

**T.C.
GALATARASAY UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF BUSINESS ADMINISTRATION**

**LOCAL BIAS OF INDIVIDUAL INVESTORS AT
BORSA İSTANBUL EQUITY MARKET:
TENDENCY TO INVEST IN GEOGRAPHICALLY
CLOSE FIRMS**

PH.D. THESIS

HÜSEYİN EVREN ARIK

Advisor: Associate Professor Oğuzhan BAHADIR

JULY 2024

**T.C.
GALATARASAY UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF BUSINESS ADMINISTRATION**

**LOCAL BIAS OF INDIVIDUAL INVESTORS AT
BORSA İSTANBUL EQUITY MARKET:
TENDENCY TO INVEST IN GEOGRAPHICALLY
CLOSE FIRMS**

PH.D. THESIS

HÜSEYİN EVREN ARIK

Advisor: Associate Professor Oğuzhan BAHADIR

JULY 2024

PREFACE



TABLE OF CONTENTS

1	Introduction.....	1
2	Theoretical Framework.....	7
2.1	Traditional Finance Theories.....	7
2.1.1	Expected Utility Theory.....	7
2.1.2	Modern Portfolio Theory	8
2.1.3	Capital Asset Pricing Model	11
2.1.4	Efficient Market Hypothesis	14
2.2	Behavioral Finance	16
2.2.1	Are Markets Really Efficient?: Limited Arbitrage	17
2.2.2	Rational Man versus <i>Normal</i> Man: Bounded Rationality and Prospect Theory	19
2.2.3	Psychological Biases.....	21
2.2.4	Home Bias: Definition and Review of Empirical Studies	37
2.2.5	Local Bias: Definition and Review of Empirical Studies.....	42
3	Data and Methodology.....	68
3.1	Data	68
3.1.1	Institutional Background.....	68
3.1.2	Individual Investors Data.....	79
3.2	Methodology	83
3.2.1	Return Performance of Investors	83
3.2.2	Existence of and reasons for Local Bias	86
3.2.3	Local bias and investors' characteristics	91
4	Results.....	94
4.1	Return Performance of Investors.....	94
4.1.1	Return performance and investors' individual characteristics.....	96
4.1.2	Return performance across investors' cities/regions	100
4.2	Existence of Local Bias	104
4.2.1	City-based local bias	104
4.2.2	Region-based local bias	110
4.2.3	Distance-based local bias.....	114

4.3	The reasons for local bias: information vs. familiarity	116
4.3.1	Local vs. non-local returns.....	117
4.3.2	Local vs. non-local returns and information asymmetry	120
4.4	Local bias and investors' characteristics	126
4.5	Discussion	128
5	Concluding Remarks.....	131
6	References.....	133



ABBREVIATIONS

APT : Arbitrage Pricing Theory

BIST : Borsa İstanbul A.Ş.

CAPM : Capital Asset Pricing Model

CMB : Capital Markets Board

CML : Capital Market Line

EMH : Efficient Market Hypothesis

MKK : Merkezi Kayıt Kuruluşu A.Ş. (Central Depository Agency of Türkiye)

MSA : Metropolitan State Areas of the U.S.



LIST OF SYMBOLS

AR : Average abnormal return

CAR : Cumulative average abnormal return

HHL_{jt} : Herfindahl index for investors

LB : Local bias measures

p_{ijt} : the weight that was calculated by dividing the end-of-day market value for stock i to the end-of-day (day t) market value of portfolio held by investor j

R_f : Risk-free rate

R_m : Market return

R_p : Return of the portfolio

r_{ij} : daily return for stock i in day t

s_{jt} : the number of stocks held by investor j on day t

LIST OF FIGURES

Figure 1: Efficient risk (V) and return (E) combinations of two risky assets...	10
Figure 2: Efficient portfolio frontier	10
Figure 3: Capital market line (CML).....	12
Figure 4: Value of share trading (USD billions, 2023)	70
Figure 5: Value of market capitalization (USD billions, 2023).....	72
Figure 6: Number of listed firms (as of the end of 2023).....	74
Figure 7: Turnover velocity (2023)	76
Figure 8: Trading activity: domestic vs. foreign investors	78
Figure 9: Average adjusted returns for deciles of adjusted returns (% , 1st for the lowest)	95
Figure 10: Average adjusted returns for deciles of age (% , 1st for the lowest age decile)	96
Figure 11: Average adjusted returns for deciles of portfolio size (% , 1st for the lowest portfolio size decile)	97
Figure 12: Number of investors across the number of stocks held (x- axis shows the number of stocks)	98
Figure 13: Number of investors across the HHL index value	98
Figure 14: Average adjusted returns for deciles of number of stocks held (% , 1st for the lowest number of stocks decile).....	99
Figure 15: Cities of Turkey.....	106
Figure 16: Geographical regions of Turkey	110
Figure 17: Economic regions of Turkey	111

LIST OF TABLES

Table 1: Summary of the literature on local bias.....	60
Table 2: Descriptive statistics	80
Table 3: Geographical distribution of investors (by city).....	81
Table 4: Geographical distribution of investors (by region)	83
Table 5: Return Performance of Individual Investors	94
Table 6: Return Performance of Individual Investors (adjusted portfolio return, by years).....	95
Table 7: Adjusted returns across cities	101
Table 8: Adjusted returns across regions.....	103
Table 9: Cross Sectional Regression of Adjusted Return.....	104
Table 10: Local bias in Turkey (city-level measure).....	108
Table 11: Local bias in Turkey (city-level measure) (full sample, by years).	109
Table 12: Local bias in Turkey (geographical region-level measure).....	111
Table 13: Local bias in Turkey (economic region-level measure).....	112
Table 14: Local bias in Turkey (distance-based measures).....	114
Table 15: Local bias in Turkey (relative number of investors)	116
Table 16: Return performance of local investments.....	117
Table 17: Return performance of local investments (by years).....	118
Table 18: Return performance of local investments (by cities).....	119
Table 19: Local bias across characteristics of equities	123
Table 20: Cross Sectional Regression of Local Bias (dependent variable is city- based local bias measure [LB1])	127

Résumé

Bien que les théories financières traditionnelles soulignent les avantages de la diversification, les investisseurs individuels ont souvent tendance à ne détenir que quelques actions nationales dans leurs portefeuilles. Ce phénomène a fait l'objet de recherches depuis les deux dernières décennies sous le titre de biais domestique. La préférence pour investir près de chez soi s'applique également aux portefeuilles d'actions nationales. En d'autres termes, l'asymétrie d'information entre les investisseurs locaux et non locaux peut conduire à une préférence pour des investissements géographiquement proches ; ce phénomène est appelé biais local dans la terminologie de la finance comportementale. La thèse fournit de nouvelles preuves concernant les préjugés locaux des investisseurs individuels sur le marché boursier d'un pays émergent, à savoir la Borsa Istanbul (BIST). Plus précisément, cette étude examine si les investisseurs individuels pèsent plus que prévu dans leurs portefeuilles les actions d'entreprises géographiquement proches d'elles.

Les résultats des analyses indiquent que les investisseurs individuels turcs sont en moyenne sujets à des biais locaux, ce qui constitue la principale conclusion de la thèse. Ce résultat est robuste aux méthodes alternatives de calcul du biais local, y compris les définitions basées sur la ville/région et la distance. De plus, il est démontré que les investissements locaux ne génèrent pas de rendements supplémentaires par rapport à ceux des investissements non locaux. Nous trouvons donc la preuve que la motivation de l'investissement local n'est pas un avantage informationnel. Nous étayons davantage cette conclusion en comparant les rendements des investissements locaux entre différentes classifications des actions des entreprises. Nous classons les actions selon qu'elles sont de premier ordre ou non, qu'elles ont un score de gouvernance d'entreprise plus élevé, un taux de flottant plus élevé et une base de propriété institutionnelle plus large, ce qui implique tous une différence de niveau d'asymétrie de l'information. Si la raison du biais local est un avantage informationnel, on peut s'attendre à ce que cet avantage soit plus évident dans les actions présentant un niveau élevé d'asymétrie informationnelle. Cependant, nous constatons que les indicateurs d'un niveau élevé d'asymétrie de l'information ne conduisent pas à des rendements plus élevés pour les investissements locaux.

Puisque nos résultats impliquent que la raison des biais locaux est comportementale, il peut être utile de vérifier plusieurs caractéristiques individuelles des investisseurs utilisées dans d'autres études comportementales. Nous constatons que le genre affecte les préjugés locaux, les investisseuses ayant un niveau de préjugé local plus faible. D'un autre côté, à mesure que les investisseurs vieillissent, leur tendance à investir dans des actions locales diminue, ce qui peut s'expliquer par l'augmentation du niveau de leurs connaissances et de leur expérience financières. À mesure que les investisseurs deviennent de plus en plus sophistiqués, ils peuvent négocier davantage sur des informations fiables. La taille du portefeuille, qui peut être un indicateur de la richesse, a un effet positif sur le biais local.

Enfin, nous vérifions les effets des facteurs liés à la ville sur les biais locaux. Nous constatons que les biais locaux sont faibles dans les villes plus peuplées et plus développées. Le niveau de développement des villes ne s'avère pas efficace en raison d'un biais local. Enfin, la distance par rapport à la capitale économique du pays, Istanbul, a un effet négatif sur les préjugés locaux.

Abstract

Although the advantages of diversification are emphasized by traditional finance theories, individual investors often tend to hold only a few domestic stocks in their portfolios. This phenomenon has been subject to research since the last two decades under the title of home bias. The preference for investing close to home also applies to portfolios of domestic stocks. In other words, asymmetric information between local and nonlocal investors may drive the preference for geographically proximate investments and this phenomenon is called local bias in the terminology of behavioral finance. The dissertation provides new evidence concerning local bias of individual investors in an emerging country's stock market namely, Borsa Istanbul (BIST). More specifically, this study investigates whether individual investors weigh shares of firms, which are geographically close to themselves, more than expected in their portfolios.

The results of the analyses indicate that Turkish individual investors are prone to local bias on the average, which is the main finding of the dissertation. This result is robust to alternative calculation methods of local bias, including both city/region-based and distance-based definitions. Further, it is shown that local investments do not generate extra returns with respect to that of non-local investments. Therefore we find evidence that the motivation of local investment is not information advantage. We support this finding further by comparing the returns of local investments between different classifications of the companies' shares. We classify the shares based on whether they are blue-chip or not, have higher corporate governance score, have higher free float rate, and have larger institutional ownership base, all of which imply the difference in the level of information asymmetry. If the reason of local bias is information advantage, we may expect that such advantage is more obvious in shares which have high level of information asymmetry. However, we find that the proxies of high level of information asymmetry do not lead to higher returns for local investments.

Since our findings imply that the reason of local bias is behavioral, it may be meaningful to check several individual characteristics of investors which are used in other behavioral studies. We find that gender affects local bias, female investors have lower level of local bias. On the other hand, as the investors get older, their tendency to invest in local stock decreases, which may be explained by increasing level of their

financial knowledge and experience. As investors get more sophisticated in time, they may trade on reliable information more. Portfolio size, which may be a proxy for wealth, affects local bias positively.

Last, we check the effects of city-related factors on local bias. We find that local bias is lower in more populous and more developed cities. Development level of the cities is not found effective on local bias. Last, distance to the economic capital of the country, İstanbul, has negative effect on local bias.



Özet

Her ne kadar çeşitlendirmenin avantajları geleneksel finans teorileri tarafından vurgulansa da, bireysel yatırımcıların genellikle portföylerinde yalnızca birkaç yerli hisse senedi tutma eğiliminde olduğu görülmektedir. Bu olgu son yirmi yıldır coğrafi olarak yakın şirketlere yatırım yapma eğilimi (“home bias”) başlığı altında araştırmalara konu olmaktadır. Coğrafi olarak yakın şirketlere yatırım tercihi ülke içindeki hisse senedi portföyleri için de geçerli olabilmektedir. Bir başka deyişle, belli bir bölgede ya da şehirde bulunan ve bulunmayan yatırımcılar arasındaki asimetrik bilgi, coğrafi olarak yakın yatırımların tercih edilmesine neden olabilmektedir. Bu olguya davranışsal finans literatüründe yerel yatırım eğilimi (“local bias”) adı verilmektedir. Bu doktora tezi, gelişmekte olan ülkeler arasında yer alan Türkiye’nin tek finansal borsası konumunda olan Borsa İstanbul’da (BIST) bireysel yatırımcıların yerel yatırım eğilimine ilişkin yeni bulgular içermektedir. Tez, bireysel yatırımcıların coğrafi olarak kendilerine yakın olan firmaların portföylerindeki paylarına beklenenden daha fazla ağırlık verip vermediklerini araştırmaktadır.

Tezin temel bulgusu, Türk bireysel yatırımcıların ortalamada yerel yatırım eğilimi göstermekte olduğudur. Bu sonuç, hem şehir/bölge bazlı hem de mesafe bazlı tanımlar dahil olmak üzere, yerel yatırım eğiliminin alternatif hesaplama yöntemleri ile doğrulanmıştır. Ayrıca, yerel yatırımların yerel olmayan yatırımlardan daha yüksek getiri sağlamadığı da gösterilmiştir. Dolayısıyla yerel yatırım eğiliminin kökeninde bilgi avantajı bulunmadığı sonucuna ulaşılmıştır. Tezde bu bulgu, şirket paylarının bilgi asimetrisinin göstergesi niteliğindeki farklı sınıflandırmaları arasındaki karşılaştırmalar ile de desteklenmiştir. Gösterge likit endekste yer alıp almaması, kurumsal yönetim endeksinde yer alıp almaması, halka açıklık oranının yüksekliği ve kurumsal yatırımcı tabanının genişliğine göre şirketlere sınıflandırılmıştır. Bu başlıkların tamamı bilgi asimetrisi farklılığını göstermeye yöneliktir. Yerel yatırım eğilimin arkasındaki neden bilgi avantajı ise, bilgi asimetrisi yüksek olan paylarda bu avantajın daha belirgin olması beklenebilir. Ancak, bilgi asimetrisinin daha yüksek olabileceği paylardaki yerel yatırımların daha yüksek getiri sağlamadığı bulunmuştur.

Bu çerçevede tezin bulguları, yerel yatırım eğiliminin nedeninin davranışsal olduğunu ima etmektedir. Bu kapsamda, diğer davranışsal finans çalışmalarında da örnekleri görüldüğü üzere, bireysel yatırımcıların çeşitli özelliklerinin yerel yatırım

eğilimi ile ilişkisi incelenmiştir. Cinsiyetin yatırım yapma eğilimini etkilediği, kadın yatırımcıların daha düşük düzeyde yerel yatırım eğilimine sahip olduğu görülmüştür. Öte yandan yatırımcıların yaşı ilerledikçe yerli hisse senedine yatırım yapma eğilimleri azaldığı tespit edilmiştir. Bu bulgunun zamanla finansal bilgi ve tecrübe düzeylerinin artmasıyla açıklanabileceği düşünülmektedir. Ek olarak, yüksek gelir seviyesinin göstergesi olarak değerlendirilebilecek portföy büyüklüğü ile yerel yatırım eğilimi arasında pozitif bir ilişki bulunmaktadır.

Son olarak şehirlerin bazı niteliklerinin yerel yatırım eğilimi üzerindeki etkisi incelenmiştir. Daha kalabalık şehirlerde yerel yatırım eğiliminin daha düşük olduğu görülmüştür. Kentlerin gelişmişlik düzeyinin yerel yatırım eğilimi üzerinde etkili olmadığı gözlenmiştir. Ülkenin ekonomik başkenti İstanbul'a olan uzaklık ile yerel yatırım eğilimi arasında ters yönlü bir ilişki bulunmaktadır.

1 INTRODUCTION

The core question of behavioral finance, which has been developed since 1970s and challenged the assumptions of traditional finance theories, may be defined as whether the individuals -investors, consumers, managers etc.- make decisions based on a rational and knowledge-based framework, or deviate from rationality due to several bias shaped by their individual preferences. Almost all the subjects of behavioral finance are broadly shaped around this question.

Within this scope, the starting point of the dissertation is that, whether individual investors weigh shares of firms, which are geographically close to themselves, more than expected in their portfolios, and, relatedly, whether they have any informational advantage in these shares. This phenomenon is named as “local bias” in the literature. This study investigates different research questions all of which focus on geography and information advantage of individual investors from different aspects.

We first investigate the success of individual investors in equity investing in general. Whether their portfolio returns are higher or lower than the market return is tested in the first step. Second, we search for the existence of local bias, and, if there is, for the source of such bias. Third, we test the local bias in a more specified setting: mergers and acquisitions. More specifically, we ask the following question: “*Do the individual investors have local bias in their short-term response to the mergers and acquisitions?*” In order to investigate these issues, we utilize a unique data set; trade and balance data of 10,000 individual investors active in the equity market of Borsa Istanbul. Our data have the following strengths: (1) having weekly frequency; (2) reflecting official records; (3) not having bias toward any investor group or investment bank, (4) covering 10 years from the beginning of 2014 to the end of 2023. Thereby, we expand the research on local bias to a new and important -one of the most active markets in terms of turnover- market. In the following paragraphs, we elaborate our above-mentioned research questions.

Firstly, returns of individual investors’ portfolios are analyzed across both different periods and investors characteristics so as to reach a first insight on the investing performance of the individual equity market participants. We calculate both raw and market-adjusted returns. Investor characteristics include age, gender, city

where the investor lives, date of opening first account to invest in equities, and portfolio size. All these variables are included in the behavioral finance literature in several ways to explore different psychological biases and their impact on investment decisions. Specifically, we expect different outcomes for different age groups and genders. For instance, there is plenty of evidence that women have better performance than men in equity investing (e.g. Barber and Odean, 2001; Choi et al., 2002; Charness and Gneezy, 2012; Erdem et al., 2014). On the other hand, there is mixed evidence for the effect of the age. For instance, Feng and Seasholes (2005) argue that people become more experienced and are less prone to biases as they get older whereas Korniotis and Kumar (2011) argue that cognitive abilities decline with the age. Furthermore, date of opening of the first account and portfolio size are accepted as proxies for investing experience and level of wealth, respectively.

Second, we test the central question of the dissertation: existence of local bias, which we define above, among the individual investors. Within the context of local bias, we also use phrases “local investors” and “local stocks” throughout the text. By “local investors”, we mean individuals investing in firms which are geographically close to them. By “local equities”, we mean equities owned by investors geographically close to the firm issued these equities. Most of the studies in this field find that there is local bias, i.e. investors weigh local equities more in their portfolios (Coval and Moskowitz, 1999; Ivkovic and Weisbenner, 2005; Massa and Simonov, 2006; Dorn, Huberman and Sengmüller, 2008; Seasholes and Zhu, 2010; Jacobs and Weber, 2011). To the best of our knowledge, this dissertation is the first to investigate the existence of local bias at Borsa İstanbul (BIST) Equity Market.

In addition, we investigate whether investors gain more from their local equity investments. There are two competing opinions for this question in the literature. A bunch of studies claim that investors make more returns from their local investments, and the reason for this is that they have additional information in these equities due to their geographical proximity (e.g. Coval and Moskowitz, 2001; Ivkovic and Weisbenner, 2005; Massa and Simonov, 2006). On the contrary, another group of studies argue that local bias does not generate excessive returns and the reason for the existence of local bias is mostly behavioral, e.g. familiarity (e.g. Zhu, 2002; Pirinsky and Wang, 2006; Seasholes and Zhu, 2010). In parallel with this literature, we check the returns of local investments.

If there is a local bias and the reason of it is informational advantage, the level of local bias is expected to be less in equities in which the information asymmetry is lower, i.e., the share of information about the company publicly available to all of the investors and/or analysts is higher. In this regard, we additionally analyze whether the level of returns of local investors differentiate for various classes of equities. Specifically, we search for the local returns for equities included in benchmark index which is BIST 100 for Borsa İstanbul covering the most liquid 100 stocks in Turkish market, in the corporate governance index of BIST, having higher institutional investor base, and higher free float rate. BIST Corporate Governance Index consists of the companies that apply Corporate Governance Principles. The index aims to measure the performance of companies traded on Borsa Istanbul Markets with corporate governance rating of minimum 8 over 10 as a whole and minimum of 7 for each main section. The corporate governance rating is determined by the rating institutions incorporated by Capital Markets Board (CMB, the regulatory authority of Turkish capital markets) in its list of rating agencies as a result of their assessment of the company's compliance with the corporate governance principles. There are currently 73 companies in the index (as of June 2024).¹ Regarding the other possible variables mentioned above, institutional investors (funds) hold approximately half of the stocks in terms of market value and average free float rate is 30%.

As the last analysis, we further investigate the relationship between local bias and individual characteristics of investors in the light of several hypotheses of behavioral finance. We repeat this analysis by using cities' several features as well. To specify, we check the effects of gender, age, wealth, experience and wealth on local bias. Furthermore, variables reflecting size, development and accessibility of the cities are included.

This dissertation makes several contributions to the literature. First, this is the first study on local bias utilizing the trade and portfolio data of Turkish individual investors, to the best of our knowledge. We extend this line of research to a new country, Turkey, which is particularly important in the sense that Turkish equity market has one of the highest trading activities among the world exchanges and this

¹ Detailed information on BIST Corporate Governance Index is provided at <https://borsaistanbul.com/en/sayfa/2202/corporate-governance-index>.

turnover is dominated by individual investors. Hence, testing hypotheses of behavioral finance in such a market structure and bringing new explanations for current debates in academic and professional circles are thought to be value-adding. Furthermore, such an analysis may give insight for emerging countries, which are characterized by low level of financial awareness and literacy.

Second, though the existence of local bias is widely shown in the literature, the reason for local bias is still an open question. Related studies reach different conclusions and there is not a commonly accepted answer. Therefore, the dissertation is expected to contribute to answer an open question in the international literature.

Another contribution of this dissertation is related to the data. There is relatively limited number of studies focusing on individual investor-level data due to data constraints, difficulty to reach individual investor-level databases. In general, studies utilizing individual investors' data around the world obtain data from a single brokerage firm; hence their samples are limited to the clients of that firm. We obtain our data from the Central Registry Agency of Turkey (MKK) rather than a single brokerage firm. As a result, our sample is constructed from the whole population in the country and does not have any bias towards any sub-group. The data is also very reliable due to the fact that equities traded in Borsa Istanbul is fully dematerialized at MKK and therefore it reflects the official records of the investors' portfolios.

From a broader perspective, as behavioral finance is a newly-emerging field (in the sense of theory development) and has very limited number of commonly accepted explanations, it needs new evidence and stronger connections with the other fields of finance. In this sense, this dissertation aims to make a contribution in two ways: first, by linking different research questions each other, second, carrying this line of research over to a new market. Moreover, our findings may also add value to policies of both the exchanges and regulatory institutions in market design. Our findings on the behavioral patterns of individual investors may support the efforts of policy makers in developing equity culture in the country.

In order to measure the local bias in Turkish equity market in a robust way, we review and test several alternative methods in the literature. We classify the documented approaches to measure the local bias up to now as follows: first, we label

the investments as local if the investor and the stocks are in the same city or in the same region. Second, we label the investments local or non-local based on pre-specified distance between the investor and the firms' locations, which means that if a stock is closer to the investor than a pre-specified distance, we label this investment as local. Last, as an alternative approach, we calculate local bias based on relative number of shareholders. To be robust, we test all these measures with our data, as explained in detail in Section 3.2.2. Existence of and reasons for Local Bias. In addition to the full sample analyses, we conduct our tests on subsamples across years and cities/regions. Furthermore, we also question these measures and make some modifications.

The main findings of this study are as follows:

We find evidence that the individual investors trading at Turkish equity market have local bias. We confirm this result by different methods. We further document that local investments of the Turkish individual investors do not have abnormal returns with respect to the market, which implies that the source of the local bias is not the informational advantage. Supporting this result, proxies signaling the level of information asymmetry such as inclusion in the benchmark indices or institutional ownership do not make difference in the returns of local investments.

Since our findings imply that the reason of local bias is behavioral, it may be meaningful to check several individual characteristics of investors which are used in other behavioral studies. Specifically, through a cross-sectional regression setup, we test the effect of age, gender, experience, portfolio size of the investors on their local bias. In addition, we also test the role of investors' cities: population and level of development and accessibility.

We find that men are more exposed to local bias than women. On the other hand, as the investors get older, their tendency to invest in local stock decreases, which may be explained by their increasing wisdom in time. As investors get more sophisticated, they may trade on reliable information more. Portfolio size affects local bias positively.

We further check city-related factors. We find that local bias is lower in large cities. On the other hand, effect of development level of the cities is not found

significant. Last, distance to the economic capital of the country, Istanbul, has negative effect on local bias.

The remainder of this dissertation is structured as follows: Second chapter covers the theoretical framework, including both the traditional finance theories and behavioral finance. Beyond the founding blocks of behavioral finance, the previous literature on local bias is documented in this chapter. Third chapter deals with data and methodology. The results of the dissertation are presented in the fourth chapter. The last chapter concludes the dissertation.



2 THEORETICAL FRAMEWORK

As behavioral finance challenges the assumptions of traditional finance theories, we first have to mention the pillars of traditional finance. First section of this chapter covers these theories: expected utility theory, modern portfolio theory, capital asset pricing model, and efficient market hypothesis. Next, we present the challenge of behavioral finance centered around questions on market efficiency and rationality of people. Then, we focus on home/local bias literature and cover them in detail.

2.1 Traditional Finance Theories

Traditional finance theory is based on the assumption that people are rational and make rational decisions in order to maximize their utilities. Rationality of people is twofold (Barberis and Thaler, 2003): “First, when they receive new information, they update their beliefs correctly. Second, given their beliefs, agents make choices that are normatively acceptable.” This framework of rational agents is based on expected utility theory, which formed the ground on which traditional finance theory has been developed. Construction of modern portfolio theory is the first step in the progress of traditional finance. Asset pricing models and efficient market hypothesis are other cornerstones. This section covers these pillars of traditional finance theory in the following subsections: expected utility theory, modern portfolio theory, capital asset pricing model, and efficient market hypothesis, respectively.

2.1.1 Expected Utility Theory

Risk-averse people choose the option which has higher level of utility under uncertainty. Expected utility theory, rooted to Bernoulli’s work (1738)², was set forth by Von Neumann ve Morgenstern (1944). Accordingly, total utility equals to the sum of utilities of outputs; utility function is measured by ultimate wealth, and the shape of utility function is concave. Within their framework, there are four axioms: completeness, transitivity, continuity, and independence.

² Bernoulli’s article was originally published in 1738 in Latin. English translation of the article was published in *Econometrica* in 1954.

