internet searches have recently been used to measure the level of retail investors' attention. Da, Engelberg and Gao (2011) explain that Hal Varian, Google's Chief Economist, interprets the search data as a way of revealing investors' real time interest in different financial activities. Consistently, Mondria, Wu and Zhang (2010) state that queries used in the Internet searches can offer a proxy for measuring attention due to three main reasons. First, they suggest that the World Wide Web serves as the principle platform for obtaining information. Also, it is argued that the Internet search engines have become the most attractive instruments for information acquisition as they make the desired amount of information available without any loss of time. Finally, users' search queries are claimed to directly reveal users' interests. Similarly, Ding and Hou (2015) suggest that individual investors tend to seek information using the Internet since online media is more readily reachable and usable when compared with newspaper coverage.

Da, Engelberg and Gao (2011) make use of these Internet searches through Google Search Engine when building their direct proxy for investor attention measurement. They use the "aggregate search frequency" provided by Google and argue that it serves as a direct measurement tool. They claim that Google is the most popular search engine used for obtaining information and searching for a stock via Google means that the investors are directing their attention to that particular stock.

The "aggregate search frequency" named as the search volume index (SVI) by Google can be accessed through Google Trends. Da, Engelberg and Gao (2011) explain weekly SVI for a particular term as "…the number of searches for that term

scaled by its time-series average...” In the Da et al. study (2011), the Russell 3000 stocks are examined. In order to measure the level of attention directed to these stocks, their ticker symbols are used as the search criteria and corresponding SVI are obtained. Results of the analysis reveal that although the SVI is correlated with existent attention proxies, it is also different from them. It is shown that the SVI serves as a proxy for measuring individual investor attention rather than institutional investor attention. Da et al. (2011) also find that an increase in the SVI makes leads to an increase in the stock price in the short run and to a return reversal in the long run.

The Da, Engelberg and Gao (2011) study offers a new area of research in financial economics. Referring to this study many researchers make use of the Internet search volume, especially Google searches, when measuring the attention of retail investors. Following Da et al. (2011), Ding and Hou (2015) use the search volume index (SVI) as a proxy for the active attention of individual investors. They find that when retail investors direct their attention to a particular stock via Google searches, they become more likely to be a part of the related firm’s shareholder base. The Ding and Hou (2015) study also provides evidence that increased attention leads to greater stock liquidity. Consistent with the findings of Ding and Hou (2015), Aouadi, Arouri and Teulon (2013) show that French investors’ attention influence the liquidity of the French stock market. Aouadi et al. (2013) rely on the Google search volume as a proxy for the attention of French investors highlighting the fact that Google dominates the French search engine market with a prominently high share. The Bank, Larch and Peter’s (2011) study also provides evidence for the positive relationship between changes in investor attention and stock liquidity. They proxy uninformed German investors’ attention by the Google search volume of firm names for the Xetra-listed German stocks. Goddard, Kita and Wang (2015) also use the SVI obtained from Google Insights as a proxy for investor attention. In their study, they show that investor attention influences the volatility of currency market. Vozlyublennaia (2014) proxies active investor attention by Google search in a similar fashion and investigates the impact of attention on index performance. The

study focuses on indexes in stocks, bonds, commodities and gold as investment types. It is shown that investor attention does have a short-run effect on the performance of stock, bond and commodity indexes.

As an alternative to the studies proxying investor attention by the Google search volume, the study of Mondria, Wu and Zhang (2010) uses another Internet search query dataset -namely the AOL dataset- for specifically measuring the allocation of investor attention. Mondria, Wu and Zhang (2010) explain that in 2006, the AOL released a dataset which spans through a three-month period and consists of all search queries submitted by AOL users. This dataset also reveals information about whether an AOL search engine user clicks on any of the results returned as a consequence of the query submission. Using this dataset for the given period, Mondria et al. (2010) develop an attention measure by counting the number of times users click on a result from a specific country. They argue that via this variable they can measure the attention captured by a particular country, since this dataset allows eliminating irrelevant results and identifying the relevant ones through the clicking information. Their study shows that there is a "two-way causality" between home bias and attention.

In 2015, Zhang and Wang's study, conducted with a sample of stocks listed on the China's ChiNext board market, is published. They proxy the individual Chinese investor attention by aggregate Internet search volume obtained from the Baidu search engine, which is among the most popular search engines in China with an extremely high market share. They argue that this Baidu index in question is a good candidate to serve as a proxy for measuring Chinese investors' attention for two main reasons. First, they state that Chinese retail investors mainly use the Baidu search engine instead of Google. Second, different from Google, this search engine provides daily data in real time, thereby better presenting the stocks which grab investors' attention. The Zhang and Wang (2015) study reveals a significant correlation between investor attention and the indicators of the stock market. Also, they show that attention as a limited cognitive resource that may influence the performance of the stock market.

Another notable study making use of the Internet when measuring investor attention is by Rubin and Rubin (2010). They state that they use the "Wikipedia editing frequency" as a proxy for measuring the level of investor engagement in company-specific information processing. It can be deduced that if an investor is directly involved in this process, s/he is obviously allocating attention to the firm's stock whose information s/he edits on Wikipedia. Thus, "Wikipedia editing frequency" can be considered as a proxy for investor attention. In their study, Rubin and Rubin (2010) argue that Google Trends, which provides the Internet usage as search volume measures, has the drawback of not discriminating search queries on the company products from the particular ones on the company itself. They also state that the "Wikipedia editing frequency" is more advantageous over other measures since editing Wikipedia entries requires investors to be more informed and involved as it is more than just browsing a webpage that is returned as a result of a submitted query.

In 2012, Vlastakis and Markellos suggested another use for the Google Search Volume. They proxy the demand for information by Google's Search Volume Index (SVI), whereas the number of news headlines are used as a proxy for information supply. Their study reveals the positive correlation between information demand and supply. Vlastakis and Markellos (2012) also show that increased levels of risk aversion and greater returns lead to an increase in the demand for information.

2.3. Investor Attention in the IPO Setting

So far, existing academic studies that use investor attention proxies are reviewed by especially focusing on the ones which employ the Internet in proxy construction. After explaining the means of measuring investor attention, another subject of discussion is related with observing the impact of this attention in financial markets. Among many other financial events, the Initial Public Offerings (IPOs) serve as one of the best platforms to investigate the effect of retail investor attention. Essentially, firms going public are likely to grab the attention of investors and the media. Consistently, Da, Engelberg and Gao (2011) argue that IPOs offer a common setting

to observe the impact of investor attention and test the retail attention hypothesis since the Google SVI already exists prior to going public.

The performances of IPOs in both short and long-run have been well studied and documented in the IPO literature. It is revealed that firms undergoing IPOs generally experience extremely high initial returns followed by underperformance in the long-run (Aggarwal and Rivoli, 1990; Ritter, 1991; Levis, 1993; Ljungqvist, 1997).

Many researchers have provided behavioral explanations for the observedshort and long-run performances of IPO stocks. In their 2002 study, Ritter and Welch state that the behavioral explanations for IPO underpricing and negative long-run performance are more reasonable. . Similarly, Ljungqvist, Nanda and Singh (2006) link "IPO anomalies" to the existence of irrational sentiment investors. By providing evidence from the Dot.com bubble, Chan (2014) also documents that overoptimism and bullish behavior of retail investors result in the deficient performance of IPO stocks in the long-run.

Da, Engelberg and Gao (2011) explain that investors have a tendency to buy the stocks that capture their attention according to the Barber and Odean study (2008). Thus, stocks that grab more attention from retail investors prior to going public are more likely to experience higher levels of buying when they start to be traded. Da, Engelberg and Gao (2011) also argue that due to the unlikelihood of short selling IPOs and high levels of demand from investors, IPO stocks experience temporarily high initial returns followed by price reversals as a result of declining demand in the longer run.

By its very nature, with high first-day returns and long-run underperfomance, IPOs offer one of the ideal settings to observe the impact of investor attention. There are a number of studies investigating the effects of attention in the IPO literature. One of the earliest studies is the Reese study (1998) which uses media as a proxy for investor attention. Reese counts the number of news articles that appear on 25 major newspapers citing the name of the IPO company. News articles published prior to the IPO issue date and during the period including the first year after issuance are

included in the sample. Results of the analyses reveal that companies grabbing more attention from investors (i.e. companies with a larger number of related news articles) prior to going public are more likely to be subject to higher levels of underpricing. This also leads to higher initial returns and greater volume of trading both in the short- and long-run.

Similarly, Liu, Sherman and Zhang (2009) proxy investor attention by media when investigating the influence of investor attention before going public on the level of IPO underpricing. From various news sources, articles mentioning the name of the IPO company are gathered and counted over a window from one day after the filing date to one day prior to the offering date. Liu et al. (2009) allow for abbreviations such as "Co.", "Corp.", "Inc.", "Ltd.", and "Grp." when using full company names as the search criteria. They provide evidence that increased investor attention proxied as media coverage leads to increased underpricing and thus greater first-day return. In 2014, Liu, Sherman and Zhang conducted a similar study again using media coverage as a proxy for investor attention. Their search criteria and measure of investor attention are exactly the same. Different from the previous one, in this study they focus on the month before the issue date and investigate the persistence of investor attention. Results of their study suggest that media coverage prior to the IPO has a long-term effect. Liu et al. (2014) also provide evidence that special events published in the media during the month prior to going public lessen the amount of attention allocated to the IPO firms.

Another prominent study analyzing the effects of investor attention on IPO stocks' short and long-term performances was conducted by Da, Engelberg and Gao in 2011. They use Google Search Engine for gathering information on the individual investor attention and measure the level of attention through the use of Google's aggregate search frequency, namely the Search Volume Index (SVI). They use company names provided by the Securities Data Corporation (SDC) database as the search criteria and cover the period from 2004 to 2007 for the IPO sample. Their

results reveal that the Abnormal SVI (ASVI)[2], on a stand-alone basis, strongly predicts first-day IPO return. In fact, ASVI even seems to be a better predictor than the usage of media, i.e. number of news articles mentioning the name of the IPO company, for measuring the level of investor attention. Da et al. (2011) also document that IPOs having greater investor attention before going public experience higher underperformance in the long-run.

One of the more recent studies investigating the relationship between investor attention and IPO returns is by Fang, Jiang and Qian's (2014). They measure the attention of individual investors using the Baidu index obtained from the Baidu Search Engine, which is the largest engine in China. Fang et al. (2014) use the official names for the stocks listed in the ChiNext market as the search criteria on Baidu.com. Daily values of the Baidu index for each stock in the sample are gathered for the period from June 2010 to December 2011. Results of the Fang, Jiang and Qian study (2014) indicate that increased individual investor attention has a positive effect on extreme first-day returns whereas it negatively influences returns in the long-run. Results of the Fang et al. study (2014) conducted in the emerging market of China are also consistent with the findings of previous studies which are conducted in the developed U.S. market.

A tabulated version of this literature review and a detailed list of references can be found in Appendix A and Appendix B, respectively.

[2] Abnormal Seach Volume Index (ASVI) is calculated as the difference between the log of the SVI during the IPO week and the log of median SVI during the previous 8 weeks.

CHAPTER 3

DATA AND SAMPLE CONSTRUCTION

3.1. Passive Attention Measure

Media-based measures are common proxies for the passive attention of investors (Reese, 1998; Liu et al., 2009; Fang and Peress, 2009). In order to measure the passive attention paid by Turkish investors to public information, the number of news articles -mentioning the name of the IPO company- that appear in various public disclosure platforms and news sources are counted. According to capital market regulations, IPO-related company documents are required to be announced by Borsa Istanbul prior to the IPO date. Until 2009, these documents were announced as part of the Borsa Istanbul Bulletins and the bulletins were available online at the Borsa Istanbul web site. After 2009, the documents started to be published at the Public Disclosure Platform hosted by Borsa Istanbul[3]. In this study, both platforms are reviewed in accordance with the time range of the sample.

The "Finnet News Analysis"[4] database collects up-to date news related to BIST companies and indexes and covers all official public disclosure platforms, daily newspapers and financial periodicals all the way back to 1986. The IPO-related news and mandatory disclosures are collected from the Finnet database. The software is designed to take equity name and code changes into account over the years. Some companies in the sample have undergone name and/or code changes during the sample period. The Finnet database lists the latest and current version of the company name and ticker, but does not ignore news articles that were published

[3] See http://kap.gov.tr/en/home.aspx

[4] See http://www.finnet.gen.tr/urun/fha/

previously referring to former names and/or codes. These articles are also stored under the current company name and ticker, preventing any loss of data.

The Finnet software has the option to apply filters based on news subjects, news sources and time periods while gathering company- and index-related news. Finnet states that teams read and review each and every news article and categorize them under specific subjects.

In this study, all mandatory and discretionary news originated in the media and/or announced by firms are gathered as part of the sample news collection. The only filter applied is the determination of the pre-IPO time period. The study focuses on news articles published during the 2-month period prior to the IPO date of the company. For the sample period from 2005 to 2015, a dataset of 595 articles is collected covering 118 IPOs[5] that took place in the Equity Market and 27 IPOs that took place in the Emerging Companies Market[6].

It should be noted that articles published in newspapers are important in the sense that they give rise to a "self-selective mechanism" leading information to disseminate towards individual investors rather than institutional ones (Bajo and Raimondo, 2015). Bajo and Raimondo (2015) state that newspapers enable readily available access to information by selecting the related financial information to be published in a very limited space in an explicit and understandable manner.

In this thesis, a news measure, *News*, is generated from these aforementioned news articles that are gathered via the Finnet database. This measure is equal to the ratio of the number of news articles published during the 30 days prior to the IPO date to the average number of articles issued during the 60 days prior to the IPO date. The

[5] During the period from 2005 to 2015, a total of 119 IPOs took place in the Equity Market of BIST. One of these IPOs, namely the IPO of "Evg Yatırım Ortaklığı A.Ş.", is excluded from the sample, since there are no data available regarding this IPO in the Finnet database.

[6] Borsa Istanbul consists of six markets, two of which are Equity Market and Emerging Companies Market. 118 IPOs took place in the National, Second National and New Economy Markets which are submarkets of the Equity Market.

News measure is adopted to capture the trend in the number of news during the month prior to the IPO.

$$News = \frac{number\ of\ news\ over\ last\ 30\ days}{average\ number\ of\ news\ over\ last\ 60\ days} \quad (1)$$

According to this measure, if there are no news published between days -60 and -31 prior to the IPO and if news appear only during the month just prior to the IPO (between days -30 and 0), then *News* would be equal to 2 and this is the maximum value for this variable.

3.2. Active Attention Measure

For active attention measurement, following Da et al. (2011) the Google search volume (GSV) index is used as a proxy for the Turkish retail investors' attention. Google search is well documented as a proxy for measuring individual investor attention in a number of academic studies (Bank et al., 2011; Da et al., 2011; Aouadi et al., 2013; Goddard, Kita and Wang, 2015; Ding and Hou, 2015). The Google search volume is used as an active attention proxy because: *(i)* the Google search volume proxies investor attention in a more timely manner when compared to measures of passive attention, *(ii)* when an investor searches for a stock via Google, s/he is obviously directing attention to that particular stock (Da, Engelberg and Gao, 2011), and, *(iii)* Google is one of the most popular search engines in the Turkish market.

Google provides search volume frequency information via its Google Trends service since January 2004. Google Trends adjusts search data to avoid the situation in which geographical locations with the highest search volume would always be ranked on top. Adjustment takes place by both normalizing and indexing. The actual search volume, i.e. the number of searches submitted for a particular keyword or topic, is first normalized by the total number of Google search queries for all keywords from a particular geographical location and time range. This normalized search volume is then indexed through by dividing it by the highest point of interest. As a result, an interval of [0,100] is obtained for the relative representation of the

Google search volume[7]. Thus, as explained in Aouadi et al. (2013), an increase in GSV indicates higher popularity for that specific keyword and it does not simply mean an increase in the number of search queries submitted for the keyword in question.

When using Google Trends as a tool to gather Google Web Search data related to the IPO companies covering the period from 2005 to 2015, geography is restricted to Turkey since this study focuses on Turkish investors. By allowing its users to select a specific geography, Google Trends makes it possible to refine results by region. Also, in order to obtain more meaningful results, Google suggests using wide time windows for the queries. For this purpose, a 2-year period covering one year before and one year after the IPO date is chosen as the time range. In this study, Google Web Search data were gathered in earlier months of 2016. Thus, for the companies that went public in year 2015, it is not possible to gather data over the 2-year window. For these companies, data are gathered within the widest possible time range starting from one year before the IPO date until the month during which data are collected. Later, when the Google Trends data are used to calculate the active attention measure, a narrower portion of this 2-year period data -*2 months prior to the month in which the individual IPO took place*- is used.

Google search volume data is collected on the basis of company names instead of stock tickers. Company names are preferred mainly due to the reason that before going public the ticker information is not available to the retail investors (Da et al., 2011). Also, usage of company names presents a much broader measure of retail attention (Bank et al., 2011 and Aouadi et al., 2013).

Regarding the usage of company names as the search criteria, Da, Engelberg and Gao (2011) argue that there are two main issues which constitute problems. First, company names can be inserted as keywords for reasons other than investing. Thus, the Google search volume for company names may include some component which is not related to stocks, such as people searching for company products (Vlastakis

[7] See Google Trends Help Center: (https://support.google.com/trends/answer/4365533?hl=en&ref_topic=4365599)

and Markellos, 2012). It should be noted that especially companies having names with multiple or generic meanings also may introduce noise to the news measure. Atypical example for such a case is the company name "*Apple*" (Da et al., 2011; Ding and Hou, 2015). Second, there are various ways of expressing the name of the companies. So, investors may spell the company names in many different ways.

In order to deal with the first problem, the context in which keywords are used in the queries are analyzed separately[8]. If it is observed that the context is not exclusively related to the IPO stock in question, a meticulous effort is given to isolate the relevant part. For this purpose, different punctuation marks are used to filter the results following Google's search tips for Trends[9]. For instance, "-" is used to exclude irrelevant contexts such as multiple or generic meanings. This punctuation is also used to eliminate other irrelevant searches looking for company products, similar firms, etc. Quotation marks are also used to exclude specific names or phrases when isolating the relevant context from multiple or generic meanings. One example to give would be the search query "flap" which is used as the Google keyword for the company named "*Flap Kongre Toplantı Hizmetleri Otomotiv ve Turizm A.Ş.*" from the sample. When an analysis is carried out for the context in which the keyword "flap" is used, it is observed that there is a considerable part associated with "flap jack", which is a cereal bar brand having no relevance with the company in question. Thus, in order to be able to isolate the relevant part, '*flap – "flap jack"*' is submitted as the search term. Also, if it is observed that search queries are completely irrelevant regarding the context or if it is not possible to isolate the relevant context, the stock is excluded from the sample aiming to decrease the amount of noise introduced to the data.

[8] When a term is searched in Google and if there is enough search volume, Google Trends lists "Top searches" under the "Related searches" section at the bottom of the page. Top searches include the terms which are frequently searched together with the entered term, which enables us to identify the context of searches in the most general sense. Findings listed in the "Related searches" section can be downloaded and observed in a "csv" file together with weekly/monthly search volume.
(See https://support.google.com/trends/answer/4355000?hl=en&rd=1)

[9] See Search tips for Trends.
(https://support.google.com/trends/answer/4359582?hl=en)

While handling the Google search data, it is also seen that if there is not enough search volume regarding a submitted term, Google Trends is unable to list the contexts in which the term is used. In such cases, if the keyword in question has a generic or multiple meaning, the corresponding stock is excluded from the dataset for avoiding doubt. Also, Following Da et al. (2011) and Ding and Hou (2015), stocks with zero GSVs with an insufficient amount of search volume are excluded from the sample.

In order to address the second problem regarding different variations of company names, following Vlastakis and Markellos (2012) a method is adopted when inserting keywords on Google Trends. As a start, the full company name as listed on Borsa İstanbul is used as the search term allowing for abbreviations such as "A.Ş.". Together with the full company name, other known variations are also inserted in Google Trends and the keyword with the highest search volume in the most relevant context is adopted. If the highest search volume appears in the variations which have multiple or generic/conventional meanings in Turkish, such as "*Hedef*" (*meaning "aim" in Turkish*) and "*Sağlam*" (*meaning "strong" in Turkish*), following Aoudi et al. (2013) these keywords are excluded from the sample to prevent noise. Also, in order to extend results to include more than one popular or known variation, the "+" punctuation is used following Google's tips for Trends[10].

When generating IPO companies' dataset for the Google search data, companies who have very similar names or have gone public within the same year are handled meticulously. If it is identified that these companies are owned by the same parent company or are related to each other in terms of subsidiaries or affiliates, then they are removed from the sample. The main motivation behind the removal is the well-nigh impossibility of separating investors' attention directed to these companies from each other. In other words, these companies' IPOs occurring within the same year are treated as confounding events. One example to give would be the companies "*İhlas Gazetecilik A.Ş.*" and "*İhlas Yayın Holding A.Ş*" who both went

[10] See Search tips for Trends.
(https://support.google.com/trends/answer/4359582?hl=en)

public within the year 2010. Approximately 57% of "*İhlas Gazetecilik A.Ş.*" is affiliated with "*İhlas Yayın Holding A.Ş*" through their parent company and this leads to the exclusion of both companies from the sample.