Completeness means that when an individual faces a choice between two alternatives, he either chooses one of them or stays indifferent between them. To explain the other axioms, let's assume there are three choices: A, B, and C. If an individual prefers A to B, and B to C, then he prefers A to C, which is called the axiom of transitivity. Continuity means that, if an individual prefers A to B, and B to C, there exists a probability rate (p) such that $p(A) + (1-p)C \sim B$. In other words, there should be a mix of A and C which is equivalent to B for that individual. The last axiom is independence, which means that, if an individual prefers A to B, adding C to both of them does not change his preference.

Expected utility theory is accepted as normative rational choice theory and it is assumed that all reasonable people obey the axioms of this theory. In economics and finance, it is expected that rational individuals make decisions under uncertainty based on their attached possibilities to the alternative outcomes (e.g. returns of the assets when constructing investment portfolios).

2.1.2 Modern Portfolio Theory

Following the expected utility theory, Markowitz (1952) laid the foundation of modern portfolio theory, which attempts to explain optimum portfolio selection of rational and risk-averse investors.³ His theory, which is named as “the expected returns-variance of returns rule” in the original article (1952), is then called mean-variance portfolio theory. As the name of the theory suggests, he derived an expected rate of return for a portfolio of assets (mean) and the variance of the rate of return as an appropriate risk measure. Markowitz (1991) proposed expected (mean) return, E, and variance of return, V, of the portfolio as the whole criteria for portfolio selection. According to Rubinstein (2002), Markowitz's paper is the first mathematical formalization of the idea of diversification of investments.

The equations for mean and variance of modern portfolio theory are as follows:

$$E(R_p) = \sum_i w_i E(R_i)$$

³ Though Markowitz is generally accepted as the father of modern portfolio theory, he (1991) states that Roy (1952) can claim an equal share of this honor.

where R_p is the return on the portfolio, R_i is the return on asset for each asset i , and w_i is the weight of asset in the portfolio.

$$\sigma_p^2 = \sum_i \sum_{j \neq i} w_i w_j \sigma_i \sigma_j \rho_{ij}$$

where σ_p^2 is the variance of the portfolio, σ_i^2 is the variance of each asset i , and ρ_{ij} is the correlation coefficient between the returns on assets i and j .

The Markowitz model (1952) is based on several assumptions regarding investor behavior. Accordingly, an investor can decide whether he prefers event A or event B, or both; and possesses probability beliefs for these events. His beliefs are roughly consistent, and he acts based upon these probability beliefs. For the mean and variance of returns, he prefers higher returns and lower variance (lower risk) consistently.

Basic idea of the theory is that combining assets having correlations with each other less than one decreases the portfolio risk without changing the expected return. By diversification, unsystematic risk can be eliminated. Of course, as Markowitz (1952) points out, diversification is not limited to number of securities in the portfolio:

“The adequacy of diversification is not thought by investors to depend solely on the number of different securities held. A portfolio with sixty different railway securities, for example, would not be as well diversified as the same size portfolio with some railroad, some public utility, mining, various sort of manufacturing, etc. The reason is that it is generally more likely for firms within the same industry to do poorly at the same time than for firms in dissimilar industries.” (Markowitz, 1952; 89)

Figure 1 plots the efficient combinations of two risky assets where E (y-axis) is the expected returns of two-asset portfolios and V (x-axis) is the standard deviations of those portfolios. The investor chooses one of the return-risk combinations.

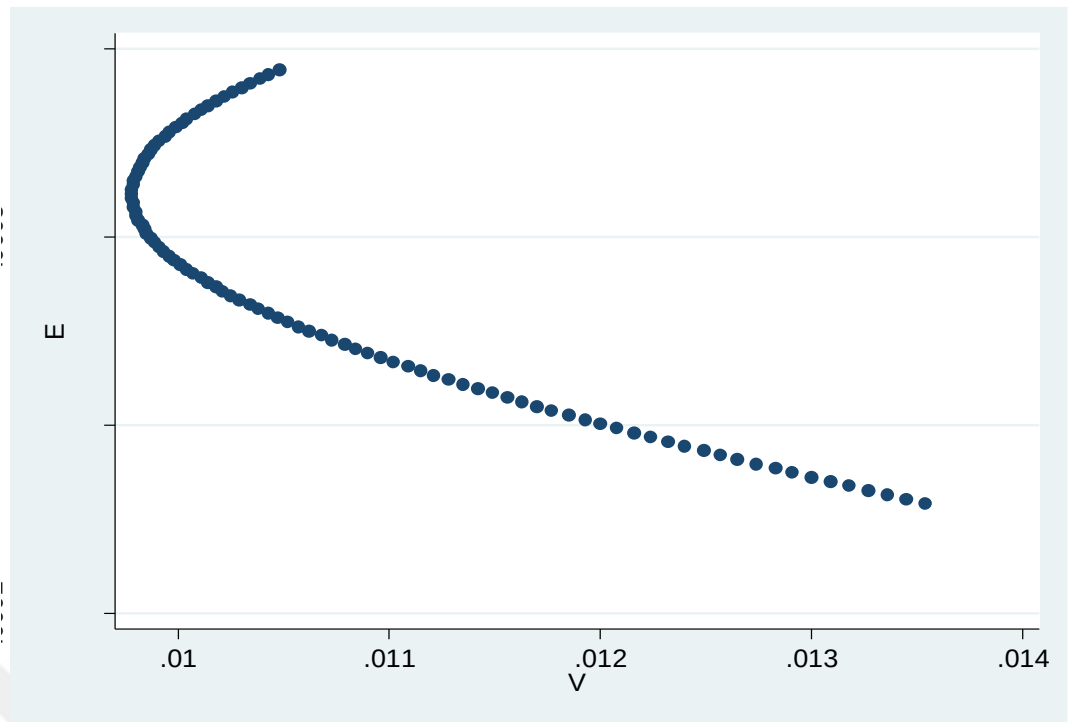


Figure 1: Efficient risk (V) and return (E) combinations of two risky assets

Since there are higher expected returns for the same (or higher) risk levels in the graph, an investor naturally chooses the higher expected returns. Therefore, the efficient portfolio frontier (efficient combinations of risk and return levels) is reduced to the form given in figure 2.

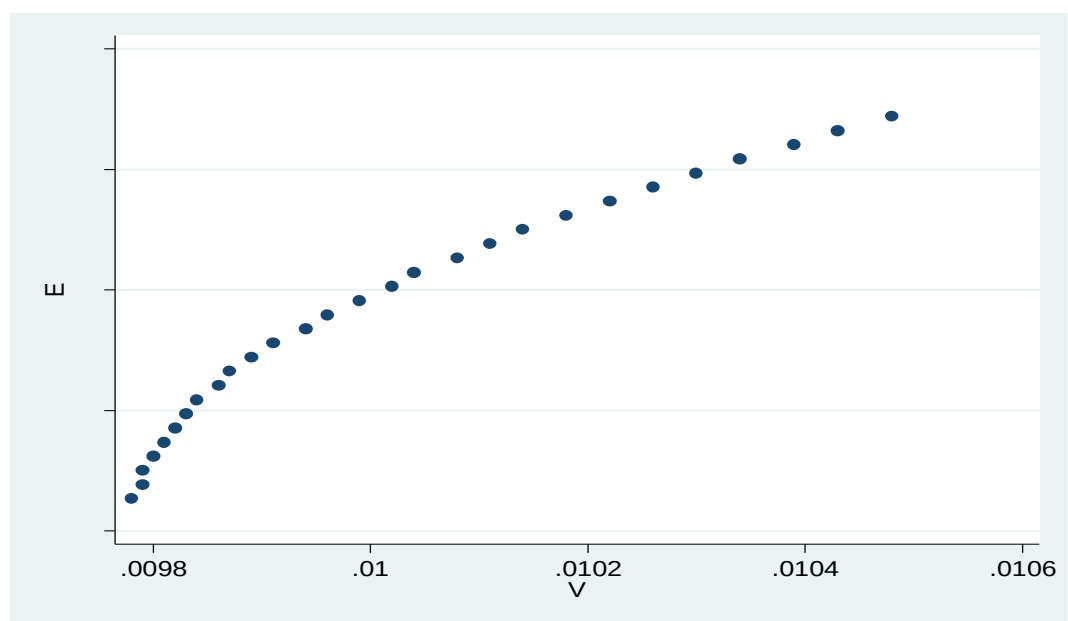


Figure 2: Efficient portfolio frontier

The next step in the progress of modern portfolio theory may be attributed to Tobin (1958). He assumes that the investor seeks a mean-variance-efficient combination of monetary assets, and presents the Tobin Separation Theorem. Accordingly, assuming a model with n risky assets and one riskless asset, he separates the problem of finding an optimal portfolio for a given level of risk tolerance into two parts: first finding an optimal combination of risky securities that doesn't vary with risk tolerance, and second, deciding whether to lend or borrow depending on the attitude toward risk. This approach laid the foundation for the introduction of capital asset pricing model (CAPM), which will be covered in the next section.

2.1.3 Capital Asset Pricing Model

Following the works of Markowitz (1952), Roy (1952), and Tobin (1958), Sharpe (1964), Lintner (1965) and Mossin (1966) introduce the capital asset pricing model. Within the context of the mean-variance portfolio theory, there are only risky assets available to the investor. However, in reality, people usually allocate their wealth across both risky and risk-free assets. A risk-free asset is the security that has a return known ahead of time, so the variance of the return is zero. Hence, after adding the risk-free asset to the portfolio, the shape of the efficient frontier changes from a curve to a line. This linear frontier is called capital market line (CML) (Sharpe, 1964). The investor should choose a point on the capital market line combining the risk-free asset and an optimal portfolio. As Sharpe (1964) points out:

“The market presents the investor with two prices: the price of time, or the pure interest rate and the price of risk, the additional expected return per unit of risk borne.”

As the investor chooses a point combining the risk-free asset and an optimal portfolio, the CML is tangent to the efficient portfolio frontier (Figure 3).

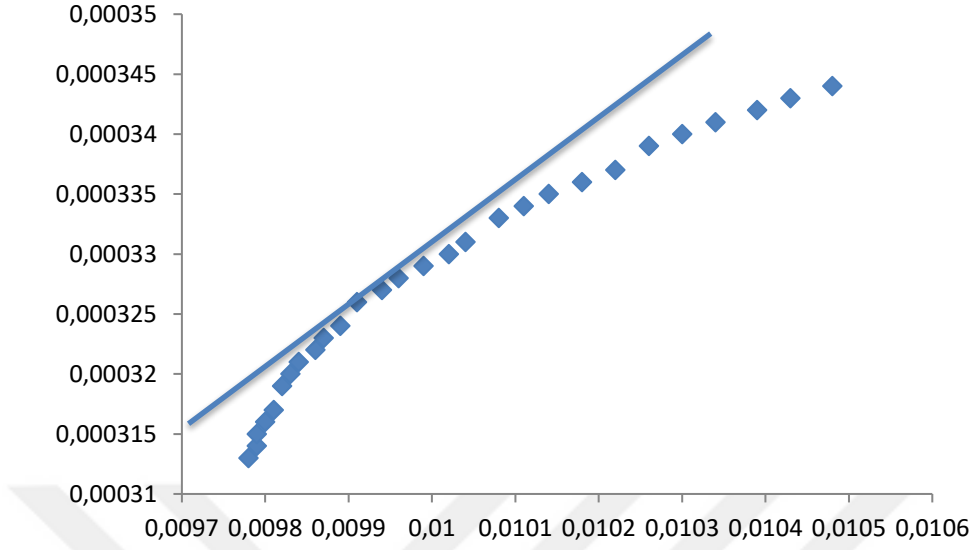


Figure 3: Capital market line (CML)

Equation of the CML is:

$$E(R_p) = R_f + \frac{E(R_M) - R_f}{\sigma_M} \cdot \sigma_p \quad (1)$$

where $E(R_p)$ is the expected return of the portfolio p lying on the CML, R_f is the risk-free rate, $E(R_M)$ is the expected rate of return on the market portfolio, σ_M is the standard deviation of return on the market portfolio, σ_p is the standard deviation of return on portfolio p . $\frac{E(R_M) - R_f}{\sigma_M}$, the slope of the CML, is often called the market price of risk, and equals the reward-to-risk ratio (or Sharpe ratio) for the market portfolio.

According to Sharpe (1964), diversification cancels out all the risks except the risk coming from general economic activity. Therefore, response of the security's return to the economic activity is relevant (systematic risk). If a security is not affected by the economic activity, its return will be pure interest rate; otherwise, its return will be higher.

This rationale, together with the assumption of identical investors, leads to a pricing model of assets based on their sensitivity to movements in the market (systematic risk), called Capital Asset Pricing Model (CAPM). The equation for CAPM for asset i is as follows:

$$E(R_i) = R_f + \beta_i[E(R_M) - R_f]^4 \quad (2)$$

where β (beta) is a measure of the asset's sensitivity to movements in the market (equals to $\frac{cov(R_i, R_M)}{var(R_M)}$). According to CAPM, the expected return depends on two variables: risk-free rate, and expected excess return on the market (so-called market risk premium, extra return compared to the risk-free rate of return). CAPM makes several assumptions (Sharpe, 1964; Lintner, 1965):

1. Investors behave based on only two parameters: expected value and standard deviation.
2. Investors have identical forecasts of risky assets' expected returns, variances, and covariances.
3. Investors can invest any fraction of their capital in risky securities traded in a single perfectly competitive market.
4. All investors can borrow or lend at equal terms (at a common risk-free rate).
5. There are no frictions to trading, such as taxes or transaction costs.

Black (1972) further replaces the fourth assumption with a more realistic one which is, "*there is no riskless asset and riskless borrowing or lending is not allowed*" and develops a version of the CAPM with limited risk-free borrowing or lending. Mossin (1966) has also credit in the development of the CAPM with an emphasis on specifying equilibrium conditions in the asset market. On the other hand, French (2003) and Sullivan (2006) notice that Treynor (1962)⁵ develops the earliest version of the CAPM.

Modigliani and Pogue (1974) give a precise explanation of the link between portfolio theory and capital asset pricing theory. They argue that portfolio theory deals

⁴ The line of this equation is called security market line.

⁵ This manuscript was not published at that time and circulated during the 1960s in mimeographed draft (French, 2003). Final version of the manuscript was published in 1999.

with investors' optimal portfolio selection based on their risk & return preferences. On the other hand, capital asset pricing theory deals with the effects of investors' portfolio selection on security prices. The question of the capital asset pricing theory is that *“what relationship should exist between security returns and risk if investors behave in this optimal fashion.”* (Modigliani and Pogue, 1974).

CAPM has been a controversial model and criticized for a long time, especially for its very simple assumptions which have been found too unrealistic. It's known that there are significant transaction costs and taxes on the investments. Investors have in fact different expectations. Risk-free assets are actually not fully risk-free, even treasury bills have risks (e.g. reinvestment risk, inflation risk). Similarly, beta, the measure of systematic risk, is not the only source of the risk an investor faces. There are other risks for investors like liquidity or inflation. On the other hand, since the end of the 1970s, there have been number of studies documenting that return predictions of the CAPM have been overshooted (see for example Banz, 1981).

Later, Ross (1976) develops an alternative model to the CAPM, which is called *arbitrage theory of capital asset pricing* (APT). His theory includes a set of factors in explaining the expected return and factor-specific β s. The CAPM may be thought as narrower, one-factor version of the APT. Probably more importantly, the APT eases the assumption of identical investors which is essential in the CAPM. The APT assumes that, in contrast to the market portfolios of identical investors in the CAPM, investors hold unique portfolios with their own betas.

2.1.4 Efficient Market Hypothesis

Another building block of traditional finance theory is efficient market hypothesis (EMH), introduced by Fama (1965, 1970). Fama (1970) defines an efficient market as follows:

“A market in which firms can make production-investment decisions, and investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time “fully reflect” all available information. A market in which prices always “fully reflect” available information is called “efficient”.

This hypothesis has been one of the cornerstones of the finance theory. An efficient market requires large number of profit-maximizing actors in the market, who adjust prices rapidly to the infusion of new information. The adjustment may be imperfect, but is unbiased. This means that the market sometimes overadjusts and other times underadjusts, but cannot be predicted which will occur at any given time. The combination of new information which comes to the market in a random fashion and large number of investors means that price changes are expected to be independent and random (Reilly and Brown, 2006).

Fama (1970) sets three levels of tests for market efficiency:

1. *Weak form efficiency*: Prices reflect all the market information (price, volume etc.) publicly available. Historical price/volume information cannot bring excess return.
2. *Semi-strong form efficiency*: Prices reflect all the information (earnings announcements, P/E ratios, stock splits, news etc. in addition to the market information) publicly available. All publicly available information cannot bring excess return.
3. *Strong form efficiency*: Prices reflect all the information, both publicly available and private. No investors or groups have monopolistic access to any information relevant for price formation. Such a market is 'perfect', i.e. everybody reaches all the information at the same time without any cost.

Specific tests have been developed to test these three types of efficiency. Tests for weak-form efficiency broadly include return predictability tests (Fama, 1991). Statistical test of independence of returns (e.g. autocorrelation tests, runs test) and tests of trading rules (technical analysis rules) are examples of weak-form efficiency tests.

Semi-strong form efficiency tests include event studies and cross-sectional return predictions. All types of publicly available information may be subject to semi-strong form efficiency test: earnings and dividend announcements, significant economic news, stock splits, M&As, announcements of accounting changes, calendar anomalies, price multipliers' (P/E ratio, BV/MV ratio etc.) effects.

Last, strong form efficiency tests analyze whether any investment group consistently receive above-average risk-adjusted returns. The following four major groups who are expected to have access to private information have been investigated in this line of research: corporate insiders, stock exchange specialists, security analysts, and professional money managers (Reilly and Brown, 2010).

2.2 Behavioral Finance

Pillars of traditional finance theory summarized in Section 2.1 have been increasingly questioned in the last 30 years. It has been observed that people may systematically violate the rationality assumption, and returns in the markets may not be completely random, to some extent may be predictable. Therefore, supported by the psychology literature, new branch of finance has emerged, called *behavioral finance*.

Behavioral finance challenges the very basic assumption of traditional finance: *the agents are rational*. Rationality means that people maximize their expected utility and are unbiased Bayesian forecasters (make rational choices based on rational expectations) (De Bondt and Thaler, 1995). On the other hand, behavioral finance argues that some financial phenomena can be better understood using models in which some agents are not fully rational (Barberis and Thaler, 2003).

Standard finance has been based on rational investors making their portfolios according to the mean-variance portfolio theory, and efficient markets. In response to this prescription, Statman (2008) puts the manifest of behavioral finance as follows:

- (1) *Investors are normal, not rational.*
- (2) *Markets are not efficient.*
- (3) *Investors view their portfolios not as a whole, but as distinct mental account layers.*

(4) *Expected returns are determined by more than risk such as emotional and cognitive bias.*⁶

According to De Bondt and Thaler (1995), the axioms of traditional finance (expected utility theory, risk aversion, Bayesian updating, rational expectations) are shown to be false by psychologists. First, people deviate from rationality and make decisions based on, for example, overconfidence or familiarity. Second, defenders of traditional finance argue that markets clear the behaviors of irrational investors through rational arbitrageurs exploiting these deviations. However, several studies (see for example, Schleifer and Vishny, 1997 and Mitchell et al., 2002) demonstrate that arbitraging activity is not able to be sufficient to clear the mispricings/anomalies at the aggregate market level.

Following these findings on both people's biases and market structures restricting to reach fundamental values of the assets, Barberis ve Thaler (2003) claim that the field of behavioral finance has two building blocks: (1) *limits to arbitrage*, which argues that it can be difficult for rational traders to undo the dislocations caused by less rational traders; and, (2) *psychology*, which catalogues the kinds of deviations from full rationality we might expect to see. Accordingly, in the next two subsections, we review the efficient markets and rationality of people through the eye of behavioral finance. In the third subsection, we summarize the psychological biases of individuals documented in the behavioral finance literature.

2.2.1 Are Markets Really Efficient?: Limited Arbitrage

In 1980s, new evidence is found that asset prices deviate from their fundamental values and this deviation becomes permanent (Shiller et al., 1984; Shleifer, 1986). It is documented that noise traders, investors making trading decisions without the use of fundamental data, have an impact on this permanent deviation; hence the opportunity of arbitrage is limited. According to Black (1986), who first coins the term 'noise trader', *the prices reflect both the information that information traders trade on*

⁶ Statman (2017) further adds a fifth element to this list. Accordingly, people do not save and spend as described by the standard life-cycle theory. Instead, they save and spend as described by behavioral life-cycle theory, in which several biases such as weak self-control make it difficult to make rational saving/spending decisions.

and the noise that noise traders trade on. The link between this phenomenon and the efficient market hypothesis is that noise trading puts noise into the prices.

De Long et al. (1990) further show that risk created by the unpredictability of uninformed investors' (noise traders) opinions reduces the attractiveness of arbitrage. Therefore, noise traders may lead to an even larger divergence between market prices and fundamental values. Having documented the effect of noise traders on prices, they also find that (1991) noise traders can survive in the market, opposed to Friedman (1953). Accordingly, they argue that even a single rational investor dominates a noise trader, and a group of noise traders may dominate rational investors.

Shleifer and Summers (1990) show that the assumption of limited arbitrage has stronger explanatory power than the assumption of perfect arbitrage, which efficiency relies on. Shleifer and Vishny (1997) further find that information-based professional arbitrage strategies may be insufficient to bring back the prices to their fundamental values, especially during extreme price movements. According to the standard theory, arbitrageurs become more aggressive as the prices deviates more. However, in Shleifer and Vishny's (1997) setting, correcting power of the arbitrageurs is the lowest when the prices are at the extreme. Gemmill and Thomas (2002) also find that noise generated by small investors does affect asset prices.

Mitchell et al. (2002) argues that there are costs which limit arbitrage in equity markets, the main reason for which is lack of information. Even if the information is obtained, the outcome (return) of this information remains unknown. According to Mitchell et al. (2002), lack of information and transaction costs lead to increase in tendency of specialization, which decreases the effectiveness of diversification. Higher fundamental risk due to lower level of diversification limits arbitrage.

Fama (1998) argues that the anomalies we observe in the prices tend to disappear mainly due to changes in methodology. Shiller (2003) criticizes this argument that the anomaly of excess volatility have almost never been disappeared, even it is reinforced by the past years in the stock markets.

2.2.2 Rational Man versus *Normal Man*: Bounded Rationality and Prospect Theory

One of the most proper definitions of *rational investors* perhaps belongs to Modigliani and Miller (1961; 412): “*those who always prefer more wealth to less and are indifferent as to whether a given increment to their wealth takes the form of cash payments or an increase in the market value of their holdings of shares*”. Rationality of investors has become a cornerstone for traditional finance theory for decades.

The assumptions of modern finance theory were started to be questioned to a limited extent in 1970s. Kahneman and Tversky, in their seminal work (1979), document that people systematically violate the principle of probability-weighting of outcomes in the expected utility theory. Hence, they develop an alternative theory of choice challenging the expected utility theory, so-called prospect theory, in which value of the asset depends on gains and losses rather than on final wealth. According to their theory, the value function of the investor differs for gains and losses; concave for the gains and convex for the losses, and generally steeper for losses than for gains. It also reflects decision weights instead of probability weights (Kahneman and Tversky, 1979).

Today, defenders of behavioral finance argue that people may not always be *rational*, but they are always *human*. Kahneman (2003) states that people do not reason poorly, instead, they often act intuitively. In this regard, behavioral finance may be defined as the application of psychology to financial behavior (Baker and Nofsinger, 2002). People do not act in a rational manner in all the times, are affected from different psychological factors, and naturally make mistakes. Moreover, results of such mistakes may not be limited to easily correctable errors in the functioning of the markets. Instead, they may be common and systematical, therefore may have permanent effects and markets cannot adjust them.

In this context, the concept of “bounded rationality” has been developed, which means that people are not irrational, instead they are “intendedly rational” but they have limits hence they fail in making decisions. Cognitive and emotional biases play a role in this failures. (Jones, 1999) The term “bounded rationality”, proposed first by

Simon (1955), replaces the rationality of economic man as a broad concept with the rationality limited by access to information and computational capabilities.

Simon (1955) criticized the framework of expected utility theory which consists of pre-defined three elements: the set of behavior alternatives, the set of outcomes, and the pay-off. Accordingly, he argues that there is no evidence that the computations needed to specify these elements can be performed. Alternatively he suggests that an individual may regard an outcome he faces acceptable, or satisfactory, without ordering all the possible outcomes (“fixing the boundary at the aspiration level”). In real-life decision-making process, alternatives are examined sequentially instead of evaluating all alternatives before the decision. In his another study (1972), Simon gives an example from chess that players do not cover all possible strategies and pick the best, but examine a rather small number of alternatives and make a choice when they discover a satisfactory one.

In this framework, Simon (1972) summarizes the constraints on rationality in maximizing the utility as follows. There are risk and uncertainty, meaning that an individual does not have perfect knowledge of the outcomes, but of the distributions of these outcomes. Second, he has incomplete information about alternatives. In this case, the problem of selecting the best would be trivial, instead, how much of his resources should be allocated to search would become the prior question. It is not possible to search for an indefinite time, there are limits to time, money, attention, or other finite resources (Gigerenzer, 2001). Last, complexity in the cost function or other environmental constraints may be so great that he cannot calculate the best course of action.

To sum up, it is shown that individuals face constraints when they make decisions, therefore the standard approach of “rational man” does not hold and requires adjustments. Simon (1955) adopts the concept of “a choosing organism of limited knowledge and ability” instead of economic man. In the following section, we focus on the psychological factors which systematically deviate people from rationality.

2.2.3 Psychological Biases

According to Barberis and Thaler (2003), market conditions and human behavior are two pillars of behavioral finance. They call the former limited arbitrage (reviewed in Section 2.2.1), and the latter psychology. Indeed, these two lines are not independent of each other. They argue that deviations from fundamental values in financial markets require existence of irrational investors. Therefore, researchers in finance have focused on psychology to explain the structure of irrationality.

In this section, we cover the major biases of people documented in the behavioral finance literature. These biases are classified as *cognitive* and *emotional* in common (e.g. Pompian, 2006), both of which lead to irrational behavior. A cognitive bias is a pattern of deviation in judgment, whereby inferences about other people and situations may be drawn in an illogical fashion (Haselton et al. 2005). Cognitive biases are related to how people think: To decrease the complexity in decision-making, people filters out some information and uses shortcuts to simplify the input (Baker and Nofsinger, 2002). Thus, cognitive biases may sometimes lead to perceptual distortion, inaccurate judgment, or illogical interpretation (Kahneman and Tversky, 1972; Baron, 2007).

While cognitive biases stem from faulty reasoning, emotional biases originate from impulse or intuition (Pompian, 2006). Emotional biases are related to how people feel: Greed, fear, hope, pride, and regret are some examples of strong emotions which affect decisions (Baker and Nofsinger, 2002). In the following two subsections, we briefly review the major cognitive and emotional biases, based on the classification of Pompian (2006).

2.2.3.1 Cognitive Biases

Overconfidence

It is widely documented that human beings are overconfident about their abilities and knowledge (Barber and Odean, 2001). Overconfidence can be defined as “unwarranted faith in one’s intuitive reasoning, judgments, and cognitive abilities” (Pompian, 2006). The evidence of overconfidence is coming from psychology literature, according to which “overconfidence causes people to overestimate their

knowledge, underestimate risks, and exaggerate their ability to control events” (Nofsinger, 2001).

Benos (1998) and Odean (1998) propose that, due to their overconfidence, investors will trade too much. Odean (1998) shows that overconfident investors trade more than and earn less than other investors. Indeed, we observe high level of trading activity in the world’s equity markets, which seems higher than the level traditional finance theory implies.

Barber and Odean (2001) further take another finding of psychology that men are more overconfident than women, and show that “men trade more than women and thereby reduce their returns more so than do women”.

Gervais and Odean (2001) develops a model including traders who do not know his own ability initially. Then he learns with the experience, however, since “he takes too much credit for his successes, he becomes overconfident in the early stages of his career, then, with more experience, he comes to better recognize his own ability.”

Overconfidence, generally measured by trading activity in finance literature following the above-mentioned studies, has two aspects according to Barberis and Thaler (2003): The confidence intervals of people’s estimates are too narrow, and they make big mistakes when estimating probabilities. Pompian (2006) calls the former “prediction overconfidence” and the latter “certainty overconfidence”.

Representativeness

According to Shefrin and Statman (2000), representativeness refers to judgements based on stereotypes. He views this bias as one of the most important principles affecting financial decisions. Kahneman and Tversky (1972, 1974) first studied the heuristic of representativeness. According to them (1974), people often judge probabilities by the degree to which event A resembles event B. In other words, when they assign subjective probability to an event, they take into account “the degree of similarity in essential characteristics to its parent population, and reflect the salient features of the process by which it is generated” (Kahneman and Tversky, 1972).

The classic example of representativeness given by Tversky and Kahneman (1983) is the case of Linda:

“Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. When asked which of “Linda is a bank teller” (statement A) and “Linda is a bank teller and is active in the feminist movement” (statement B) is more likely, subjects typically assign greater probability to B. This is, of course, impossible. Representativeness provides a simple explanation. The description of Linda sounds like the description of a feminist – it is representative of a feminist – leading subjects to pick B.”

The Linda case is an example of base rate neglect. Representativeness may also lead to sample size neglect, which means that people tend to decide too quickly on the bases of too few data (Pompian, 2006). For instance, “they will come to believe that a financial analyst with four good stock picks is talented because four successes are not representative of a bad or mediocre analyst. It also generates a “hot hand” phenomenon, whereby sports fans become convinced that a basketball player who has made three shots in a row is on a hot streak and will score again, even though there is no evidence of a hot hand in the data (Gilovich, Vallone and Tversky, 1985). This belief that even small samples will reflect the properties of the parent population is sometimes known as the “law of small numbers” (Rabin, 2002).

In situations where people do know the data-generating process in advance, the law of small numbers leads to a gambler’s fallacy effect. If a fair coin generates five heads in a row, people will say that “tails are due”. Since they believe that even a short sample should be representative of the fair coin, there have to be more tails to balance out the large number of heads. (Barberis and Thaler, 2003)

For Turkey, Kahyaoğlu (2012) finds evidence of representativeness based on the sample of 31 individual investors. In sum, people tend to label events with general statements or patterns. Such a tendency underestimates the unique feature of the specific event.

Anchoring and Adjustment

We know from the psychology literature that people’s quantitative estimates may be influenced by the previous values. Fuller (1998) gives an example from car

sales. Accordingly, for a second-hand car, “the salesman always starts negotiating with a high price and then works down. He is trying to get the consumer anchored on the high price so that when he offers a lower price, the consumer will estimate that the lower price represents a good value”.

Therefore initial value, or starting point, is crucial for people making estimations. Slovic and Lichtenstein (1971) states that adjustments are insufficient regardless of the determination process of the initial value. Kahneman and Tversky (1974) called this phenomenon as anchoring (i.e. different starting points yield different estimates).

When people are stick to initial values, it is hard to adjust to a new situation. Fuller (1998) claims that anchoring can cause investors to underreact to new information. In this framework, anchoring and insufficient adjustment are naturally complementary to each other.

Cognitive Dissonance

Festinger (1957) developed a new concept in social psychology: the theory of cognitive dissonance. According to him, if anyone knows various things which are not consistent with one another, he will try to make them more consistent. When two simultaneously held cognitions are inconsistent, this will produce a state of cognitive dissonance. Because the experience of dissonance is unpleasant, the person will strive to reduce it by changing their beliefs. Pompian (2006) argues that people tend to harmonize their cognitions (i.e. attitudes, emotions, beliefs, or values) in order to relieve their mental discomfort (i.e. dissonance).

The existence of cognitive dissonance among individual investors trading in financial markets is tested by Chang, Solomon and Westerfield (2016). They first find that investors avoid realizing losses since they do not like admitting that their past purchases were mistakes, which is actually the case of disposition effect. Interestingly, they further find that, if they delegate asset management to professionals (e.g. mutual funds), the disposition effect disappears. Delegation allows the investor to blame the manager. Therefore Chang et al. (2016) claims that cognitive dissonance provides an explanation for both behaviours which at first seems contradictory.

Availability

Sewell (2007) define availability as “a cognitive heuristic in which a decision maker relies upon knowledge that is readily available rather than examine other alternatives or procedures”. Massa and Simonov (2006) have a similar definition that defines availability (or saliency) bias as the “tendency to focus heavily on information that is salient or is often mentioned rather than information that is blended in the background”.

According to Wanke et al. (1995), ease of recall serves as a source of information in making judgments. Thaler (2016) states that use of this heuristic will lead to predictable errors in those situations where frequency and ease of recall diverge.

Salzman and Zwinkels (2013) argue that availability can also result in the representativeness bias: Investors typically mistake the most recent price changes as representative for the full distribution of returns.

Availability heuristic is a common shortcut for people to make life easier –as is the case for the other heuristics-. It may also be considered in the context of the dissertation. Existence of local bias may be related to that local companies’ information may be ready or easier-to-reach for local investors through different communication channels –written, electronic, or oral-.

Self-Attribution

Shefrin (2002) states that ‘self-attribution bias occurs when people attribute successful outcomes to their own skill but blame unsuccessful outcomes on bad luck’.

Consistent with bias in self-attribution, trading activity by individual investors increases after they experience high returns (Barber & Odean, 2002). Similarly, investor trading and market trading volume increase after high returns (Statman et al., 2006).

Daniel, Hirshleifer and Subrahmanyam (1998) reach similar results and their explanation for this finding is as follows. When public information confirms the private signal, the investor becomes even more confident in the private signal.

However, when public information does not confirm the private signal, the investor does not lose much confidence in the private signal.

The self-attribution bias is not limited to individual investors. Bias in managerial self-attribution have also been found in the contexts of repeated acquisitions (Billett & Qian, 2008) and in the issuance of management earnings forecasts after past successes (Hilary & Hsu, 2011).

Illusion of Control

Montier (2009) describes illusion of control as “people's belief that they have influence over the outcome of uncontrollable events”. Langer (1975) first coined the term ‘illusion of control’. Her definition for the illusion of control is as follows: ‘an expectancy of a personal success probability inappropriately higher than the objective probability would warrant’. She finds that skill situations (e.g. competition, choice, familiarity, and involvement) introduced into chance situations cause individuals to feel inappropriately confident.

In Langer’s (1975) experimental setup, the effect of familiarity may have implications for the dissertation. In the setup, there is a lottery game played by cards. There are two sets of cards: in the first set there is a letter on the cards, in the second set there is an unfamiliar symbol on the cards. People choose one card. Then they are said that the chance of winning on the other set is higher and they could change their cards. However, majority of them holding a letter-card do not change their cards. They are asked for a reason to keep the original card. Their reasons include initials for their or their wives’ names, or simply the first or last letter of the alphabet. Such a finding imply that people make choices based on familiar, but irrelevant, aspects of the matter.

Langer and Roth (1975) further show that people even rate themselves as significantly better in coin tosses if they succeed. They also overremembered their past successes. Fellner (2009) argues that the illusion of control appears to distort the portfolio decision and may lead to relatively underdiversified portfolios.

The illusion of control may lead to overconfidence and hence to trading more aggressively in the stock market. Being familiar with the companies may amplify such tendency.

Conservatism

Conservatism bias is first documented by Edwards' (1968) classic experiment. In the experiment, there are two urns, one containing 3 blue balls and 7 red balls, the other containing 7 blue balls and 3 red balls. People were given this information and told that someone had drawn 12 times from one of the urns –restored draw-. This draw yielded 8 reds and 4 blues. They were then asked whether the probability that the draw was made from the first urn is. The most of the people estimate a number around 0.7 while the correct answer is 0.97. They seem to overweight the base rate of 0.5.

Conservatism bias may be defined as resistance to a new information. In this case, people tend to stick to their current beliefs at the expense of proceeds of the new information. Ritter (2003) claims that conservatism bias is “at war with the representativeness bias”. Accordingly, when there is a change, people may underreact. Barberis et al. (1998) also use conservatism bias to explain underreaction. Indeed, the literature shows that investors tend to underreact to announcements about earnings, dividends, stock splits and others (Ramiah et al, 2015).

To contrast conservatism and representativeness, one may say that the former may be defined as “overweighting of base rates” whereas the latter may be defined as “underweighting of base rates” (Oechssler et al, 2009).

Ambiguity Aversion

Starting point for ambiguity aversion may be the well-known, classical experiment of Ellsberg (1961). In the experimental setup, there are two urns, one containing 50 red balls and 50 black balls, the other containing 100 red and black balls, distribution of colors is unknown. People are asked to choose between the following two bets:

- bet 1: draw a ball from the first urn, get \$20 if Red/Black
- bet 2: draw a ball from the second urn, get \$20 if Red/Black

People tend to choose the first urn in both of colours, which may imply that people do not like situations where there is uncertainty about the probability distribution. The more ambiguous the prize, the less attractive the bets for people.

Fox and Tversky (1995) extend the discussion and argue that ambiguity aversion is driven by the comparison with more familiar events, and diminishes in the absence of such a comparison.

Shefrin (2002) notes that "people prefer the familiar to the unfamiliar" and the emotional aspect of ambiguity aversion is fear of the unknown. Ambiguity aversion has also an implication on portfolio diversification. It may lead investors to hold relatively few securities rather than many (Hoffmann et al., 2010).

Mental Accounting

Thaler (1985) develops the concept of mental accounting. He reveals that people behave differently in their consuming decisions across different conditions. One of the examples he gives is that a couple saving money for a vacation home. They have saved USD 15,000, which earns 10% yearly. At the same time they bought a car for USD 11,000, financed by a credit with 15% interest rate. People create various compartments in their minds and attach revenue/expenditure items to these boxes. They make decisions under these boxes separately.

Thaler (1999) defines mental accounting as "the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities". According to him, the mental accounting has three components which receive more attention. First part is about perception and experience of outcomes and then evaluation of them. Second and third parts are the assignment of activities to specific accounts (housing, food etc.) and evaluation frequency of accounts (accounts can be balanced daily, weekly, yearly etc.).

Kahneman and Tversky (1984) presents a well-known example of mental accounting process in our minds. In their experiment, people were first asked, given they paid 10\$ for a theatre ticket and lost this ticket as they entered the theatre:

"Would you pay 10\$ for another ticket?"

46 per cent of the respondents say "yes".

In the second case, the subjects were told that they decided to go –did not pay yet- and discovered that they have lost 10\$ as they entered the theatre. The second question was:

“Would you still pay 10\$ for a ticket for the play?”

Now, 88 per cent of the respondents say “yes”. The reason for such a difference is the topical organization of mental accounts according to Kahneman and Tversky (1984). The cost of going to theater increases to an unreasonable level with the second ticket in the first case. However, in the second case, the loss of cash is not recorded in the account of going to theater, therefore the cost does not increase so much.

The mental accounting has important implications on portfolio management of individuals. Shefrin and Statman (2000) develops behavioral portfolio theory based on the concept of mental accounting –which is indeed based on Kahneman and Tversky’s (1979) isolation effect. Accordingly, investors having more than one mental account segregate their portfolios into mental accounts and overlook covariance among mental accounts.

Hindsight

Pompian (2006) describes hindsight bias as follows. An event in the past seems to us predictable, even if it was not before the event. People easily fall into this trap and tend to be overconfident about the accuracy of their predictions. They falsely believe that they predicted the outcome of that event in the beginning. Arkes et al. (1988) have a proper definition: “Those who consider the likelihood of an event after it has occurred exaggerate their likelihood of having been able to predict that event in advance.”

Fischhoff (1975) first coined the concept of hindsight bias. Based on his experiment, he finds that subjects were unaware of the effect that outcome knowledge had on their perceptions. They overestimated what they would have known without outcome knowledge. Fischhoff (1975) argues that such lack of awareness can seriously restrict one’s ability to judge or learn from the past.

In finance field, there are several papers showing the existence of hindsight bias. Biais and Weber (2009) show that investment bankers with higher hindsight bias have lower performance. They also report that, based on an experiment at a university, hindsight bias leads to lower volatility estimates.

We may argue that, we tend to link past events which have sequential order in a way that there is a cause-effect relationship between them. We omit the other probabilities at that time. For instance, after a price jump in a stock we may think that I have thought this. However, our current thinking is not independent of the current outcome now. At that time, we were not so clear indeed.

Recency

Recency bias may be described that recent events or information is weighted more with respect to the older ones while making a decision. Lee et al. (2008) show that the current states of the economies are overweighted in the growth forecasts. According to Pompian (2006), investors' projections may be based on too short historical data starting from the current time and they may ignore the fundamental value of the assets.

Since the recent information is more important, gambler's fallacy and hot hand fallacy are also related to this concept (Kudryavtsev et al., 2013). They argue that gambler's fallacy is an example of negative recency since the gambler expects the opposite outcome. On the other hand, hot hand fallacy is an example of positive recency, in which the individual expects recent events to repeat. They show that recent events' effects on stock market investors are moderate.

Framing

The concept of framing, or narrow framing, is also based on Kahneman and Tversky's (1979) prospect theory –isolation effect, as is the case for the mental accounting. Individuals do not consider newly faced risks together with their existing risks. Instead, they evaluate a new risk separately.

The classic experiment of narrow framing comes from Tversky and Kahneman (1981). There are two concurrent choices in the experiment:

Choice 1:

- A. A sure gain of 240\$
- B. A 25% chance to gain 1.000\$ and a 75% chance to gain nothing

Choice 2:

- C. A sure loss of 750\$
- D. A 75% chance to lose 1.000\$ and a 25% chance to lose nothing

73% of the subjects chose A and D, in which the expected outcome is -510\$. However, the expected outcome of B and C is -500\$. The subjects evaluate the outcomes separately. They are risk averse in the first choice, and risk taking in the second choice, in line with the value function of the prospect theory.

Another well-known experiment in Tversky and Kahneman (1981) is as follows. The U.S. is preparing for an unusual disease which is expected to kill 600 people. Two alternative programs are prepared.

If Program A is adopted, 200 people will be saved.

If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that nobody will be saved.

72% of the subjects chose Program A, i.e. they are risk averse.

A second group is subject to the same problem in a different setting:

If Program C is adopted, 400 people will die.

If Program D is adopted, there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die.

Now 78% of the subjects chose Program D, i.e. they are risk taking.

The two settings are in fact identical. However, the subjects frame the problem differently. Choices involving gains are often risk averse and choices involving loss are often risk taking.

In the stock market decisions, Kumar and Lim (2008) states that separate decisions are more likely to be narrowly framed than simultaneous decisions (i.e. clustered trades). Glaser et al. (2007) show that return forecasts differ across upward & downward time series. The forecasts also differ with respect to whether return or price forecast is requested. Chen and Lai (2013) argue that industries' policies affect framing behavior. They show that government emphasize on health industry led to investor to buy more. On the other hand, heterogeneity of high-tech stocks led to less tendency to invest in this industry.

2.2.3.2 Emotional Biases

Endowment

The fact that people often demand much more to give up an object than they would be willing to pay to acquire it is called the endowment effect by Thaler (1980). As Weber et al. (2000) put it, most people would demand a considerably higher price for a product that they own than they would be prepared to pay for it. Another definition for endowment effect is "reluctance to exchange an endowed item for an alternative" (Lindsay, 2019). Thaler (1980) also points out the link between loss aversion and the endowment effect.

Investors tend to assign a greater value to their already-invested assets with respect to those they do not have. Loewenstein and Kahneman (1991) made an experiment to test the existence of endowment effect. Half of the subjects were given pens, the others were given a token redeemable for an unspecified gift. All participants were then asked to rank the attractiveness of six gifts under consideration as prizes in subsequent experiments. Finally, all the subjects were then given a choice between a pen and two chocolate bars. 56% of those endowed with the pen chose a pen. However, only 24% of the other subjects chose a pen. On the other hand, when making the attractiveness ratings, the subjects endowed with pens did not rate them as more

attractive. The authors argue that the main effect of endowment is not to enhance the appeal of the good one owns, only the pain of giving it up.

Williams et al. (2015) approach from a different angle and argue that our brains' reward system is sensitive to value when gambling for ourselves. This sensitivity to value is not observed when gambling for another. In stock investments, Tong et al. (2016) find that endowment effect decreases with trading experience.

Self-Control

Thaler (1980) and Thaler and Shefrin (1981) develop the concept of self-control bias in finance literature. Thaler and Shefrin (1981), using the principal-agent framework, introduce a self-control into a formal model of intertemporal choice by modeling man as an organization with a planner and many doers⁷.

Self-control bias may be characterized as “intra-personal decision time-inconsistency problem” (Gathergood, 2012). It is simply the tendency to consume today at the expense of saving for tomorrow. In another words, it involves postponing consumption (Shu, 2010). Several studies find negative relationship between wealth accumulation and self-control (e.g. Ameriks et al, 2007). Biljanovskaa and Palligkinis (2016) also find that lack of self-control negatively affects wealth. They posit that three components of self-control are planning, monitoring, and commitment to pre-set goals. Strömbäck et al. (2017) also find that people with high level of self-control are more likely to save.

One important point about self-control is that if an individual is aware of his self-control problem, he seeks the ways of commitment, i.e. trying to restrict himself (Noor, 2007). Interestingly, investment in illiquid assets may overcome lack of self-control, which is opposite to general assumption that liquid assets are better to invest (Angerer and Szymczak, 2019). On the other hand, Gambetti and Giusberti (2019) argue that individuals with high self-control tend to invest more, instead of staying in cash.

De Bondt and Thaler (1995) argue that mental accounting may be a good way to deal with self-control problems. Shefrin and Statman (1984) combine the concepts of

⁷ “A planner: concerned with lifetime utility. A doer: exists only for one period and completely selfish, or myopic.” (Thaler and Shefrin, 1981).

self-control and mental accounting, and extend the discussion to dividend payments. Accordingly, investors would be willing to pay a premium for a cash dividends because of self-control reasons. An investor may decide to spend dividend income if needed at the beginning. When he/she spend dividend income instead of reinvestment, then if the price of the stock increases, he/she would not regret. However, another investor who spends by selling stock would feel more regret. Therefore, separating the revenue as dividend from the total revenue may make it easier for an investor to manage his portfolio.

The trait of self-control is also investigated with its link with education. Frisanchio (2019) mentions that personal finance courses are able to increase self-control and patience.

Optimism

Optimism may simply be defined as positive expectations about the future (Millstein et al, 2019). It is different from hope, in the sense that while the former is a broad expectation that good events will likely be occur, the latter is related to one's perception about his capabilities (Shanahan et al, 2020). If one's expectations are unrealistic, we may call it over-optimism (Dawson and Henley, 2012).

Optimism itself is actually a strength for human psychology. However, being overly optimistic may lead to irrational decisions. People overestimate their work performance (Meyer, 1975), underestimate their task completion times (Buehler et al., 1994). Lovallo and Kahneman (2003) argue that, in organizations, we ignore competitors' capabilities, approve highly overoptimistic proposals, and reward optimism and interpret pessimism as disloyalty. They suggest an outside view, including a more objective forecasting method utilizing past information. Pompian (2006) argues that this approach is applicable for investors.

Lin et al. (2013) find that over-optimistic forecasts of analysts can lead to investors overstating the value of firms. Heger and Papageorge (2018) show that optimism and overconfidence are positively correlated and together drive wishful thinking. According to them, the difference between optimism and overconfidence is that the former is about the outcomes of the estimations while the latter is about one's own performance (i.e. "ego-related").

Jacobsen et al. (2014) argue that men tend to be more optimistic than women in financial markets. Su-Chun et al. (2018) show that banks with optimistic CEOs create more liquidity.

Loss Aversion

As several biases mentioned so far, loss aversion comes from the prospect theory of Kahneman and Tversky (1979). In this theory, the value function is normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains. Steeper function for losses –in the negative domain- means higher sensitivity to losses. In another words, investors are more sensitive to losses (Barberis et al 2001).

Benartzi and Thaler (1995) find that investors are reluctant to invest in stocks due to loss aversion. Barberis et al. (2001) develops dynamic version of loss aversion model. Loss aversion rises (falls) after past gains (losses). On the other hand, Imas (2014) argues that investors avoid risk after realized losses. However, if the loss is not realized -only paper loss-, investors take more risk. Boyce et al. (2013) find that experienced falls in income have a larger impact on a well-being than equivalent income gains.

Lindsay (2019) coins the concept of adaptive loss aversion, which states that loss aversion protects investors from being exploited by informed traders by making them more cautious. Xie et al. (2018), in their cross-country work, find that loss aversion increases with wealth and individualism (one of the cultural dimensions of Hofstede). Alessandri et al. (2018) extends the concept to the managers of family and non-family firms. They find that family firms suffer less from myopic loss aversion, i.e. they are more long-term oriented.

Regret Aversion

The concept of regret aversion is first coined by Bell (1982) and Loomes and Sugden (1982). Loomes and Sugden (1982) state that if an alternative outcome to the chosen one is more desirable, an individual may feel regret. Accordingly, this feeling may reduce the pleasure. Another definition of regret is the difference between the chosen portfolio and the ex-post best alternative (Baule et al, 2019). Sautua (2017)

argues that regret which is anticipated by the investor can lead to inertia in individual decision making.

Korn and Rieger (2019) argue that corporate hedging activity is affected by regret aversion. They argue that regret aversion leads to stronger tendency to hedge downside risk more than standard theory implies. Reb (2008) finds that regret aversion leads to more careful decision making.

Michenaud and Solnik (2008) show that adding regret risk in addition to a traditional volatility risk to a decision-making changes the results sharply. They find that regret-averse investors do not like positive skewness due to a potential large loss while loss-averse investors do not like negative skewness. Both type of investors underinvest in such assets with respect to normally distributed ones. They further find that regret-averse investors may not prefer fully-hedged portfolio in case of foreign currency risk. The reason is that they do not want to face regret if foreign currency appreciates, which is a different outcome than loss aversion implies.

A regret-averse investor may choose to maintain status quo, which is the next bias we investigate.

Status Quo

Samuelson and Zeckhauser (1988) first coined the concept of status quo bias in decision making. Their definition of status quo is simple: “doing nothing or maintaining one’s current or previous decision”. Their experiments show that individuals disproportionately stick with the status quo.

Kahneman et al. (1991) argue that status quo bias is an implication of loss aversion as the disadvantages of leaving it loom larger than advantages. They combine status quo bias and endowment effect in line with loss aversion. They gave an example of an economist who have wines appreciated in value since he/she had bought. The economist would not be willing to sell the wine. According to the authors, this case illustrates endowment effect –since it is more difficult to give up an object- and status quo bias –preserving the current state is preferred-.

Dean et al. (2017) combine status quo bias and limited attention. They show that status quo bias is more prevalent in larger choice sets. According to Daniel et al. (2002), limited attention and processing capability of investors lead to status quo bias.

2.2.4 Home Bias: Definition and Review of Empirical Studies

2.2.4.1 Definition

According to the modern finance theory –starting from the seminal work of Markowitz (1952), a risk-averse investor has to invest in market portfolio (or a sufficiently diversified portfolio) together with a risk-free asset in order to obtain maximum profit for a given level of risk. However, in practice, investors do not diversify their portfolios within this framework. One explanation for this fact is that investors may weigh the assets in their territories more. This phenomenon has been subject to research in the last two decades under the title of home/local bias.⁸

Studies on home bias may be viewed as the starting point of studies focusing on local bias. Since 1970s, finance researchers have been noticing that the share of foreign assets in the portfolios of domestic investors is much lower than predicted by the modern portfolio theory (e.g., Levy and Sarnat, 1970; French and Poterba, 1991; Tesar and Werner, 1995).

Home bias may be defined as *the tendency of investors to invest their country's equities relatively more. Home-biased investors have tendency to overweight domestic equities and underweight international equities* (French and Poterba, 1991). Lewis (1999) defines home bias as “*the observation that individuals hold too little of their wealth in foreign assets*”.

2.2.4.2 Review of Empirical Studies

French and Poterba (1991) report that, although the benefits of international diversification have been recognized for decades most investors hold nearly all of their wealth in domestic assets. They show that U.S. equity investors allocate 94% of their

⁸ To clarify, home bias is not one of the psychological biases covered in the previous section. Rather, it is a phenomenon observed in the financial markets, and some of the aforementioned biases are potential explanations for the existence of home bias.

resources to U.S. shares although the share of U.S. equities in the world is 48%. Hiraki et al. (2003) and Karlsson and Nordén (2007) document the existence of home bias in Japanese and Swedish stock markets, respectively.

Baele et al. (2007) and Sorensen et al. (2007) show the existence of home bias in a cross-country framework, the former covers 25 countries and the latter OECD countries. Öztürkkal (2013) documents that investors in Turkey prefer to invest in local equity market based on a survey on 85 people.

There are several explanations for the existence of home bias. Earlier studies focus on barriers to international investment (Black, 1974; Stulz, 1981). Hedging inflation risks is another explanation (Stulz, 1981; Adler and Dumas, 1983). Alternatively, from the behavioral point of view, investors exaggerating the risks abroad (Kho et al., 2009), being more optimistic about the home market and believing they have greater competence in domestic stocks (Graham et al. 2005) may be the reasons for the existence of home bias.