When the above mentioned methods are followed, 42 companies are excluded from the sample of 145 IPOs over the period from 2005 to 2015. The GSV data for all the 103 IPO companies remaining in the sample are downloaded from https://www.google.com/trends/. When downloading the GSV data, the above mentioned methods and processes are followed to determine the related search keywords for each and every company in the sample[11]. According to the amount of search volume data, Google creates the GSV indexes on a weekly basis for those companies with popular and frequently searched keywords and on a monthly basis for companies with less frequent searches[12].

In order to use in the analyses, a consolidated monthly stock sample is generated by using the weekly and monthly GSV data. Following Bank et al. (2011), weekly data are converted into monthly format for the sample construction. When applying this conversion, monthly data are obtained from the average GSV data of the corresponding weeks. While converting weekly data into a monthly format, companies that went public at the beginning of the month are analyzed with extra caution. One example from the sample is the company "*Coca-Cola İçecek A.Ş.*", which underwent its IPO on May 3, 2006. When this specific day is marked on the calendar, it can be observed that it corresponds to the middle of the week starting with April 30, 2006[13]. Therefore, when Coca-Cola's weekly GSV data is pivoted into the monthly format using Excel's date function, this day seems to be in April resulting in misleading monthly data. For such cases, GSV of the previous month containing IPO day's corresponding weekly GSV data is used in the analyses.

[11] See Appendix D for the complete list of chosen search keywords.

[12] Google Trends data are exported in the CSV file format.
(See https://support.google.com/trends/answer/4365538?hl=en)

[13] Unlike the international standard ISO 8601, Google considers Sunday as the start of the 7-day week.

The measure of attention based on the GSV data is calculated by following Da et al. (2011) and Ding and Hou (2015) methodology. Different from this study, the variable is constructed from the monthly GSV data instead of the weekly data since 51 of the 103 IPO companies in the sample only have monthly GSV data available. The change in GSV, namely the abnormal Google search volume (*AGSV*), is calculated as follows:

$$AGSV = \Delta GSV_m = Log(GSV_m) - Log[Avg(GSV_{m-1}, GSV_{m-2)}] \quad (2)$$

In Equation (2), GSV_m and [Avg(GSV_{m-1}, GSV_{m-2})] represent the search volume during the IPO month m and the average value of the search volume during the previous 2 months, respectively. Using the change in GSV makes it possible to eliminate the seasonality with low frequency and time trends in the data as stated by Da et al. (2011). Also, a positive change in GSV reflects increased investor attention which leads to engagement in trading activity (Da et al., 2011; Ding and Hou, 2015).

While performing the above logarithmic transformation of the data, in order to handle the zero GSV values a simple work-around is adopted by replacing zeros with ones. 1 is a relatively small value when the [0, 100] interval is considered for the relative representation of the Google search volume. Also, when the GSV values of the 103 companies in the sample are analyzed over time, it is observed that values under 10 are not common. Therefore, 1 is considered small enough to replace the zeros and obtain meaningful results at the same time. Choosing a much smaller value such as 0.0001 would lead to misleading results when the [0, 100] data range is taken into account since such a replacement would cause negative log values. Additionally, transformation by adding 1 to the zero GSVs has the neat feature of mapping zeros to zeros.

3.3. Investor Attention and the IPO Sample

Pre-IPO attention of individual investors is proxied by using the GSV-based measure. During the period from 2005 to 2015, 145 IPOs took place in the Turkish stock market. 118 of these IPOs occurred in the Equity Market whereas 27 IPOs

were in the Emerging Companies Market. 42 of these IPOs are eliminated from the sample due to missing GSV values or having names with multiple and/or generic meanings in the Turkish language. As a result, a sample of 103 IPOs is constructed. 52 of these IPOs have weekly GSV values available whereas 51 of them have only monthly GSV values according to the amount of search volume on Google. As described in the previous section, the weekly data are converted into a monthly format resulting in a consolidated monthly stock sample of 103 IPOs. A subsample of 52 IPOs is also constructed with companies having weekly GSV values.

With these two stock samples, it is first analyzed whether there is a significant increase in the retail investor attention around the IPO event. Panel A of Figure 3.1 demonstrates a considerable trend in the upward direction beginning from 3 to 4 weeks before the IPO date and making an extreme jump of approximately 89% in the IPO week. This trend in the weekly sample of 52 IPOs is consistent whether the sample mean or median is used in measuring the GSV around the IPO event. Panel B of Figure 3.1 illustrates the GSV trend in the monthly sample of 103 IPOs. Monthly trend is also consistent with the results in Panel A. Mean GSV value starts to ascend beginning from 2 months prior to the IPO and makes a drastic leap in the IPO month. In Panel B, another noticeable result is that following the IPO month, the mean GSV does not revert back to the value before the IPO date. It continues to float above the pre-IPO mean GSV values. This trend shows that companies undergoing their IPOs persist in attracting individual investors' attention even after the IPO date. The trend in the monthly sample is consistent when GSV is measured by the sample median as well. Figure 3.1 illustrates the GSV values in the range of [0,100] since this interval is defined for the relative representation of search volume on Google as described in section 3.2.

Following the study of Da et al. (2011), a similar analysis is also performed with weekly and monthly stock samples to examine the trend in abnormal Google search volume (*AGSV*) around the IPO date. The plots in Panel A and Panel B of Figure 3.2 reveal results validating the trend in Figure 3.1. In Panel B of Figure 3.2, median

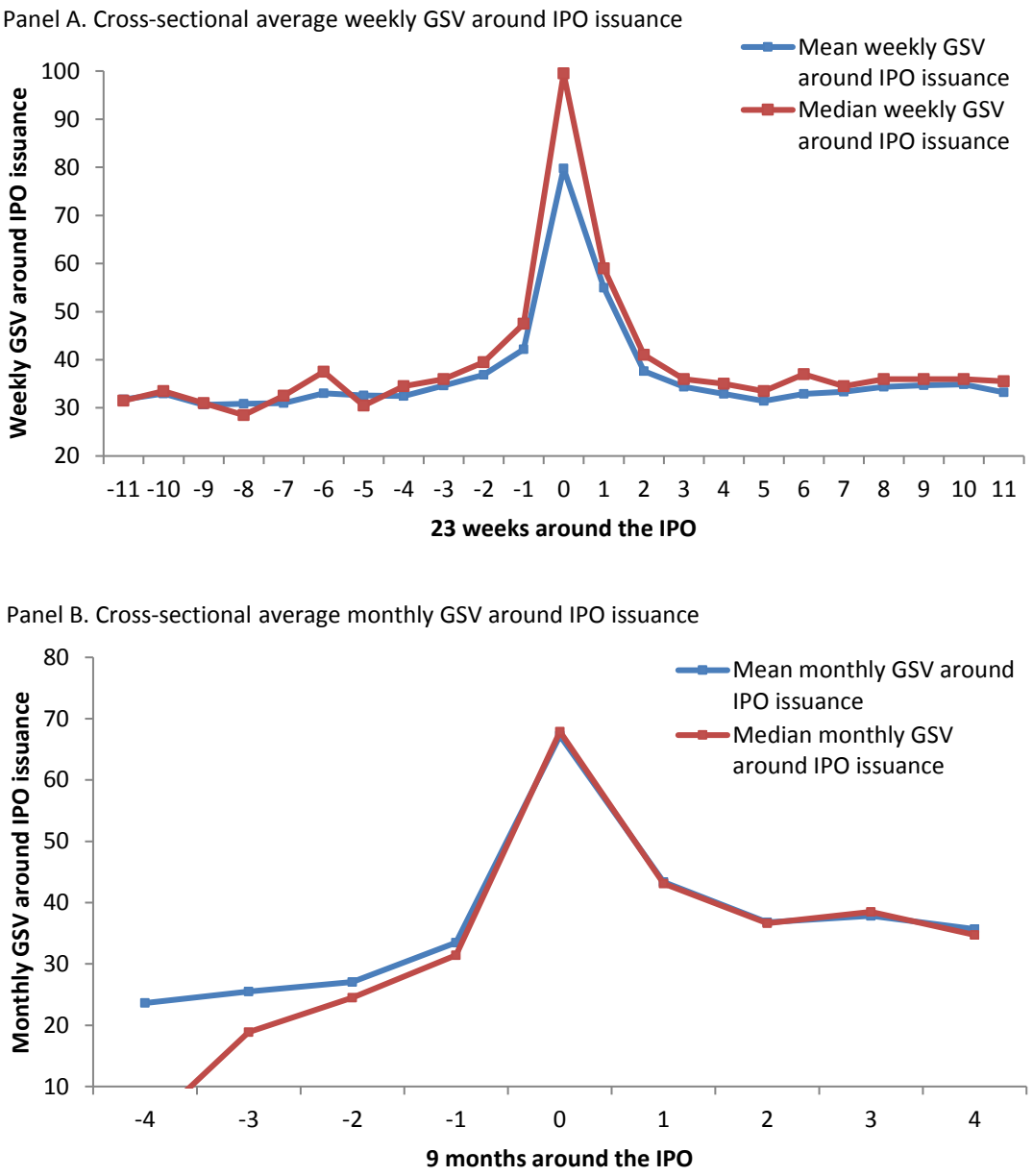


Figure 3.1. Average weekly and monthly GSV around the IPO date. Panel A illustrates the cross-sectional weekly mean and median of the Google search volume (GSV) index around the IPO week. The sample covers 52 IPOs from January 2005 to December 2015. Panel B shows the cross-sectional monthly mean and median of GSV around the IPO month. The monthly subsample includes 103 of the IPOs from January 2005 to December 2015 for which either weekly GSV values are not available or the company has a name with multiple/generic meanings in the Turkish language. GSV values are illustrated in the range of [0, 100] as described in section 3.2.

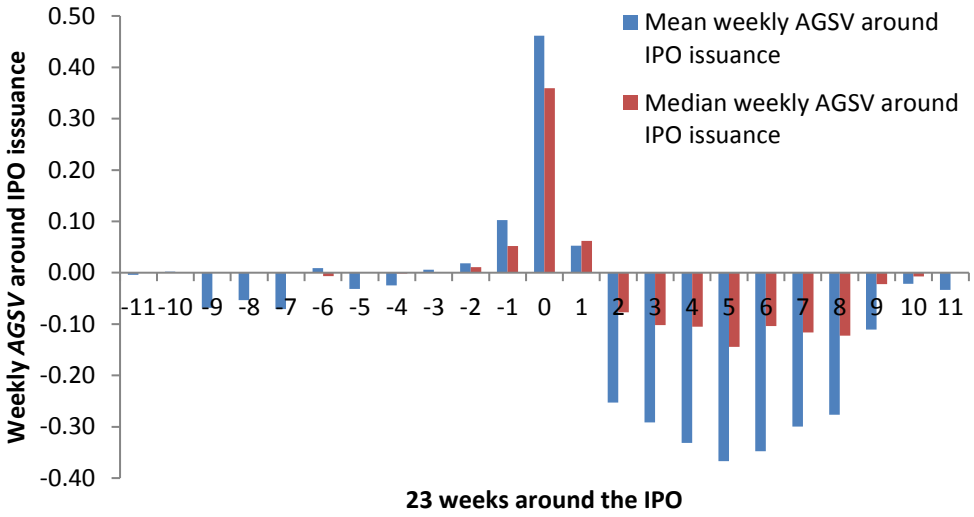
monthly *AGSV* values prior to the IPO month do not appear on the graph since most of the companies have a zero *AGSV* value before the IPO month.

The relationship between company size and the amount of attention allocated to the IPO companies is also investigated. 103 firms in the monthly subsample are classified into two groups according to their size. Companies with a size larger than the sample median are classified as large and others are classified as small. Average *AGSV* values are calculated within these groups. Panel A of Figure 3.3 shows how active investor attention, namely *AGSV*, differs across the IPO companies with small and large size. Larger companies are expected to capture higher levels of investor attention; however, results reveal that small companies have an average *AGSV* value of 0.88, whereas large companies' measure is around 0.54. This unexpected difference shows that individual investors direct greater attention to smaller firms. A possible explanation could be that retail investors mainly use Google Search Engine to gather information about smaller companies which are less likely to be known by the public.

A similar analysis is performed with the passive attention measure, namely *News*. A grouping according to company size is carried out in the extended IPO sample of 145 companies[14]. Mean and median *News* measures are calculated for both groups of small- and large-sized firms. Panel B of Figure 3.3 illustrates the results. Median *News* measures for both company sizes are calculated to be 2, which is the maximum possible value. This is due to the reason that most of the companies in the sample have the *News* measure value 2, experiencing great levels of passive attention during the 1-month period prior to the IPO date. According to Panel B of Figure 3.3, there is no noticeable difference between the amount of passive attention allocated to small and large companies. Hence, it can be concluded that company size is not a determinant of the frequency with which various news sources and public disclosure platforms publish news articles about IPO companies.

[14] 42 companies which are eliminated due to their names or missing GSV values are included in this sample since they have their *News* measure data available.

Panel A. Cross-sectional average weekly *AGSV* around IPO issuance



Panel B. Cross-sectional average monthly *AGSV* around IPO issuance

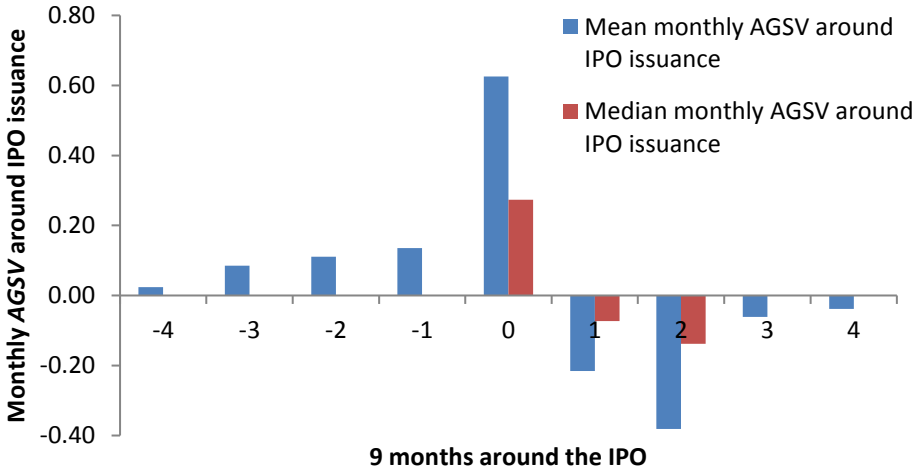
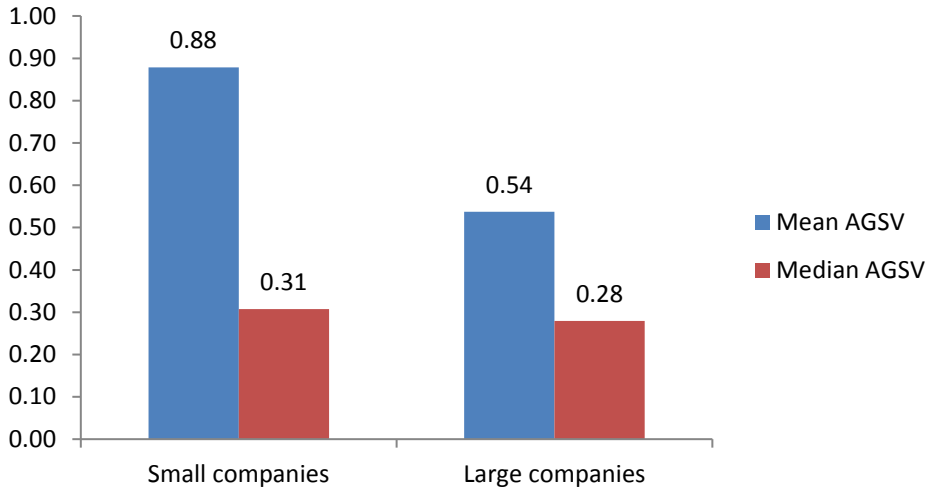


Figure 3.2. Average weekly and monthly *AGSV* around the IPO date. Panel A illustrates the cross-sectional weekly mean and median of the abnormal Google search volume (*AGSV*) around the IPO week. The sample covers 52 IPOs from January 2005 to December 2015. Panel B shows the cross-sectional monthly mean and median of the abnormal GSV around the IPO month. The monthly subsample includes 103 of the IPOs from January 2005 to December 2015 for which either weekly GSV values are not available or the company has a name with multiple/generic meanings in the Turkish language.

Panel A. Average *AGSV* across small and large companies



Panel B. Average *News* measure across small and large companies

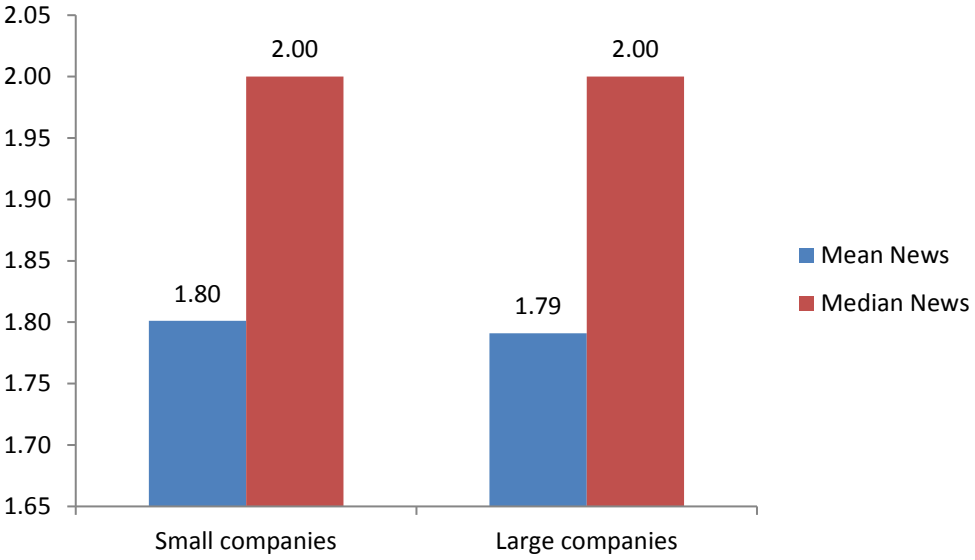


Figure 3.3. Average values for *AGSV* and *News* measures across small and large companies. If the pre-IPO *total assets* of a company is below the sample median, that company is classified as *small*; it is classified as *large* otherwise. In Panel A, 103 companies are classified according to their size. Mean and median *AGSV* values are calculated for groups of small and large companies. In Panel B, the classification is carried out for 145 companies and mean and median *News* values are calculated for each group.

Another analysis is performed to observe how mean *AGSV* values of companies vary across the range of sectors for the IPO companies. The 103 companies in the sample are grouped according to their corresponding industries as listed on the BIST. Mean *AGSV* values are calculated for each industry. Panel A of Figure 3.4 illustrates the results. Most attention-grabbing companies seem to be in the "*Transportation, Telecommunication and Storage*", "*Wholesale and Retail Trade, Hotels and Restaurants*" and "*Technology*" sectors. Also, results reveal that individual investors do not allocate much attention to firms which belong to the "*Education, Health, Sports and Other Social Services*" and "*Electricity, Gas and Water*" sectors.

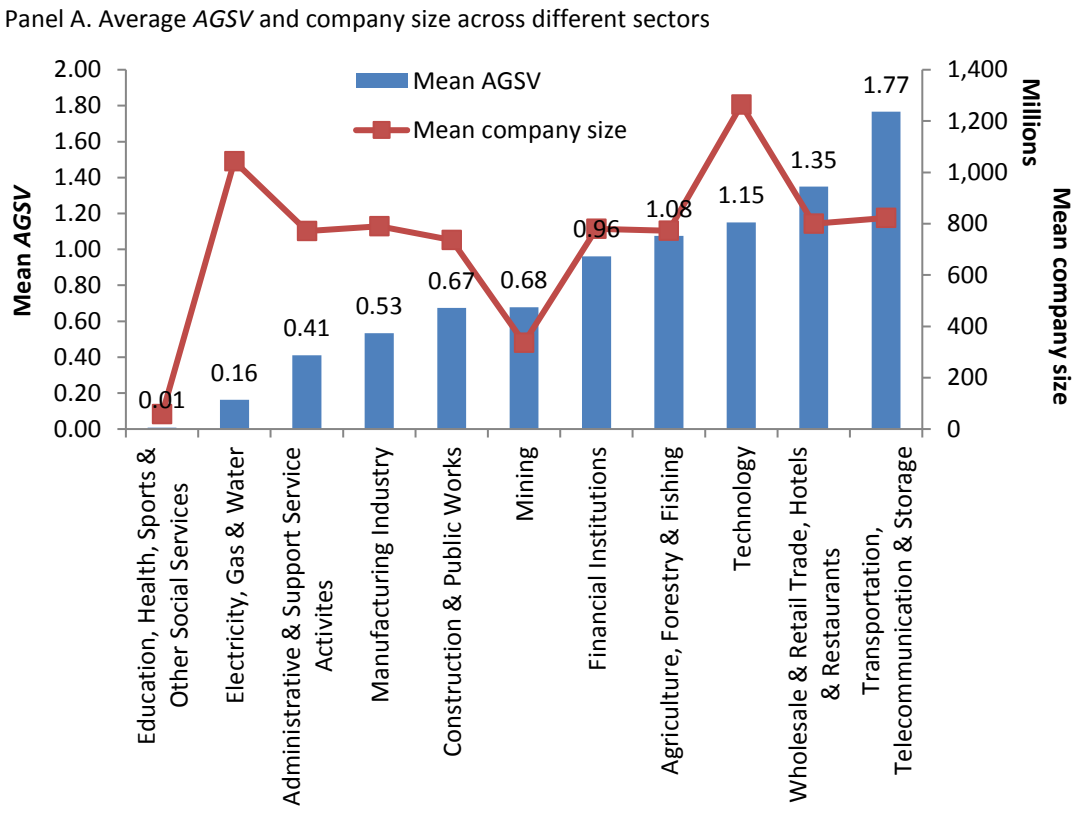


Figure 3.4. Average company size, *AGSV* and *News* values across different sectors. In Panel A, 103 companies are classified according to their sectors. Mean company size and *AGSV* values are calculated for each sector.