Language barriers or differences in reporting standards (Baker, 2010) and patriotism/national pride (Morse and Shive, 2011) may also be sources for the existence of home bias.

Maroney et al. (2008) find that investors tend to invest in firms which have financial statements under their country regulations. Accordingly, they argue that familiarity is a reason for the existence of home bias.

Pungulescu (2022) coins a new method instead of distance to measure home bias and uses semantic similarity between countries' languages via an artificial intelligence application. She argues that such similarity better reflects the closeness between countries.

Gaudio et al. (2024) explore the tendency of banks to invest in geographically closer fintech firms and find evidence of the existence of home bias. They argue that information asymmetries stemming from distance may create a resistance to innovation.

Hu (2023) focus on cross-sectoral analysis. He documents that there is high level of home bias in nontradable industries and investors have higher level of home bias in industries in which their home countries have higher level of comparative advantage. In his another work (2020), he claims that home bias is stronger in emerging countries.

Dlugosch et al. (2023) find that local overweight in portfolios does not lead to excess returns. They attribute this tendency to familiarity and home-land sympathy.

Lee et al. (2023) review the literature and sum up the reasons for home bias as follow: “foreign investment barriers, country-specific risks, information asymmetry, and cultural/behavioural factors”.

Kim and Kim (2022) find that investors’ unfamiliarity with foreign countries are positively associated with their bias to invest in home-country assets. They use a question to determine the country-specific unfamiliarity: “Could you tell me for each whether you trust people from this group completely, somewhat, not very much or not at all? - People you meet for the first time”.

Carpio et al. (2021) argue that wealthier investors are more likely to invest in foreign stock markets, however, they reduce their foreign share in their risky assets.

Gamez and Gonzalez (2024), investigating four European countries, approaches the concept from a different angle and find that home bias does not lead to positive or negative returns in local stocks. Therefore, they argue that local indices should be questioned for using in the design of strategic portfolio.

Wallmeier and Iseli (2022) argue that the effect of home bias is small on expected returns. One reason for this is that large countries have similar level of home bias and their relative weight in a portfolio is largely unaffected.

On the other hand, Hiraki and Liu (2021) argue that both home- and foreign-biases portfolios outperform portfolios with average returns, supporting information hypothesis. They also find that fund managers younger, better educated and having MBA degree have lower level of home bias.

Dougal and Retzl (2021) find that private firms have much higher home bias with respect to publicly traded firms. They argue that private firms are more sensitive to find local investment opportunities. Almaghrabi (2023) argues that firms in competitive local product markets have higher level of home bias.

Savchenko and Sukach (2020) find that home bias still exists in European Union but has decreased in time. They argue that this evidence shows increase in the level of integration in the Union.

Gosse and Jehle (2024) argue that investors from several European Union countries investing in central and eastern European countries significantly benefit from these investments. Therefore, they claim that easing cross-border investment within the EU would be beneficial for investors.

Suchanek (2021) focuses on the relationship between several bias and negative personality traits, namely, machiavellianism, narcissism and psychopathy. He finds that for the U.S. investors, such traits affect the final investment decisions. The level of these traits is positively associated with overconfidence and herd mentality, and negatively associated with home bias. Their explanation for this is that, based on Graham et al. (2009), investors feeling competent trade more often and have a more international portfolio, and such feeling of competency comes from narcissism.

Regarding the effect of Covid-19, Yousefi and Najand (2022) find that European investors reduce their local investments while investors from the U.S. and Asia increase their local investments. They attribute this result to the flight-to-safety effect stemming from the performance of countries in controlling pandemic.

Balasubramanian and Kumar (2023) also report that home bias has decreased after Covid-19, covering the data of 22 developed and emerging countries. They attribute this result to the increasing level of digital communication. Liu and Jin (2023) also find evidence that stay-at-home duration decreases local holdings of institutional investors and firms' institutional ownership in the U.S.

Similarly, Socaciu et al. (2023) find that home bias increases in crisis times (2008 financial crisis, tapering of Fed in 2013, and Covid-19 in 2020). Accordingly,

they argue that there is a positive relationship between home bias and flight-to-quality. Kwabi et al. (2023) argues that international investments to host country decrease in case of political uncertainty, specifically in election years.

Jiang et al. (2022) extend the research to crowdfunding and find evidence of home bias reward-based crowdfunding in China. Since they find that home bias includes informative aspect, they argue that effective information disclosure may balance this effect.

Narayan and Rehman (2021) compare the potential benefits of inter-region investments in regions Asia, Central and Eastern Europe, Latin America, and North Africa and the Middle East. They find that since a stable long-term equilibrium of returns between Asian markets is absent, investing within Asia may be beneficial for Asian investors.

Altdörfer et al. (2024) show that analysts located far from the firms have more conservative ratings. Marra et al. (2024) argues that CEOs tend to invest in firms in their birth-countries.

Silva et al. (2017) documents for Brasil that there exists home bias for mutual funds, which is costly and probably due to behavioral biases. They also show that level of home bias is lower in funds designed for qualified investors and those requiring higher level of investment.

Doğukanlı and Şahin (2016) report the existence of home bias for Turkey for the period of 2001-2010. Kocaarslan et al. (2017) argue that newly emerging financial centers may contribute to decreasing home bias, in this regard, Turkish stock market provides diversification benefits to the global investors.

2.2.5 Local Bias: Definition and Review of Empirical Studies

The main theme of the dissertation is local bias of equity market investors. Therefore, in this section we present a detailed cover of the literature in this research line. First, we look at the definition of local bias in the literature. Second, we cover measurement of local investment and local bias. We separately discuss three main measures of local investment&bias. Next, we review the results of studies on the existence of local bias. Last, we present the findings on the possible reasons of local bias.

2.2.5.1 Definition of local bias

Portfolio diversification is one of the cornerstones of the modern finance theory. Investors utilize this process in order to reduce the level of investment risk through distribution of their wealth among a variety of assets. Markowitz (1952) first formalized the concept of diversification in his mean-variance model. He reveals that effective diversification should consist of assets which have low covariance. To measure the risk, both the variances of assets and their covariances should be taken account.

According to Markowitz's "Modern Portfolio Theory", a rational investor's objective is to maximize returns for a given level of risk, or alternatively, to reduce risk for a given level of return. This theory led to the development of "Capital Asset Pricing Model (CAPM)" by Sharpe (1964), Lintner (1965), and Mossin (1966). CAPM classifies the risk as either diversifiable or non-diversifiable. Diversification is a crucial factor to consider for risk-averse investors, who are assumed to be rational, and aim to maximize returns while minimizing risk.

Since Markowitz, the benefits of diversification have been examined extensively in the literature, for both both domestic and international assets. Levy and Sarnat (1970) show that international diversification may induce further benefits. Several studies document low correlations among international assets' returns (e.g., Granger and Morgenstern, 1970; Speidell and Sappenfield, 1992), which implies that greater profits can be made by diversifying internationally.

However, in practice, investors do not diversify their portfolios sufficiently. Diversification across local assets is much more common than internationally diversified portfolios. One explanation is that investors may be more likely to weigh the assets in their own territories. This phenomenon is called home bias, which can be defined as the tendency of investors to favor their own country's assets. This tendency against diversification seems to be the result of investor choices rather than institutional constraints (French and Poterba, 1991).

Similarly, Coval and Moskowitz (1999) show that such tendency is also valid across domestic stocks. They suggest that asymmetric information between local and non-local investors may drive the preference for geographically proximate investments.

Many studies support the argument of asymmetric information. According to this argument (Coval and Moskowitz, 1999; Ivkovic and Weisbenner, 2005, and Massa and Simonov, 2006) investors earn more from their local investments due to their informational advantage. On the other hand, another group of studies argue that local bias does not include extra information, therefore it cannot lead to greater returns. According to them, the reason is mostly behavioral, e.g. familiarity (Zhu, 2002; Pirinsky and Wang, 2006; Seasholes and Zhu, 2010).

In this context, local bias may be called as intra-country version of home bias, which is a cross-border phenomenon. We also use the terms local investors and local stocks throughout the dissertation. Local investor refers to individuals investing in firms which are geographically close to his/her hometown and local stock to stocks issued by the firms which are geographically close to the hometown of the investor.

Definition of local bias

Since 1970s, it is observed that share of foreign assets are much lower than the predictions of modern portfolio theory (e.g., Levy and Sarnat, 1970; French and Poterba, 1991; Tesar and Werner, 1995). This phenomenon is called home bias puzzle. Such local bias has not only been shown for international markets, but has also been documented for local markets. Several definitions of local bias are as follows:

“...to have a preference for geographically proximate investments, restricted to domestic economy.” [Coval and Moskowitz, 1999]

“...as the tendency to invest in companies closer to them relative to the market portfolio.” [Zhu, 2002]

“...local bias, that is, disproportionate preference for local stocks. . . .” [Ivkovic and Weisbenner, 2005]

“The phenomenon of investor preference for nearby domestic companies has become known as local bias. Its commonly accepted interpretation is that people prefer to invest in the familiar.” [Bodnaruk , 2009]

“... investors tend to tilt their domestic portfolios towards local stocks-investment anomaly which has been dubbed local bias in the literature.” [Baltzer, Stolper and Walter, 2013]

Measurement of local investment and local bias

The measurement of local bias differs depending on the definition of local investment accepted by the researcher. First of all, we show the alternative local investment measures. The different local investment definitions found in the literature survey can be categorized in three groups: Local investment is (1) defined as a pre-specified distance, (2) defined as a computed distance, (3) defined as a specific city or region. The studies for each category are listed in Table 1. The local bias is measured after defining local investment.

(1) Local investment defined as a prespecified distance and measurement of local bias

In some studies, a local investment is defined as a pre-specified distance (e.g. 100 kilometers, 250 miles). For instance, in their pioneering study in this field, Coval and Moskowitz (2001) classify any stock within 100 kilometers of the fund headquarters as a local stock. Then, they measure the degree to which a manager invests locally by computing the fraction of fund assets invested in these local stocks.

Finally, they compare this fraction to the fraction of the market of available investments that resides within 100 kilometers of the fund. The difference between these two fractions is their local bias measure, representing the degree to which a manager invests locally in excess of what she would hold locally if she held the market portfolio.

Definition/Measurement of <i>local investment</i>	
Coval and Moskowitz (2001)	100 km
Hau (2001)	100 km
Ivkovic and Weisbenner (2005)	250 miles
Gaspar and Massa (2007)	100 km
Ivkovi'c, Sialm Weisbenner (2008)	50 miles
Goetzmann and Kumar (2008)	250 miles
Seasholes and Zhu (2010)	250 miles
Chhaochharia, Kumar and Niessen-Ruenzi (2012)	250 miles
Baltzer, Stolper and Walter (2015)	100 km
<i>City or region based measure</i>	
Grinblatt and Keloharju (2001)	Municipalities of Finland
Loughran and Schultz (2004)	US cities
Pirinsky and Wang (2006)	US MSAs
Feng and Seasholes (2008)	Chinese cities
Kedia and Zhou (2011)	US MSAs
Das (2011)	US MSAs
Nofsinger and Varma (2012)	US states
Jacobs and Weber (2012)	German cities
<i>Computed distance based measure</i>	
Coval and Moskowitz (1999)	
Zhu (2002)	
Dorn and Huberman (2005)	
Massa and Simonov (2006)	
Dorn, Huberman and Sengmueller (2008)	
Bodnaruk (2009)	
Cumming and Dai (2010)	

Following Coval and Moskowitz (2001), Gaspar and Massa (2007) define a mutual fund as local with respect to a firm if the mutual fund manager is located within a 100 km radius of the firm's headquarters. In another study on the equity trades of professional traders from different countries, Hau (2001) uses different locational dummy variables, one of which concerns traders located within a 100 km of the

corporate headquarters, in the case that the corporation is headquartered outside Frankfurt.

Baltzer, Stolper and Walter (2015) also use a distance-based measure of local bias. They categorize each stock issued by a company, which is headquartered within 100 kilometers of a given representative portfolio i , as local for that specific portfolio; shares beyond this radius are referred to as remote. In order to obtain their local bias measure, they compute the fraction of locally available float-adjusted market capitalization for each of the representative portfolios and subtract it from their actual local investments.

In other studies, 250 miles is used for discriminating the local from the non-local. For instance, Ivkovic and Weisbenner (2005) compute a household's local bias by subtracting the fraction of the market portfolio headquartered within 250 miles from the fraction of household's portfolio headquartered within this distance. Similarly, the local bias measure for Goetzmann and Kumar (2008) is the proportion of a portfolio that is invested in stocks of firms located within a 250-mile radius from investor's location (zip code). For robustness tests, the same method is used by Chhaochharia et al. (2012) in order to determine local institutional investors. Stocks whose headquarters are within a 250-mile radius of the investor location are considered local by Seasholes and Zhu (2010).

On the other hand, Ivkovic et al. (2008) favor a limit of 50 miles between the corporate headquarters and the investor's household.

(2) Local investment defined as a specific city or region and measurement of local bias

For an investment to be considered local, some other researchers use a city or region-based measure for considering an investment as local. For instance, Loughran and Schultz (2004), in their study on localized trading behavior in Nasdaq, incorporate companies located in the city's metropolitan area, and not just the city itself, into their sample. Local investors are the ones who are located in the same city as a Nasdaq firm's headquarters.

Following Loughran and Schultz (2004), Pirinsky and Wang (2006) define a firm's location as the location of its headquarters. The authors claim that this is a reasonable choice, given that corporate headquarters are not only close to corporate core business activities but also the center of information exchange between the firm and its suppliers, service providers, and investors.

In a study investigating the role of local market makers in providing liquidity and improving the quality of a dealer market, Kedia and Zhou (2011) classify dealers as geographically proximate or local if they are in the same Metropolitan Statistical Areas (MSA)⁹ as their clients. According to the authors, there are two advantages of using MSA as a unit of analysis: (1) It provides a more natural unit of geographical analysis compared to an arbitrary cutoff of 100 or 250 km. (2) The tight social and economic interaction within an MSA is precisely what facilitates information transfer and generates information advantages. Local share for a firm is defined as the fraction of the firm's market makers that are located in the same MSA.

Das (2011) defines a firm and mutual fund manager as local if located in the same MSA in his study examining the influence of geographical proximity on mutual fund proxy voting decisions. In analyses, he uses a dummy variable (local) that takes the value of 1 if the fund and firm are located in the same MSA.

In another study exploring familiarity bias in the geographic context by focusing on the individual's decision to purchase utility stocks, Nofsinger and Varma (2012) use dummy variable that takes the value 1 if a household is local to utility i . In order to explore whether households overweigh their local stocks as a proportion of their entire utility stock portfolio, both in terms of the number and value of stocks, they first of all divide all households into the following four regions according to the 1990 U.S. Census classification: midwest, northeast, west, and south. Then, they compute a household's observed local utility allocation according to value (or number of stocks) by averaging the percentage of the total value (or number of stocks) of its utility

⁹ MSA is a geographic entity defined by the US Office of Management and Budget. An MSA consists of a core area that contains a substantial population nucleus, together with adjacent communities that have a high degree of social and economic integration with that core. MSAs include one or more entire counties, and some MSAs contain counties from several states. For example, the New York MSA includes counties from four states. New York, New Jersey, Connecticut, and Pennsylvania.

portfolio invested in local utility stocks over the number of months in which it held utility stocks.

A non-US study in this field, by Jacobs and Weber (2012), uses a sample consisting of the common stocks of all firms headquartered in Germany, which have been listed on a German stock exchange. They use a firm's headquarter as a proxy for its location. In a similar way, Feng and Seasholes (2008) compare the investment behavior of men and women in the People's Republic of China, and they define as local a stock of a company whose headquarter is located in the same province as the investor.

Grinblatt and Keloharju (2001) find that investors are more likely to hold, buy, and sell the stocks of Finnish firms that are located close to the investor. In order to measure the influence of the distance, they use the ratio of the firm i 's shareowner weight for investors in the municipality of its headquarters to the firm i 's shareowner weight among all investors in Finland. They give as an example the shipping firm Birka Line, which has 3,299 household shareowners, 1,669 of whom live in its headquarters city of Mariehamn. Summing the number of household shareowners over all firms, they find that Mariehamn has 14,440 household shareowners, while Finland has 1,157,783 shareowners. The numerator for Birka Line's ratio is thus $1,669/14,440$, and the denominator is $3,299/1,157,783$, making Birka Line's ratio 40.56. In the absence of distance effect, this ratio is one.

(3) Local investment defined as a computed distance and measurement of local bias

In a bunch of studies, the distance between the invested firm and the investor has been computed before measuring local bias. In their pioneering study, Coval and Moskowitz (1999) investigate whether investors have a preference for geographically proximate investments and to this end, they develop a test statistic. The procedure used by Coval and Moskowitz (1999) has been used by many other authors. Since it is a very common measure, we quote the test procedure in Box 1.

Box 1. Computation of the test statistic for local bias

“Suppose there are F different fund managers and n different securities in the economy. Let $m_{i,j}$ represent the portfolio weight on stock j in the benchmark portfolio for which fund manager i is compared. If the market portfolio is the relevant benchmark for all funds, then $m_{i,j}$ is the same across all fund managers i and represents the market value weight of stock j in the economy. Next, let $h_{i,j}$ represent the actual weight that fund i places on stock j . We then compute the distance, $d_{i,j}$, between fund manager i and the corporate headquarters of stock j as follows:

$$d_{ij} = \arccos(\deg_{latlon}) \times \frac{2\pi r}{360}$$

$$\begin{aligned} \deg_{latlon} = & \cos(lat_i) \times \cos(lon_i) \times \cos(lat_j) \times \cos(lon_j) \\ & + \cos(lat_i) \times \sin(lon_i) \times \cos(lat_j) \times \sin(lon_j) \\ & + \sin(lat_i) \times \sin(lat_j) \end{aligned}$$

where lat and lon are latitudes and longitudes (measured in degrees) of the fund manager and company headquarters locations and r is the radius of the earth (≈ 6378 km).

Finally, we compute the average distance of fund i from all securities j it could have invested in, by weighting the distances between manager i and all n stocks in the economy, by the appropriate benchmark weights. More formally,

$$d_i^M = \sum_{j=1}^n m_{i,j} d_{i,j}.$$

With variables defined as above, our test for whether fund i exhibits a proximity preference is stated in Proposition 1.

Proposition 1 Consider the test statistic,

$$LB_i \equiv \sum_{j=1}^n (m_{i,j} - h_{i,j})(d_{i,j}/d_i^M)$$

which measures how much closer fund manager i is to her portfolio than to her benchmark (as a fraction of the distance she is from her benchmark). If deviations from the benchmark portfolio are unrelated to the distance between manager i and the securities she chooses to hold, then the null hypothesis $H_0: LB_i = 0$ cannot be rejected.”

Source: Coval and Moskowitz (1999).

Zhu (2002) follows a 3-step procedure for measuring the individual investor local bias. Firstly, following Coval and Moskowitz (1999), he calculates the distance between an investor and the market portfolio. In order to calculate the location of the market portfolio as the value-weighted average of the location of all stocks in the market, first of all, he obtains the latitude and longitude of the centroids of all 3-digit

zip codes and calculates the total market value of companies headquartered in each. The latitude and longitude of the market portfolio is computed as the average of the latitude and longitude of all 3-digit zip codes, weighted by the total value of public companies headquartered in each particular zip code area. The distance between a particular investor and the market portfolio is then calculated as the distance between the zip codes of the investor and the market portfolio. The second step consists of calculating the distance between the investor and their investment by measuring the distance between the zip codes of the investor and the company's headquarter, focusing only on buy transactions. Zhu (2002) then calculates the distance between investor and personal portfolio as the average of the distances between investor and investments, weighted by the value of each transaction (Box 2).

Box 2. Computation of the distance between investor and personal portfolio

$$Dist_{i,own} = \sum_{j=1}^{n_{i,j}} w_{i,j} Dist_{i,j}$$

where $Dist_{i,own}$ is the distance between investor i and her own portfolio $w_{i,j}$ is the value of j th buy transaction divided by the total value of investor i 's buy transactions during the sample period, $n_{i,j}$ is the number of buy transactions that investor i has made during the sample period, $Dist_{i,j}$ is the distance between investor i 's home and the headquarters of the company of her j th buy.

Source: Zhu, 2002.

The final step involves two methods for calculating local bias (Box 3).

Box 3. Computation of Local Bias

The local bias of an investor is calculated in two different ways:

[First way]: The absolute local bias LB_{abs} is calculated as the difference between an investor's distance to the market portfolio and the distance to his or her own portfolio.

$$LB_i^{abs} = Dist_{i,market} - Dist_{i,own},$$

where $Dist_{i,market}$ is the distance between investor i and the market portfolio. $Dist_{i,own}$ is the distance between investor i and her own portfolio.

This absolute local bias can be either positive or negative. A positive (negative) absolute local bias indicates that the investors' own portfolio is closer to (farther from) her than the market portfolio.

[Second way]: To accommodate the heterogeneity in investors' locations, an alternative normalized measurement of local bias is used. It is defined as the absolute local bias normalized by the distance between the investor and the market portfolio:

$$LB_i^{norm} = LB_i^{abs} / Dist_{i,market},$$

where LB_i^{norm} is the normalized local bias of investor i .

If there is no local bias in individual investors' investments, the normalized local bias will have the mean of 0.

The average distance between investors and the market portfolio is measured as both an equally weighted and as a value-weighted average of all investors' distances to the market portfolio.

$$Dist_{avg,market}^{equal} = \frac{1}{n} \sum_{i=1}^n Dist_{i,market}$$

$$Dist_{avg,market}^{value} = \sum_{i=1}^n \left(Value_i / \sum_{i=1}^n Value_i \right) * Dist_{i,market},$$

where $Dist_{avg,market}^{equal}$ is the equally weighted average of the distances $Dist_{i,market}$ between investors and the market portfolio, $Dist_{avg,market}^{value}$ is weighted average of the distance between investors and the market portfolio, $Value_i$ is the total value of all buy transactions that investor i has made during the sample period, n is the sample size.

The equally weighted and value-weighted average distance between investors and their own portfolios are similarly defined as

$$Dist_{avg,own}^{equal} = 1/n \sum_{i=1}^n Dist_{i,own},$$

$$Dist_{avg,own}^{value} = \sum_{i=1}^n \left(Value_i / \sum_{i=1}^n Value_i \right) * Dist_{i,own}.$$

Finally, the average absolute and normalized local biases as equally weighted and value-weighted averages of all investors' absolute and normalized local bias are calculated as follows:

$$LB_{avg,equal}^{abs} = \frac{1}{n} \sum_{i=1}^n LB_i^{abs} \text{ and } LB_{avg,value}^{abs} = \sum_{i=1}^n \left(\frac{Value_i}{\sum_{i=1}^n Value_i} \right) * LB_i^{abs},$$

$$LB_{avg,equal}^{norm} = \frac{1}{n} \sum_{i=1}^n LB_i^{norm} \text{ and } LB_{avg,value}^{norm} = \sum_{i=1}^n \left(\frac{Value_i}{\sum_{i=1}^n Value_i} \right) * LB_i^{norm}.$$

Source: Zhu (2002).

Dorn and Huberman (2005), following the approach of Coval and Moskowitz (1999), define the local bias of a portfolio as one minus the ratio of the distance between the investor and his portfolio, to the distance between the investor and the market portfolio. A local bias of 0.05 means that the customer holds a portfolio that is 5% closer than the market portfolio. Mutual funds are assumed to have the same distance from the investor as the market portfolio.

In another study, for measuring the proximity between the residence of the investor and the place where the company is located, Massa and Simonov (2006) use two different measures: (1) the logarithm (to base 10) of the inverse of the distance between the ZIP code of the investor and the ZIP code of the closest branch/subsidiary of the company whose stock they consider; (2) the logarithm of the inverse of the distance between the ZIP code of the investor and the ZIP code of the company headquarters. These measures are similar to those used by Coval and Moskowitz (1999). The greater the value of the variable, the closer is the investor to the stock.

Analogous to the approach of Coval and Moskowitz (1999), Dorn, Huberman, and Sengmueller (2008) calculate the average distance between a trader on a given stock-day and company headquarters by translating investors' and firms' zip codes into geographic longitude (lon) and latitude (lat) by matching them against a list of zip codes and the corresponding geo-graphic coordinates for 6,900 German municipalities. Given the geographic coordinates, the distance between trader i and firm j is estimated as follows:

$$d_{ij} = 3963 \times \arccos[\sin(\text{lat}_i) \sin(\text{lat}_j) + \cos(\text{lat}_i) \cos(\text{lat}_j) \cos(|\text{long}_i - \text{long}_j|)],$$

The authors set the distance between traders with addresses outside Germany and other traders to 1,000 km., and to make the distance measures comparable across stocks, they normalize these by the average distance between company headquarters and the full client sample.

Bodnaruk (2009) has a different approach, analyzing the portfolios of individual investors who have changed their place of residence, Bodnaruk (2009) calculates a measure of proximity for Swedish investors, by using postal codes of the location of

the investor's residence and the company's closest establishment. Throughout the analysis, the logarithm of this distance is used to measure proximity to the investment. The logarithm of the distance is taken in order to capture the nonlinearity of the effect.

Cumming and Dai (2010), investigating the local bias in venture capital investments, calculate the geographic distance between the VCs and their portfolio companies as follows:

$$d_{ij} = 3963 \times \arccos[\sin(\text{lat}_i) \sin(\text{lat}_j) + \cos(\text{lat}_i) \cos(\text{lat}_j) \cos(|\text{long}_i - \text{long}_j|)],$$

where latitude (lat) and longitude (long) are measured in radians and 3,963 is a constant representing the Earth's radius in statute miles.¹⁰

Following the formula developed in Coval and Moskowitz (1999), Cumming and Dai (2010) measure the local bias as the percentage difference between the weighted-average distance of the actual investment portfolio for each venture capital and the weighted-average distance of a hypothetical benchmark portfolio. They estimate equally weighted-average distance for both the actual investment portfolio and the benchmark portfolio.

2.2.5.2 Review of Empirical Studies

Local bias

The pioneering study in this line of research, Coval and Moskowitz (1999), represents the first attempt to analyze the impact of distance on domestic portfolio choice. By using a sample consisting of 1,189 investment managers, running 2,183 different US equity funds, for the year 1995, they find that U.S. investment managers

¹⁰ Sorenson and Stuart (2001) use "3,437" as the constant representing the radius of the Earth in nautical miles; Coval and Moskowitz (1999, 2001) use "6,379" as the constant representing the radius of the Earth in kilometers. Adopting these different units does not change the measure of local bias in the study of Cumming and Dai (2010).

exhibit a strong preference for locally headquartered firms, particularly small, highly levered firms that produce nontraded goods.

In their succeeding study (2001), they analyze the equity holdings of the U.S. mutual funds for the period January 1975–December 1994, finding that, despite the gains that can be generated from local investments, the average fund in their sample exhibited only a modest bias toward local stocks. On the other hand, they also find that funds, which have a strong focus on local assets, exhibit even greater local performance and, the extent to which a firm is held by nearby investors is positively related to its future expected return.. Finally, they found that the extent to which a firm attracts nearby investors is positively related to its future expected return. Based on their finding that fund managers earn substantial abnormal returns in nearby investments, they suggest that investors trade local securities at an informational advantage and point toward a link between such trading and asset prices.

In another study, Huberman (2001) find that the shareholders of a Regional Bell Operating Company (RBOC) tend to live in the area which it serves. The same year, Grinblatt and Keloharju (2001) analyze Finnish investors for the period from December 1994 through January 1997. Their results indicate that Finnish investors tend to invest not only in nearby firms, but also exhibit preference for same-language and same-culture firms, and the degree of these tendencies is inversely related to investor sophistication.

For the period January 1991 – November 1996, Zhu (2002) uses a sample of 27189 U.S. individual investors and finds that individual investors tend to invest in companies closer to them. An interesting result of this study is that investors holding foreign securities exhibit significantly weaker local bias than those not holding foreign securities and this result suggests that international home bias and domestic home bias are correlated. For the same period as that of Zhu (2002) and by using data on the investments of individual investors in U.S., Ivkovic and Weisbenner (2005) show that households strongly prefer local investments. The findings of Hong, Kubik, and Stein (2008) provide evidence for the local bias of investors in U.S., for the period 1970-2005. The authors find that, share prices of spatially close firms increase with the excess demand of nearby residents, in the presence of only few local firms competing for investors' money.

Similarly, Ivkovic and Weisbenner (2005) find that households exhibit a strong preference for local investments for individual U.S. investors. They also document that the average household generates an additional annualized return of 3.2% from its local holdings relative to its nonlocal holdings, suggesting that local investors can exploit local knowledge. Massa ve Simonov (2006) also show existence of the tendency to concentrate holdings in stocks to which the investor is geographically or professionally close or that he has held for a long period. They show that this familiarity is not a behavioral bias, but is information driven.

In the following years, many other studies provided evidence for local bias of investors. Following the study of Coval and Moskowitz (2001), Zhu (2002) published his study using a sample of 27,189 U.S. individual investors, for the period January 1991–November 1996, finding that individual investors tended to invest in companies closer to them. The existence of individual investors' bias towards the companies that are close to their residences was detected through various measurements. The study also found that investors holding foreign securities exhibit significantly weaker local bias than those not holding foreign securities. This finding suggests that international home bias and domestic home bias are correlated.

Pirinsky and Wang (2006) support the argument that the reason of local bias is not information advantage: they find that the co-movement in local equity is not explained by fundamentals, and they propose that a word-of-mouth effect and thus familiarity may be the reason. Their approach is different in the sense that they focus on comovement of stocks in the same geography, instead of returns of investors' local stock investments. They find that stock returns of firms in the same location exhibit a strong degree of comovement. However, they also find that this comovement is not explained by comovement in underlying fundamentals. They further document that this finding is “stronger in smaller, less profitable firms, in firms with more individual investors, and in regions with less financially sophisticated residents”.

Liao (2012) also reaches similar result for the Chinese investors. In their case, they compare the comovements of price and volume in two stock exchanges of China (namely Shanghai and Shenzhen Stock Exchanges). They argue that since investing in each of the exchanges does not differ in terms of information advantage, if retail investors favor local firms, it would be a supportive argument for behavioral

explanation of local bias. Indeed, they document a strong bias toward the local exchange.

There are several other studies showing the existence of local bias. Hau (2001) documents that traders located outside Germany in non-German-speaking cities show lower proprietary trading profit. For the Finnish investors, Grinblatt and Keloharju (2000) find that individual investors exhibit stronger local bias in their equity investments than institutional investors. They further find that (2001) investors are more likely to hold, buy, and sell the stocks of Finnish firms that are located close to the investor, that communicate in the investor's native tongue, and that have chief executives of the same cultural background. Feng and Seasholes (2008) document that investors in China tend to invest a high fraction of their portfolios locally.

There are also studies linking local bias to other subjects. Bodnaruk (2009) find that, all else equal, investors who hold more diversified equity portfolios gain more from investing in local companies (rather than in far away companies) than less diversified investors. Jacobs and Weber (2012) find that local bias at individual level materially affects stock turnover at the firm level. Chhaochharia et al. (2012) show that firms with high local ownership have better internal governance, and are more profitable.

In their study investigating whether investors in U.S. have value-relevant information about local stocks, Seasholes and Zhu (2010) find that investors tilt their portfolios towards local stocks. Their data starting on January 1, 1991 and ending on November 1, 1996 come from a large discount brokerage house and have been extensively studied in the behavioral finance literature.

The study of Cumming and Dai (2010) differs from previous studies by using a different sample type. They investigate local bias in the context of U.S. venture capital investments for the period 1980 – June 2009 and they find that venture capitals exhibit strong local bias in their investment decisions. They also find that more reputable venture capitals (older, larger, more experienced, and with stronger IPO track record) and those with broader networks exhibit less local bias. On the other hand, Han et al. (2022) reports that venture capital funds invest in more distant firms after the Covid-19 pandemic.

Related to Covid-19 pandemic, Cahill et al. (2022) use abnormal mobility in the U.S. as a proxy of face-to-face interaction. They find that lower interaction leads to underreaction and negatively affects price discovery.

There are also studies that provide evidence for local bias in the countries other than U.S. For instance, Massa and Simonov (2006) investigate whether Swedish investors use their investment in financial assets to hedge their nonfinancial income. Their findings are for the period 1995-2000, and based on the inspection of the relationship between investor nonfinancial and financial income and a portfolio-based index of hedging. These findings provide evidence for the fact that investors do not engage in hedging, but intentionally tend to concentrate their holdings in stocks to which they are geographically or professionally close or that they have held for a long period. Bodnaruk (2009) finds that after moving, Swedish investors abnormally increase their ownership in companies closer to their new location and these new investments provide them with higher risk-adjusted returns than companies in which they kept holdings unchanged or abnormally reduced holdings. Another study focusing on a country other than U.S. belongs to Jacobs and Weber (2012). They provide evidence that local bias at the individual level materially affects stock turnover at the firm level in Germany, for the period between June 1988 and January 2009. In addition, the stocks of firms located in holiday regions are less traded than otherwise very similar stocks in non-holiday regions.

Among few studies on emerging countries, Feng and Seasholes (2008) carry out an analysis on a data set provided by a national brokerage firm from the People's Republic of China. Their results indicate that, over the period from January 1999 to December 2000, individual investors tend to invest a high portion of their portfolios locally. More specifically, both men and women over-weight local stocks by 9% relative to the market portfolio. In Chinese stock market, for the period January 2003 through June 2009, Liao et.al. (2012) also reach similar results suggesting that retail investors display a strong tendency to invest in stocks listed at the stock exchange that is geographically close to them in China.

Baltzer, Stolper and Walter (2013) go one step further and hypothesize that individual investors' local bias determines also their international investment decisions. By using the stockholdings of German individual investors in firms

headquartered in each of Germany's nine neighbor countries, for the period December 2005–December 2010, they find a cross-border local bias among individual investors.

Meng and Pantzalis (2018) argue that if individuals exhibit local bias, investors who fit the profile of a lottery-type stock investor tend to invest in local lottery stock.

Cave and Lancheros (2024) argue that firms' dividend decisions are affected by their local peers, which is driven by competition of these firms to reach local clientele.

Ahern (2017), covering legal documents of the 335 cases in the U.S for the time period of 2009-2013, shows that insider information flows through geographical proximity in addition to family and friends.

Kim et al. (2022) show that distance between institutional investors and firm leads to friction in the market. If institutional investor base is strong, funding friction is lower and valuation is higher for local firms at that region or city.

Wang and Yin (2018) search for CEOs' tendency to target companies located in the U.S. states they earned their undergraduate and graduate degrees. Based on the data of 3574 CEOs for the years 2000 to 2015, they find that acquirers pay a lower target premium and cumulative abnormal returns around the announcement are positive. These findings support that CEOs have informational advantage for firms in the states they earned their degrees.

Meng and Pantzalis (2022), covering the sample of ADRs in the U.S. for the period of 2010-2017, combine home bias and local bias, and find that individuals born abroad has both local and home (their birth country) bias.

On the other hand, Liang et al. (2023) find opposite evidence for fund managers. They find that, covering China for the period of 2005-2018, fund managers overweight firms located in their education provinces. They further show that this tendency leads to poor fund performance.

There are several works on China in the recent years. Jiang et al. (2020) show the existence of local bias in peer-to-peer lending in China. Zheng et al. (2024) explore

the effect of enlarging high-speed rail network on local bias. They find that return comovement of local stocks decreases (in particular small firms and firms with poor corporate governance).

We summarize the related literature in Table 1 in chronological order. Studies on developed markets dominate this line of research. There is also limited number of studies on emerging Asian markets.



Table 1: Summary of the literature on local bias

Authors & Publication	Date of	Country	Sampling Period	Main findings: existence of local bias	Main findings: generating abnormal returns
Coval and (1999)	Moskowitz	United States	1995	✓	n.a.
Grinblatt and (2000)	Keloharju	Finland	1994-1996	✓	n.a.
Coval and (2001)	Moskowitz	United States	1975-1994	✓	✓
Huberman (2001)		United States	1996	✓	n.a.
Hau (2001)		Germany	1998	✓	✓
Zhu (2002)		United States,	1991-1996	✓	-
Ivkovic' and (2005)	Weisbenner	United States	1991-1996	✓	✓
Massa and Simonov (2006)		Sweden	1995-2000	✓	✓
Pirinsky and Wang (2006)		United States	1988-2002	✓	-
Hong, Kubik, and (2008)	Stein	United States	1970-2005	✓	✓

Bodnaruk (2009)	Sweden	1995-2001	✓	✓
Seasholes and Zhu (2010)	United States	1991-1996	✓	-
Jacobs and Weber (2012)	Germany	1988-2009	✓	n.a.
Liao et al. (2012)	China	2003-2009	✓	-
Ahern (2017)	United States	2009-2013	✓	✓
Wang and Yin (2018)	United States	2000-2015	✓	-
Jiang et al. (2020)	China	2010-2016	✓	n.a.
Meng and Pantzalis (2022)	United States	2010-2017	✓	n.a.
Liang et al. (2023)	China	2005-2018	✓	-
Zheng et al. (2024)	China	2004-2019	✓	-

Possible reasons of local bias

Aabo, Pantzalis and Sorensen (2013) state that, though the local bias within and between countries is well established in the empirical literature, the underlying reasons are more ambiguous. Two different views exist in the literature. The first view suggests that investors may have informational advantage due to their closeness to the companies, while the second assumes the existence of a behavioral bias, e.g. familiarity. Those who defend the second view argue that investors may not have any valuable information; instead, they may rely on their familiarity with these stocks or on another behavioral bias. The classical approach to determine the possible reason of local bias is to compare the return performances of local and non-local investments. If the investors earn money from their local investments, it may be a result of additional information. The hypothesis behind this view is that obtaining value-relevant information about companies is easier for local investors. If there is a local bias and the reason is informational advantage, the level of local bias is expected to be more in equities in which the information asymmetry is higher. Different results are found in literature (table 2).

Table 2
Possible reasons of local bias

Information advantage	Familiarity
Coval and Moskowitz (2001)	Zhu (2002)
Hau (2001)	Pirinsky and Wang (2006)
Ivković and Weisbenner (2005)	Seasholes and Zhu (2010)
Massa and Simonov (2006)	Liao et al. (2012)
Ivković, Sialm and Weisbenner (2008)	Baltzer, Stolper and Walter (2015)
Bae, Stulz and Tan (2008)	Xu et al. (2020)
Bodnaruk (2009)	Aabo et al. (2020)
Bonaparte et al. (2017)	Dyer (2021)
Florentsen et al. (2020)	

Informational advantage

In their study analyzing the equity holdings of US mutual funds for the period 1975–1994, Coval and Moskowitz (2001) find that an average fund manager obtains an annual return, 2.67 percent greater from local investments compared to non-local investments and these returns are stronger among smaller and older funds. This result means that investors trade local securities at an informational advantage.

Similarly, Ivkovic and Weisbenner (2005) find that an average U.S. household earns an additional annualized return of 3.2% from local holdings, indicating that local investors are able to profit from local knowledge. As expected, excess returns are larger among less widely known stocks, outside the S&P 500 index, for which information asymmetries between local and non-local investors are greater. In their next study on the same data set, Ivković, Sialm and Weisbenner (2008) investigate the role of information asymmetries in individual investors' portfolio decisions, on the same dataset. Their findings show that investments which concentrate on few stocks outperform more diversified ones and excess returns of these concentrated portfolios are stronger for stocks outside the S&P 500 index and local stocks, reflecting concentrated investors' capacity to profit from informational advantages.

In one of the studies outside the United States, Hau (2001) analyzes informational asymmetries across 756 professional traders located in 23 different cities and 8 European countries and finds that traders located outside Germany, in non-German-speaking cities, show lower trading profit. Their underperformance is statistically and economically significant, and occurs for the 11 largest German blue-chip stocks. The author finds also evidence for an information advantage due to corporate headquarters proximity in the case of high-frequency trading.

Huberman (2001) find that Shareholders of a Regional Bell Operating Company (RBOC) tend to live in the area served by the company. This geographic bias of the RBOC investors is closely related to the tendency of households' portfolios to be concentrated and to the employees' tendency to own their employers' stocks in their retirement accounts. Guidolin (2003) argues that home bias is rational and explained by learning giving local investors an information advantage.

Massa and Simonov (2006) show that Swedish investors tend to intentionally invest in stocks which are most closely connected to them and they explain this finding using the concept information-driven familiarity. More specifically, they assert that familiarity-based investment is a rational reaction to information constraints, as opposed to a behavioral heuristic and this type of investment brings higher returns compared to hedging. The authors observe also that high-wealth investors are more likely to hedge, compared to low-wealth investors, and for these high-wealth investors, the impact of geographical proximity and the holding period on profits is lower and

less significant. Bodnaruk (2009) also finds that individual Swedish investors obtain economically and statistically significant gains from investing locally, and the link between proximity to investment and performance is stronger for more diversified investors, who are able to benefit from the effective collection and processing of information.

In a cross-country study with sample of 32 countries, Bae, Stulz and Tan (2008) investigate whether analysts resident in a country are able to make earnings forecasts for firms in that country with greater accuracy than foreign analysts and their findings suggest that the earnings forecasts of local analysts are more precise. They call it as “local analyst advantage”.

Aabo et al. (2020), focusing on the U.S. data, argue that informational advantage of local investors may be meaningful under political uncertainty. They find that local institutional investors’ trading strongly predict the returns, which is not the case for nonlocal investors.

Xu et al. (2020) analyse the U.S. data of 8334 firms for the period of 1997 to 2017. They find that local leader firms have less stock price crash risk. They argue that being a local leader brings strong local monitoring, therefore local investments include information component. On the other hand, Zuo et al. (2023) also investigate the stock price crash risk utilizing the Chinese data. They find that firms in region with a stronger speculative culture have higher level of price crash risk. They also find that this effect is stronger if the managers of the firm have similar cultural backgrounds with the local area. Even they do not comment, we may argue that their findings contradicts the informational advantage argument.

Li et al. (2020) take the implementation of XBRL (eXtensible Business Reporting Language) to financial reporting and show that this change reduce the level of local bias. They argue that decreasing information cost and increasing disclosures and analyst recommendations may be the possible reasons for this effect, which implies the informative advantage of local investors.

Dyer (2021) also supports the informative advantage argument. Covering the U.S. data for the period of 2003-2015, he finds that local investors acquire more public information for their local investments and earn more from these investments.

Lim et al. (2023) argues that local bias of investors itself does not increase the demand to “local” SMEs. Instead, increase in liquidity depends on the number of shareholders.

Baltakis et al. (2019) investigate Finnish market and find that local information channels between neighbors are used in decision making. They focus on trade timing synchronization instead of portfolio diversification.

Familiarity

Another group of studies claim that local bias does not generate excessive returns since it is mostly behavioral (i.e. based on familiarity) instead of information driven. For instance, Zhu (2002) finds that, although their investments do not lead to excess returns, compared to non-local investors; investors tend to invest in familiar companies. The author finds further that investors with stronger local bias do not outperform those with weaker and individual investors are more likely to invest in remote companies that spend heavily on advertising in order to create familiarity. Another paper of Zhu (with Seasholes, 2010), investigates the distribution of individual U.S. investors’ portfolios, for the period 1991-1996 and aims to answer the following research question: “Do individuals have value-relevant information about local stocks?” Their findings suggest that portfolios of local holdings do not generate abnormal performance.

In another study, Pirinsky and Wang (2006) find that stock returns of firms in the same location show a strong degree of co-movement and the authors argue that this phenomenon can not be explained by fundamentals. Pirinsky and Wang (2006) focus on co-movement of stocks in the same geography, instead of returns of investors’ local stock investments and they claim that, a word-of-mouth effect, and thus familiarity, is likely to be the cause of this strong degree of co-movement. The co-movement is stronger in not only smaller, less profitable firms, but also in firms with more

individual investors, and those located in regions with less financially sophisticated residents.

Another study claiming that local bias might be induced by non-information based familiarity belongs to Liao et.al. (2012). They find that local bias of Chinese investors seems not to be motivated by information advantage, since investors do not generate abnormal returns from local investments.

Another study investigates whether familiarity, induced by ambiguity aversion, may explain the local bias of individual investors (Baltzer, Stolper and Walter, 2015). To this end, they use the theoretical framework of investor familiarity developed by Boyle et al. (2012), which states that familiarity arises from investors' aversion toward the ambiguous. Boyle et al. (2012) argue against the key assumption of traditional models of portfolio choice, which supposes that investors have perfect knowledge about the probability distribution of asset returns. Using geographic closeness as a proxy for investor familiarity, they find that investors prefer local stocks during periods of increased market uncertainty. This supports the conclusions of Huberman (2001), suggesting that instead of preferring to optimize along risk-return trade-offs, investors tend to concentrate their portfolios on known stocks (e.g. their own company's stock, stocks of firms that are visible in the investors' lives, and stocks that are reported favorably on the media).

Kuchler et al. (2020) points out the importance of social local networks for local bias. Bonaparte et al. (2017) argue that investors become more optimistic when the party they support is in power and perceive markets less risky. In this case, their preference for local stocks decreases.

Florentsen et al. (2020) compare the investors recently relocated to Denmark and the other investors in Denmark. They find that local bias of newly located investors is lower, however, increases in time and the difference between two groups disappear in 7-8 years. Accordingly, it can be argued that familiarity with local stock increase in time.

Pantzalis and Uçar (2018) find that allergy problems (using pollen counts as a proxy) lead to lower trading activity. They further find that this relationship is stronger

in stocks that are more likely held by local investors. Ding et al. (2021) reach similar kind of finding through air pollution. Covering Chinese data, they find that there is a negative relationship between air pollution and stock returns. This relationship is stronger in stocks more likely to held by local investors.

Wei and Zhang (2020), covering the U.S. data, find that level of local bias is lower in high-trust regions. Shao and Wang (2021) focus on trust through using the Chinese data. They similarly find that investors with higher trust have lower local bias, which suggests that they are more confident when they face unfamiliar opportunities.

Branikas et al. (2020) argue that local bias may be endogenous in a way that decision to live in that city or region may be based on economic prospects of the city/region, which may be correlated to later local stock demand.

Lindblom et al. (2018) find evidence of birthplace bias in addition to local bias, even lasting for a long time after leaving the birthplace. They argue that this is an urban phenomenon, the focus should be on financial sophistication of the investors instead of familiarity or informational advantage.

3 DATA AND METHODOLOGY

3.1 Data

We first give brief information on Turkish equity market before providing the details of the sample. The next section summarizes the basic facts of Borsa İstanbul Equity Market, which may give insight on why this particular market is important for the research questions of the dissertation. Afterwards, we describe the individual investors' data.

3.1.1 Institutional Background

Although the foundation of capital markets in Turkey goes far beyond in the history; modern, organized capital markets were started to be established following the enforcement of Capital Markets Law in 1982. Borsa İstanbul (formerly İstanbul Stock Exchange) commenced to operate in 1986, and equity market has continued to develop since then. On the other hand, equity culture is still lacking in the country: share of equity investors is limited among savers, and equity trading is perceived as short-term gain medium instead of long-term investment alternative in general.

We first provide the aggregated values of the Turkish equity market.¹¹ Today, Borsa Istanbul has one of the largest equity markets among the emerging countries. In terms of traded value (turnover), Borsa İstanbul has slightly higher than USD 1trillion value of trading in 2023 and ranks 6th among the emerging countries whereas 17th among all the exchanges (Figure 4). Daily average traded value of Borsa İstanbul Equity Market is approximately USD 4 billions.

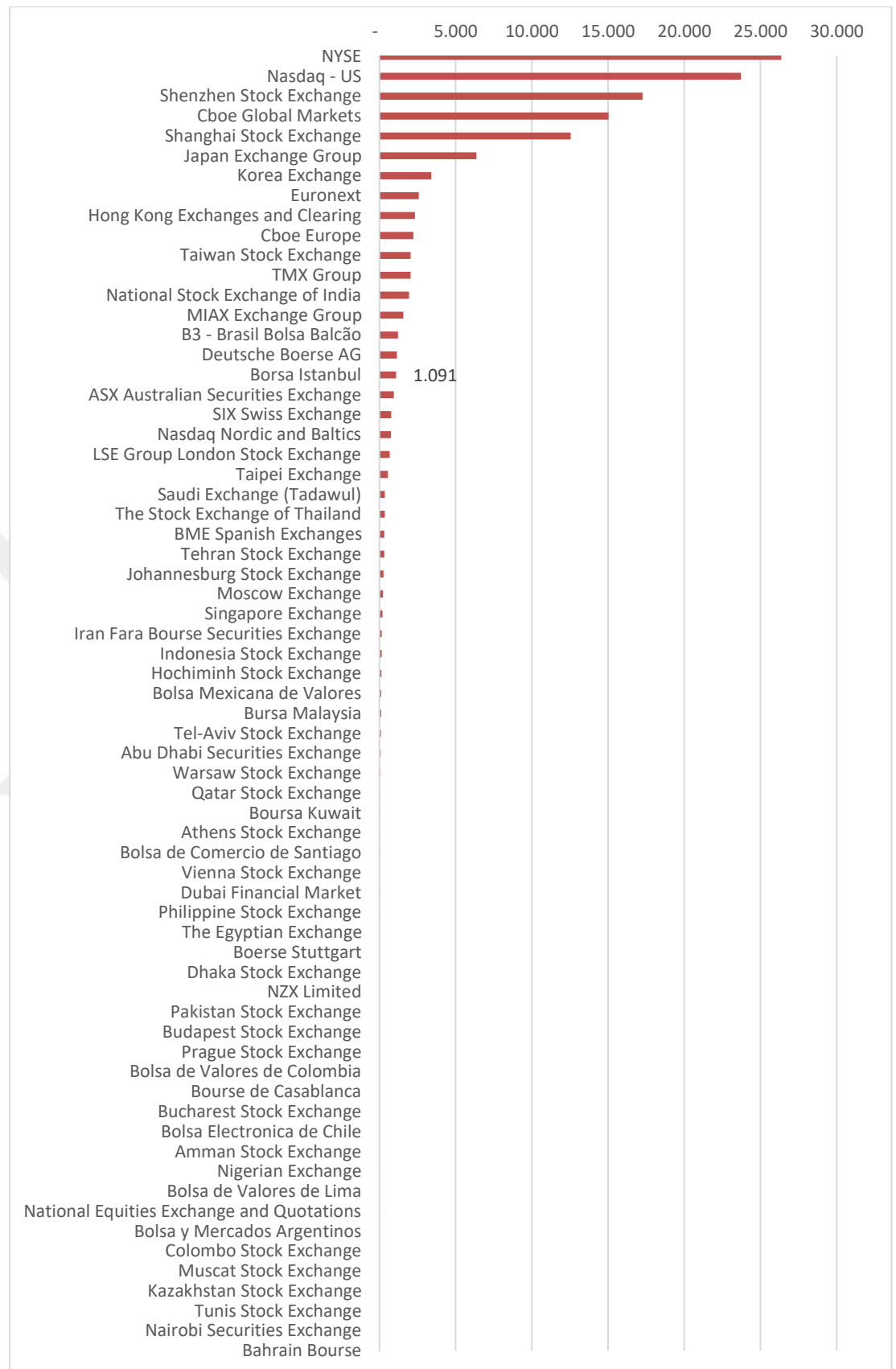
Three of top five markets in equity trading is located in the United States (ICE NYSE, Nasdaq U.S. and CBOE Global Markets). The other two market in the topfive is Chinese exchanges. The five emerging markets¹² which have higher traded value than Borsa İstanbul are Shenzhen and Shanghai stock exchanges of China, Taiwan Stock Exchange, National Stock Exchange of India, and B3 Brasil Bolsa Balcao, respectively. In its region covering Eastern Europe, Caucasians, Central Asia, and the

¹¹ There are four main markets operating at Borsa İstanbul: Equity, Debt Securities, Derivatives, and Precious Metals. In the context of the dissertation, we here focus on the data of the Equity Market.

¹² We use FTSE country classification to specify emerging markets. (http://www.ftse.com/products/downloads/Matrix-of-Markets_latest.pdf)

Middle East, Borsa İstanbul is the most liquid equity market in terms of traded value according to the 2023 figures. The other emerging markets following Borsa İstanbul has much lower traded values (e.g. Taipei Exchange, Saudi Exchange, Johannesburg Stock Exchange, Moscow Exchange).