This industry-based analysis is extended to observe the allocation of investors' passive attention among various industries. A classification according to sectors is carried out in the extended sample of 145 companies. Mean *News* measure is calculated across these sectors. Panel B of Figure 3.4 reports the results. There are no large differences across the industries. Relatively less passive attention is given to "*Technology*" and "*Education, Health, Sports and Other Social Services*" sectors. It seems like various news sources and public disclosure platforms feature news articles related to IPO companies regardless of their industry. Another noteworthy remark regarding Figure 3.4 is that "*Technology*" is one of the most attention-grabbing sectors on the active side, whereas it is the least attractive industry in terms of passive attention.

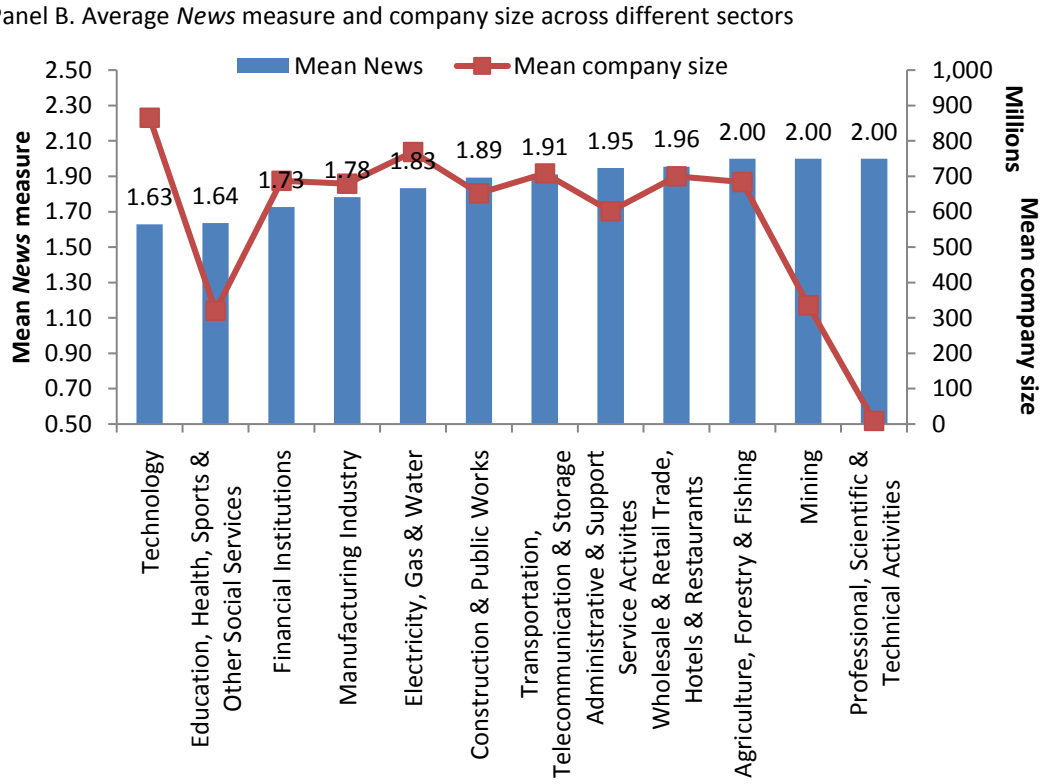


Figure 3.4 – *continued*. Average company size, *AGSV* and *News* values across different sectors. In Panel B, classification according to sectors is carried out for 145 companies and mean company size and *News* values are calculated across sectors.

Figure 3.4 also illustrates another important finding regarding the correlation between attention measures and average company size within each industry. Panel A of Figure 3.4 reveals that mean *AGSV* values and mean company size across different sectors have a similar trend. Mean active attention measure seems to increase with ascending average company size across industries. This increasing trend reveals that sectors attracting more individual investor attention also have larger average company size.

Findings in Panel B of Figure 3.4 are different from those in Panel A. Generally, average company size values do not differ considerably across the industries in the sample; however, results for the lowest and highest mean attention groups are quite unexpected. The "*Technology*" sector attracting relatively less passive attention has the greatest average company size, whereas the "*Professional, Scientific and Technical Activities*" sector has the smallest mean company size with one of the highest passive attention measures.

CHAPTER 4

METHODOLOGY AND MODEL CONSTRUCTION

4.1. Model for the Short-term Effects of Investor Attention

As stated in Da et al. (2011), IPOs offer an ideal setting to observe the effects of individual investor attention on prices. By their very nature, IPOs are more than likely to grab the attention of retail investors and generate a tendency to engage in buying behavior. As discussed in Da, Engelberg and Gao (2011), this increased pressure of buying leads to even higher returns in the first trading day.

Following Da et al. (2011), it is observed how the level of pre-IPO active attention affects the first trading day returns. The 103 IPOs in the sample are classified into two groups according to having low or high individual investor attention during the corresponding month of the IPO. Companies with an attention measure higher than the sample median are classified as high and others are classified as low. Figure 4.1 illustrates the relationship between investors' active attention during the month of the IPO and the first trading day returns. The group of IPOs having low *AGSV* during the IPO month experiences an average first trading day return of 3.03% whereas the group with high *AGSV* has a higher return of 4.94% on the first trading day. T-tests followed by non-parametric Wilcoxon tests are performed to observe whether this difference of approximately 1.91% between the sample means are statistically significant or not. Unlike the expectation, the results of both tests appear to be statistically insignificant.

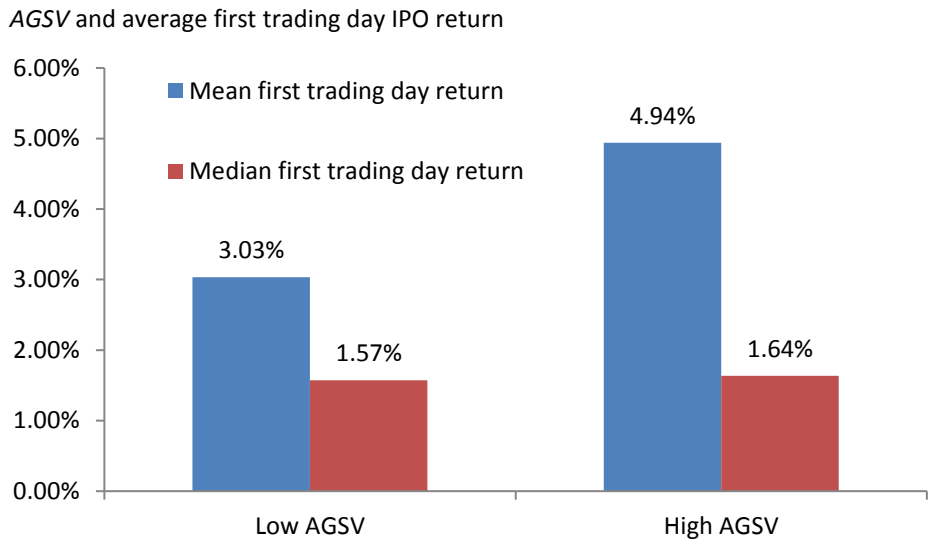


Figure 4.1. *AGSV* during the month of the IPO and average first trading day IPO returns. First trading day IPO returns are calculated across low and high *AGSV* companies. If the *AGSV* of a company is below the sample median, that company is classified as *low AGSV*; it is classified as *high AGSV* otherwise. For this figure, 103 companies are classified according to their *AGSV* values.

A similar analysis is also performed to examine the relationship between investors' passive attention, namely *News* measure, and IPO first trading day returns. 145 IPOs having corresponding *News* measure data available in the sample are categorized according to having low or high levels of passive attention prior to the IPO date. When the *News* measure values within these categories are examined, it is observed that 105 out of 145 companies belong to the group experiencing high passive attention with the maximum possible value, 2. Since approximately 72% of the companies have this maximum value, it is deduced that calculating mean first day returns within the categories would not have a discriminative implication.

In order to empirically observe the effects of investor attention on short-run IPO returns, the above mentioned analysis is further formalized by adopting the following model:

$$first-day\ return = f\ (AGSV, News, total\ assets, age, offer\ size, past\ sector\ return, underwriter\ reputation) \quad (3)$$

The dependent variable in Equation (3) is the return of an IPO stock on the first trading day and is calculated as follows:

$$first - day\ return = \frac{IPO's\ first\ trading\ day\ closing\ price}{IPO's\ offer\ price} - 1 \quad (4)$$

First trading day closing prices for the samples IPOs are obtained from the BIST database. In the model, it is examined whether pre-IPO active and passive investor attention measures, *AGSV* and *News* respectively, predict high IPO returns on the first day of trading. The expected relationship with these attention measures and the IPO *first-day return* is positive. Thus, consistent with the Reese study (1998), companies capturing more attention of investors are expected to be subject to greater levels of underpricing, experiencing higher initial returns eventually.

Also, some firm characteristics are controlled in this model. The logarithm of the size of the company prior to the IPO (log(*total assets*)), the logarithm of the company age (log(*age*)) and the logarithm of the IPO offer size (log(*offer size*)) are these firm-level control variables.

Size of a particular company prior to its IPO is equal to its *total asset*s in the last reported annual balance sheet before the IPO. For example, if the company went public in the year 2008, the amount of *total assets* is taken from the company's December 2007 balance sheet. The company *age* is defined as the number of years passed from the founding of the company to the time of its IPO.

The independent variables of *total assets* and *age* are expected to have a positive influence on short-run IPO returns. These independent variables are likely to influence the amount of retail investor attention allocated to a particular stock and increase the tendency of engaging in buying behavior resulting in higher first-day IPO returns. Larger and older firms have a higher probability of being publicly known and recognized. As stated in Kahneman (1973), investors have limited attention to allocate among different stocks. Since attention is a "limited cognitive resource", individual investors are more likely to select stocks that they are already

familiar with. Also, as stated in Liu et al. (2014), older firms have more time to capture the attention of retail investors when compared to the younger ones.

Here, it should be referred back to section 3.3, where a preliminary analysis regarding the relationship between attention measures and company size are investigated for the sample. Although larger companies are expected to attract more investor attention, Figure 3.3 reveals that investors direct more of their attention, especially their active attention, to smaller firms. As presented in section 3.3, a possible explanation would be that individual investors use the Google Search Engine to obtain information regarding the smaller companies that are less likely to be known and recognized publicly. This relationship between attention measures and company size should be further analyzed according to the empirical findings.

The other independent variable, IPO *offer size*, is calculated by multiplying the IPO offer price by the number of shares offered. The data regarding the offer price and number of shares offered are obtained from the corresponding IPO prospectus stored in the BIST database. The expected relationship between IPO *offer size* and initial returns is also positive. Companies having greater offer size are more likely to be noticed and traded by retail investors. As discussed in Güner, Önder and Danışoğlu Rhoades (2004) companies with larger offer size are expected to experience higher levels of underpricing and greater initial returns.

In the model, following Da, Engelberg and Gao (2011), a control variable for the past sector return is also constructed. Da et al. (2011) control for past industry return that is defined as the "Fama-French 48-industry portfolio return". Similarly, a *past sector return* variable is defined in the following manner:

$$past\ sector\ return = [(1 + r_{t-4})(1 + r_{t-3})(1 + r_{t-2})(1 + r_{t-1})] - 1 \quad (5)$$

In Equation (5), r_{t-1} to r_{t-4} are the corresponding weekly sector returns and t is the week of the IPO. This variable is defined as the cumulative return of the IPO company's sector index during the 4-week period prior to the IPO date General sector-level movements during the 4-week period prior to the IPO are controlled for

by this *past sector return* variable. A positive relationship is expected between this variable and the IPO *first-day return*. A positive trend in the *past sector return* is expected to have a positive influence on the short-run IPO performance.

In this model, the *underwriter reputation* is also controlled. The reputation measure is calculated as the share of the IPO's lead underwriter in the total amount of IPOs conducted on Borsa Istanbul until the time of the IPO in question. There is no clear expectation regarding how this reputation affects the IPO *first-day return*. This relationship can be approached from two different aspects. First, in the IPO literature it is well-documented that more reputable underwriters underprice to a lesser level leading to relatively lower initial returns (Wang, Liu and Wu, 2003; Güner, Önder and Danışoğlu Rhoades, 2004). On the other hand, from the attention perspective, it is likely to expect IPO companies with reputable underwriters to attract more investor attention, be subject to greater levels of trading and experience higher initial returns.

4.2. Models for the Long-term Effect of Investor Attention

4.2.1. Model for the Liquidity Effect

This part of the analysis focuses on identifying whether pre-IPO investor attention has long-run effects in terms of having a longstanding role. As stated in Kahneman (1973), investors have limited attention to allocate among various stocks. Consistently, investors experience home bias (Tesar and Werner, 1995; Ding and Hou, 2015) and continue to invest in stocks that they are already familiar with. Van Nieuwerburgh and Veldkamp (2009) further show that investors favor stocks that they already know about and keep directing their limited attention to them. In this context, the tests are focused on whether stocks continue to attract the same level of their pre-IPO investor attention in the long-term.

When a stock continues to attract investors' attention, it becomes more likely to be traded by a larger base of shareholders and has a greater liquidity eventually (Ding and Hou, 2015). Thus, following Liu, Sherman and Zhang (2014), post-IPO investor

attention is proxied by the stock's subsequent *liquidity*. In this study, *liquidity* is measured by the logarithm of the turnover ratio. Turnover ratio is defined as the mean post-IPO trading volume of the company divided by number of shares outstanding by the end of week [t+52], where week t is the week the company's IPO took place.

Company post-IPO volume of trading is calculated as the mean value of the monthly trading volume during the period starting from the Friday of week [t+5] until the end of week [t+52], where week t is again the week the company underwent its IPO. Here, the period of [t+5, t+52] is defined following Da, Engelberg and Gao (2011). As stated in Da et al. (2011), the main motivation is to eliminate the effects of underwriters' attempts for stabilizing price as the market maker during the first four weeks following the IPO.

The following model is constructed to observe how the pre-IPO active and passive investor attention measures *AGSV* and *News* affect the stock's subsequent *liquidity* after the IPO date:

$$liquidity = f\ (AGSV, News, total\ assets, age, underwriter\ reputation, \\ first-day\ return, long-run\ return, post-IPO\ sector\ return) \quad (6)$$

Regarding the active and passive attention measures, a positive influence on company's post-IPO *liquidity* is expected. As already discussed, stocks with high pre-IPO investor attention are likely to retain this attention leading to greater levels of liquidity following the IPO.

In this model, other variables such as the logarithm of the size of the company prior to the IPO (log(*total assets*)), the logarithm of the company age at the time of the IPO (log(*age*)) and the *underwriter reputation* are also controlled. These control variables are defined as before and are expected to affect the amount of attention directed to a particular stock influencing its *liquidity*.

Larger companies are likely to attract more investor attention as their probability to be known and recognized by individual investors is higher. Thus, the expected

relationship between company size and post-IPO *liquidity* is positive. However, as discussed in the previous section, it should be noted that Figure 3.3 in section 3.3 illustrates findings which are not consistent with the expectations. Thus the empirical estimations should be further analyzed.

Similarly, older companies have more time to capture investors' attention. Hence, the *age* variable is expected to be positively related to the IPO stock's subsequent *liquidity*. Likewise, a positive relationship between *underwriter reputation* and *liquidity* is expected since an IPO brought to the market by a more reputable underwriter is expected to have a greater likelihood to be noticed and traded by retail investors (Liu et al., 2014).

IPO first trading day returns as described in Equation (4) are also controlled for in the model. From the attention perspective, companies with high initial returns are likely to continue to capture retail investors' attention and experience higher levels of trading. Thus, this variable is expected to have a positive influence on the IPO stock's subsequent *liquidity*.

Another firm-level control variable is the post-IPO cumulative return, *long-run return*, of the IPO company during the [t+5, t+52] window:

$$long - run\ return = [(1 + r_{t+5})(1 + r_{t+6})(1 + r_{t+7}) \dots (1 + r_{t+52})] - 1 \quad (7)$$

In Equation (7), r_{t+5} to r_{t+52} are the weekly returns calculated according to the closing price of the IPO company on each Friday through the period of [t+5, t+52], where week t is the week of the IPO. A positive relationship is expected between *long-run return* of the company and stock *liquidity* after the issuance of the IPO.

Post-IPO cumulative sector return (*post-IPO sector return*) is also controlled for in the model. *Post-IPO sector return* is calculated cumulatively for the IPO company's sector index during the weekly period of [t+5, t+52] and based on the Friday closing prices. The general trend within the company's sector is likely to influence the IPO company's probability to be traded and hence experience greater liquidity. Thus,

this industry-level characteristic is expected to be positively related to the stock's *liquidity* after the IPO.

4.2.2. Model for the Long-run Return Effect

Long-run underperformance of IPOs has been well-studied in the IPO literature (Ritter, 1991; Ljungqvist, 1997; Da et al., 2011). These studies document that IPOs having positive short-run returns generally experience negative returns in the long-run as they are subjected to greater levels of underpricing. This section of the analysis concentrates on observing whether and how pre-IPO individual investor attention is related to the performance of the IPO stocks in the long-run.

In order to formalize the analysis, the following model is adopted:

$$\begin{aligned} &long-run\ return \\ &= f\ (AGSV, News, first-day\ return, total\ assets, age, offer\ size, \\ &\qquad underwriter\ reputation, post-IPO\ sector\ return) \end{aligned} \tag{8}$$

In Equation (8), all variables are defined as before.

The independent variables of IPO first day return, *first-day return*, and the pre-IPO passive and active individual investor attention measures, *News* and *AGSV*, are the main focus points of the model. The influence of these variables on the long-run IPO returns is open to discussion. This relationship can be approached from two different aspects. From the attention point of view, a positive relationship can be expected since IPO companies experiencing high initial returns and/or attracting greater levels of investor attention prior to the IPO are likely to continue to capture investor attention, be subject to greater levels of trading and may experience higher returns in the long-run. On the other hand, from the classical point of view IPO companies with higher first day returns are likely to experience price reversals in the long-run due to the declining demand. Greater levels of pre-IPO investor attention also contribute to the buying pressure at the IPO date and increase the likelihood of long-run price reversions. For further analysis of the nature of the relationship between these independent variables and long-run IPO performance, following Da

et al. (2011), the interaction of attention measures with the IPO first day return is also controlled for in the model.

Some firm-level characteristics such as the logarithm of the age of the company (log(*age*)) and the logarithm of the company's total assets prior to the IPO (log(*total assets*)) are also controlled for in the model. As discussed in the previous sections, larger and older firms are more likely to grab individual investors' attention. Stocks of these firms have a greater likelihood of being involved in trading activity, which also affects IPO returns both in the short- and long-run. Thus, these firm-level variables are expected to be positively related to the long-run price performance of IPO companies. At this point, findings in Figure 3.3 of section 3.3 should be remembered. As explained before, this figure shows that smaller firms attract more investor attention contrary to the expectations. Thus, results of empirical analysis should be further examined.

Another control variable is the logarithm of the IPO offering size (log(*offer size*)). From the attention perspective, companies with higher offer size have a greater likelihood of being noticed and subjected to trading. Thus, the *offer size* variable is expected to have a positive influence on the *long-run return* of the IPO companies.

Underwriter reputation is also controlled for in the model. As discussed in section 4.1, more reputable underwriters underprice to a lesser degree, avoiding extreme price reversals in the long-run. Also, in order to maintain their reputation, these underwriters select companies which are likely to be successful in the long-run and bring mostly such companies' issues to the market (Carter, Dark and Singh, 1998). Consistent with this general intuition, companies which are brought to the market by reputable underwriters are also more likely to capture individual investors' attention and experience higher long-run returns. Thus, this reputation variable is expected to be positively related to the long-run performance of the IPO. For further analysis, the interaction of this reputation variable with the active and passive attention measures is also controlled.

A sector-level variable, namely *post-IPO sector return*, which is described in section 4.2.1, is also controlled for in the model. This variable is expected to affect long-run performance of the IPO positively, since the general trends within an industry also influence the performance of individual companies belonging to that sector in a parallel manner.

CHAPTER 5

EMPIRICAL RESULTS AND DISCUSSION

5.1. Descriptive Statistics

Table 5.1 summarizes the descriptive statistics for the main variables of interest in the study. These variables are used to characterize the attention measures, IPO firms and their corresponding short- and long-run returns within the sample.