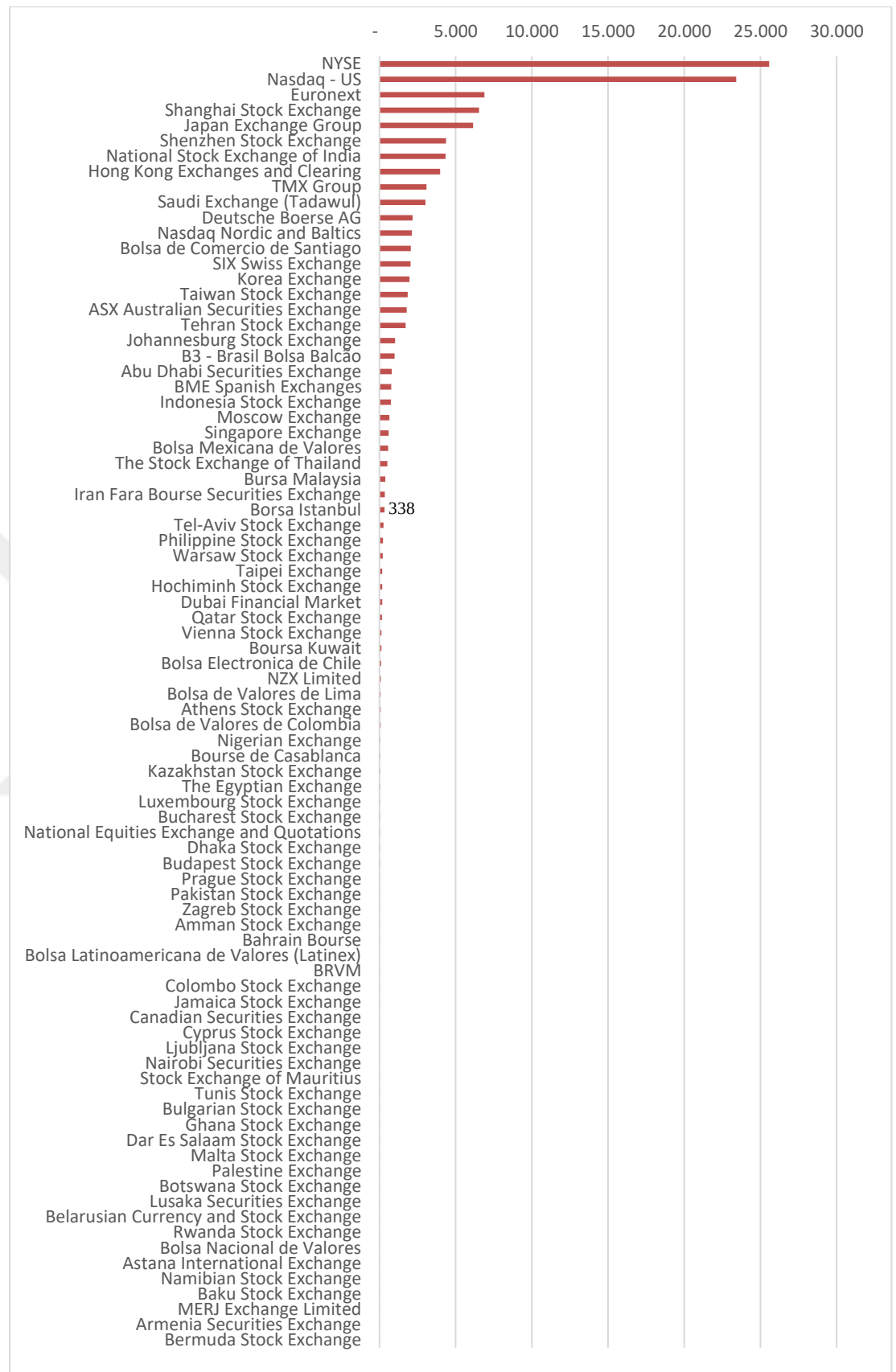
Source: World Federation of Exchanges, <http://world-exchanges.org/statistics>

Figure 4: Value of share trading (USD billions, 2023)

On the other hand, in terms of market capitalization, Borsa İstanbul ranks 17th among emerging markets and 30th among all the exchanges¹³, with a total market capitalization of USD 338 billions (Figure 5). The two U.S. exchanges, NYSE and NASDAQ - US, comprise 43 per cent of the global market capitalization. Among the emerging markets, Shanghai and Shenzhen Stock Exchanges of China and National Stock Exchange of India have the largest market capitalization values, which amounts to 13 per cent of the global market capitalization.



¹³ By all the exchanges, we mean the member exchanges of World Federation of Exchanges, covering all the major exchanges in the world.



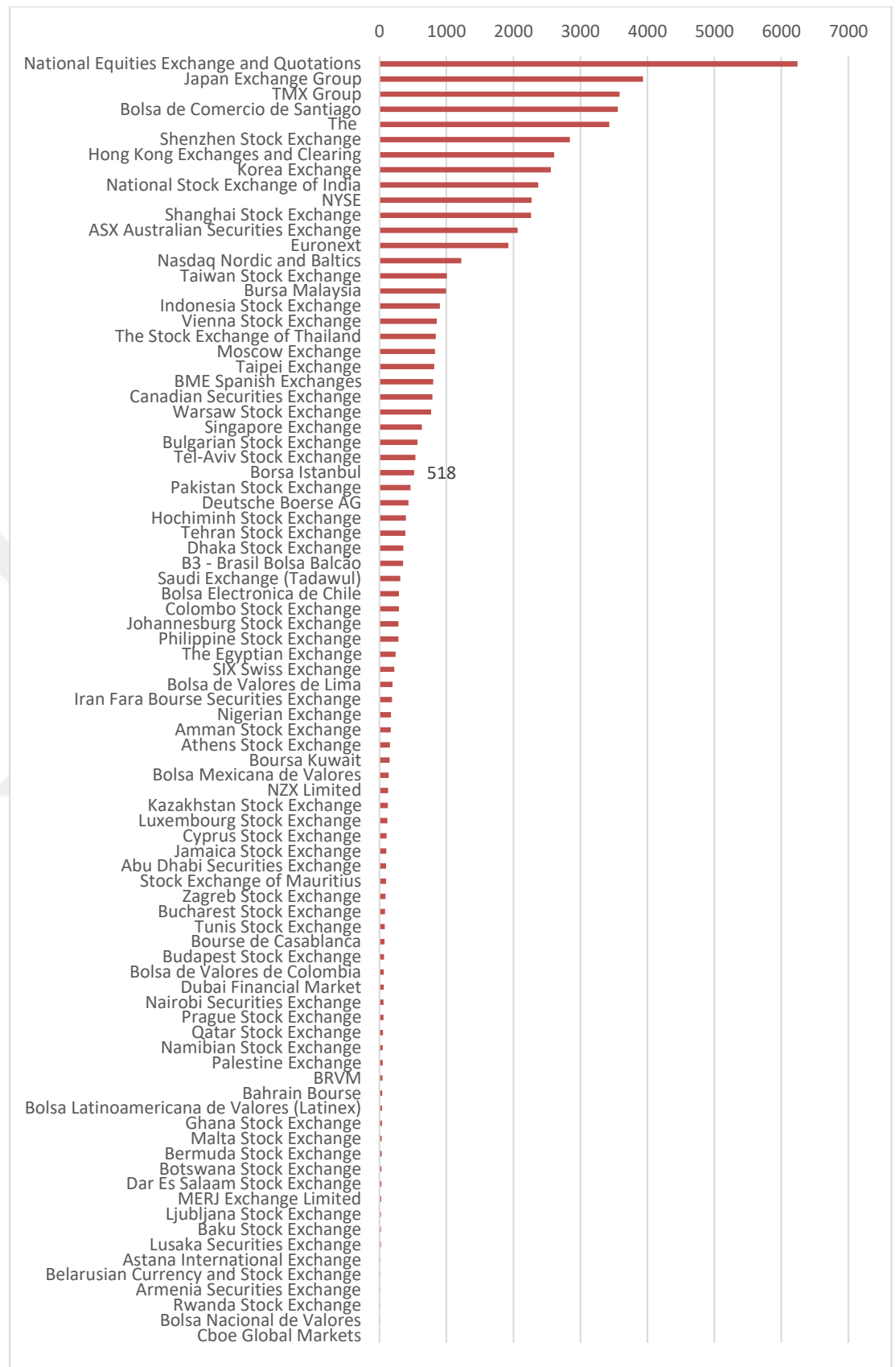
Source: World Federation of Exchanges, <http://world-exchanges.org/statistics>

Figure 5: Value of market capitalization (USD billions, 2023)

There are 518 firms listed in Borsa İstanbul as of the end of 2023, which carries Borsa İstanbul 14th rank among emerging markets and 28th among all the exchanges (Figure 6). The first, 6th and 11th exchanges of the list are operated in China. High numbers of the listed companies are observed particularly in Asian markets.

10 per cent of the listed companies in total are foreign companies (6,151 of 59,220 firms) There is only one foreign company (DOCO) listed on Borsa İstanbul.





Source: World Federation of Exchanges, <http://world-exchanges.org/statistics>

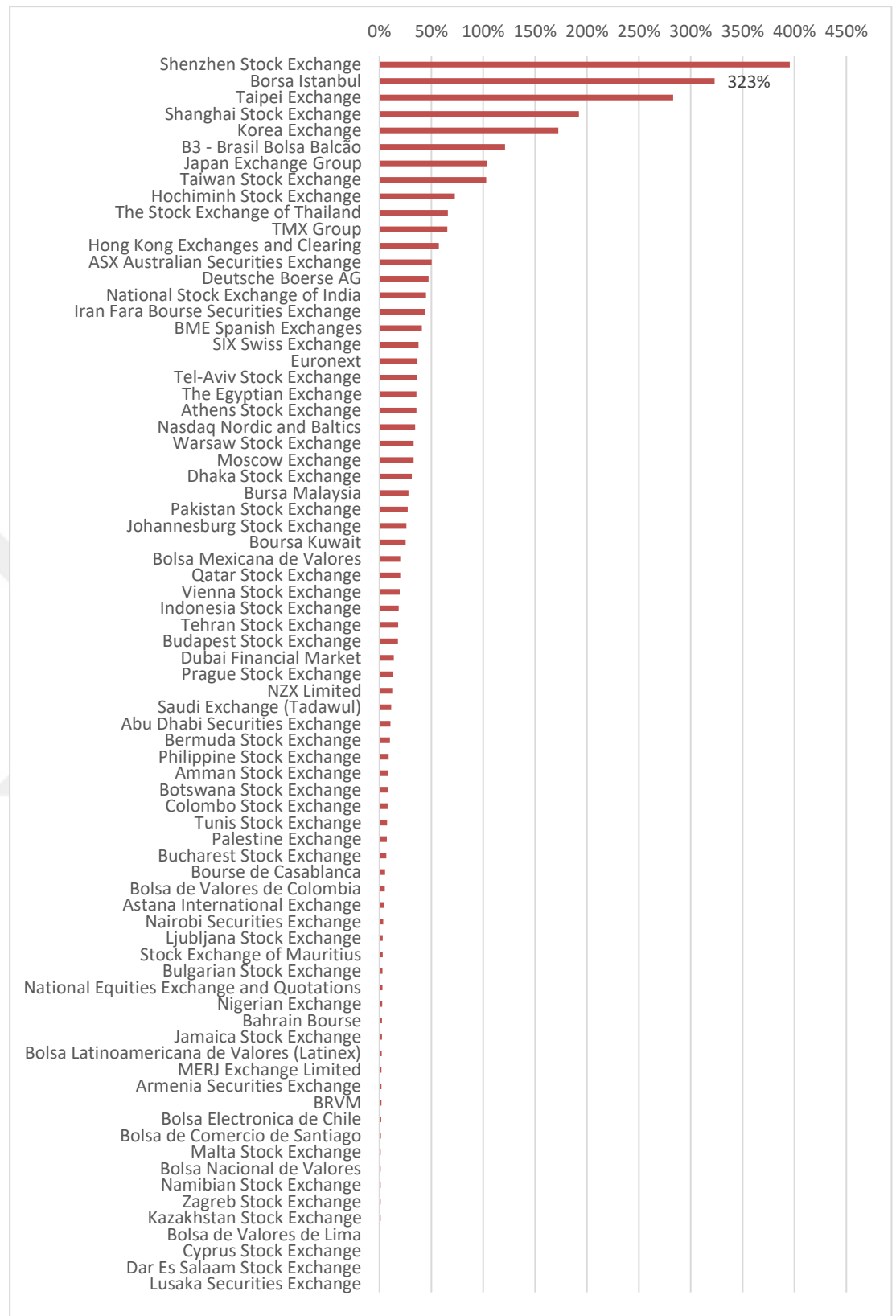
Figure 6: Number of listed firms (as of the end of 2023)

As provided in the Figures 4 and 5, it is observed that traded value of Borsa İstanbul is high with respect to its market capitalization. Therefore, it would be meaningful to adjust trading activity figures with market capitalization.

Next, in figure 7, we present turnover values adjusted for market size, so-called turnover velocity¹⁴. In terms of turnover velocity, Borsa İstanbul Equity Market ranks second among all the exchanges. With respect to the size of the market, the level of trading activity is very high in Turkish equity market. We observe that Turkish and the Far East markets show similar characteristics in terms of trading activity.



¹⁴ Turnover velocity is calculated as year-total traded value divided by year-end market capitalization.



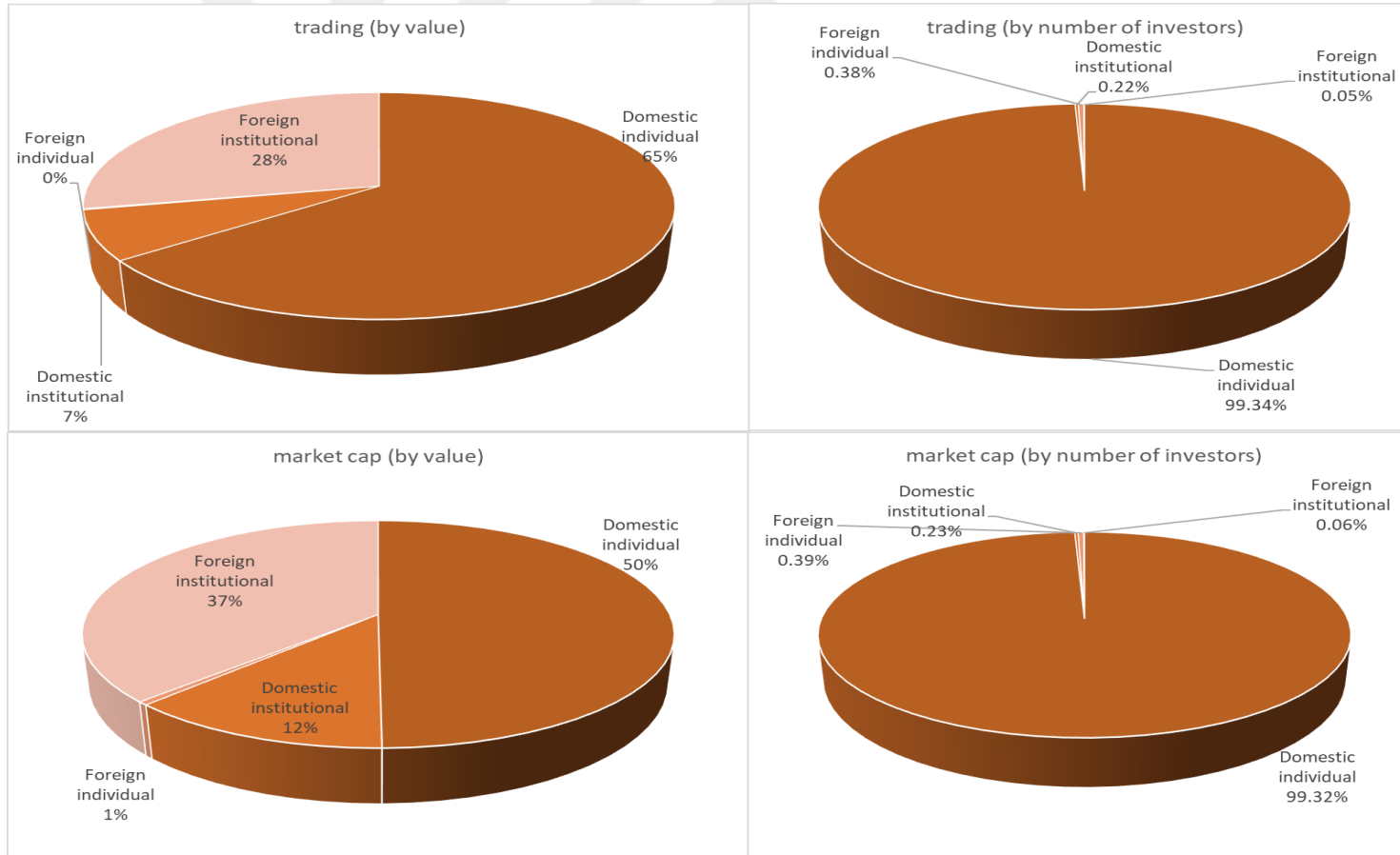
Source: World Federation of Exchanges, <http://world-exchanges.org/statistics>

Figure 7: Turnover velocity (2023)

Having documented the high level of trading activity relative to its size, we then get into details of this activity in Borsa İstanbul. Domestic individual investors actively trade in Borsa İstanbul equity market. Domestic investors' share in total traded value is 72 per cent, although their share in total market capitalization of the listed firms is 62 per cent, as of 2023. 38 per cent of the equities are held by foreign investors, almost all of which are institutional investors. Foreign investors' share in total traded value is 28 per cent in the same period.¹⁵

Regarding the portfolio data, individual investors comprise half of the domestic investors. Domestic institutional investors comprise one fifth of the domestic investors whereas almost all of the foreign investors are institutional (Figure 8). These figures document that trading activity in Borsa İstanbul Equity Market is dominated by domestic individual investors, which points out the potential importance of the market for testing the hypotheses of behavioral finance.

¹⁵ Source: Central Registry Agency of Turkey (MKG), Borsa İstanbul.



Kaynak: Borsa İstanbul, MKK (<https://portal.mkk.com.tr/portal/#Portal-Login>)

Figure 8: Trading activity: domestic vs. foreign investors

3.1.2 Individual Investors Data

Our data set is provided by the Central Registry Agency of Turkey (Merkezi Kayıt Kuruluşu A.Ş., MKK). MKK is a subsidiary of Borsa İstanbul and is the official central depository agency of Turkey in which financial assets are held electronically at the investor level. Equities are fully dematerialized, i.e., there have not been hard copies for equities anymore; all equities have been created electronically since 2005.

The data covers 10 years, from 2014 to 2023. The sampling process is summarized as follows. Total number of investors in Borsa İstanbul Equity Market is 1,097,791 as of the end of 2013. When we exclude foreign and domestic institutional investors, there remain 1,086,400 domestic individual investors at Borsa İstanbul Equity Market. In order to filter active investors, we put one criterion: we filter out individuals who held portfolios less than 1,000 TRY as of the end of 2023. We apply this filter to select the sample from the population of active investors in the market. We are informed by the provider of the data that there are a lot of accounts once opened however not actively used, i.e., very low amounts have been remained and there is no trade in such accounts for years. Hence, through eliminating inactive investors, we reach the population of active investors in the market.

Next, 10,000 investors were randomly selected from the active-investors population. The sampling period covers 10 years from January 10, 2014 to December 29, 2023. We obtain weekly (503 weeks) portfolio data (stock-by-stock) of all the investors throughout the sampling period. We also obtain several characteristics of investors available in the database. We have age and gender of the investors, the city they live in, date of opening an investment account for the first time. All the data sets consist of approximately 10 million rows in total. We use Stata program for the analyses.

We get adjusted price series of all the equities included in the portfolios for the return calculations from Bloomberg. Since T+2 settlement rule is applied in Borsa İstanbul Equity Market, we match portfolio data of every friday to weekly return data of every preceding wednesday.

Table 2: Descriptive statistics

	All individuals	Women	Men
Number of individuals	10,000	2,736	7,264
PANEL A: Age			
0-19	22	7	15
20-39	601	135	466
40-59	5,043	1,241	3,802
60+	4,334	1,353	2,981
PANEL B: Average portfolio size (TRY)			
mean	272,521	205,209	297,872
median	6,740	3,215	10,216
standard deviation	2,580,185	2,428,158	2,634,883

Table 2 provides some descriptive statistics. The age information shows the ages of the investors in 2014, which is the beginning year of the sampling period. The mean age of all the investors is 57.4. The mean age of the female investors is 56.8, whereas of the male investors is 58.8.

As shown in Table 2, Panel B, the average portfolio size of the investors is TRY 272,521 (approx. USD 8,300.-). However, median value of portfolio size is TRY 6,740, which shows the existence of highly negatively skewed distribution. Average and median portfolio size of men is higher than that of women.

In Table 3, we show the geographical distribution of investors across cities in the country. Investors from Istanbul constitute 31 per cent of the total number of investors. Investors from the three biggest cities of the country (Istanbul, Ankara and Izmir) constitute approximately half of the sample.

Table 3: Geographical distribution of investors (by city)

City	Number of investors
İstanbul	3,123
Ankara	1,117
İzmir	967
Antalya	328
Konya	297
Balikesir	243
Adana	224
Kocaeli	204
Mugla	195
Mersin	190
Denizli	149
Aydin	148
Manisa	143
Eskisehir	123
Kayseri	101
Hatay	93
Canakkale	81
Sakarya	79
Yalova	78
Trabzon	76
Ardahan	76
Bartın	75
Batman	73
Kirikkale	72
Aksaray	69
Kutahya	67
Yozgat	67
Van	66
Usak	65
Sanliurfa	64
İgdir	62
Tokat	61
Karabuk	60
Sivas	59
Afyon	57
Siirt	57
Samsun	56
Kilis	55
Nigde	52
Mus	50
Kahramanmaras	47
Zonguldak	44
Edirne	43

Malatya	41
Corum	40
Kirklareli	40
Kars	37
Karaman	36
İsparta	33
Ordu	32
Kastamonu	31
Giresun	28
Tekirdag	28
Amasya	27
Erzurum	26
Rize	25
Burdur	24
Bolu	23
Nevsehir	22
Adiyaman	21
Bilecik	18
Duzce	18
Mardin	17
Erzincan	16
Elazig	15
Osmaniye	14
Cankiri	12
Kirsehir	11
Bursa	9
Gumushane	9
Agri	8
Bingol	7
Gaziantep	6
Artvin	5
Sirnak	5
Bitlis	4
Sinop	4
Diyarbakir	3
Tunceli	3
Hakkâri	2
Bayburt	1
Total	10,000

Table 4 summarizes the geography of the investors at region-level and provides a comparison among the regions. Marmara region has the highest share (43.4 per cent) while Eastern and Southeastern Anatolia regions have the lowest shares (1.6 and 1.9

per cent, respectively) in the sample. Central Anatolia, Aegean, and Black Sea regions have the shares of 18.5%, 17.9%, and 7.1%, respectively.

The last two columns of Table 4 shows investors' portfolio size across the regions. The mean and median value of Eastern Anatolia is the highest among the other regions, which may be attributed to lower number of investors in this region and thus higher effect of small number of investors on the distribution. On the other hand, the mean value of the Marmara region is the highest, which may be attributed to the fact that wealthy investors may be concentrated in more industrialized parts of the country.

Table 4: Geographical distribution of investors (by region)

Region	Number of investors	Number of investors (%)	Portfolio size (mean)	Portfolio size (median)
Aegean	1,780	17.9	111,445.7	4,965.6
Black sea	703	7.1	156,619.8	5,623.0
Central anatolia	1,845	18.5	300,806.1	6,233.8
Eastern anatolia	158	1.6	339,034.3	13,094.6
Marmara	4,327	43.4	364,270.9	8,352.3
Mediterranean	968	9.7	197,830.9	6,633.9
Southeastern Anatolia	190	1.9	182,458.5	7,749.0

3.2 Methodology

3.2.1 Return Performance of Investors

We first attempt to measure the performance of individual investors in general before testing the existence of local bias. In this context, we calculate daily average raw and market-adjusted returns of all the investors in the sample. We also investigate whether the investor characteristics such as gender, age, portfolio size, and portfolio diversification have significant influence on the return performance. Our methodology in this regard is provided in detail in this section.

Having collected the data, we first compute the daily portfolio returns of the investors. To do so, we first match our portfolio data at investor-level with daily return

data of stocks. Then, we calculate weighted daily raw returns of investors' portfolios as follows (Barber and Odean, 2000; 2001):

$$r_{jt}^{raw} = \sum_{i=1}^{s_{jt}} p_{ijt} r_{it} \quad (6)$$

where

r_{it} is the daily return for stock i in day t ;

p_{ijt} represents the weight that was calculated by dividing the end-of-day market value for stock i to the end-of-day (day t) market value of portfolio held by investor j ,

s_{jt} is the number of stocks held by investor j on day t .

Then, we calculate market adjusted returns (Barber and Odean, 2000; 2001):

$$r_{jt} = r_{jt}^{raw} - r_t^m \quad (7)$$

where r_t^m denotes corresponding daily rate of return on BIST 100 Index (formerly IMKB 100 Index)¹⁶.

The average adjusted return for each investor throughout the sampling period is calculated as follows:

$$\bar{r}_j = \frac{1}{T} \sum_{t=1}^T r_{jt} \quad (8)$$

where T is the number of trading days.

¹⁶ BIST 100 Index is the main broad value-weighted index of Borsa Istanbul's equity market.

Next, we compute our diversification measures. We calculate two variables to measure the level of portfolio diversification. We first calculate the average number of stocks held by each investor.

Number of investors may not reflect the concentration of the portfolio since it does not take into account the amount of investment in each stock in the portfolio. Therefore, as a second diversification measure, we calculate Herfindahl Index (HHL) for each of the investor, for each date as follows (Fuertes et al., 2012):

$$hhl_{jt} = \sum_1^{s_{jt}} p_{jt}^2 \quad (9)$$

Next, we calculate the average HHL for each investor.

We further investigate the variation in return across gender, age, portfolio size, portfolio diversification level, and location primarily using quintile analysis. At this point, we test if there is any multicollinearity between the variables. We notice that there is a high level of correlation between portfolio size and portfolio diversification level. Therefore we do not use these two variables together as independent variables in the regressions.

We also use dummy variable for portfolio size, which is highly negatively skewed. Furthermore, we winsorize the data for the adjusted returns and omit outlier observations (5 per cent from each tail).

Accordingly, we run the following cross-sectional regressions for measuring the effects of above mentioned variables on portfolio return.

$$\begin{aligned} \bar{r}_j = & \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \beta_3 Portfoliosize_j + \beta_{5-10} Regional\ dummies_j \\ & + \varepsilon_j \end{aligned} \quad (10)$$

$$\begin{aligned} \bar{r}_j = & \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \\ & \beta_4 Portfoliodiversification(numberofinvestors)_j + \\ & \beta_{5-10} Regional\ dummies_j + \varepsilon_j \end{aligned} \quad (11)$$

$$\bar{r}_j = \beta_0 + \beta_1 \text{Gender}_j + \beta_2 \text{Age}_j + \beta_4 \text{Portfoliodiversification(HHL)}_j + \beta_{5-10} \text{Regional dummies}_j + \varepsilon_j \quad (12)$$

where;

Gender is a dummy variable takes value of one for female investors;

Age is age of the investor divided by 10 (as in Barber and Odean, 2001);

Portfolio size is a dummy variable takes value of one for the investors which have above-median portfolio size amounted in TRY;

Portfoliodiversification(numberofinvestors) is the average number of stocks an investor holds;

Portfoliodiversification(HHL) is the average value of Herfindahl Index for an investor.

3.2.2 Existence of and reasons for Local Bias

We test local bias - the tendency of individual investors to weigh the equities of firms in their territories more- with the major measures documented in the literature review section.

Our methodology consists of three steps: (1) 1st step: Precise statement of local investment; (2) 2nd step: Test of local bias; (3) 3rd step: Determination of the reason of local bias (familiarity / information asymmetry).

In this study, we use 5 alternative definitions of “local investment” derived from the literature review. As a city or region based measure, we use (L1), (L2) and (L3); as a distance based measure, we use (L4) and (L5):

- Investment in the same city (L1);
- Investment in the same geographical region (L2);

- Investment in the same economic region (L3);
- Investment closer than 100 kms to the investor (L4);
- Investment closer than 250 kms to the investor (L5).

According to the classification of Turkish Statistical Institute, there are 81 cities, seven geographical regions, and 26 economic regions in Turkey. Determining the city (L1) of a stock is a crucial issue at this point. Coval and Moskowitz (1999) suggest that “a firm’s location might be more accurately captured by a measure of its economic center of gravity rather than its headquarters address”. To address this issue, we use the city indices of Borsa Istanbul, which makes our approach different than the other studies in the literature. Stocks are included in these indices not based on headquarter’s address. Instead, stocks are included in a city index if their at least 50 per cent of operational activity occurs in that city. Currently, the city indices are calculated for 14 cities which have more than five firms listed (Adana, Ankara, Antalya, Aydın, Balıkesir, Bursa, Denizli, İstanbul, İzmir, Kayseri, Kocaeli, Konya, Manisa, and Tekirdağ). Therefore, when we determine the cities of the stocks, we rely on the city indices of Borsa Istanbul for the stocks included in these indices, and headquarter addresses for the remaining stocks.

In addition to the cities, we also use seven geographical (L2) and twenty six economic regions (L3) of Turkey as alternative locality designation. One advantage of using region-based measures is that the city-based measure does not cover investors living in cities where there isn’t any company operating. The geographical regions are wider areas while economic regions are smaller, economically integrated areas which may be thought as analogous to the MSAs of the U.S.

Therefore we use various regional classifications of Turkey to flag investments local or non-local. We have three different local investment criteria in this approach:

- investments in the same city,
- investments in the same geographical region,
- investments in the same economic region.

Following Feng and Seasholes (2008), we calculate the average weight of investor portfolio invested locally. We further calculate weight of these local stocks in

the market. Last, we subtract the latter from the former and obtain our local bias measure.

Next, we calculate the distances between all the pairs among the 81 cities of Turkey. We calculate the distances by taking the distances of highways between the cities in contrast to the usage of bird's eye distances in the previous literature. Our approach may be better that it may reflect closeness of the locations stronger since it is based on transportation infrastructure, which particularly makes sense regarding the fact that Turkey is a very mountainous country.

Last, for robustness check, we use the following formula as local bias measure following Grinblatt and Keloharju (2001):

$$\frac{\text{Firm i's shareowner weight for investors in the municipality of its headquarters}}{\text{Firm i's shareowner weight among all investors in Finland}} \quad (13)$$

To sum up, we calculate the following local bias measures:

Definition of local investment	Local bias measure	
Investments in the same city	L1	(Proportion of the investments of the investor in the firms which are located in the same city) – (Proportion of all the firms located in that city in total market capitalization)
Investments in the geographical region	L2	(Proportion of the investments of the investor in the firms which are located in the same geographical region) – (Proportion of all the firms located in this geographical region in total market capitalization)
Investments in the economic region	L3	(Proportion of the investments of the investor in the firms which are located in the same economic region) – (Proportion of all the firms located in this economic region in total market capitalization)
Investments closer than 100 kms to the investor	L4	(Proportion of the investments of the investor in the firms closer than 100 km to his residence) –

		(Proportion of all the firms located in this area with 100 km radius in total market capitalization)
Investments closer than 250 kms to the investor	L5	(Proportion of the investments of the investor in the firms closer than 250 km to his residence) – (Proportion of all the firms located in this area with 250 km radius in total market capitalization)
N.A.*	L6	Proportion of weight of investors of the same city in a stock / Proportion of weight of all the investors of that stock in the market

*This measure is not based on local amount of investment.

The next step of the methodology involves the investigation of the reason of local bias. Having measured local bias in different settings, we calculate corresponding returns of these portfolio preferences to analyze the reason for such a tendency (i.e., is local bias an information-related or familiarity-related phenomenon?). If returns of local investments are higher, investors are thought to have informative advantage in their decisions. We calculate average raw and market-adjusted returns for local and non-local investments and compare them.

To this end, we calculate the returns of investors' portfolios. If returns of local investments are significantly higher than non-local ones, we can claim that the local bias is related to the accessibility to advantageous information, in other words, investors are thought to have informative advantage in their decisions. Otherwise, local bias is thought to be due to familiarity.

Our approach in linking the returns and the local bias is that, we basically calculate average raw and market-adjusted returns for local and non-local investments and compare them. Comparing the return of local and non-local investment is the standard approach in the previous literature to determine whether local preferences have any informational component.

Next, we deepen our analysis on the discussion of information vs. familiarity with the help of several other characteristics of equities. If there is a local bias and the reason of it is informational advantage, the returns of local investments is expected to be higher in equities in which the information asymmetry is lower, i.e., the share of

information about the company publicly available to all of the investors and/or analysts is higher. In this regard, we additionally analyze whether the returns of local investments differ across various classes of equities. Specifically, we search for the returns of local investments for equities;

- i. included in the corporate governance index of BIST,
- ii. included in the blue-chip index which is BIST 30,
- iii. having higher free float rate,
- iv. having higher institutional investor base.

We expect that, if local bias has an informative component, the returns of local investments which fall into these classes of equities may be lower than those which are not included in BIST corporate governance index or BIST 30 indices and have lower free float rate and institutional investor base. Brief explanations on these variables are provided below:

BIST Corporate Governance Index consists of the companies that apply Corporate Governance Principles. The index aims to measure the performance of companies traded on Borsa Istanbul Markets with corporate governance rating of minimum 8 over 10 as a whole and minimum of 7 for each main section. There are four main sections: shareholders, public disclosure and transparency, stakeholders, and board of directors. The corporate governance rating is determined by the rating institutions incorporated by Capital Markets Board, the regulatory authority of Turkish capital markets, in its list of rating agencies as a result of their assessment of the company's compliance with the corporate governance principles. There are currently 48 companies in the index.

BIST 30 index includes the top thirty stocks in terms of market capitalization and trading activity. These stocks are very liquid, which means that it is difficult to distort their prices easily. The amount of publicly available data and information is also high in these stocks, which have higher levels of analyst coverage.

Next, we classify the equities by free float rate. First sub-group includes stocks which have free float rate above median value, and the second sub-group includes stocks which have below median value. Average free float rate is around 30 per cent in the market. We may expect that companies with high free float rates may experience better corporate governance practices.

Last, for the institutional investor base criterion, we again create two sub-groups. First group includes those which have ratio of institutional investors above 0. Second group includes those which have ratio of institutional investors equals to 0. Here we may expect that a larger institutional investor base may imply again better corporate governance practices.

Having created two sub-groups for each of the four criteria described above, we perform standard t-test to compare the returns of these two sub-groups. If local returns are lower in blue-chips, those in the corporate governance index, those with higher free float rates, and those with larger institutional investor base, we can claim that local investments generate higher returns in stocks, which have high level of information asymmetry.

3.2.3 Local bias and investors' characteristics

Having completed the above-mentioned analyses for the reason of local bias, as a last analysis, we make a cross-sectional regression analysis to investigate the effects of several investor characteristics on their local bias. Factors such as gender, age, experience (proxied by the length of period since the account opening, wealth (proxied by portfolio size), city population, development and accessibility level of cities are included in this part.

In this regard, we perform the following regressions.

$$LB1_j = \beta_0 + \beta_1 Gender_j + \varepsilon_j \quad (17)$$

$$LB1_j = \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \varepsilon_j \quad (18)$$

$$LB1_j = \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \beta_3 Experience_j + \varepsilon_j \quad (19)$$

$$LB1_j = \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \beta_3 Experience + \beta_4 Portfoliosize_j + \varepsilon_j \quad (20)$$

$$LB1_j = \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \beta_3 Experience + \beta_4 Portfoliosize_j + \beta_5 Population + \varepsilon_j \quad (21)$$

$$LB1_j = \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \beta_3 Experience + \beta_4 Portfoliosize_j + \beta_5 Largacity + \varepsilon_j \quad (22)$$

$$LB1_j = \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \beta_3 Experience + \beta_4 Portfoliosize_j + \beta_5 Developmentindex + \varepsilon_j \quad (23)$$

$$LB1_j = \beta_0 + \beta_1 Gender_j + \beta_2 Age_j + \beta_3 Experience + \beta_4 Portfoliosize_j + \beta_5 DistancetoIstanbul + \varepsilon_j \quad (24)$$

where;

Gender is a dummy variable takes value of one for female investors;

Age is age of the investor divided by 10 (as in Barber and Odean, 2001);

Experience is the natural logarithm of the number of days since the account opening;

Portfolio size is the natural logarithm of portfolio size amounted in TRY;

Population is the natural logarithm of the population of the city center investor lives in;

Largecity is a dummy variable takes value of one if the city is one of the ten largest cities in the country (Coval and Moskowitz (2001) uses this variable for the U.S. with 20 largest cities);

Developmentindex is an index published by Turkish Ministry of Development which shows an inverse relationship (i.e. the lowest is the most developed);

DistancetoIstanbul is the logarithm of km highway distance of the city to İstanbul.

We obtain population data of the 81 cities in the country from Turkish Statistical Institute (Address Based Population Registration). The largest 10 cities in the country are Istanbul, Ankara, Izmir, Adana, Bursa, Antalya, Konya, Gaziantep, Kayseri, and Diyarbakır.

The development index is obtained from the Ministry of Development which takes value of one for the most developed city (which is Istanbul) while takes 81 (which is Muş) for the lowest developed city.

4 RESULTS

4.1 Return Performance of Investors

We first report the average daily raw and adjusted returns of the investors. The average weekly raw return for all the investors is 0.787 per cent (median value is 0.689 per cent). The average weekly adjusted return for all the investors is 0.281 per cent (median value is 0.181 per cent). Women have significantly higher adjusted average return than men, confirming the previous findings (e.g. Barber and Odean, 2001) documented in the literature. Both mean and median values of women's average adjusted returns are significantly higher than those of men.

Table 5: Return Performance of Individual Investors

	All individuals	Women	Men	Significance of gender difference (women-men)
Raw return (mean, %)	0.787	0.776	0.792	-
Adjusted return (mean, %)	0.281	0.319	0.266	**
Raw return (median, %)	0.689	0.659	0.699	***
Adjusted return (median, %)	0.181	0.185	0.177	**
Number of observations	9,950	2,721	7,229	9950

Note: Returns are calculated as in equations 1 and 2. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Tests for differences in medians are based on Wilcoxon signed rank and Wilcoxon/Mann-Whitney test statistics.

Approximately 30 per cent of have negative average adjusted returns. When we form deciles by sorting the observations from the lowest adjusted return to the highest (Figure 9), we find that the average adjusted return is -0.829 per cent for the lowest decile and 2.116 per cent for the highest decile. The lowest three deciles have negative average adjusted returns. The remaining seven deciles have positive returns. We further observe that the highest decile differs from the rest of the sample.

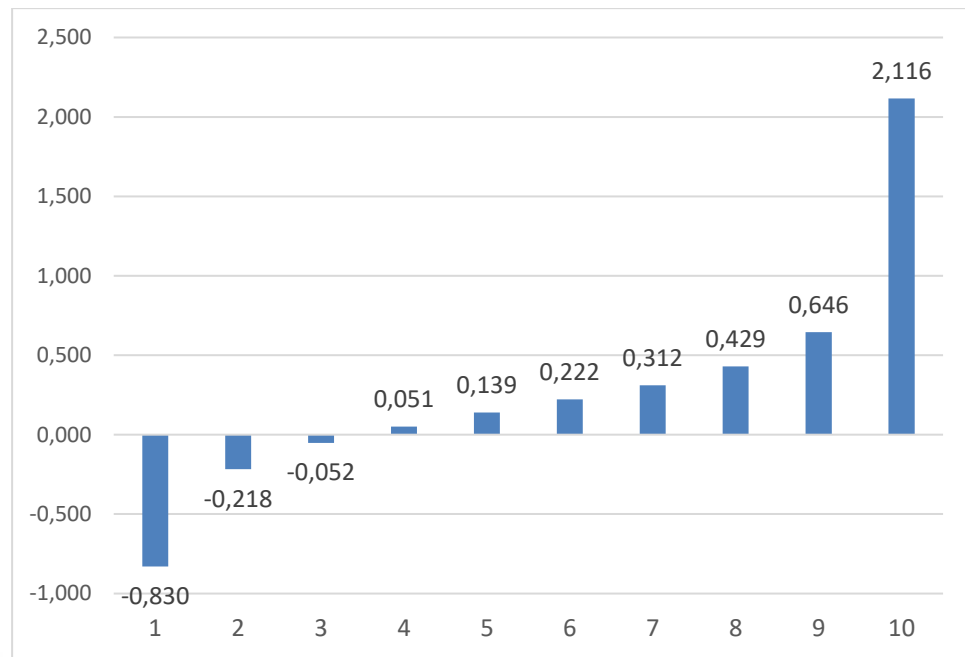


Figure 9: Average adjusted returns for deciles of adjusted returns (% ,1st for the lowest)

We further investigate the adjusted returns across the years in our sample. The weekly average adjusted returns is higher for the years 2020 and afterwards, which may be attributed to increasing inflation in this period. In addition, men's adjusted returns are also significantly higher in years following 2020. Women have higher significant adjusted returns on the average in 2015, 2016, 2019, and 2020.

Table 6: Return Performance of Individual Investors (adjusted portfolio return, by years)

	Women	Men	Significance of gender difference (women-men)
2014	0.011	0.071	***
2015	0.244	0.215	*
2016	0.112	0.079	*
2017	0.114	0.116	-
2018	0.106	0.094	-
2019	0.508	0.391	**
2020	0.945	0.867	*
2021	-0.001	0.055	*
2022	0.240	0.525	***
2023	0.665	1.019	***

Note: Returns are calculated as in equations 1 and 2. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Tests for differences in medians are based on Wilcoxon signed rank and Wilcoxon/Mann-Whitney test statistics.

4.1.1 Return performance and investors' individual characteristics

Next, we focus on the relationship between the returns of the investors and other factors including age, portfolio size, level of portfolio diversification and location. First, we group the sample into deciles with respect to these factors and report average adjusted returns for each decile.

Figure 10 presents the average adjusted returns across age deciles. The results give some mixed visual evidence of positive relationship between the age and adjusted return. Lower return for investors younger than 30 supports Goetzmann and Kumar (2008) and Feng and Seasholes (2005) as they argue that older investors might be less prone to behavioral biases. On the other hand, decreasing trend in older ages supports Korniotis and Kumar (2011) who find evidence that investment performance declines with age, which they attribute to the decline of cognitive abilities with age.

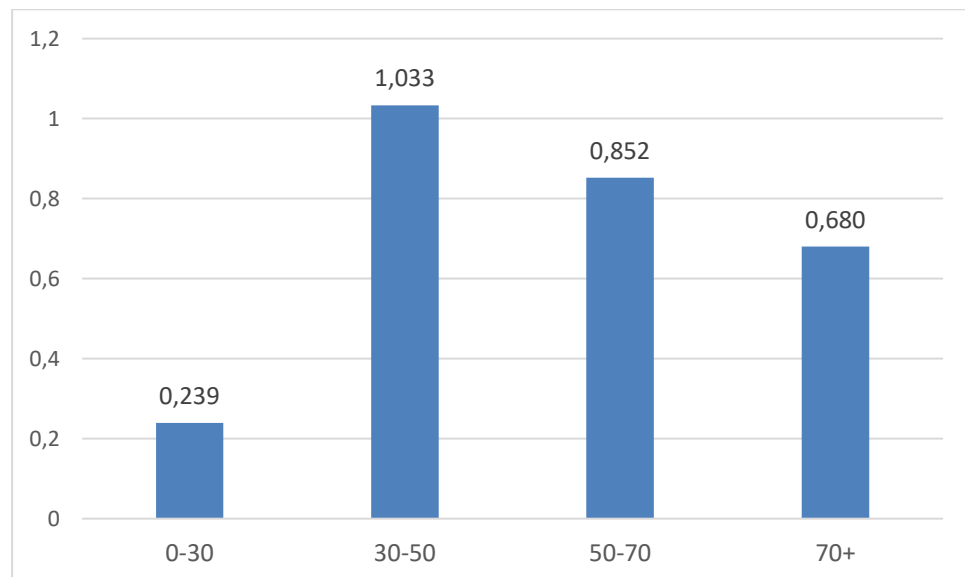


Figure 10: Average adjusted returns for deciles of age (% , 1st for the lowest age decile)

Figure 11 presents the average adjusted returns across portfolio size deciles. The lowest decile has one of the lowest average returns, however, the picture is mixed when we look at the other deciles. The highest average adjusted returns belong to those having median portfolio size, on the average.

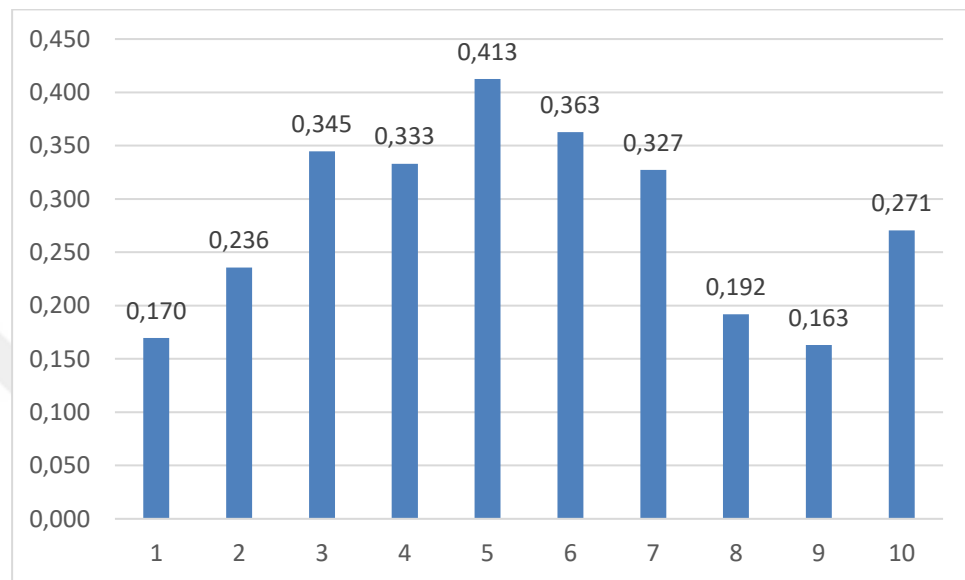


Figure 11: Average adjusted returns for deciles of portfolio size (% , 1st for the lowest portfolio size decile)

Next we calculate two measures for the level of portfolio diversification. First, we compute average number of stocks held by investors. For all of the sample, number of stocks held by the investors is 3.34, on the average (median value is 1.99). As shown in Figure 12, 27 per cent of the investors (2,697 investors) hold only one stock on the average. 69 per cent of the investors hold three or less than three stocks on the average. This finding is not unique to the Turkish market. For instance, Barber and Odean (2000) and Goetzmann and Kumar (2008) find similar results for the U.S. investors.

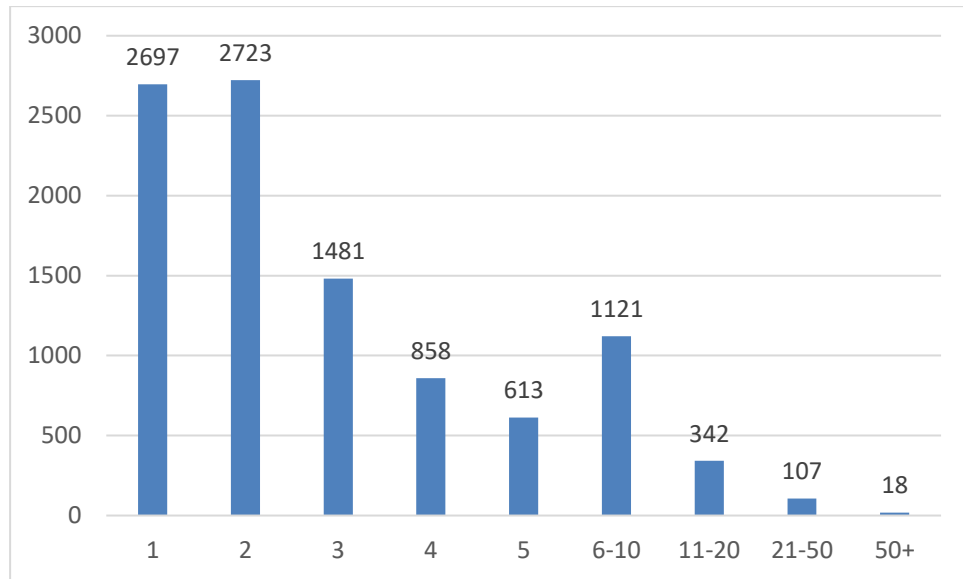


Figure 12: Number of investors across the number of stocks held (x- axis shows the number of stocks)

Second, we calculate Herfindahl (HHL) index values for each of the investors. Confirming the previous finding, almost half of the investors have HHL index value of more than 0.80, which indicates high level of concentration in equity portfolios. Most of the investors hold very low number of the stocks (i.e. one or two); which implies that their stock picking behavior may not reflect the principles of portfolio diversification.

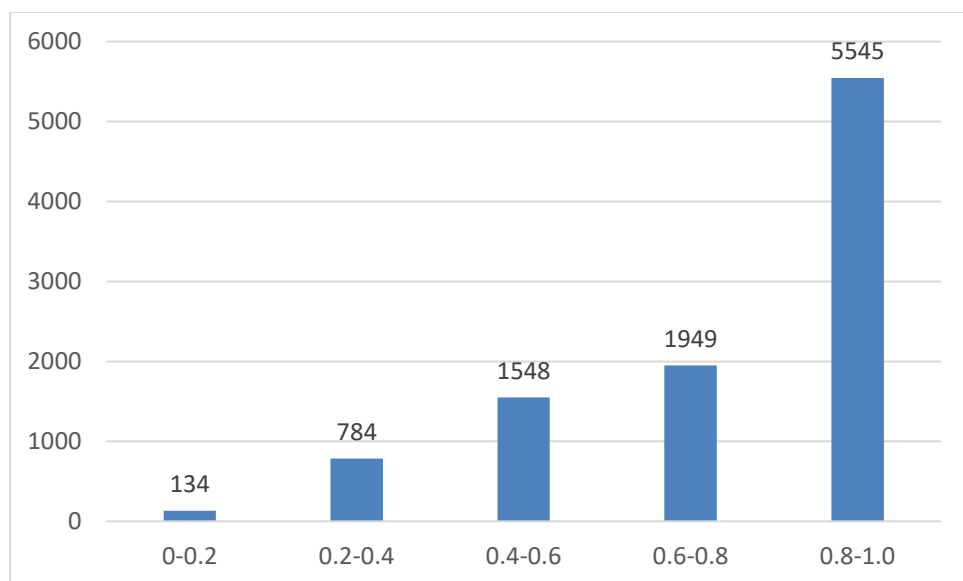


Figure 13: Number of investors across the HHL index value

Dimmock, Kouwenberg, Mitchell and Peijnenburg (2016) argue that ambiguity aversion may be an explanation for portfolio under-diversification. They find that the fraction of the portfolio allocated to individual stocks is increasing in ambiguity aversion for individuals with low self-assessed knowledge about the overall stock market.

We then sort the investors by number of stocks held and calculate average adjusted returns for each decile of number of stocks. The average adjusted return is highest in the third and fourth in which the investors hold only one or two stocks, which may be explained by small set of investors who have superior information (Goetzmann and Kumar, 2008).

The average return fluctuates in the following deciles. The important point is that in the first five deciles, average number of stocks held is at most 2 (see Figure 13), which means that the number of stock does not variate much. Even, the average number of stocks is one for all the investors in the first decile. On the other hand, in the second half set of the deciles, the number of stocks increases continuously. Therefore we may focus on these deciles and argue that level of diversification may not positively affect the adjusted returns.

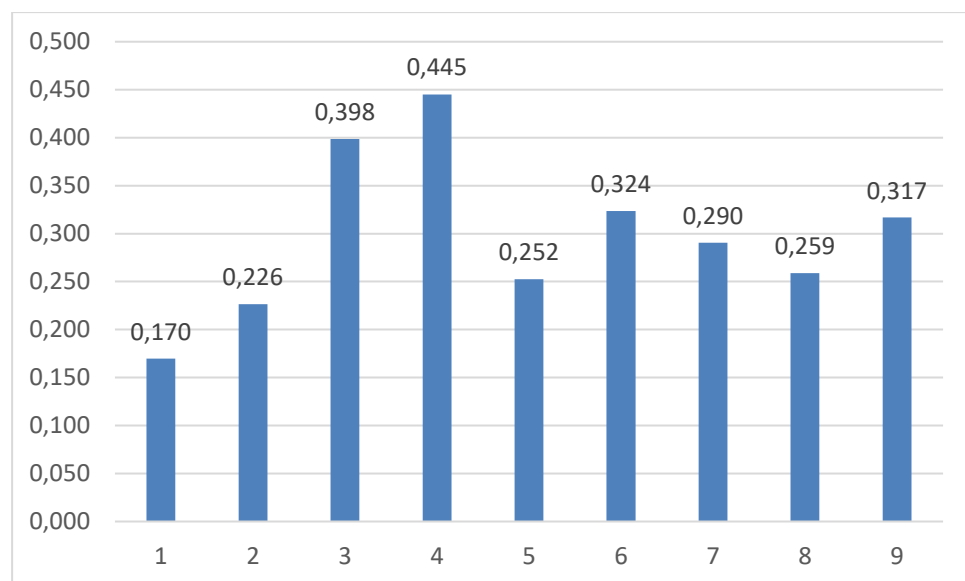


Figure 14: Average adjusted returns for deciles of number of stocks held (% , 1st for the lowest number of stocks decile)

Portfolio diversification is one of the concepts related to the main theme of the dissertation -local bias- according to Goetzmann and Kumar (2008). They find that individual investors hold under-diversified portfolios and that the level of underdiversification is also correlated with investment choices consistent with local bias¹⁷.