The descriptive statistics for all the variables in the table -except for the active attention measure, *AGSV*- are calculated for the 145 IPOs in the sample. *AGSV* summary statistics are calculated over the sample of 103 IPOs, since 42 companies are excluded due to missing GSV values or having names with multiple and/or generic meanings in Turkish as explained in the previous sections.

Average *AGSV* and *News* values in Table 5.1 show that IPOs in the sample are quite attractive in terms of retail investors' active and passive attention. Mean *AGSV* value of 0.71 indicates that an average IPO captures approximately 5 times[15] more investor attention during the IPO month when compared to the previous 2 months. Also, mean *News* measure of 1.80 illustrates that approximately 90% of news articles (see Equation (1)) about an average IPO company are published during the 1-month period prior to the IPO date.

The average age of 14.10 shows that the IPO companies in the sample are relatively younger companies. Table 5.1 also reports that IPO firms in the sample experience average initial and long-run returns of 4.64% and 3.02%, respectively.

[15] When calculating the *AGSV*, the common logarithm with base 10 is used. *AGSV* is defined as $\log(GSV_m/(Avg(GSV_{m-1}, GSV_{m-2}))$ in Equation (2), where month m is the month of the IPO. Therefore, when mean *AGSV* value is calculated as 0.71, $10^{0.71}$ defines approximately how much more attention is attracted during the IPO month when compared to the median value of the previous 2 months.

The skewness and kurtosis values presented in Table 5.1 reveal that the data have considerable deviations from being normally distributed. Skewness scores range from -2.81 to 9.36, while none of the variables has 0 skewness (which would be indicative of normality). Also, findings illustrated in Table 5.1 suggest that all variables except for *AGSV* have heavy-tailed distributions with positive kurtosis, whereas *AGSV* has a thin-tailed distribution with a negative kurtosis value. As a result, for the empirical analyses the Generalized Method of Moments (GMM) method is implemented as it does not require the data series to be normally distributed. In the following section, instead of linear regression, the GMM approach is adopted with an objective function using two stage least squares (2SLS) methodology.

For further analysis, correlations between the variables are calculated as well. Findings reveal that these correlations are usually very low. Results are reported in Appendix C.

5.2. Estimation Results

5.2.1. Short-term Effects of Investor Attention

In this part of the study, the analysis in section 4.1 is formalized. The model in Equation (3) is examined empirically by adopting a GMM approach with an objective function using 2SLS.

Table 5.2 shows the estimation results. In models 1 and 2, it is aimed to isolate the respective effects of active and passive attention measures on initial IPO returns. Results of these estimations illustrate that contrary to the expectations, neither the *AGSV* -as an active attention measure- nor the *News* -as a proxy for investors' passive attention- variables affect the IPO first trading day returns on a standalone basis.

Table 5.1. Descriptive Statistics

This table presents summary statistics for the main variables of interest. The sample includes 145 IPOs that took place from 2005 to 2015 in Borsa Istanbul. The statistics for *AGSV* are calculated over a subsample of 103 IPOs, excluding 42 firms with missing GSV values or having names with multiple and/or generic meanings. Mean, median, standard deviation, minimum and maximum values for o*ffer size* and *total assets* are presented in millions.

	Mean	Median	Std Dev	Min	Max	Skew-ness	Kurtosis
AGSV	0.71	0.30	0.81	-1.12	2.00	0.60	-1.08
News	1.80	2.00	0.46	0.00	2.00	-2.81	7.68
Age	14.10	12.53	11.81	0.18	72.97	1.90	6.31
First-day return	4.64%	2.08%	0.14	-69.71%	75.85%	-0.47	10.38
First-day sector return	0.10%	0.23%	1.73	-7.13%	4.44%	-0.51	2.35
Long-run return	3.02%	-11.78%	0.60	-84.16%	363.96%	2.85	12.07
Long-run sector return	10.98%	7.52%	0.26	-56.60%	139.35%	1.21	4.68
Turnover	0.74	0.35	1.21	0.01	9.42	4.17	22.43
Offer size	110.42	18.08	316.77	1.35	2,498.00	6.04	41.40
Total assets	676.16	44.45	3,122.56	1.06	34,424.69	9.36	97.44

In models 3 and 4, while including active and passive attention variables separately, it is also controlled for the IPO characteristics and other variables which are expected to be related with IPO initial returns. None of the attention variables and none of the control variables have a significant influence on IPO *first-day return*.

Finally, in model 5, GMM estimation is run with both attention measures and all control variables. Results again reveal that none of the variables included in the model is statistically significant. Contrary to the expectations, investors' pre-IPO attention does not seem to affect the initial IPO returns in the sample.

Table 5.2. Pre-IPO Retail Investor Attention and IPO Initial Returns

This table reports the estimation results of the following equation:

first-day return
= f (AGSV, News, total assets, age, offer size, past sector return, underwriter reputation)

The dependent variable is the IPO first-day return, *first-day return*, defined as the single-day return of the IPO calculated from its offer price and first trading day closing price. *AGSV* is the active attention measure calculated from the Google search volume data. *News* is the passive attention measure calculated from the number of articles/reports gathered from various news and public disclosure platforms covered by Finnet's News Analysis database. *Total assets* are obtained from the IPO company's last available annual balance sheet prior to its IPO. *Age* is defined as the number of years between the foundation of the IPO company and its IPO date. *Offer size* is equal to the offer price times the number of shares issued for the IPO. *Past sector return* is defined as the cumulative return of the IPO company's sector index during the 4-week period prior to the date of the IPO. *Underwriter reputation* is calculated as the share of the IPO's lead underwriter in the total amount of IPOs conducted on Borsa Istanbul until the time of the IPO in question. The sample period is from 2005 to 2015. The sample covers 145 IPOs that took place during this period. While performing analyses related to *AGSV*, 42 of these IPOs are excluded due to missing GSV values or having names with multiple/generic meanings in the Turkish language. Numbers below the coefficients are p-values. Bold figures followed by *, **, *** indicate significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: IPO first day return				
	(1)	(2)	(3)	(4)	(5)
AGSV	0.0134		0.0174		0.0177
	(0.4810)		(0.3760)		(0.3709)
News		-0.0244		-0.0269	-0.0128
		(0.3313)		(0.3009)	(0.7247)
Log(total assets)			0.0396	0.0346	0.0367
			(0.2918)	(0.2417)	(0.3408)
Log(age)			-0.0235	-0.0299	-0.0225
			(0.5729)	(0.2400)	(0.5918)
Log(offer size)			-0.0136	-0.0221	-0.0106
			(0.7685)	(0.5365)	(0.8220)
Past sector return			0.1034	0.0884	0.1144
			(0.6359)	(0.5887)	(0.6057)
Underwriter reputation			-0.0012	-0.0012	-0.0013
			(0.3374)	(0.2299)	(0.3140)
Constant	0.0305	**0.0902***	-0.1541	0.0214	-0.1315
	(0.1352)	(0.0540)	(0.4577)	(0.8873)	(0.5462)
Observations	103	145	103	145	103
R^2	0.49%	0.66%	3.37%	3.45%	3.50%

5.2.2. Long-term Effects of Investor Attention

5.2.2.1. Liquidity Effects

In this section, an empirical analysis is carried out in order to test the model in Equation (6) by implementing GMM with 2SLS. Estimation results are reported in Table 5.3.

In models 1 and 2, it is aimed to separately observe the respective effects of pre-IPO attention measures -*AGSV* and *News*- on subsequent stock *liquidity* after the IPO. Model 1 results show that *AGSV* has a statistically significant influence on post-IPO *liquidity*. The coefficient for *AGSV* is reported as 0.1804. This indicates that when there is a 1 percent increase (decrease) in the pre-IPO active attention measure, the subsequent stock *liquidity* increases (decreases) by 0.1804 percent. In model 2, contrary to the expectations the passive attention variable appears to be statistically insignificant. These results indicate that on a standalone basis an IPO stock's long-run *liquidity* is influenced by only the active attention paid by investors before the IPO date.

In model 3 where all control variables are included alongside the active attention variable, *AGSV* is still statistically significant at the 5% alpha level. In this model, the first trading day IPO returns are significant. The coefficient estimate indicates that when there is a 1 percent increase (decrease) in IPO *first-day return*, post-IPO *liquidity* increases (decreases) by 0.7859 percent. This reported positive relationship is consistent with the expectations as explained in section 4.2.1. In model 3, another statistically significant variable is the logarithm of the company's *total assets* prior to the IPO date. However, contrary to the expectations, smaller, not larger, IPO firms seem to enjoy higher long-run liquidity.

In model 4, this time the pre-IPO passive attention measure, *News* is included in the model along with the control variables. In this model, surprisingly, the passive attention measure becomes significant with a negative coefficient. The parameter estimate shows that a 1 percent increase (decrease) in passive attention is associated

with a 0.1676 percent decrease (increase) in *liquidity*. The first trading day return and size are significant with similar coefficient estimates as model 3.

Finally, the model is run by including both attention measures and all other control variables. Results are shown in column 5 of Table 5.3. Consistent with the expectations, the active attention measure *AGSV* is still statistically significant at the 5% level and has a strong positive influence on long-run *liquidity*. Interestingly, the passive attention measure is no longer significant. In line with the previous findings, IPO *first-day return* and *total assets* variables are significant with similar coefficient estimates.

5.2.2.2. Long-run Return Effects

In this part of the study, in order to formalize the analysis regarding how pre-IPO retail investor attention affects the long-run performance of the IPO stocks, the model in Equation (8) is tested with a GMM approach.

As already discussed in section 4.2.2, the expectations regarding the standalone impact of pre-IPO investor attention and first-day IPO returns on long-run performance of IPOs are unclear. The attention variables are likely to interact with *first-day return* when influencing the IPO returns in the long-run. Thus, the analysis in this section is performed to include interaction terms between the attention measures and the first trading day return variable. Table 5.4 illustrates the results.

In the first model no interaction terms are included. Results in column 1 of Table 5.4 indicate that passive attention, namely *News*, has a statistically significant and negative effect on long-run IPO performance whereas the *AGSV* variable appears to be statistically insignificant. The coefficient of the *News* variable shows that when there is a 1 percent increase (decrease) in the passive attention measure, the long-run performance decreases (increases) by 0.3388 percent.

Table 5.3. Pre-IPO Retail Investor Attention and Post-IPO Stock Liquidity

This table reports the estimation results of the following equation:

liquidity= f (AGSV, News, total assets, age, underwriter reputation, first-day return, long-run return, post-IPO sector return)

The dependent variable is the IPO stock's long-term post-IPO *liquidity* defined as the logarithm of the turnover ratio. Turnover ratio is the mean post-IPO trading volume of the company divided by number of shares outstanding by the end of the week [t+52], where week t is the week the company's IPO takes place. *AGSV* is the active attention measure calculated from the Google search volume data. *News* is the passive attention measure calculated from the number of articles/reports gathered from various news and public disclosure platforms covered by Finnet's News Analysis database. *Total assets* are obtained from the IPO company's last available annual balance sheet prior to its IPO. *Age* is defined as the number of years between the foundation of the IPO company and its IPO date. *Underwriter reputation* is calculated as the share of the IPO's lead underwriter in the total amount of IPOs conducted on Borsa Istanbul from 1990 until the time of the IPO in question. *First-day return* is defined as the single-day return of the IPO calculated from its offer price and first trading day closing price. *Long-run return* is the post-IPO cumulative return calculated from the weekly returns during the period of [t+5, t+52]. *Post-IPO sector return* is calculated cumulatively from weekly returns for the IPO company's sector index during the period of [t+5, t+52]. The sample period is from 2005 to 2015. The sample covers 145 IPOs that took place during this period. While performing analyses related to *AGSV*, 42 of these IPOs are excluded due to missing GSV values or having names with multiple/generic meanings in the Turkish language. Numbers below the coefficients are p-values. Bold figures followed by *, **, *** indicate significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: Turnover Ratio				
	(1)	(2)	(3)	(4)	(5)
AGSV	**0.1804*** **		**0.1157** **		**0.1193** **
	(0.0072)		(0.0441)		(0.0378)
News		-0.0873		**-0.1676***	-0.1287
		(0.4270)		(0.0672)	(0.2212)
Log(total assets)			**-0.3436*** **	**-0.3641*** **	**-0.3543*** **
			(< 0.0001)	(< 0.0001)	(< 0.0001)
Log(age)			0.0465	-0.0846	0.0500
			(0.6822)	(0.3310)	(0.6593)
Underwriter reputation			-0.0029	-0.0039	-0.0036
			(0.3984)	(0.2257)	(0.2927)
First-day return			**0.7859*** **	**0.8135*** **	**0.7837*** **
			(0.0097)	(0.0074)	(0.0097)
Long-run return			0.0150	-0.0869	-0.0066
			(0.8572)	(0.2202)	(0.9375)
Post-IPO sector return			-0.0727	-0.1342	-0.0806
			(0.6598)	(0.4072)	(0.6252)
Constant	**-0.6830*** **	**-0.3425***	**2.0328*** **	**2.7290*** **	**2.3486*** **
	(< 0.0001)	(0.0942)	(0.0001)	(< 0.0001)	(0.0001)
Observations	103	145	103	145	103
R^2	6.94%	0.44%	37.65%	38.15%	38.64%

In model 2, the analysis is repeated including the interaction term between *AGSV* and first-day IPO return. Results indicate that the *News* variable retains its statistical significance at the 5% level. The passive attention proxy is again reported to have a negative influence on long-run IPO performance. When the active attention measure's results are examined, it is observed that *AGSV* is not significant on a standalone basis. However, its interaction term with the *first-day return* is statistically significant and negative at the 5% level. In order to interpret the interaction term's coefficient, one should consider the partial derivative of model 2 with respect to the *AGSV* variable. The partial derivative would include the coefficients of the *AGSV* variable and its interaction term with the *first-day return*. Since the *AGSV* coefficient is insignificant, the significant interaction term suggests that for a given level of the pre-IPO active attention, higher first trading returns are associated with lower long-term IPO returns. In model 2, initial IPO returns are significant on a standalone basis as well. Inconsistent with the traditional IPO literature, the *first-day return* is reported to have a positive influence on long-run performance. The effect of the *first-day return* also should be considered in combination with its interaction term with *AGSV*. The partial derivative of model 2 with respect to the *first-day return* variable includes the coefficients of the *first-day return* variable and its interaction term. Since the interaction term has a negative coefficient and the *first-day return* has a positive coefficient, the two effects cancel each other out to some extent. The magnitude of the negative coefficient is larger, and therefore, even though the *first-day return* seems to have a positive effect on its own, the combined effect on the *long-run return* of IPO firms is negative[16]. In addition, the combined effect is negative at the mean values for the *first-day return* and the *AGSV* variables.

The interaction term between *News* and IPO *first-day return* is included in model 3. Reported results reveal that both attention measures are insignificant while the

[16] In results not reported, for each partial derivative of models 2 through 4 with respect to the *attention*, *first-day return* and *underwriter reputation* variables, a Wald test is conducted in order to test the significance of the sum of the coefficients that remain in the partial derivatives. All Wald tests are statistically significant.

interaction term between *News* and IPO *first-day return* is significant and negative. This is similar to the findings in model 2 and should be interpreted in a parallel fashion. Since the *News* coefficient is insignificant, the significant interaction term suggests that for a given level of the pre-IPO passive attention, higher first trading day returns are associated with lower long-term IPO returns. In addition, the *first-day return* has a significant and positive coefficient. Once again, since the interaction term has a negative coefficient and the *first-day return* has a positive coefficient, the two effects cancel each other out to some extent. The magnitude of the negative coefficient is smaller this time, and therefore, since the *first-day return* seems to have a large positive effect on its own, the combined effect on the *long-run return* of IPO firms is positive as well. Once again, the combined effect is positive at the mean values for the *first-day return* and the *News* variables Furthermore, in model 3, the interaction term between the *News* and *underwriter reputation* variables is significant and positive. Since neither of the variables is significant on a standalone basis, the positive coefficient of the interaction term implies that for a given level of pre-IPO passive attention, a higher *underwriter reputation* is associated with higher long-term returns.

In model 4, all variables from models 2 and 3 are included. Results are very similar to the previous findings with the exception that the standalone *News* variable and the interaction between *News* and *underwriter reputation* are no longer significant. A comparison of the magnitude of the positive coefficient for the *first-day return* versus the magnitudes of the negative coefficients for both of the interaction terms implies that a higher *first-day return* is associated with higher long-term IPO returns. Consistent with this interpretation, the combined effect is positive at the mean values for the *underwriter reputation* and the *News* variables.

Table 5.4. Pre-IPO Retail Investor Attention and Post-IPO Stock Performance

This table reports the estimation results of the following equation:

long-run return= f (AGSV, News, first-day return, total assets, age, offer size, underwriter reputation, post-IPO sector return)

The dependent variable *long-run return* is the cumulative post-IPO return which is calculated from the weekly returns during the period of [t+5, t+52], where week t is week company's IPO took place. The weekly returns used in this calculation are obtained from the closing price of the IPO company on each Friday from week 5 to week 52 following the IPO date. *AGSV* is the active attention measure calculated from the Google search volume data. *News* is the passive attention measure calculated from the number of articles/reports gathered from various news and public disclosure platforms covered by Finnet's News Analysis database. *First-day return* is defined as the single-day return of the IPO calculated from its offer price and first trading day closing price. *Total assets* are obtained from the IPO company's last available annual balance sheet prior to its IPO. *Age* is defined as the number of years between the foundation of the IPO company and its IPO date. *Offer size* is equal to the offer price times the number of shares issued for the IPO. *Underwriter reputation* is calculated as the share of the IPO's lead underwriter in the total amount of IPOs conducted on Borsa Istanbul from 1990 until the time of the IPO in question. *Post-IPO sector return* is calculated cumulatively from weekly returns for the IPO company's sector index during the period of [t+5, t+52]. The sample period is from 2005 to 2015. The sample covers 145 IPOs that took place during this period. While performing analyses related to *AGSV*, 42 of these IPOs are excluded due to missing GSV values or having names with multiple/generic meanings in the Turkish language. Numbers below the coefficients are p-values. Bold figures followed by *, **, *** indicate significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: Long-run IPO Return			
	(1)	(2)	(3)	(4)
AGSV	-0.0359	0.0638	0.0203	0.0876
	(0.6155)	(0.4341)	(0.7694)	(0.2642)
AGSV × First-day return		**-1.5598****		**-1.1485***
		(0.0194)		(0.0765)
News	**-0.3388****	**-0.2740****	-0.0585	-0.0412
	(0.0141)	(0.0449)	(0.6992)	(0.7836)
News × First-day return			**-3.8989*****	**-3.4774*****
			(0.0007)	(0.0027)
First-day return	0.4089	**1.0450****	**7.7757*****	**7.4477*****
	(0.2613)	(0.0204)	(0.0005)	(0.0007)
Log(total assets)	-0.1383	-0.1549	-0.1514	-0.1622
	(0.3248)	(0.2594)	(0.2542)	(0.2172)
Log(age)	0.0031	0.0664	0.0199	0.0647
	(0.9833)	(0.6551)	(0.8882)	(0.6492)
Log(offer size)	0.0094	0.0244	-0.0029	0.0094
	(0.9578)	(0.8886)	(0.9863)	(0.9548)

Table 5.4 (continued)

	Dependent Variable: Long-run IPO Return			
	(1)	(2)	(3)	(4)
Underwriter reputation	-0.0085	-0.0061	-0.0026	-0.0014
	(0.2986)	(0.4467)	(0.7445)	(0.8526)
AGSV × U. Reputation	-0.0007	<0.0001	-0.0073	-0.006
	(0.9083)	(0.9924)	(0.2256)	(0.3137)
News × U. Reputation	0.0080	0.0067	**0.0107***	0.0094
	(0.1907)	(0.2659)	(0.0676)	(0.1054)
Post-IPO sector return	0.2914	0.2472	0.2137	0.1896
	(0.1536)	(0.2161)	(0.2699)	(0.3228)
Constant	**1.6423****	**1.4424****	1.2354	1.1323
	(0.0487)	(0.0769)	(0.1189)	(0.1489)
Observations	103	103	103	103
R^2	12.68%	17.79%	22.98%	25.64%

5.3. Discussion of results

In this part of the study, the findings reported in section 5.2 will be further discussed and evaluated.

Regarding the impact of pre-IPO investor attention on short-run returns, as illustrated in Table 5.2, none of the variables included in the model is statistically significant. Contrary to the expectations, the results of the empirical analyses reveal that neither the active attention measure, (*AGSV*) nor the passive attention variable (*News*) is significantly associated with the IPO first trading day returns. This result also contradicts with some of the findings reported in the IPO literature. Reese (1998), Liu et al. (2009) and Da, Engelberg and Gao (2011) report that pre-IPO investor attention positively influences the extreme returns observed during the first day of trading.

These unexpected findings may be explained by the development level of the Turkish stock market. In an emerging market, where market efficiency is low, information acquisition and processing is highly costly. Therefore retail investors

are more than likely to gather information via low-cost information sources such as the Internet and various news and public disclosure platforms. Additionally, when compared to the developed markets, the number of IPOs is much smaller in an emerging market like Turkey. For instance, during the sample period from 2005 to 2015 only 146 IPOs took place in BIST whereas the U.S. market had 1786 IPOs. When IPOs with their attention-grabbing nature are few in number, their likelihood of capturing individual investors' attention may increase even further. Thus, it may be expected that since Turkish retail investors pay attention to all of the IPOs taking place in BIST, pre-IPO investor attention does not seem to have a discriminating impact on short-run IPO returns.

At this point, the findings reported in Fang, Jiang and Qian (2014) should also be discussed. This study investigates how retail investors' attention affects stock returns in China's emerging stock market. Unlike this thesis study's results, the Fang et al. study's findings provide evidence that high individual investor attention prior to the IPO is associated with high initial returns. Although ChiNext is also an emerging market, these reported results are not in line with ours. BIST and ChiNext may be compared to explain the difference in the results. During an approximately 2-year period from October 2009 to December 2011, 281 IPOs took place in ChiNext market. This number is nearly twice as much as the 146 IPOs that occurred in BIST during an 11-year period from 2005 to 2015. Since they are fewer in number, all IPOs in the Turkish stock market are likely to grab attention whereas not all of the more frequent IPO events in the ChiNext market may be received with the same level of enthusiasm. In addition, it should be stated that although both the Turkish and Chinese stocks markets are categorized as emerging, the latter is the largest emerging market in the world. The Chinese market, with its constantly improving information system, makes large amounts of information publicly available (Fang et al., 2014). In this sense, it may be that BIST has lower market efficiency and Turkish individual investors are more likely to allocate attention using less expensive sources of gathering information

In the second part of the discussion, the results illustrated in Table 5.3 regarding the impact of pre-IPO investor attention on subsequent stock *liquidity* are interpreted. Models 1 and 2 reveal that on a standalone basis only the pre-IPO active attention (*AGSV*) is significantly related to post-IPO long-run *liquidity* although both measures are expected to have a positive effect. When the third and fourth models are analyzed, findings are again surprising regarding the passive attention measure, *News*. When control variables are included and the model is run as two separate estimations with one attention measure in each, it is observed that *AGSV* has a statistically significant positive influence on subsequent *liquidity*, whereas *News* has a negative impact at the 10% level. Liu, Sherman and Zhang (2014) view post-IPO liquidity as a proxy for long-term attention. In this context, it is not surprising to find that higher levels of pre-IPO active attention are associated with higher levels of post-IPO (long-term) attention since investors seem to continue to trade stocks with which they are familiar. Surprisingly, stocks with high media coverage (passive attention) during the pre-IPO period seem to have a decline in their long-term attention (*liquidity*) during the post-IPO period. This may reflect a temporary shift in the demand curve as argued in Gao and Ritter (2010). The pre-IPO media coverage may create a "fad" phase in the market regarding the demand for the stock and the negative coefficient in model 4 may be a reflection of the fad dying out in the long-run.

In the fifth and final estimation, all control variables and both of the attention measures are included in the model. Results of model 5 show that *AGSV* retains it significant coefficient, while *News* loses its significance. *AGSV* has a positive influence on subsequent stock *liquidity* in line with the expectations. These results can be interpreted regarding the nature of attention in terms of whether it is active or passive. *AGSV* is an active attention measure, whereas *News* is a passive one. When retail investors search for a company on Google, they are evidently directing their attention to that particular stock. On the other hand, investors do not have a direct influence when constructing the passive attention measure, *News*. They simply allocate their attention among news articles which are already presented to them via

various news and disclosure platforms. In this regard, individual investors are more likely to engage in trading stocks to which they direct their active attention and contribute to increasing their subsequent liquidity. Thus, only the *AGSV* measure has a statistically significant impact on long-run stock *liquidity*.

When the results regarding the control variables are examined in Table 5.3, it is observed that IPO *first-day return* has a positive influence on subsequent stock *liquidity* in line with the expectations. In all three of the estimations in which *first-day return* is included as a control variable, it is seen that it has a statistical significance at the 1% level indicating its considerable influence on long-term *liquidity*. IPOs with high first trading day returns are more likely to keep capturing individual investors' attention and be subject to greater levels of trading. Hence, IPO companies with high (low) initial returns experience greater (less) stock liquidity following the IPO in the long-run.

Another statistically significant control variable reported in Table 5.3 is the company size. Findings regarding this right-hand side variable are inconsistent with the expectations. From the attention perspective, large companies are primarily expected to attract higher levels of investor attention both in the short- and long-run. Large IPO companies' stocks capturing higher investor attention are more likely to be subject to greater amounts of trading and should experience higher levels of subsequent liquidity. However, findings reported in Table 5.3 do not confirm these expectations. Results show that company size, represented by the logarithm of the *total assets* prior to the IPO, has a strong negative influence on subsequent *liquidity* at the 1% level. Small (large) IPO companies experience greater (less) subsequent stock liquidity following the IPO issuance. At this point, it can be referred back to Figure 3.3, which shows that smaller companies attract higher individual investor attention prior to the IPO. In line with the findings in this figure, these small IPO companies capturing greater amounts of pre-IPO investor attention are likely to retain this attention level since investors have a tendency to select stocks with which they are already familiar. As a result, smaller companies experience greater levels of trading and higher subsequent liquidity.

In the final part of the discussion, it is continued with the results reported in Table 5.4 regarding how pre-IPO investor attention affects IPO returns in the long-run. As already discussed in previous sections, the attention variables are very likely to interact with IPO *first-day return*. Hence, in the estimations in Table 5.4, it is also concentrated on the interaction terms between attention measures and initial returns. In Model 1, where both interaction terms are excluded, only the passive attention measure, *News*, is reported to predict long-run IPO returns. In his 1987 study, Merton argues that if investors mostly trade stocks with which they are familiar, then when stocks receive higher (active) attention, their demand curves will likely shift outward, resulting in higher stock values and thus lower returns. Passive attention paid to stocks may be another reason why the demand curve shifts outward or it may be just a reflection of the shift itself. If companies attracting high investor attention prior to the IPO date experience such a shift in their demand curves, then they are also likely to experience greater price reversals that may come following the buying pressure resulting from increased pre-IPO attention.

When the coefficients for the interaction terms between the attention measures and the *first-day return* variables in Models 3 and 4 are analyzed together, it is seen that although the price pressure coming from higher investor attention seems to result in lower long-term returns, the *first-day return*'s positive influence on long-term returns is generally larger. This finding implies that if a higher *first-day return* is indicative of a company with favorable long-term prospects, then it is not surprising to find this company performing well in the long-run as well.

Findings in Models 3 and 4 regarding the influence of the interaction term between *News* and *underwriter reputation* are also intriguing. In model 3, this interaction term has a positive influence on long-run performance at the 10% level, whereas it continues to be marginally significant in model 4. These results reveal that for a given level of pre-IPO attention, IPO companies that are underwritten by reputable underwriters experience greater returns in the long-run. This finding implies that investment banks with better reputation prefer underwriting IPO companies that are believed to be successful in the long-run.

To summarize, the analyses of IPO stocks in the sample report three interesting empirical findings. First, surprisingly, no statistically significant result is found regarding the effects of pre-IPO investor attention on short-run returns. Second, the active attention measure, *AGSV*, is significantly associated with subsequent *liquidity* in the long-run. This result is consistent with the Liu et al. (2014) study in terms of investor attention. Finally, in the long-run, it is seen that although the price pressure coming from higher investor attention seems to result in lower long-term returns, the *first-day return*'s positive influence on long-term returns is generally larger. The result regarding price pressure is consistent with the findings reported in Da et al. (2011).

CHAPTER 6

CONCLUSION

In this thesis, the relationship between pre-IPO investor attention and IPO returns in the short- and long-run are analyzed for Borsa Istanbul. A further analysis is also carried out to observe the persistence of pre-IPO investor attention as evidenced by the stock's post-IPO liquidity. To the best of my knowledge, this is the first study that aims to observe how investor attention prior to the IPO event influences short- and long-run returns and post-IPO liquidity in the emerging stock market of Turkey. Previous research in the literature provides evidence that increased investor attention prior to the IPO leads to higher first-day returns and greater long-run underperformance in the developed U.S. market. The IPO literature also documents that higher levels of pre-IPO investor attention result in greater subsequent stock liquidity in the U.S. An earlier study also reports similar results regarding short- and long-run returns in the emerging stock market of China. However, these results may not be expected in such a young and emerging market like Turkey's where market efficiency is low, involvement of individual investors is extremely high and number of IPOs is quite few. As a result, empirical analyses have to be carried out to observe the results in BIST.

In this study, main focus is on individual investors since trading volume in the Turkish stock market is mainly generated by domestic retail investors (Fung et al., 2015). Following Ding and Hou (2015), two attention measures are constructed to measure the active and passive attention of investors. The passive attention measure, namely *News*, is calculated for 145 companies who had their IPOs between January 2005 and December 2015. Finnet's News Analysis database is used to gather the news articles and reports that were published in various news and public disclosure platforms around the IPO dates.

Following Da et al. (2011), the active attention measure, *AGSV*, is constructed based on Google's search volume (GSV) information regarding the IPO stocks. While gathering the search volume data, a meticulous methodology is adopted in order to isolate the searches that were carried out for investment purposes. When searching for keywords in Google Trends, possible variations of IPO company names are taken into consideration and some filtering is used in order to isolate the relevant context for the searches and leave out cases such as searches for the IPO company's products. Some filters regarding geographical location or time range are also applied. While applying the methodology to construct the active attention measure, 42 IPOs are excluded from the sample due to missing GSV values or having company names with multiple and/or generic meanings. GSV values for the remaining 103 IPO companies in the subsample are downloaded from https://www.google.com/trends. Based on the amount of the search volume, data for the companies are reported on either on a weekly or monthly basis. As discussed in previous sections, some conversions are applied to transform weekly data into the monthly basis. The corresponding abnormal search volume (*AGSV*) measure is calculated for each IPO company from this monthly data to capture the trend in investors' active attention prior to the IPO.

After the construction of the active and passive attention measures, three separate models are estimated to empirically observe how pre-IPO investor attention influences IPO returns and post-IPO stock liquidity. These models also include other independent variables to control for some firm- and industry-level characteristics. Since the sample data series exhibit serious deviations from normality, these models are run within a GMM framework as this methodology does not have any requirements regarding the distribution of the right-hand side variables.

The results of the short-run analysis indicate that contrary to the expectations neither the active attention measure, *AGSV*, nor the passive attention variable, *News*, have an influence on the first trading day IPO returns. This surprising finding is attributed to the nature of the Turkish stock market. It is a young and emerging market where information acquisition is costly, individual investors are highly involved and IPOs

are quite few in number. Thus, pre-IPO investor attention loses its discriminating power on short-run returns as all of the IPOs experience increased attention prior to the IPO date. The results of the long-term analyses show that pre-IPO active attention (*AGSV*) has a positive impact on subsequent stock liquidity, whereas the passive attention measure is shown to have no significant effect regarding the long-run liquidity. This finding is explained by the direct involvement of investors in the Google search volume data used for the construction of *AGSV*. Since the investors are actively searching for the company on Google, they are more likely to be familiar with these companies during the post-IPO period as well. Results suggest that retail investors exhibit a tendency to trade these already familiar stocks in the long-run leading to greater subsequent stock liquidity. The final analysis results reveal that first-day IPO returns are positively associated with long-term post-IPO returns. At the same time, pre-IPO attention seems to exert price pressure on the first trading day returns and this pressure later leads to lower post-IPO returns. When both of these effects are considered together, it is observed that the positive effect of the initial returns is generally higher compared to the negative effect of the first trading day's price pressure.

In further discussion, the limitations of this study should be stated. First, when compared to the developed markets, the Turkish stock market stages a very small number of IPOs. The sample is even further restricted since Google Trends makes search volume data available starting from 2004. Another limitation regarding the Google Trends data is the insufficient volume of search for some of the companies. Some IPO companies with low search volume have missing GSV values, whereas others have only monthly data available. This makes the separation of relevant and irrelevant searches extremely difficult since the "Related search section" which helps identifying the search context cannot be presented on Google Trends due to insufficient data. Some noise is also introduced when converting the weekly data into the monthly format. The results of the analyses related to the *AGSV* measure would be more precise if it were possible to work with weekly GSV values for all companies.

As stated by Ding and Hou (2015), this study has implications for companies which seek to improve their level of public recognition. The findings show that by becoming more visible on the Internet, companies can attract greater levels of investor attention. This is especially useful for IPO companies which pursue ways of making investors acquainted with their companies and eventually experience greater returns and liquidity.

The results of this study contribute to the growing literature of behavioral finance. This study further reveals that it is beneficial to use Internet search data in financial analyses. At this point, it should be stated that this study is the first one to use Google's search volume data in a financial economics study about the Turkish market. Internet search volume is a direct measure of individual investors' attention since it requires their active attendance. Hence, more research is required regarding its broader applications in finance and especially in the emerging market of Turkey. The research also can be extended to other emerging markets. These applications are left for future research.

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APPENDICES

Appendix A. TABULATED LITERATURE REVIEW

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
1998	Reese	Media	The number of news articles from 25 major U.S. newspapers that cite the name of the IPO company *First Search News* and *Current Events DataBase* are used for this purpose.	Prior to IPO issue date and during the period that involves the first year after issuance	Mentions of each company in the sample	• Linear regressions are performed to observe the effect of investor attention prior to the IPO on volume and initial return.	• Results suggest that companies provoking more investor attention prior to issuance are likely to be subject to more underpricing that leads to higher initial return and trading volume. • Results also reveal that amount of investor attention prior to going public also affects trading volume in the long-run.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2009	Chemmanur & Yan	Trading volume	Exchange-adjusted trading turnover Exchange-adjusted trading turnover is the log ratio of a firm's trading turnover to the average trading turnover in the stock exchange in which the stock is listed.	Trading turnover is calculated on a yearly basis for the period 1996 to 2005.	-	• Cross-sectional regressions are performed for every year. • To see the relationship between advertising and attention a regression test is performed (in which trading turnover in a particular year is used as a proxy for investor attention). • Other regression tests are further carried out to observe how attention of investors affects stock returns in both current and following years. Attention is again proxied by trading turnover.	• Results of the regression test indicate that increased amount of advertising leads to a greater amount of trading volume and thus increased level of investor attention. • Results also show that stocks receiving greater levels of investor attention experience larger stock returns in the current year and smaller returns in the following year.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2009	Chemmanur & Yan	Financial analyst coverage	The number of financial analysts covering the stock; i.e. making forecasts about the stock.	The log of the number of financial analysts following the company in the last month of the fiscal year is used.	-	• Cross-sectional regressions are performed for every year. • To see the relationship between advertising and attention a regression test is performed (in which number of analysts in a particular year is used as a proxy for investor attention). • Other regression tests are carried out to see how attention of investors affects stock returns in both current and following years. Again attention is proxied by the number of analysts' forecasts.	• Results of the regression test reveal that increased amount of advertising leads to a greater number of analysts covering the stock and thus increased amount of investor attention. • Results show that stocks receiving more investor attention have larger stock returns in the current year and have smaller returns in the following year.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2009	Hou, Peng & Ziong	Trading volume	Turnover	Average turnover over the prior year period is used on a monthly basis.	Securities listed in NYSE and AMEX are observed (ADRs, closed-end funds and REITs are excluded). Firms having their monthly data listed in CRSP database are included in the sample.	• Cross-sectional tests are performed. • Trading volume is used as a proxy for investors' attention in these tests. • Time-series tests are also performed, since investor attention demonstrates variation with different market states.	• Stocks with high volume have higher profits of price momentum. • Stocks with low volume have higher profits of earnings momentum.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2009	Liu, Sherman & Zhang	Media	The number of articles from various news and business sources mentioning the name of the IPO company during a search window. *Factiva* database is used to obtain these articles.	A window from one day after the filing date to one day prior to offering date. Standardization of media coverage measure into a per month measure is adopted. Another window of one month prior to issue date is also used to check for robustness.	Full company names allowing for common abbreviations such as “Co.”, “Corp.”, “Inc.”, “Ltd.”, and “Grp.”	• Univariate tests are performed. In these test companies are sorted into five groups according to media coverage (HITS). • Regression tests are also carried out to control for the impact of some common variables. • Some robustness checks are also performed.	• Results of univariate tests show that increase in media coverage also leads to an increase in first-day return. • Regression results reveal that IPO underpricing experience a significant increase with media coverage.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2010	Mondria, Wu & Zhang	AOL Search Engine	The number of times a user clicks on a result of a search query from a specific country.	Dataset spans the period over March 1 to May 31 of 2006.	-	• Three instrumental variables are chosen for attention allocation: "cultural sites", "female models" and "internet users" (within each country). • 2SLS and 3SLS regressions are carried out.	• All results point out that between attention and home bias there is a two-way causality. • Countries with smaller home bias attract more attention from investors. • Also when investors allocate more attention to a particular country, they possess less home bias towards it.
2010	Rubin & Rubin	Wikipedia (Internet-based encyclopedia)	Wikipedia editing frequency – the number of edits on Wikipedia entries on a monthly basis	Data is collected for the period between July 2005 and December 2006.	Entries for the firms listed in the Dow Jones Index (DJI) are observed.	• Univariate and multivariate analysis is performed with the dependent variable of average number of updates on Wikipedia.	• Results of the analysis reveal that increased editing frequency leads to decreased analyst forecast errors and forecast dispersions. • Increase in editing frequency also drives the increase in bid-ask spread after recommendations of analysts.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2010	Yu & Hsieh	Extreme one-day returns	According to previous day's return, stocks are sorted into deciles.	Stocks are sorted and buy-sell imbalances (BSI) are calculated on a daily basis for each and every stock in the sample during the period of January 2005 to December 2009.	Data consist of all orders placed to the Taiwan Stock Exchange (TSE) through the sample period.	• Investors are grouped into four categories as individual investors, foreign institutional investors, mutual funds and dealers. The latter three are all considered as institutions. • After stocks are sorted into deciles according to previous day's return, BSIs are calculated for each decile and investor type on a daily basis. • BSI is defined as "the number of purchased shares minus the number of sold shares divided by the total number of traded shares".	• Results indicate that inconsistent with the trading behavior of retail investors, all three types of institutional investors are net buyers of stocks experiencing unusual positive returns.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2011	Bank, Larch & Peter	Google Search Engine	Google Search Volume (GSV) derived from Google Insights	GSV is obtained on both weekly and monthly basis.	Firm name as given in Thomson Reuters Datastream	• Amihud (2002) ratio is used as a proxy for stock illiquidity. • Monthly/weekly portfolios' average firm characteristics are sorted on the basis of changes in GSV of company names (*single-sorted portfolios*). • Consolidated portfolios' average firm characteristics are then double-sorted; first according to market value/stock turnover, and then on the basis of changes in GSV. • Panel regressions are also performed controlling for other variables.	• Single-sorting reveals that stocks with higher search volume, and thus higher investor attention, experience less illiquidity. • Double-sorting shows that changes in investor attention are still negatively related to stock illiquidity. • Panel regression results support the finding of negative relation between GSV and stock illiquidity.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2011	Da, Engelberg & Gao	Google Search Engine	Google's Search Frequency-Abnormal Search Volume Index (ASVI) provided by Google Trends	For the ASVI, data period is during the week and previous 8 weeks.	Company name provided by the SDC	For the IPO sample: • IPO first-day returns are regressed on pre-IPO week abnormal search volume (ASVI) and IPO characteristics. • Some cross-sectional regressions are also performed to observe how higher investor attention before the IPO affects the long-run performance of IPO stocks.	• ASVI, on a stand-alone basis, strongly predicts first-day IPO return. • ASVI seems to be a better predictor than *Media*, which is roughly the logarithm of the number of news articles recorded by Factiva between 1 day after the filing date and 1 day before the IPO date. • Results also reveal that IPOs with higher first-day returns experience greater underperformance in the long-run.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2012	Vlastakis & Markellos	Google Search Engine	Information demand is measured by Search Volume Index (SVI) obtained from Google Trends.	SVI is obtained on a weekly basis between January 2007 and October 2009.	Company name	• Granger causality analysis is performed to investigate the causal relationship between information demand and supply. • OLS regressions are performed to observe various relationships throughout the study.	• Results of the study exhibit that information demand and supply are linked.
2013	Aouadi, Arouri & Teulon	Google Search Engine	Google Search Volume (GSV) obtained from Google Insights	Weekly GSV data is drawn for the period 2004 to 2010.	Company name as listed in Euronext Paris	• To observe whether investor attention influence liquidity of particular stocks regression tests are performed. • In these tests, for each and every stock illiquidity ratio is regressed by "one-week lagged Google Search Volume". • The effect of investor attention on volatility of stock market is also observed.	• Results support that increased attention leads to a decrease in illiquidity of stocks in the sample. • Analysis also confirms that attention is significantly related with market volatility.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2014	Liu, Sherman & Zhang	Media	The number of times that the company's name is mentioned in major news and business publications based on a *Factiva Search* (Counting the number of articles that mention the IPO company during the search window)	During the last month (30 days) of the filing period, up to one day before the offering (month before the issue date)	Full company names allowing for common abbreviations such as "Co.", "Corp.", "Inc.", "Ltd.", and "Grp."	• Whether pre-IPO media coverage plays a lasting role; i.e. persistence of attention is studied. • Three proxies for post-IPO attention are used: number of analysts who cover the stock, number of institutional investors who hold the stock, and aftermarket liquidity. • First, univariate tests are performed by sorting IPO firms into four groups (zero media, low media, medium media, and high media) according to their pre-IPO media coverage one month before their offer date. • Then, univariate tests are extended by implementing regression tests that control for the impact of other variables that may also affect post-IPO attention.	• Evidence of a long-term role for pre-IPO media coverage is provided. • Also, it is shown that more special news reports during the month before the offering date are related to significantly less media coverage for the IPO firms in the sample, consistent with exogenous special events drawing attention away from IPO firms.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2014	Lin, Wu & Chiang	Trading volume	Turnover Turnover is calculated as traded shares over outstanding shares. Weekly turnover is calculated and then averaged to obtain yearly turnover.	Turnover is calculated on a yearly basis for the period of 1984 to 2011.	Firms having a stock price less than $5 are excluded.	• Some regression tests are run to obtain price synchronicity and observe effects of investor attention and analyst coverage on this synchronicity.	• It is observed that firms with higher investor attention are more likely to have greater synchronicity. • Similarly, firms having greater levels of analyst coverage tend to possess higher synchronicity.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2014	Fang, Jiang & Qian	Baidu Search Engine	Baidu Index – search frequency of a keyword calculated as the ratio of daily search frequency to the number of news references about that keyword over the past 30 days	Daily data obtained for the period of June 2010 to December 2011.	Official names of stocks	• Ordinary least squares (OLS) method is adopted to estimate the regression model for the purpose of investigating the impact of investor attention on IPO first-day returns. • OLS method is again used to observe how individual investor attention affects the performance of IPO stocks in the long-run.	• Results of the analysis indicate that increased investor attention positively influence the extreme returns experienced on the first trading day. • Study also provides evidence for the negative effect of increased investor attention on long-term IPO performance. It is explained that this is a natural result of market correction of the overpricing experienced on the first day.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2014	Vozlyublennaia	Google Search Engine	Google search probability	Weekly data is obtained for the period of January 2004 to December 2012	Security index name	• Granger Causality tests and Vector Autoregression (VAR) models are employed. • Regressions are performed to observe the relationship between investor attention and index performance.	• Results indicate that investor attention has a temporary impact on performance of security indexes.
2015	Goddard, Kita & Wang	Google Search Engine	Google's Search Volume Index provided by Google Insights.	Weekly data is obtained for the period of January 2004 to September 2011 for 7 currency pairs.	Pairs of three-letter abbreviations of currencies from ISO 4217	• An augmented GARCH(1, 1) model is used to observe how attention affects currency market volatility. • An OLS regression is also performed.	• An increase in SVI leads to higher levels of volatility in the currency market.