Kumar (2009) further documents that individual investors prefer stocks with lottery features, and like lottery demand, the demand for lottery-type stocks increases during economic downturns, which may be another explanation for the phenomena of underdiversification.

4.1.2 Return performance across investors' cities/regions

Next, we calculate average adjusted returns for investors in each of the 81 cities in Turkey, results of which are provided in Table 7.¹⁸ Bingöl has the lowest (-0.6%) and Muş has the highest (2.4%) weekly average adjusted return. Average returns in 4 cities (Bingöl, Sinop, Ardahan and Kırklareli) are less than the market average (i.e., negative market-adjusted returns). Siirt (1.5%) and Kırşehir (1.4%) follows Muş on the top of the list.

The average and median values for 81 cities are 0.31% and 0.28%, respectively. 30 cities have average adjusted returns above the mean value. 44 cities have values between 0 and 0.30%, including İstanbul, Ankara, and İzmir.

¹⁷ They use 250 miles radius to define local investments.

¹⁸ To clarify, this analysis does not include local vs. non-local investors classification yet. Here, we provide average returns of the investors coming from all of their portfolio as a kind of preliminary analysis before investigating local bias. The same approach also applies for Table 8.

Table 7: Adjusted returns across cities

City	Adj. Portfolio Return (%)	Number of investors
Adana	0.330	223
Adiyaman	0.470	21
Afyon	0.210	57
Agri	0.008	8
Amasya	0.481	27
Ankara	0.285	1113
Antalya	0.288	327
Artvin	0.341	16
Aydin	0.220	146
Balikesir	0.264	242
Bilecik	0.358	18
Bingol	-0.599	7
Bitlis	0.525	4
Bolu	0.016	23
Burdur	0.363	24
Bursa	0.305	375
Canakkale	0.305	81
Cankiri	0.249	16
Corum	0.592	40
Denizli	0.395	149
Diyarbakir	0.115	34
Edirne	0.274	43
Elazig	0.633	26
Erzincan	0.681	10
Erzurum	0.098	21
Eskisehir	0.281	123
Gaziantep	0.200	58
Giresun	0.086	28
Gumushane	0.129	9
Hakkari	0.226	2
Hatay	0.251	92
İsparta	0.229	59
Mersin	0.217	188
İstanbul	0.279	3104
İzmir	0.240	962
Kars	0.143	9
Kastamonu	0.249	31
Kayseri	0.298	100
Kirklareli	-0.017	27
Kirsehir	1.338	11
Kocaeli	0.250	202
Konya	0.337	294
Kutahya	0.202	67
Malatya	0.282	40
Manisa	0.398	143
Kahramanmaras	0.341	40
Mardin	0.381	17
Mugla	0.225	194
Mus	2.356	4
Nevsehir	0.307	22
Nigde	0.108	26

Ordu	0.044	32
Rize	0.372	25
Sakarya	0.225	78
Samsun	0.184	101
Siirt	1.453	9
Sinop	-0.198	17
Sivas	0.143	34
Tekirdag	0.095	77
Tokat	0.707	31
Trabzon	0.129	75
Tunceli	0.030	3
Sanliurfa	0.279	26
Usak	0.325	59
Van	0.299	22
Yozgat	0.236	17
Zonguldak	0.451	94
Aksaray	0.365	27
Bayburt	0.492	1
Karaman	0.258	36
Kirikkale	0.402	22
Batman	0.607	11
Sirnak	0.055	5
Bartın	0.207	31
Ardahan	-0.158	1
İgdir	0.044	2
Yalova	0.037	39
Karabuk	0.382	120
Kilis	0.463	6
Osmaniye	0.505	14
Duzce	0.752	24

We also aggregate the results and calculate adjusted returns for the seven regions in Turkey (Table 7). The average adjusted return is the highest in Eastern and Southeastern Anatolia (0.330%). Black Sea (0.319%) and Central Anatolia (0.297%) follow these regions. Aegean region has the lowest average adjusted return. In sum, the adjusted returns are close to each other, varying between 0.260% and 0.330%.

Table 8: Adjusted returns across regions

Region	Number of investors	Number of investors (%)	Average adjusted return (%, mean)
Aegean	1,780	17.9	0.263
Black sea	703	7.1	0.319
Central anatolia	1,845	18.5	0.297
Eastern anatolia	158	1.6	0.330
Marmara	4,327	43.4	0.270
Mediterranean	968	9.7	0.284
Southeastern Anatolia	190	1.9	0.330

Finally, we run a regression for the factors analyzed separately before. We make some adjustments to solve the normality problems in variables. As explained in Section 3.2.1, we use dummy variable for portfolio size, which is highly positively skewed. We also winsorize the data for the adjusted returns and omit outlier observations (5 per cent from each tail).

As documented in Table 9, we find that female investors have slightly higher adjusted returns, confirming Barber and Odean (2001) and Choi et al. (2002). Furthermore, as people get older, their average adjusted returns decrease, confirming the arguments of Goetzmann and Kumar (2008) and Feng and Seasholes (2005). They argue that younger people are better in investment decisions.

There are not notable differences across the regions, any of which has significant coefficient. We repeat this analysis for the years in our sample separately. Our unreported results confirm the full sample findings.

Table 9: Cross Sectional Regression of Adjusted Return

Dependent variable	Market adjusted return (%)
Gender (d, female=1)	0.056 (1.92)*
Age	-0.004 (-3.95)***
Portfolio size (d, above median=1)	-0.042 (-1.93)*
Aegean (d)	-0.002
Black Sea (d)	0.055 (-0.05)
Central Anatolia (d)	0.031 (0.93)
Eastern Anatolia (d)	0.060 (1.06)
Mediterranean (d)	0.017 (0.46)
Southeastern (d)	0.052 (0.55)
R ²	0.28%
F-value	3.34
Number of observations	9,942

4.2 Existence of Local Bias

4.2.1 City-based local bias

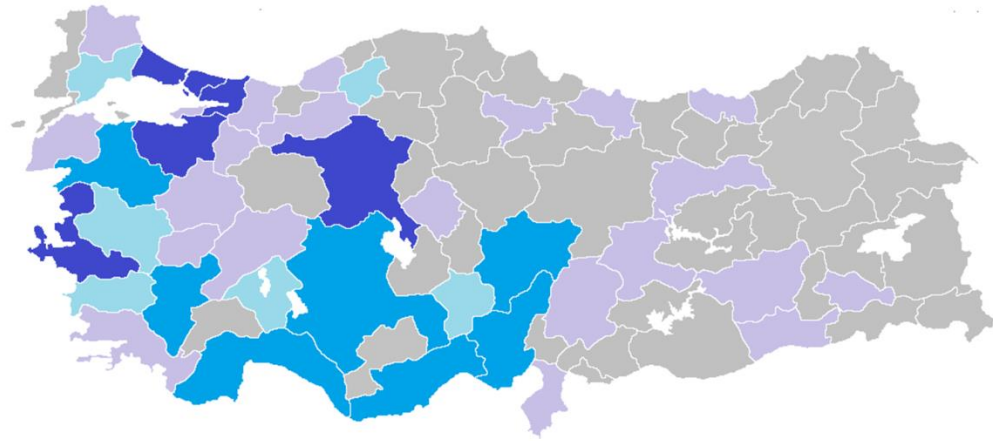
We first report local bias based on the cities of the investors. The listed companies operate in 45 different cities of 81 cities in Turkey. Therefore we limit our analysis in this section with the investors living in these cities. We also exclude investors in İstanbul due to the fact that İstanbul is the economic centre of the country (the remaining number of cities is 44). 75% of the free float market capitalization of Turkey belongs to İstanbul-based companies. In this regard, it may not be appropriate to label investments of investors living in İstanbul on companies in İstanbul as local. Another reason for this exclusion may be that Istanbul has been a migration-receiving city for decades.

Figure 15 presents the concentration of the listed companies among the cities of the country. İstanbul, Ankara, İzmir, Kocaeli, Bursa, Kayseri, and Balıkesir have 10

or more firms. There are six cities where there are 5-9 listed companies, which are Konya, Manisa, Tekirdağ, Aydın, Antalya, and Denizli. It is observed that the listed companies are concentrated on the western parts of the country, which is in parallel with the other economic facts about the regions. For instance, 59 per cent of the total GDP belongs to two regions on the western coast of the country, Marmara and Aegean regions. The twelve cities listed above have 66 per cent share in total GDP.¹⁹



¹⁹ Source: Turkish Statistics Institute, <http://www.tuik.gov.tr/UstMenu.do?metod=temelist>, National Accounts.



■ +10 stocks
 ■ 5-9 stocks
 ■ 3-4 stocks
 ■ 1-2 stocks

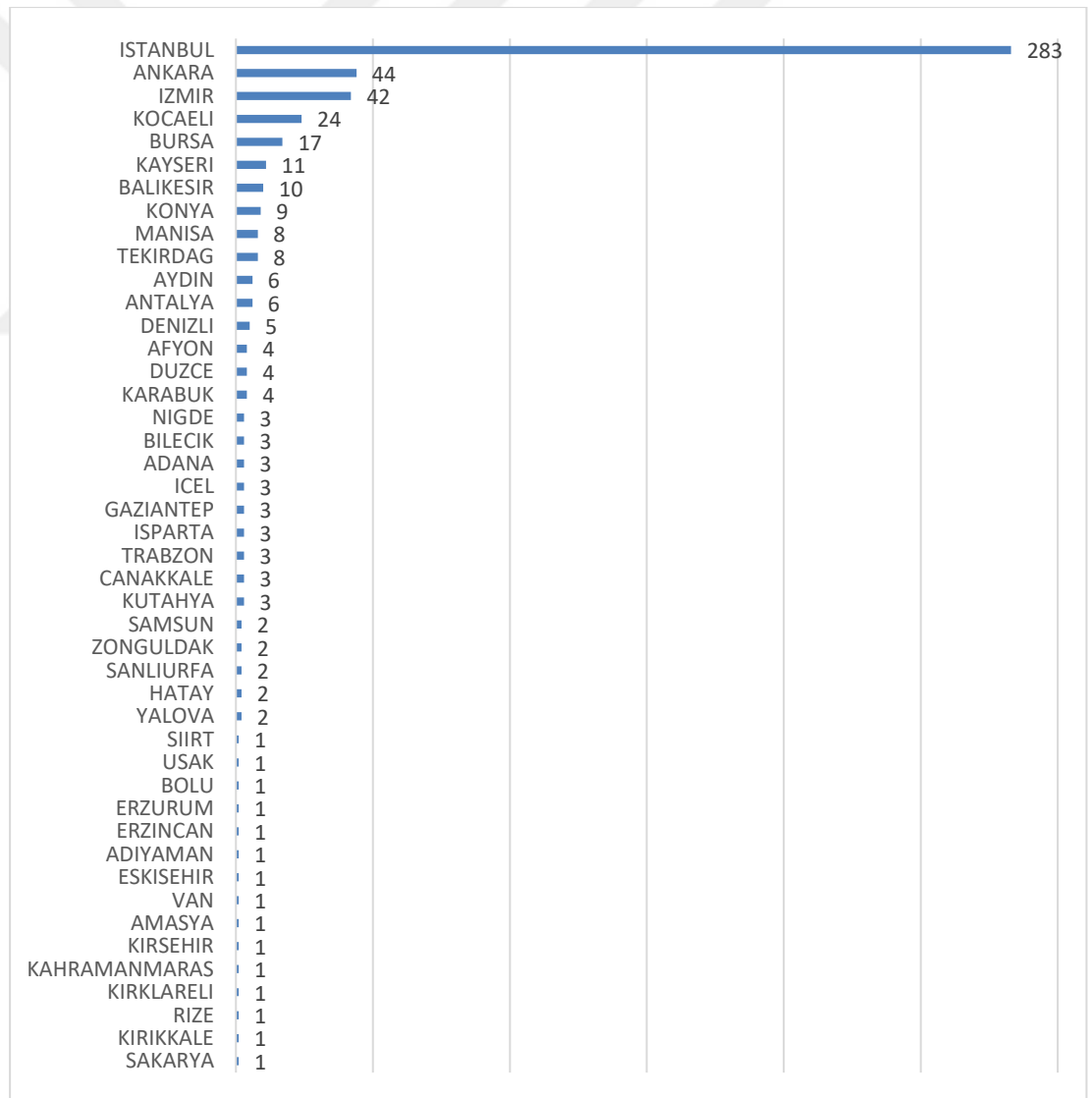


Figure 15: Cities of Turkey

Table 10 presents the level of local bias at the city level, which is our first local bias measure (LB1). Panel A reports the aggregate result and Panel B reports the results across 39 cities. We find evidence that there is a local bias in the Turkish equity market (6.32%) at 1% significance level and consequently, we confirm the previous evidences in this strand of literature.

At city level, evidence of a local bias is found in 18 of 44 cities. The highest levels of local bias are in Konya (42%), Karabük (35%), Zonguldak (15%), Isparta (12%), and Bursa (8%), respectively. In Karabük and Zonguldak, there are big steel companies (Kardemir and Ereğli) with large employee bases. The fact that the employees holding stocks of those firms seems the main reason for such a high level of local bias. Investing in own-company stock is seen as the reflection of ambiguity aversion by Kumar (2009).

Adana, Afyon, Ankara, Antalya, Aydın, Balıkesir, Gaziantep, Hatay, İzmir, Kayseri, Kocaeli, Kütahya, and Trabzon are the other cities in which the investors have local bias. On the other hand, we observe that Adıyaman, Bolu, Eskişehir, Kahramanmaraş, Rize, Şanlıurfa, Yozgat, Yalova, and Düzce has ‘negative’ local bias, which means that the investors of these cities do not prefer to invest in local stocks even at the level of the other investors. In general, it may be argued that local bias is evident in larger cities.

We find evidence that there is local bias in all cities which have 10 or more firms (Ankara, İzmir, Kocaeli, Bursa, Kayseri, and Balıkesir). In all of these cities, investors exhibit a preference for local investments. Among the five cities which have 5-9 firms, three of them have local bias. For cities which have less than five listed companies, 9 of 23 cities have local bias. Hence, we find some evidence that local bias is higher in cities which have more listed firms. The reason for this may be that there should be a kind of local stock market (i.e. sufficient local alternatives) for the existence of local bias.

Another possible explanation may be that most of the cities where local bias is not observed are relatively far from the big cities (e.g. Diyarbakır, Erzincan, Niğde)

and this may imply that investors in such cities may not be aware of the equity market sufficient enough to notice the local stocks.

Table 10: Local bias in Turkey (city-level measure)

Sample	Number of investors	Local bias (weight of local investment in investor's portfolio - weight of local stocks in the market) (LB1)	t-value	Significance
Panel A: Full sample				
Full sample	5,778	6.32%	20.84	***
Panel B: Across cities				
Adana	224	0.83%	2.45	**
Adiyaman	21	-0.01%	-6.99	***
Afyon	57	1.30%	1.76	*
Amasya	27	2.68%	1.01	
Ankara	1117	5.29%	7.77	***
Antalya	328	0.97%	2.34	**
Aydin	148	1.44%	1.93	*
Balikesir	243	4.53%	3.83	***
Bilecik	18	0.21%	1.10	
Bolu	23	-0.05%	-14.76	***
Bursa	9	8.22%	6.85	***
Canakkale	81	0.11%	1.54	
Denizli	149	0.79%	1.41	
Erzincan	16	0.00%	-0.99	
Erzurum	26	-0.04%	-1.42	
Eskisehir	123	-0.06%	-2.69	***
Gaziantep	6	0.12%	2.13	**
Hatay	93	1.68%	2.64	***
İsparta	33	12.46%	3.08	***
Mersin	190	0.74%	1.20	
İzmir	967	5.89%	8.03	***
Kayseri	101	3.13%	2.11	**
Kirsehir	11	-0.05%	-1.28	
Kocaeli	204	7.50%	3.10	***
Konya	297	42.01%	13.96	***
Kutahya	67	5.27%	2.14	**
Manisa	143	0.60%	1.41	
Kahramanmaras	47	-0.03%	-7.73	***
Nigde	52	0.21%	0.82	
Rize	25	-0.03%	-9.77	***
Sakarya	79	0.10%	0.54	
Samsun	56	0.77%	1.11	
Siirt	57	-0.01%	-0.49	
Tekirdag	28	0.14%	1.35	

Trabzon	76	9.54%	3.52	***
Sanliurfa	64	-0.26%	-7.84	***
Usak	65	2.25%	1.85	*
Van	66	1.87%	0.99	
Yozgat	67	-0.02%	-5.13	***
Zonguldak	44	14.79%	3.94	***
Kirikkale	72	0.01%	0.48	
Yalova	78	-0.25%	-3.00	***
Karabuk	60	35.16%	9.38	***
Duzce	18	-0.04%	-5.39	***

Table 11 shows the results for the full sample across the years. We find evidence that there is tendency for local bias consistently for all the years our sample covers. The value for local bias has fluctuated between 4.5% and 6.5%. There is an increase from the period of 2014-2016 to 2017-2019. The level of local bias has decreased after 2021. Though we do not have direct evidence, Covid-19 pandemic may affect the local networks or local information flow.

Table 11: Local bias in Turkey (city-level measure) (full sample, by years)

Year	Local bias (weight of local investment in investor's portfolio - weight of local stocks in the market) (LB1)	t-value	Significance
2014	4.56%	15.71	***
2015	4.68%	14.95	***
2016	4.56%	14.00	***
2017	6.25%	16.45	***
2018	6.57%	16.68	***
2019	6.49%	16.11	***
2020	5.69%	15.01	***
2021	6.02%	15.72	***
2022	4.86%	14.10	***
2023	5.78%	17.15	***

4.2.2 Region-based local bias

The city-based method presented above naturally misses the investors in the remaining 37 cities where there aren't any listed firms. Hence, next we calculate the local bias across geographical regions, and cover all the investors in our sample. We label investments in the same geographical region as local.



Figure 16: Geographical regions of Turkey

As seen in Figure 16, Turkey is divided into seven geographical regions. We exclude the Marmara Region with the same reason as we excluded İstanbul in the city-level analysis. Table 12 presents our findings across six geographical regions. We find that the investors prefer local stocks in all the regions. The highest level of local bias (LB2) is evident in the Black Sea Region (16%), most probably due to the high level of local investment in Karabük and Zonguldak, which we mentioned above. Central Anatolia and Aegean regions rank second and third, respectively. Mediterranean and the eastern regions have significant but much lower levels of local bias.

Table 12: Local bias in Turkey (geographical region-level measure)

Sample	Number of investors	Local bias (weight of local investment in investor's portfolio - weight of local stocks in the market) (LB2)	t-value	Significance
Panel A: Full sample				
Full sample	4,716	9.02%	22.93	***
Panel B: Across regions				
Aegean	1,530	7.39%	12.3054	***
Black sea	438	16.82%	9.6125	***
Central Anatolia	1667	13.39%	16.6416	***
Eastern Anatolia	52	1.33%	1.4083	***
Mediterranean	915	1.60%	5.0006	***
Southeastern Anatolia	114	0.10%	0.8219	-

One may argue that geographical regions are too wide, and economic or financial linkages within these regions may be too weak to imply locality. Therefore we make an additional analysis based on the Turkish Statistical Institute's classification. They classify 81 cities of the country into 26 economic regions (LB3) as shown in Figure 17. The rationale behind this classification is common economic activity, which may be analogous to the MSA classification of the U.S. which has been widely used in the literature (e.g. Coval and Moskowitz, 1999).

**Figure 17: Economic regions of Turkey**

Table 13 provides economic region-based results. There are 20 regions reported. Among 26 regions in total, 3 regions do not have any listed stocks. 3 regions correspond with the biggest three cities (Istanbul, Ankara, and Izmir; i.e., they are economic regions as their own). We have already reported the findings about Ankara and Izmir in the previous part. Therefore, we exclude these seven regions.

The results show that the highest tendency to invest in local stocks is in the Kocaeli, Sakarya, Düzce, Bolu, Yalova” region (6.1%). In 12 of the 20 economic regions, there exists local bias. These cities constitute the most industrialized areas of the country. Therefore level of development, relatively high number listed local companies and close ties with İstanbul may be alternative explanations for the existence of local bias.

The second rank belongs to “Zonguldak, Karabük, Bartın” region, which is parallel to our previous findings. “Antalya, Isparta, Burdur” region ranks third. “Hatay, Kahramanmaraş, Osmaniye” and “Bursa, Eskişehir, Bilecik” regions rank fourth and fifth. Local bias measured by economic region is not significant for most of the eastern regions.

Table 13: Local bias in Turkey (economic region-level measure)

Sample	Number of investors	Local bias (weight of local investment in investor's portfolio - weight of local stocks in the market) (LB3)	t-value	Significance
Panel A: Full sample				
Full sample				

Panel B: Across economic regions				
Tekirdağ, Edirne, Kırklareli	0.142%	1228	1.18	
Balıkesir, Çanakkale	0.475%	2073	2.85	***
Aydın, Denizli, Muğla	0.521%	1646	3.67	***
Manisa, Afyon, Kütahya, Uşak	0.566%	2283	3.11	***
Bursa, Eskişehir, Bilecik	1.128%	2310	4.66	***
Kocaeli, Sakarya, Düzce, Bolu, Yalova	6.081%	2650	20.89	***
Konya, Karaman	0.537%	1415	2.41	**
Antalya, Isparta, Burdur	1.446%	1478	5.55	***
Adana, Mersin	0.479%	1569	2.04	**
Hatay, Kahramanmaraş, Osmaniye	1.382%	641	4.09	***
Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir	-0.073%	1144	-0.53	
Kayseri, Sivas, Yozgat	0.220%	1466	1.28	
Zonguldak, Karabük, Bartın	2.954%	2376	8.56	***
Samsun, Tokat, Çorum, Amasya	0.151%	1435	1.59	
Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane	1.128%	860	3.57	***
Erzurum, Erzincan, Bayburt	0.195%	291	1.38	
Bitlis, Muş, Van, Hakkari	0.320%	172	0.95	
Adıyaman, Gaziantep, Kilis	0.171%	899	1.91	*
Şanlıurfa, Diyarbakır	-0.544%	848	-6.89	***
Mardin, Batman, Şırnak, Siirt	-0.029%	469	-2.45	**

Our city- and region-based results are consistent with the previous findings (e.g. Seasholes and Zhu, 2002). It is well documented for different countries such as the U.S., Sweden, China that investors have tendency to invest in local stocks (Coval and

Moskowitz, 1999; Grinblatt and Keloharju, 2001; Feng and Seasholes, 2008). We confirm this finding for Turkish stock market.

4.2.3 Distance-based local bias

Based on the other methodological approaches in the previous studies (e.g., Coval and Moskowitz, 1999), we further analyze the existence of local bias through calculating distances between the households and the companies. Table 14 provides the results for the distances of 100 km and 250 km (LB4 and LB5). In this case, the companies operating close less than 100 km and 250 km to the household are accepted as local. We again find that the investors weigh stocks close to themselves more. The average household invests 5.13% more of his portfolio in the stocks at most 100 km far away. The ratio is 5.28% for the stocks at most 250 km far away.

Across the years, local bias is evident continuously without any exception. For the 100km-measure, we observe that there is a decreasing trend from 2014 to 2022. The decrease has accelerated in particular in 2021 and 2022. There is a similar decreasing trend for the 250-km measure, as well. Decrease in 2021 and 2022 may be interpreted in a way that as people were mostly at home and access the information online due to the Covid-19 pandemic, their local ties with the local stocks may weaken and they may access all the stocks' information relatively equally.

Table 14: Local bias in Turkey (distance-based measures)

Sample	Number of investors	Local bias (weight of local investment in investor's portfolio - weight	t-value	Significance
--------	---------------------	---	---------	--------------

of local stocks in the market) (A)				
Panel A: 100 km (LB4)				
Full sample	5,933	5.13%	15.20	***
2014	5,494	4.13%	11.79	***
2015	4,824	3.99%	10.73	***
2016	4,437	3.75%	9.83	***
2017	4,157	3.83%	9.73	***
2018	3,957	3.88%	9.65	***
2019	3,732	3.78%	9.17	***
2020	3,841	3.48%	8.87	***
2021	3,745	2.80%	7.38	***
2022	3,743	2.35%	6.46	***
2023	4,357	4.55%	12.64	***
Panel B: 250 km (LB5)				
Full sample	5,933	5.28%	13.53	***
2014	5,310	4.19%	10.005	***
2015	4,642	4.37%	9.7783	***
2016	4,269	4.62%	10.0472	***
2017	4,009	4.56%	9.4868	***
2018	3,807	4.98%	10.0381	***
2019	3,552	4.71%	9.0237	***
2020	3,711	3.85%	7.7729	***
2021	3,550	3.45%	6.9902	***
2022	3,494	3.12%	6.4122	***
2023	4,357	3.80%	8.6915	***

Finally, we take a different approach following Grinblatt and Keloharju (2001) for robustness check purposes. Initially, we calculate a ratio which shows the relative number of investors who invest in local stocks. If the ratio equals to one for each stock, it means that the share of local investors in the local market is similar to the share of local investors in the national market (called absence of distance effect in Grinblatt and Keloharju, 2001). On the other hand, if the ratio exceeds one, there exists a distance effect and the investors tend to invest local stocks more.

We calculate this ratio for the end-year days through our sample (Table 15). The median value of the ratio is above 1 in all year-ends. It means that share of local investors in a stock in the city is higher than share of investors in that stock in the country.

We observe first an increasing trend in the period of 2014-2016 from 1.84 to 2.34. Then there is a decreasing trend till 2023 to 1.56. The last column shows that at least 80 per cent of the firms have the ratio greater than 1 for every year except 2022.

Table 15: Local bias in Turkey (relative number of investors)

Sample	(number of local investors in a stock/all investors in the city)/(number of investors in a stock/all investors in the country) (LB6)	Fraction greater than 1	
Full sample	271	1.84	0.88
2014	154	2.12	0.89
2015	152	2.34	0.89
2016	148	2.38	0.88
2017	154	2.38	0.87
2018	154	2.19	0.85
2019	152	2.09	0.86
2020	165	1.97	0.80
2021	196	1.82	0.81
2022	216	1.70	0.76
2023	248	1.56	0.88

Our findings on the existence of local bias are in parallel with the previous literature. As Jacobs and Weber (2012) puts, local bias has been shown to be robust across countries, investor subgroups, and sample periods in the previous studies. We find similar results for Turkey, for the first