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2015	Ding & Hou	*Active attention:* Google Search Engine	Google's Search Frequency-Search Volume Index (SVI) provided by Google Trends.	SVI is gathered weekly. The change in the SVI is also calculated as the difference between the SVI during the particular week and the median value of the SVI during the previous eight weeks.	Instead of company names ticker symbols are used to capture financial information searches.	• In order to be able to observe the effects of investors' attention on the shareholder base and liquidity, regression tests are performed. • Number of shareholders and relative bid-ask spread are regressed against active (SVI) and passive attention (online media coverage and advertising expenditure) measures separately. • Change in SVI (ΔSVI) is also used for the purpose of robustness checks.	• Results reveal that both active and passive attention measures have positive association with breadth of ownership. • When tests are repeated by using change in SVI instead of SVI, it is observed that an increase in SVI leads to a greater shareholder base. • It is concluded that investors paying attention to a particular firm through Google searches are likely to become a part of the firm's shareholder base. • Test results show that both active and passive attention enhance stock liquidity by reducing the bid-ask spread.
		Passive attention: Google News coverage & advertising expenditure	The number of news articles per year obtained from Google News & Annual advertising expense	News items are counted in a yearly manner during the sample period 2004-2009. & Advertising expenses are obtained from Compustat database also on yearly basis.	Company names instead of tickers are taken as search criteria when using Google News.		

Year	Author	Data				Method Used in Empirical Studies	Results of Empirical Studies
		Proxy for Investor Attention	Measure of Investor Attention	Search Period	Search Criteria		
2015	Zhang & Wang	Baidu Search Engine	Baidu's search volume - weighted sum of aggregate search volume of some specific keywords	Daily data obtained for the period of 2011 (April 1) to 2012 (March 31).	Security name and stock number	• Four groups of market indicators are chosen: 1) "daily abnormal return of an individual stock" 2) "absolute value of daily abnormal return of an individual stock" 3) "trading volume of an individual stock" 4) "daily turnover of a tradable share" • Fixed effect model is adopted to perform regression analysis for observing the relationship between attention and market indicators. • Trading volume and turnover rate are chosen as measurable market indicators. • Fixed effect model is employed to perform a panel regression for observing how attention influences the stock market performance.	• Regression results reveal the positive correlation between market indicators and Baidu index; i.e. individual investor attention. • Panel regression results show that investor attention affects performance of stock market.

Appendix B. DETAILED LIST OF REFERENCES

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
1990	Aggarwal & Rivoli	Fads in the Initial Public Offering Market?	NASDAQ	Data is gathered from CRSP and Registration and Offering Statistics (ROS) datasets.	1977-1987
2013	Aouadi, Arouri & Teulon	Investor Attention and Stock Market Activity: Evidence from France	Euronext Paris & Stocks listed in the CAC 40 Index	Google Search Volume (GSV) data is obtained from Google Insights for the stocks listed in the CAC 40 Index with some exclusion.	2004-2010
2015	Bajo & Raimondo	Media Sentiment and the Pricing of IPOs	U.S. stock markets	Data is drawn from the SDC/Platinum Global New Issues database, Compustat, CRSP and EDGAR. Other related data is also obtained from Jay Ritter's website and from some on-line databases.	1995-2013
2004	Baker & Stein	Market liquidity as a Sentiment Indicator	-	Related data is obtained from NYSE Fact Book and Federal Reserve Bulletin.	1927-1998
2000	Baker & Wurgler	The Equity Share in New Issues and Aggregate Stock Returns	-	Related data is derived from Federal Reserve Bulletin.	1927-1996
2004	Baker & Wurgler	A Catering Theory of Dividends	-	Data is derived from Compustat.	1962-2000
2006	Baker & Wurgler	Investor Sentiment and the Cross-Section of Stock Returns	-	The firm-level data are from the merged CRSP- Compustat database.	1962-2001

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2007	Baker & Wurgler	Investor Sentiment in the Stock Market	-	-	-
2012	Baker, Wurgler & Yuan	Global, Local, and Contagious Investor Sentiment	Study is conducted for six major stock markets (Canada, France, Germany, Japan, the United Kingdom, and the United States).	Data is obtained from various international sources such as Datastream and EUROFIDAI databases.	1980-2005
2011	Bank, Larch & Peter	Google Search Volume and its Influence on Liquidity and Returns of German Stocks	-	All Xetra-listed German stocks are included in the sample. The corresponding data for capital market is obtained from Thomson Reuters Datastream. Google Search Volume is derived from Google Insights.	2004-2010
2001	Barber & Odean	The Internet and the Investor	-	-	-
2008	Barber & Odean	All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors	NYSE, NASDAQ & AMEX	Data obtained from: 1) a large discount brokerage (1991-1996) 2) a small discount brokerage (1996-1999) 3) a large retail brokerage (1997-1999) 4) the Plexus Group (a consulting firm) (1993-1996)	-

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2001	Barber, Lehavy, McNichols & Trueman	Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns	NYSE, NASDAQ & AMEX	The analyst recommendations data is gathered from the Zacks Investment Research Database. The CRSP Database is also used.	1985-1996
2010	Burghardt	Retail Investor Sentiment and Behavior – an Empirical Analysis (Thesis Study)	-	The data set contains order data (executed orders from retail investors) from the EUWAX trading segment at Boerse Stuttgart.	2004-2008
2002	Busse & Green	Market Efficiency in Real Time	NYSE, NASDAQ & AMEX	Stock reports are obtained from the recordings of the Morning Call and Midday Call segments aired on CNBC. The price and transaction data are gathered from TAQ database.	June-Oct. 2000
1998	Carter, Dark & Singh	Underwriter Reputation, Initial Returns, and the Long-Run Performance of IPO Stocks	NYSE, NASDAQ & AMEX	Related data is gathered from the CRSP Database.	1979-1991
2014	Chan	How Does Retail Sentiment Affect IPO Returns? Evidence from the Internet Bubble Period	NYSE, NASDAQ & AMEX	Related data is gathered from several databases: The TAQ dataset, The SDC New Issues Database and the CRSP/Compustat Merged Database.	1994-2004

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2009	Chemmanur & Yan	Advertising, Attention and Stock Returns	-	Data extracted from the following databases: 1) Standard & Poor's Compustat files (to obtain financial statements), 2) CRSP Database (to obtain stock prices) and 3) I/B/E/S (to gather analyst coverage data).	1996-2005
2006	Cornelli, Goldreich and Ljungqvist	Investor Sentiment and Pre-IPO Markets	-	-	-
2011	Da, Engelberg & Gao	In Search of Attention	Russell 3000 Index For the IPO sample: NYSE, NASDAQ & AMEX		2004-2008 For the IPO sample: 2004-2007
2015	Ding & Hou	Retail Investor Attention and Stock Liquidity	Firms listed in S&P 500 are included in the sample.	Media coverage measure is obtained from Google News. CRSP and Compustat databases are also used to gather other related data.	2004-2009
2009	Fang & Peress	Media Coverage and the Cross-Section of Stock Returns	NYSE & NASDAQ	The LexisNexis database is used to obtain news articles. Four major newspapers, namely New York Times, USA Today, Wall Street Journal and Washington Post, are taken as the focus of the study.	1993-2002

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2014	Fang, Jiang & Qian	The Effects of Individual Investors' Attention on Stock Returns: Evidence from the ChiNext Market	Stocks in the sample are selected from Shenzhen Stock Exchange's ChiNext market.	Required data is collected from the Wind Financial Terminal database and Baidu.com.	June 2010-December 2011
2009	Field & Lowry	Institutional versus Individual Investment in IPOs: The Importance of Firm Fundamentals	-	Data related to firms went public during the period obtained from the SDC and CRSP database.	1980-2000
2015	Fung, Demir, Lau & Chan	Reexamining Sports-Sentiment Hypothesis: Microeconomic Evidences from Borsa Istanbul	Turkish Stock Market - Borsa Istanbul (BIST)	Data is drawn from the Wharton Research Data Services (WRDS) and the Borsa Istanbul website. Also game results and betting data is gathered from www.mackolik.com and www.betexplorer.com respectively.	1999-2011
2010	Gao & Ritter	The marketing of seasoned equity offerings	NYSE, NASDAQ & AMEX	Dealogic Equity Capital Markets (ECM) Analytics Database is referred.	1996-2007
2001	Gervais, Kaniel & Mingelgrin	The High-Volume Return Premium	NYSE	Stock database of the CRSP is used. Also, some related specific data is gathered from the TAQ database.	1963-1996
2015	Goddard, Kita & Wang	Investor Attention and FX Market Volatility	-	Weekly data for 7 currency pairs are obtained from Google Insights.	2004-2011
2004	Grullon, Kanatas & Weston	Advertising, Breadth of Ownership, and Liquidity	NASDAQ & AMEX	The CRSP, Compustat and TAQ databases are used to obtain related data.	1993-1998

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2004	Güner, Önder & Danışoğlu Rhoades	Underwriter Reputation and Short-Run IPO Returns: a Re-evaluation for an Emerging Market	Turkish Stock Market – Istanbul Stock Exchange (ISE) 100 Index	Related data is obtained from "Companies Going Public: 1998" publication of the ISE and ISE Weekly Bulletins.	1993-2000
2009	Hou, Peng & Ziong	A Tale of Two Anomalies: The Implications of Investor Attention for Price and Earnings Momentum	NYSE & AMEX	Related data files are obtained from CRSP Database.	1964-2005
1973	Kahneman	Attention and Effort	-	-	-
2006	Kumar & Lee	Retail Investor Sentiment and Return Comovements	Data contain both NYSE and NASDAQ stocks.	A database consisting transactions of retail investors is used. Returns data for these transactions are obtained from CRSP.	1991-1996
2013	Larrain & Varas	Equity Issues and Return Volatility	-	Data is obtained from Compustat and CRSP databases.	1974-2007
1991	Lee, Shleifer & Thaler	Investor Sentiment and the Closed-End Fund Puzzle	-	Information on annual discounts and net asset values, as well as background information on each fund, was obtained from the 1960 to 1987 editions of Wiesenberger's Investment Companies Services annual survey of mutual funds. For 68 selected funds, the weekly net asset value per share, stock price, and discount per share are collected from the Wall Street Journal (WSJ) between July, 1956 and December, 1985 (inclusive).	1956-1985

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
1993	Levis	The Long-Run Performance of Initial Public Offerings: The UK Experience 1980-1988	The London Stock Exchange	Data is obtained from Datastream and related KPMG datasets.	1980-1988
2014	Lin, Wu & Chiang	Investor Attention and Information Diffusion from Analyst Coverage	NYSE, NASDAQ & AMEX	Data is obtained from CRSP and I/B/E/S data sets.	1984-2011
2009	Liu, Sherman & Zhang	Media Coverage and IPO Underpricing	NYSE, NASDAQ & AMEX	SDC, CRSP and Compustat databases are made use of.	1980-2004
2014	Liu, Sherman & Zhang	The Long-Run Role of the Media: Evidence from Initial Public Offerings	NASDAQ, AMEX	-	1980-2004
1997	Ljungqvist	Pricing Initial Public Offerings: Further Evidence from Germany	German stocks are included in the sample.	Related data is obtained from IPO prospectus and *Börsen-Zeitung*.	1970-1993
2006	Ljungqvist, Nanda & Singh	Hot Markets, Investor Sentiment, and IPO Pricing	-	-	-
2014	Lou	Attracting Investor Attention through Advertising	NYSE	Data related to advertising expenditures are obtained from the Compustat database. Several other databases are also used for gathering related data.	1974-2010
2014	Mclean & Zhao	The Business Cycle, Investor Sentiment, and Costly External Finance	All the U.S. firms with available values of Baker and Wurgler (2006) index are included in the sample.	Data is drawn from the Compustat database.	1965-2010
1987	Merton	A Simple Model of Capital Market Equilibrium with Incomplete Information	-	-	-

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2012	Mian & Sankaragurus-wamy	Investor Sentiment and Stock Market Response to Earnings News	-	Compustat, CRSP and I/B/E/S databases are used.	1972-2007
2013	Mola, Rau & Khorana	Is There Life after the Complete Loss of Analyst Coverage?	NYSE, NASDAQ & AMEX	Data is obtained from I/B/E/S Detail and CRSP databases.	1984-2008
2010	Mondria, Wu & Zhang	The Determinants of International Investment and Attention Allocation: Using Internet Search Query Data	-	"Search/click-through data" is obtained from AOL dataset. A cross-country study is performed.	March 1-May 31 2006
1998	Reese	IPO Underpricing, Trading Volume, and Investor Interest	NYSE, NASDAQ & AMEX	The IPO data is obtained from the SDC database. Other required data is gathered from the CRSP database.	1983-1993
1991	Ritter	The Long-Run Performance of Initial Public Offerings	NASDAQ & Amex-NYSE	-	1975-1984
2002	Ritter & Welch	A Review of IPO Activity, Pricing, and Allocations	NYSE, NASDAQ & AMEX	Data is from Thomson Financial Securities Data, with supplements from Dealogic and other sources.	1980-2001
2010	Rubin & Rubin	Informed Investors and the Internet	Dow Jones Index (DJI) A different sample of S&P 500 firms followed by at least 20 analysts is also examined.	Related data is drawn form I/B/E/S and CRSP databases. Editing frequency data is gathered from Wikipedia. For the purpose of robustness check, an analysis is also performed by obtaining data from Google Trends on the firms included in DJI.	2005-2006

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2007	Seasholes & Wu	Predictable Behavior, Profits and Attention	Shanghai Stock Exchange	Related data is obtained from the Shanghai Stock Exchange.	2001-2003
2012	Spyrou	Sentiment Changes, Stock Returns and Volatility: Evidence from NYSE, AMEX and NASDAQ Stocks	NYSE, NASDAQ & AMEX	-	1965-2007
2012	Stambaugh, Yu & Yuan	The Short of it: Investor Sentiment and Anomalies	-	-	1965-2007
2014	Şenyüz, Yoldaş & Baycan	Cyclical Dynamics of the Turkish Economy and the Stock Market	Turkish Stock Market – Istanbul Stock Exchange (ISE) 100 Index (now known as Borsa Istanbul (BIST))	Data is obtained from International Financial Statistics (IFS) database of the International Monetary Fund (IMF), the Conference Board Total Economy Database and the Turkish Central Bank database.	1968-2009
1995	Tesar & Werner	Home Bias and High Turnover	-	-	1970-1990
2007	Tetlock	Giving Content to Investor Sentiment: The Role of Media in the Stock Market	NYSE, Dow Jones Index	Wall Street Journal's (WSJ's) "Abreast of the Market" column is the focus of the study. General Inquirer Program is used for content analysis. Data is derived from CRSP, NYSE and the General Inquirer program.	1984-1999
2009	Van Nieuwerburgh & Veldkamp	Information Immobility and the Home Bias Puzzle	-	-	-

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2012	Vlastakis & Markellos	Information Demand and Stock Market Volatility	NYSE & NASDAQ 30 largest stocks traded in these exchanges; i.e. constituents of Dow Jones Index (DJI) are included in the sample.	Data is drawn from Thomson Reuters and Bloomberg databases. Other related data is also obtained from Pi Trading.	2007-2009 (Period for the information supply dataset) 2004-2009 (Period for the information demand dataset)
2014	Vozlyublennaia	Investor Attention Index Performance and Return Predictability	Stock market indexes: 1) the Dow Jones Industrial Average, 2) the S&P 500 and 3) the NASDAQ composite index	Data is obtained from www.finance.yahoo.com, www.ycharts.com and www.Google.com/trends.	2004-2012

Year	Author	Article Name	Data		
			Exchange/Index	Database	Period
2003	Wang, Liu & Wu	Does Underwriter Reputation Affect the Performance of IPO Issues?	Chinese Stock Market	Stock return and accounting data are obtained from Taiwan Economic Journal (TEJ) database. Other related data is gathered from China Securities Regulatory Commission (CSRC), Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE) databases.	1990-2001
2010	Yu & Hsieh	The Effect of Attention on Buying Behavior during a Financial Crisis: Evidence from the Taiwan Stock Exchange	Taiwan Stock Exchange (TSE)	Data is collected from the Taiwan Economic Journal (TEJ) Database.	2005-2009
2015	Zhang & Wang	Limited Attention of Individual Investors and Stock Performance: Evidence from the ChiNext Market	Stocks in the sample are selected from Shenzhen Stock Exchange's ChiNext market.	Related data is obtained from the Wind database.	2011 (April 1)- 2012 (March 31)

Appendix C. CORRELATIONS TABLE

This table presents correlations among main variables of interest. The sample includes 145 IPOs that took place from 2005 to 2015 in Borsa Istanbul. The statistics for *AGSV* are calculated over a subsample of 103 IPOs, excluding 42 firms with missing GSV values or having names with multiple and/or generic meanings.

Correlations among main variables of interest

	AGSV	News	Age	First-day return	First-day sector return	Long-run return	Long-run sector return	Turnover	Offer size	Total assets
AGSV	1.00	0.09	-0.02	0.07	-0.04	-0.02	0.05	0.27	-0.14	-0.13
News		1.00	0.00	-0.08	0.12	-0.12	0.02	-0.24	-0.03	-0.08
Age			1.00	-0.02	0.00	-0.09	-0.05	-0.22	0.32	0.45
First-day return				1.00	-0.01	0.07	-0.04	0.17	0.01	0.04
First-day sector return					1.00	-0.02	0.12	-0.08	0.04	-0.01
Long-run return						1.00	0.16	-0.06	-0.01	-0.02
Long-run sector return							1.00	-0.01	-0.15	-0.11
Turnover								1.00	-0.16	-0.11
Offer size									1.00	0.86
Total assets										1.00

Appendix D. COMPANIES IN THE INTERNET SAMPLE AND CORRESPONDING SEARCH QUERIES

Ticker	IPO Year	Company Name	Search Query
ADESE	2011	Adese Alışveriş Merkezleri Ticaret A.Ş.	adese - makromarket
AKFEN	2010	Akfen Holding A.Ş.	akfen
AKFGY	2011	Akfen Gayrimenkul Yatırım Ortaklığı A.Ş.	akfen
AKGUV	2012	Akdeniz Güvenlik Hizmetleri A.Ş.	akdeniz güvenlik-"güvenlik iş ilanları"
AKMGY	2005	Akmerkez Gayrimenkul Yatırım Ortaklığı A.Ş.	akmerkez
AKPAZ	2013	Akyürek Tüketim Ürünleri Pazarlama Dağıtım ve Ticaret A.Ş.	akyürek holding + akyürek pazarlama
AKSEL	2011	Mataş Matbaacılık Ambalaj San. Ve Tic. A.Ş.	mataş
AKSEN	2010	Aksa Enerji Üretim A.Ş.	aksa-mescidi aksa-sigorta-"jeneratör fiyatları"-akrilik-yalova-mescid-i aksa
ALBRK	2007	Albaraka Türk Katılım Bankası A.Ş.	albaraka türk-kuveyt türk-"türkiye finans"

Ticker	IPO Year	Company Name	Search Query
ANELE	2010	Anel Elektrik Proje Taahhüt ve Tic. A.Ş.	anel
ANELT	2005	Anel Telekomünikasyon Elektronik Sistemleri San. ve Tic. A.Ş.	anel
ARBUL	2014	Arbul Entegre Tekstil İşletmeleri A.Ş.	arbul
ARMDA	2006	Armada Bilgisayar Sistemleri Sanayi ve Ticaret A.Ş.	armada-sinema-ankara-alışveriş-transformers-sinemaları-otel-hotel-compaq
ARTOG	2012	Ar Tarım Organik Gıda A.Ş.	ar tarım
ASYAB	2006	Asya Katılım Bankası A.Ş.	asya katılım
ATAC	2011	Ataç İnşaat ve Sanayi A.Ş.	ataç-nurullah ataç-ufuk ataç-ataş
AVHOL	2012	Baysan Trafo Radyatörleri Sanayi ve Ticaret A.Ş.	baysan trafo
AVISA	2014	AvivaSA Emeklilik ve Hayat A.Ş.	avivasa emeklilik - bireysel emeklilik - garanti emeklilik
AVOD	2011	A.V.O.D Kurutulmuş Gıda ve Tarım Ürünleri Sanayi Ticaret A.Ş.	avod

Ticker	IPO Year	Company Name	Search Query
BAKAN	2013	Bakanlar Medya A.Ş.	bakanlar medya
BEYAZ	2012	Beyaz Filo Oto Kiralama A.Ş.	beyaz filo
BIMAS	2005	Bim Birleşik Mağazalar A.Ş.	BİM - migros
BIZIM	2011	Bizim Toptan Satış Mağazaları A.Ş.	bizim toptan
BLCYT	2011	Bilici Yatırım Sanayi ve Ticaret A.Ş.	bilici-mustafa bilici-mehmet bilici
BMEKS	2011	Bimeks Bilgi İşlem ve Dış Ticaret A.Ş.	bimeks-teknosa-vatan-a101-"media markt"-darty-gold-bim-"istanbul bilişim"-electro world-"electroworld"-"vatan bilgisayar"-vatanbilgisayar-elektroworld
BNTAS	2015	Bantaş Bandırma Ambalaj San.ve Tic. A.Ş.	bantaş bandırma
BRKSN	2011	Berkosan Yalıtım ve Tecrit Maddeleri Üretim ve Ticaret A.Ş.	berkosan
CCOLA	2006	Coca-Cola İçecek A.Ş.	coca cola - pepsi
CEMAS	2010	Çemaş Döküm Sanayii A.Ş.	çemaş
CLKHO	2011	Karkim Sondaj Akışkanları Enerji Mühendislik Hiz. San. ve Tic. A.Ş.	karkim

Ticker	IPO Year	Company Name	Search Query
DAGI	2011	Dagi Giyim Sanayi ve Ticaret A.Ş.	dagi - agri - nemrut - "pijama takımları" - "iç giyim"
DENGE	2012	Denge Yatırım Holding A.Ş.	denge holding
DESPC	2010	Despec Bilgisayar Pazarlama ve Ticaret A.Ş.	despec
DGATE	2006	Datagate Bilgisayar Malzemeleri Ticaret A.Ş.	datagate
DOCO	2010	Do&Co Restaurants and Catering AG	do&co
EKGYO	2010	Emlak Konut Gayrimenkul Yatırım Ortaklığı A.Ş.	emlak konut GYO
EKIZ	2010	Ekiz Yağ ve Sabun Sanayii A.Ş.	ekiz
ERICO	2011	Ericom Telekomünikasyon ve Enerji Teknolojileri A.Ş.	ericom
ETILR	2012	Etiler İnci Büfe Gıda Sanayi ve Dış Ticaret A.Ş.	etiler marmaris
EUHOL	2010	Euro Yatırım Menkul Değerler A.Ş.	euro yatırım

Ticker	IPO Year	Company Name	Search Query
FLAP	2012	Flap Kongre Toplantı Hizmetleri Otomotiv ve Turizm A.Ş.	flap-"flap jack"
GEDIK	2010	Gedik Yatırım Menkul Değerler A.Ş.	gedik yatırım-iş yatırım
GLBMD	2011	Global Menkul Değerler A.Ş.	global menkul
HALKB	2007	Türkiye Halk Bankası A.Ş.	halk bankası - ziraat - "yapı kredi"
HATEK	2011	Hateks Hatay Tekstil İşletmeleri A.Ş.	hateks
HDFGS	2015	Hedef Girişim Sermayesi Yatırım Ortaklığı A.Ş.	"Hedef Girişim"
HITIT	2012	Hitit Holding A.Ş.	hitit holding
HLGYO	2013	Halk Gayrimenkul Yatırım Ortaklığı A.Ş.	halk GYO + halk gayrimenkul
IDGYO	2010	İdealist Gayrimenkul Y.O. A.Ş.	idealist
ISYAT	2007	İş Yatırım Menkul Değerler A.Ş.	iş yatırım
IZFAS	2014	İzmir Fırça Sanayi ve Ticaret A.Ş.	izmir fırça
KAREL	2006	Karel Elektronik Sanayi ve Ticaret A.Ş.	karel-tolga karel

Ticker	IPO Year	Company Name	Search Query
KATMR	2010	Katmerciler Araç Üstü Ekipman Sanayi ve Ticaret A.Ş.	katmerciler
KOZAL	2010	Koza Altın İşletmeleri A.Ş.	koza altın - "adana altın koza"
KRATL	2012	Karakaş Atlantis Kıymetli Madenler Kuyumculuk Telekomünikasyon Sanayi ve Ticaret A.Ş.	karakaş atlantis + karakaş kuyumculuk
LATEK	2010	Latek Lojistik Ticaret A.Ş.	latek lojistik
LIDFA	2014	Lider Faktoring A.Ş.	lider faktoring
LKMNH	2011	Lokman Hekim Engürüsağ Sağlık Turizm Eğitim Hizmetleri ve İnşaat Taahhüt A.Ş.	lokman hekim hastanesi - keçiören hastanesi
MANGO	2010	Mango Gıda Sanayi ve Ticaret A.Ş.	mango gıda
MENBA	2013	Tepa Tıbbi ve Elektronik Ürünler Sanayi ve Ticaret A.Ş.	tepa
MEPET	2011	Mepet Metro Petrol ve Tesisleri Sanayi Ticaret A.Ş.	mepet
MMCAS	2011	Gentra Lojistik A.Ş.	gentra

Ticker	IPO Year	Company Name	Search Query
NIBAS	2012	Niğbaş Niğde Beton Sanayi ve Ticaret A.Ş.	niğbaş
ODAS	2013	Odaş Elektrik Üretim Sanayi Ticaret A.Ş.	odaş
ORGE	2012	Orge Enerji Elektrik Taahhüt A.Ş.	orge
OSMEN	2012	Osmanlı Menkul Değerler A.Ş.	osmanlı menkul
OYAYO	2007	Oyak Yatırım Ortaklığı A.Ş.	oyak yatırım
OZBAL	2011	Özbal Çelik Boru San. ve Tic. A.Ş.	özbal - aydoğan - bilişim - eray
OZKGY	2012	Özak Gayrimenkul Yatırım Ortaklığı A.Ş.	özak - faruk özak
OZRDN	2015	Özerden Plastik Sanayi ve Ticaret A.Ş.	"özerden plastik"
PAGYO	2013	Panora Gayrimenkul Yatırım Ortaklığı A.Ş.	panora - sinema - cinemaximum - cinebonus - cepa - zara - mac - teknosa - mağazalar - mağazaları - sinemalar
PLASP	2014	Plaspak Kimya Sanayi ve Ticaret A.Ş.	plaspak
POLHO	2012	Polisan Holding A.Ş.	polisan holding
POLTK	2014	Politeknik Metal Sanayi ve Ticaret A.Ş.	politeknik

Ticker	IPO Year	Company Name	Search Query
PSDTC	2014	Pergamon Status Dış Ticaret A.Ş.	pergamon
RANLO	2009	Ran Lojistik Hizmetleri A.Ş.	ran lojistik
ROYAL	2013	Royal Halı İplik Tekstil Mobilya San. Ve Tic. A.Ş.	royal halı-modelleri-saray-"pierre cardin"-merinos-sanat-kaşmir-istikbal-angora
RYGYO	2010	Reysaş Gayrimenkul Yatırım Ortaklığı A.Ş.	Reysaş
RYSAS	2006	Reysaş Taşımacılık ve Lojistik Ticaret A.Ş.	Reysaş
SANEL	2013	San-el Mühendislik Elektrik Taahhüt Sanayi ve Tic. A.Ş.	sanel
SANFM	2012	Sanifoam Sünger Sanayi ve Ticaret A.Ş.	sanifoam
SAYAS	2013	Say Reklamcılık Yapı Dekorasyon Proje Taahhüt Sanayi ve Ticaret A.Ş.	say reklam
SELEC	2006	Selçuk Ecza Deposu Ticaret ve Sanayi A.Ş.	selçuk ecza
SEYKM	2015	Seyitler Kimya Sanayi A.Ş.	seyitler kimya
SILVR	2006	Silverline Endüstri ve Ticaret A.Ş.	silverline

Ticker	IPO Year	Company Name	Search Query
SNGYO	2007	Sinpaş Gayrimenkul Yatırım Ortaklığı A.Ş.	sinpaş
SNKRN	2015	Senkron Güvenlik ve İletişim Sistemleri A.Ş.	"senkron güvenlik"
TAVHL	2007	TAV Havalimanları Holding A.Ş.	TAV
TCHOL	2006	Tacirler Yatırım Ortaklığı A.Ş.	tacirler
TKFEN	2007	Tekfen Holding A.Ş.	tekfen holding
TKURU	2012	Taze Kuru Gıda Sanayi ve Ticaret A.Ş.	taze kuru - "taze fasulye"
TMSN	2012	Tümosan Motor ve Traktör Sanayi A.Ş	tümosan-"new holland"-erkunt-oyunlar-"satılık traktör"-"massey ferguson"-"ikinci el traktör"
TRGYO	2010	Torunlar Gayrimenkul Yatırım Ortaklığı A.Ş.	torunlar
TSGYO	2010	TSKB GYO A.Ş.	tskb
TUCLK	2014	Tuğçelik Alüminyum ve Metal Mamülleri Sanayi ve Ticaret A.Ş.	tuğçelik
ULAS	2012	Ulaşlar Turizm Yatırımları ve Dayanıklı Tüketim Malları Ticaret Pazarlama A.Ş.	ulaşlar

Ticker	IPO Year	Company Name	Search Query
UTPYA	2011	Utopya Turizm İnşaat İşletmecilik Ticaret A.Ş.	utopya
UYUM	2010	Uyum Gıda ve İhtiyaç Maddeleri Sanayi ve Ticaret A.Ş.	uyum gıda
VANGD	2011	Vanet Gıda Sanayi İç ve Dış Ticaret A.Ş.	vanet
VERTU	2015	Verusaturk Girişim Sermayesi Yatırım Ortaklığı A.Ş.	verusatürk
VERUS	2013	Verusa Holding A.Ş.	verusa holding
YAPRK	2011	Yaprak Süt ve Besi Çiftlikleri	yaprak süt
YAYLA	2013	Yayla Enerji Üretim Turizm ve İnşaat Ticaret A.Ş.	yayla inşaat

Appendix E. TURKISH SUMMARY

1978 Nobel Ekonomi Ödülü sahibi Prof. Dr. Herbert Simon piyasalardaki bilgi akışı ile ilgili şunları söyler: "…Bilginin ne tükettiği aslında gayet açıktır: bilgi onu alanın verdiği dikkati tüketir. Dolayısıyla bilginin çokluğu dikkat azlığı yaratır ve bu durum da bilgiyi alanların dikkatlerini pek çok bilgi kaynağı arasında verimli bir şekilde paylaştırmaları gereğini ortaya çıkartır…"

Geleneksel varlık fiyatlama modelleri piyasalarda sürekli bir bilgi akışı olduğunu ve piyasaya ulaşan yeni bilgilerin anında fiyatlara yansıtıldığını varsaymaktadır. Bu varsayımın geçerli olabilmesi için yatırımcıların dikkatlerini, değerlendirdikleri her bir varlığa yetecek biçimde paylaştırmaları gerekir (Da, Engelberg ve Gao, 2011). Oysa dikkat kısıtlı bir bilişsel kaynaktır (Kahneman, 1973) ve dolayısı ile yatırımcıların gösterebilecekleri dikkat[17] de sınırlıdır. Bu durumda piyasaya akan bilgilerin anında fiyatlara yansıtılacağı varsayımının sorgulanması yerinde olacaktır.

Geleneksel varlık fiyatlama modelleri bilgi akışı açısından etkin piyasaların yanı sıra yatırımcıların da her zaman akılcı (rasyonel) olarak davranacaklarını da varsaymaktadır. Bu varsayıma göre yatırımcıların tek amacı akılcı olarak verecekleri kararlarla yatırımlardan elde ettikleri faydayı maksimize etmektir. Görgül finans literatüründe pek çok çalışma akılcı davranış varsayımının piyasalarda gözlemlenen kimi büyük fiyat hareketlerini açıklamakta yetersiz kaldığını ortaya koymaktadır. Amerikan hisse senedi piyasasında 1929 yılında ya da Ekim 1987'de ya da 1990'ların sonlarında yaşanan büyük çöküşler ve hatta düzenli olarak gözlemlenen Pazartesi ya da Ay Sonu anormallikleri gibi fiyat hareketleri hem piyasaların bilgi açısından etkin olmadığına hem de yatırımcıların her zaman akılcı davranmadıklarına işaret etmektedir.

Bu bağlamda, görgül finans modelini psikolojik, sosyal, bilişsel ve duygusal faktörleri içerecek şekilde genişleten davranışsal finans, yatırımcıların akılcı ve

[17] Bu bölümün geri kalanında "yatırımcı dikkati" ifadesi yerine "yatırımcı ilgisi" ifadesi de kullanılacaktır.

mantıklı olmayan kararlarına açıklık getirmek için bir araştırma alanı yaratmaktadır. 1990'lı yıllardan bu yana, davranışsal finans alanı akademik finans tartışmalarında araştırmacıların dikkat odağı haline gelmiştir. Bu kapsamda davranışsal sapmalar, rasyonel ve mantıklı karar verme çerçevesi ile çelişen çeşitli varlık fiyatlama modellerinin popüler bir açıklaması haline gelmiştir (Cornelli, Goldreich ve Ljungqvist, 2006). Bu doğrultuda finansal aktörlerin duygusal ve hata yapmaya eğilimli oldukları ve tamamen akılcı olmadıkları modellerin kullanılmasının, bazı finansal olguları ve anormallikleri daha iyi açıklayabileceği iddia edilmektedir.

Finansal platformlarda akılcı olmayan davranışlar, yatırımcıların duyguları ile tetiklenmekte ve güdülmektedir. Baker ve Wurgler (2007) tarafından tanımlandığı üzere, yatırımcı duygusu "gelecekteki nakit akışları ve yatırım riskleri hakkında elde bulunan gerçekler tarafından doğru olduğu ispatlanmamış inanç" tır. Literatürde yatırımcı duygusunu ölçmeyi ve bunun finansal ortamlardaki etkilerini belirlemeyi amaçlayan pek çok çalışma bulunmaktadır. Ayrıca bireysel yatırımcı duygusu ile bireysel yatırımcı dikkati arasındaki pozitif ilişki de literatürde tartışılmıştır. Da, Engelberg and Gao (2011) söz konusu pozitif ilişkiyi iki temel nedene dayandırmaktadır. Öncelikle, duygunun oluşması için dikkat gereklidir. Bir bireysel yatırımcının, yakın bir zamanda gerçekleşmesi söz konusu olan bir halka arz gibi finansal bir olay hakkında duygu geliştirmesi için yatırımcının öncelikle halka arza dikkat göstermesi gerekmektedir. Dolayısıyla, artan yatırımcı ilgisinin daha güçlü bir duyguya yol açması olasıdır. İkinci olarak, bireysel yatırımcıların, duyguları sebebiyle, davranışsal sapmalardan daha fazla muzdarip olma ihtimali yüksektir. Bu iç içe geçmiş ilişkiden dolayı, yatırımcı ilgisi de yakın dönem akademik literatürde popüler bir konu haline gelmiştir.

Yatırımcı ilgisinin nasıl ölçülebileceği konusunda literatürde bazı çalışmalar bulunmaktadır. Bu çalışmalardan bazıları yatırımcı ilgisinin piyasada oluşan uç nokta getiriler ile (Barber ve Odean, 2008), işlem hacmi ile (Gervais, Kaniel ve Mingelgrin, 2001; Barber ve Odean, 2008; Hou, Peng ve Xiong, 2008), basın yayın organlarında çıkan haberler ile (Barber ve Odean, 2008; Yuan, 2008) ya da

firmaların reklam harcamaları ile (Grullon, Kanatas ve Weston, 2004; Lou, 2008, Chemmanur ve Yan, 2009) ölçmektedir.

Başka bir tartışma konusu ise yatırımcı ilgisinin finansal ortamdaki etkilerinin gözlenmesi ile ilgilidir. Birçok finansal olay arasında, halka arzlar, bireysel yatırımcı ilgisinin etkilerini incelemek için en iyi platformlardan biri olarak hizmet etmektedir. Esasen, halka açılan firmaların, yatırımcıların ve medyanın ilgisini çekmesi oldukça muhtemeldir. Bu doğrultuda; Da, Engelberg ve Gao (2011) da halka arzların bireysel yatırımcı ilgisinin etkisini gözlemlemek için oldukça elverişli bir platform teşkil ettiğini belirtmektedir.

Halka arzların hem kısa hem de uzun vadedeki performansları halka arz literatüründe birçok araştırmada çalışılmış ve belgelenmiştir. Halka arz edilen hisse senetlerinin genelde çok yüksek başlangıç getirileri elde ettikleri ve bunu takiben uzun vadede ise düşük performans sergiledikleri ortaya çıkmaktadır (Aggarwal ve Rivoli, 1990; Ritter, 1991; Levis, 1993; Ljungqvist,1997).

Birçok araştırmacı, halka arz edilen hisselerin bu tipik kısa ve uzun dönem performanslarına davranışsal açıklamalar getirmektedir. Ritter ve Welch (2002), halka arzların uzun vadeli performansını ve düşük fiyatlandırılmasını (*underpricing*) davranışsal akıl yürütme ile açıklamanın daha uygun olduğunu belirtmektedir. Benzer şekilde; Ljungqvist, Nanda ve Singh (2006), "halka arz anomalileri" ni rasyonel olmayan ve duygusal yatırımcılarının varlığına bağlamaktadır. Chan (2014) ise "Dot-com balonu" döneminden kanıt sunarak, bireysel yatırımcıların aşırı iyimserliğinin uzun vadede halka arz edilen hisselerin yetersiz performansıyla sonuçlandığını belgelemektedir.

Da, Engelberg ve Gao (2011), yatırımcıların, dikkatlerini çeken hisse senetlerini satın alma eğilimi gösterdiklerini Barber ve Odean'ın araştırmasına (2008) değinerek açıklamaktadır. Bu nedenle, halka açılmadan önce bireysel yatırımcılardan daha çok ilgi gören hisse senetleri, işlem görmeye başladıklarında da daha yüksek satın alım işlem hacmi deneyimleme eğilimi göstermektedir. Da, Engelberg ve Gao (2011) ayrıca, halka arzların açığa satış (*short-sell*) olasılığının

olmaması ve yatırımcılardan gelen talebin yüksek düzeyde olması nedeniyle, halka arz edilen hisse senetlerinin geçici olarak yüksek ilk getiriler elde ettiğini ve ardından ise azalan talebin uzun vadede düşük fiyat performansına neden olduğunu iddia etmektedir.

Halka arzlar, nitelikleri gereği, yüksek ilk gün getirileri ve uzun vadedeki düşük performansları ile bireysel yatırımcıların ilgisini gözlemlemek için ideal ortamlardan birini sunmaktadır. Halka arz literatüründe yatırımcı ilgisinin etkilerini araştıran bir dizi çalışma bulunmaktadır. Örnek olarak; Reese 1998'de yayımlanan çalışmasında yatırımcı ilgisini medya ile ölçmekte ve halka arz öncesi daha yüksek yatırımcı ilgisine maruz kalan şirketlerin yüksek ilk gün getirileri elde ettiğini ve aynı zamanda da kısa ve uzun vadede daha yüksek oranlarda işlem gördüğünü ortaya koymaktadır. Benzer şekilde, Liu, Sherman ve Zhang (2009) yatırımcı ilgisini söz konusu halka arz ile ilgili olarak medyada çıkan haber sayılarından yararlanarak ölçmekte ve halka arz öncesi yatırımcı ilgisinin düşük fiyatlandırma (*underpricing*) üzerindeki etkisini gözlemlemeyi amaçlamaktadır. Çalışmanın sonuçları halka arz öncesi artan yatırımcı ilgisinin düşük fiyatlandırma seviyesini arttırdığını ve dolayısıyla daha yüksek ilk gün getirileri elde edilmesine yol açtığını göstermektedir. 2014 yılında ise Liu, Sherman ve Zhang benzer bir çalışma yürütmüş ve halka arz öncesi artan yatırımcı ilgisinin uzun vadede kalıcı etkisi olduğunu ve halka arz sonrası hisse senedi likiditesini olumlu yönde etkilediğini göstermiştir.

Yatırımcı ilgisinin halka arz edilen hisse senetlerinin kısa ve uzun vadeli performanslarına etkilerini analiz eden bir diğer önemli çalışma ise 2011'de Da, Engelberg ve Gao tarafından gerçekleştirilmiştir. Bu çalışmada Google Arama Motoru, bireysel yatırımcıların ilgisini ölçmek amacıyla bir araç olarak kullanılmış ve ilginin seviyesi Google arama hacmi verisinden yararlanılarak yenilikçi bir yöntemle ortaya koyulmuştur. Ayrıca Da, Engelberg ve Gao (2011) bu yöntemin geleneksel yöntemlerin aksine direkt (aktif, doğrudan) bir ilgi ölçüsü sağladığını da belirtmektedir. Çalışmanın sonuçları, halka arz öncesi daha fazla yatırımcı ilgisi

çeken hisse senetlerinin daha yüksek ilk gün getirileri elde ettiği ve uzun dönemde ise daha düşük performans sergilediği yönündedir.

Bu noktada; Da, Engelberg ve Gao'nun (2011) söz konusu yenilikçi ilgi ölçüsünü oluşturmasına imkân sağlayan İnternet'in sunduğu hizmetler de belirtilmelidir. İnternet'in 1991'de halkın kullanımına açılmasından sonra bilgi ediniminde yeni bir dönem başlamıştır. Yaklaşık 25 yıl içinde, İnternet bireylerin herhangi bir konuda bilgiye erişme, bilgi toplama ve işleme biçimlerini tamamen değiştirmiştir. İnternet'in ortaya çıkışı ve gelişimi, herhangi bir alan hakkında her zaman ve her yerden erişilebilen büyük hacimlerde bilgi sağlamıştır. Bu durum, Rubin ve Rubin (2010) tarafından İnternet'in "bilgi otobanı (*the information superhighway*)" olarak tanımlanmasına yol açmaktadır. Günümüzde, bireyler neredeyse her konuda birincil bilgi kaynağı olarak İnternet'e başvurmaktadır.

İnternet'in finansal platformlarda piyasa katılımcıları arasında da yaygın bir kullanımı vardır. Kurumsal yatırımcılar çoğunlukla işletmeler için finansal veri hizmetleri ve hisse alışveriş platformları sunan terminallere başvurduklarından, bireysel yatırımcılar Internet'in ticari amaç güden temel kullanıcılarıdır (Da, Engelberg ve Gao, 2011). Bu doğrultuda, Ding ve Hou (2015), bireysel yatırımcıların ticari işlem faaliyetlerine (hisse senedi alım-satımına) başlamadan önce bilgi toplamak ve bu bilgiyi işlemek için İnternet'i kullandıklarını ileri sürmekte ve İnternet'in bireysel yatırımcıların bilgi edinmesi için pahalı olmayan bir yol sunduğunu savunmaktadır.

Barber ve Odean (2001) İnternet'in, yatırımcılara genel olarak herhangi bir aracı kuruma danışmak zorunda kalmadan geniş kapsamlı bilgiye ulaşabilecekleri ve ticari kararlar verebilecekleri farklı bir platform sunduğunu belirtmektedir. Çoğu zaman üçüncü bir tarafın katılımı söz konusu olmadığından, İnternet'in bireysel yatırımcıların ilgisini ölçmek için iyi ve doğrudan bir vekil teşkil edeceği değerlendirilmektedir. Bu bağlamda yakın zamanda ortaya koyulmuş araştırmalarda İnternet aramaları bireysel yatırımcıların ilgisini ölçmek için kullanılmaktadır. Bu doğrultuda, Mondria, Wu ve Zhang (2010), İnternet aramalarında kullanılan

sorguların üç temel nedenden ötürü yatırımcı ilgisini ölçmek amacı ile kullanılabileceğini belirtmektedir. İlk neden olarak İnternet'in artık bilgi edinmek için birincil platform olarak hizmet ettiği öne sürülmektedir. İkinci olarak, yatırımcılar İnternet arama motorları aracılığı ile zaman kaybetmeden istenilen miktarda bilgiyi elde ettikleri için İnternet'in bilgi edinmek için en çekici araç haline geldiği ileri sürülmektedir. Son olarak, kullanıcıların aramalarda kullandıkları sorguların kullanıcının ilgi alanlarını doğrudan ortaya çıkardığı iddia edilmektedir. Benzer şekilde, Ding ve Hou (2015), çevrimiçi medyanın gazete kapsamına kıyasla daha kolay erişilebilir ve kullanılabilir olduğunu ve dolayısıyla bireysel yatırımcıların, İnternet kullanarak bilgi aramaya daha meyilli olduklarını ileri sürmektedir.

Bu doğrultuda; Da, Engelberg ve Gao'nun (2011) İnternet arama hacminden yararlanarak yenilikçi bir yatırımcı ilgisi ölçüsü oluşturan çalışması finansal ekonomiye yeni bir araştırma alanı sunmuştur. Bu çalışmaya atıfta bulunan birçok araştırmacı, bireysel yatırımcıların ilgisini ölçerken İnternet arama hacmi verisinden yararlanmaktadır. Bu kapsamda yatırımcı ilgisini arama hacminden yararlanarak ölçmeyi amaçlayan ve bu ilgiyle hakla arz getirileri arasındaki ilişkiyi araştıran bir diğer çalışma ise Fang, Jiang ve Qian (2014) tarafından ortaya koyulmuştur. Bu çalışmada bireysel yatırımcıların ilgisi Çin'deki en popüler arama motoru olan Baidu Arama Motoru aracılığı ile elde edilen bir endeks kullanılarak ölçülmüş ve halka arz öncesi artan yatırımcı ilgisinin ilk gün getirileri üzerinde pozitif yönde etkili olduğu gözlenirken uzun dönem getirilerini ise negatif yönde etkilediği ortaya koyulmuştur. Bu çalışma kapsamında gelişmekte olan Çin hisse senedi piyasasında elde edilen sonuçların gelişmiş Amerikan hisse senedi piyasası için yapılan araştırmalarda elde edilen sonuçlar ile tutarlı olduğu gözlenmektedir.

Bu tez çalışmasının amacı ise gelişmekte olan Türkiye hisse senedi piyasasında, şirketlerin halka arzları öncesinde, piyasalarda şirketle ilgili bilgi akışının ne kadar etkin biçimde oluştuğunu değerlendirerek halka arz edilen şirketlerin getirilerinin ve halka arz sonrası gerçekleşen hisse senedi likiditesinin bu etkinliğin derecesinden nasıl etkilendiğini ortaya koymaktır. Bu değerlendirmeler yapılırken piyasaya şirket

ile ilgili olarak akan bilgilerin ne kadarının yatırımcıların dikkatini çektiğine ve bilgi akışındaki yoğunluğun gösterilen ilgiyi nasıl etkilediğine bakılmıştır.

Yukarıda anlatılan analizlerin yapılabilmesi için ilk olarak bilgi akışının ölçülebilmesi, ikinci olarak da yatırımcıların piyasaya gelen bilgiye ne kadar ilgi gösterdiklerinin ölçülebilmesi gerekmektedir. Bu çalışmada piyasaya gelen bilgi akışını ölçmek için Finnet Haber Analiz veri tabanı kullanılarak Borsa İstanbul'da 2005 – 2015 yılları arasında halka arz edilmiş firmalar ile ilgili basın yayın organlarında ve kamuyu aydınlatma platformlarında çıkan haberler ile raporlar derlenmiştir. Haber sayılarına ek olarak yine aynı dönemde halka arz edilen firmalarla ilgili olarak Google üzerinden yapılan anahtar sözcük aramaları ile ilgili Google firmasının yayınladığı Google Trends bilgileri toplanmıştır.

Bu tez çalışmasında, IPO öncesi yatırımcı dikkati ile kısa ve uzun dönem halka arz getirileri arasındaki ilişki Borsa İstanbul için analiz edilmiştir. Halka arz öncesindeki yatırımcı dikkatinin devamlılığını gözlemlemek amacı ile halka arz sonrası hisse senedi likiditesini ölçen bir başka analiz de yapılmıştır. Bilinen kadarıyla, bu çalışma halka arz öncesi yatırımcı ilgisinin, gelişmekte olan Türkiye hisse senedi piyasasında, kısa ve uzun vadeli halka arz getirileri ile halka arz sonrası hisse senedi likiditesini nasıl etkilediğini gözlemlemeyi hedefleyen ilk çalışmadır. Literatürdeki önceki araştırmalar, halka arz öncesinde yatırımcı ilgisinde meydana gelen artışın, gelişmiş Amerikan hisse senedi piyasasında yüksek ilk gün getirisine ve uzun vadede ise düşük performansa neden olduğuna dair kanıtlar sunmaktadır. Halka arz literatürü, halka arz öncesinde yatırımcı ilgisinin daha yüksek seviyelerde seyretmesinin Amerikan hisse senedi piyasasında halka arz sonrasındaki hisse senedi likiditesinde artışa neden olduğunu belgelemektedir. Daha önce yapılan başka bir araştırmada ise gelişmekte olan Çin piyasasında da kısa ve uzun vadeli halka arz getirileri ile ilgili benzer sonuçlar elde edilmiştir. Bununla birlikte, piyasa verimliliği düşük olan, bireysel yatırımcıların katılımının son derece yüksek ve halka arzların ise sayıca çok az olduğu Türkiye gibi genç ve gelişmekte olan bir hisse senedi piyasasında benzer sonuçlar beklenmeyebilir. Dolayısıyla Borsa İstanbul'daki sonuçların gözlemlenmesi için görgül (ampirik) analizler yapılmalıdır.

Bu tez çalışmasında, ana odak bireysel yatırımcılardır, çünkü Türkiye borsasındaki işlem hacmi esasen bireysel yatırımcılar tarafından üretilmektedir (Fung, Demir, Lau ve Chan, 2015). Ding ve Hou'nun (2015) çalışması referans alınarak bireysel yatırımcı ilgisi aktif ve pasif olmak üzere iki farklı biçimde ölçülmüştür. Yatırımcıların pasif ilgisi geleneksel yönteme uygun olarak basın ve yayın organları ile kamuyu aydınlatma platformlarında halka arz edilen şirketle ilgili çıkan haber ve raporların sayısı ile ölçülmüştür. Finnet veri tabanı kullanılarak derlenen haber ve raporlar pasif ilgiyi temsil edecek bir değişken oluşturulmasında kullanılmış olup halka arz öncesindeki 2 ay içerisinde yayımlanan haberler dikkate alınmıştır. Söz konusu değişken oluşturulurken Borsa İstanbul'da 2005-2015 yılları arasında halka arz edilmiş olan 145 şirket dikkate alınmıştır. Bu 145 halka arzın 118'i Pay Piyasası'nda, 27'si ise Gelişen İşletmeler Piyasası'nda gerçekleşmiştir.

Yatırımcıların aktif ilgisi ise Da, Engelberg ve Gao'nun (2011) çalışması referans alınarak Google arama motorunun halka arz edilen şirketle ilgili yapılan aramalar hakkında sağladığı istatistiklere dayanarak hesaplanmıştır. Bu istatistikler Google Trends internet sayfasından elde edilmiştir (https://www.google.com/trends/). Google Trends tarafından sağlanan Google arama hacmi verisi yatırımcıların aktif ilgisini ölçmek için üç temel sebebe dayanarak seçilmiştir (Da, Engelberg ve Gao, 2011). İlk olarak pasif ölçülerle kıyas edildiğinde bu veri yatırımcıların ilgisini daha güncel bir şekilde ölçmektedir. Ayrıca bir yatırımcı herhangi bir şirketi Google'da aradığında dikkatini o şirkete yönlendirdiği aşikârdır. Son olarak Google oldukça yüksek bir nüfuz oranı ile Türkiye pazarındaki en popüler arama motorlarından birisidir.

Google arama hacminin yatırımcıların aktif ilgisini ölçmek için iyi bir ölçü olduğu değerlendirilmektedir. Öyle ki Google arama hacmindeki bir artış, belirli bir terim için yapılan aramaların sayısındaki artışı değil söz konusu arama teriminin popülaritesindeki yükselişi temsil etmektedir. Google bu özelliği fiili arama hacmini önce normalize edip ardından dizinlemek suretiyle sağlamaktadır.

Arama hacmi verilerini toplarken, yatırım amacı ile gerçekleştirilen aramaları ayırt etmek için titiz bir yöntem benimsenmiştir. Google Trends üzerinde anahtar kelimeler aranırken, halka arz edilen şirketler kapsamındaki ilgili içeriği ayırt etmek ve şirket ürünlerinin aranması gibi ilgisi olmayan durumları hariç tutmak için, halka arz edilen şirket adlarının olası varyasyonları dikkate alınmış ve aynı zamanda bazı filtreleme yöntemleri uygulanmıştır. Coğrafi konum veya zaman aralığı ile ilgili bazı filtrelerden de yararlanılmıştır. Aktif dikkat ölçüsünü oluşturmak için bu metodoloji uygulanmış ve 42 şirket eksik Google arama hacmi verisi sebebiyle ya da çoklu ve/veya genel anlamlara sahip şirket isimlerine sahip olması nedeniyle örneklemin dışında tutulmuştur. Alt örneklemde kalan 103 halka arz şirketi için Google arama hacmi değerleri https://www.google.com/trends adresinden indirilmiştir. Arama hacminin miktarına göre, şirketler için veri Google tarafından haftalık veya aylık bazda raporlanmaktadır. Bu çalışmada kullanılmak üzere haftalık bazda elde edilmiş olan verilerin aylık formata dönüştürülmesi söz konusu olmuştur. Halka arz öncesinde yatırımcıların aktif ilgisindeki eğilimi yakalamak için bu aylık veriler kullanılmış ve halka arz edilen şirketler için aktif ilgi ölçüsü hesaplanmıştır.

Aktif ve pasif ilgi ölçülerinin oluşturulmasını takiben, halka arz öncesi yatırımcı ilgisinin halka arz getirilerini ve halka arz sonrası hisse senedi likiditesini nasıl etkilediğini görgül olarak gözlemlemek amacı ile üç ayrı model oluşturulmuştur. Bu modeller ayrıca, bazı firma ve endüstri özelliklerini kontrol etmek amacıyla çeşitli bağımsız değişkenleri de içerecek şekilde tasarlanmıştır. Analizlerde kullanılan veri serileri normal dağılımdan ciddi sapmalar sergilediğinden, söz konusu modeller bağımsız değişkenlerin dağılımı ile ilgili herhangi bir gereksinime sahip olmayan Genelleştirilmiş Momentler Metodu (GMM) çerçevesinde incelenmiştir.

Kısa dönem analiz sonuçları, beklentilerin aksine, ne aktif ne de pasif ilgi ölçüsünün ilk işlem günü halka arz getirileri üzerinde etkili olduğuna işaret etmektedir. Halka arz öncesi artan yatırımcı ilgisinin kısa dönem halka arz getirileri üzerinde bir etkisi olmadığı gözlenmiştir. Bu şaşırtıcı bulgu, Türkiye hisse senedi piyasasının doğasına atfedilmektedir. Bu piyasa bilgi ediniminin maliyetli, bireysel yatırımcıların katılımının yüksek ve halka arz sayısının az olduğu genç ve gelişmekte olan bir

pazardır. Bu sebeple, bireysel yatırımcıların Borsa İstanbul'da gerçekleşen her bir halka arza ilgi gösterdiği; dolayısıyla da halka arz öncesi yatırımcı ilgisinin, kısa dönem halka arz getirileri üzerindeki ayırt edici gücünü kaybettiği değerlendirilmektedir. Uzun vadeli analizlerin sonuçları, halka arz öncesi aktif yatırımcı ilgisinin halka arzı takip eden hisse senedi likiditesi üzerinde olumlu bir etkisi olduğunu gösterirken, pasif ilgi ölçüsünün uzun vadeli likidite açısından önemli bir etkisi olmadığını göstermiştir. Bu bulgu, aktif ilgi ölçüsünün oluşturulması için kullanılan Google arama hacmi verilerine yatırımcıların doğrudan katılımı ile açıklanmaktadır. Yatırımcılar aktif olarak Google arama motorunda bir şirketi aradığında halka arz sonrası dönemde de bu şirketlere olan aşinalıklarının artacağı değerlendirilmektedir. Sonuçlar, bireysel yatırımcıların, hâlihazırda aşina oldukları hisse senetlerinin alış ve satışını yapma yönünde eğilim gösterdiğini ve dolayısıyla bu durumun halka arz sonrası hisse senedi likiditesinin artmasına neden olduğunu göstermektedir. Son analiz sonuçları, ilk günkü halka arz getirilerinin, halka arz sonrası uzun vadeli getirilerle pozitif yönde ilişkili olduğunu ortaya koymaktadır. Aynı zamanda, halka arz öncesi yatırımcı ilgisinin, ilk işlem günündeki getirilere fiyat baskısı uyguladığı ve bu baskının daha sonra, halka arz sonrası getirilerin azalmasına neden olduğu değerlendirilmektedir. Bu iki etki birlikte değerlendirildiğinde, ilk getirilerin olumlu etkisinin, ilk işlem gününün fiyat baskısının olumsuz etkisine kıyasla daha yüksek olduğu görülmektedir.

Bu tez çalışması kapsamında söz konusu olan kısıtlar da ayrıca belirtilmelidir. İlk olarak, gelişmiş piyasalar ile karşılaştırıldığında, Borsa İstanbul'da oldukça az sayıda halka arzın gerçekleştiği görülmektedir. Google Trends, arama hacmi verilerini 2004 yılından itibaren kullanıma sunduğundan, bu doğrultuda örneklemin daha da kısıtlanması söz konusu olmuştur. Google Trends verileri ile ilgili bir diğer kısıtlama ise, bazı halka arz şirketlerinin Google arama hacminin yetersiz olması ile ilgilidir. Arama hacmi düşük olan bazı halka arz şirketlerinin eksik arama hacmi değerleri olduğu gibi bazı şirketlerin ise yalnızca aylık verileri bulunmaktadır. Bu durum söz konusu hisse senedi ile ilgili aramaların, alakası olmayan aramalardan (örneğin, şirket ürünleri ile ilgili aramalar) ayırt edilmesini son derece

zorlaştırmaktadır; çünkü arama bağlamını tanımlamaya yardımcı olan "İlgili arama bölümü (*Related Search Section*)", yetersiz arama hacmi nedeniyle Google Trends sayfasında gösterilememektedir. Haftalık verilerin aylık formata dönüştürülmesi sırasında da bazı kısıtlar ortaya çıkmaktadır. Örneklemdeki bütün halka arz şirketleri için haftalık Google arama hacmi verileri ile çalışılması mümkün olsaydı aktif dikkat ölçüsü ilgili analiz sonuçlarının daha hassas olacağı değerlendirilmektedir.

Ding ve Hou'nun çalışmasında da (2015) belirtildiği gibi, bu tez çalışmasının halk tarafından tanınılırlığını arttırmaya çalışan şirketlere fayda sağlayacak bulguları da vardır. Sonuçlar, şirketlerin İnternet üzerinde daha fazla görünür hale gelmeleri sonucunda daha yüksek seviyelerde yatırımcı ilgisi çekebileceklerini göstermektedir. Bu durumun, özellikle yatırımcıların şirketlere olan aşinalığını arttırmanın ve dolayısıyla daha fazla getiri ve likiditeyi deneyimlemenin yollarını arayan halka arz şirketleri için yarar sağlayacağı değerlendirilmektedir.

Bu çalışmanın sonuçları davranışsal finansın giderek gelişmekte olan literatürüne katkıda bulunmaktadır. Bu tez çalışması, finansal analizlerde İnternet arama verilerinin kullanmasının faydalı olacağını da ortaya koymaktadır. Bu noktada bu çalışmanın, Türkiye hisse senedi piyasasıyla ilgili, literatürde bulunan finansal ekonomi çalışmaları arasında Google'ın arama hacmi verilerini kullanan ilk araştırma olduğu da belirtilmelidir. İnternet arama hacminin, aktif katılım gerektirdiğinden bireysel yatırımcıların dikkatini doğrudan ölçtüğü değerlendirilmektedir. Bu nedenle, İnternet arama hacminin finans alanında ve özellikle de gelişmekte olan Türkiye hisse senedi piyasasında daha geniş uygulamalarda kullanılması kapsamında daha fazla araştırma yapılması gerekmektedir. Araştırmanın ayrıca gelişmekte olan diğer pazarlara da genişletilebileceği değerlendirilmektedir. Bu uygulamalar gelecekteki araştırmalar için bırakılmıştır.

Appendix F. TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	
Sosyal Bilimler Enstitüsü	X
Uygulamalı Matematik Enstitüsü	
Enformatik Enstitüsü	
Deniz Bilimleri Enstitüsü	

YAZARIN

Soyadı : Akgün
Adı : Başak Elif
Bölümü: İşletme

TEZİN ADI (İngilizce) : Investor Attention and IPO Performance

TEZİN TÜRÜ : Yüksek Lisans [X] Doktora [ ]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. [X]

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: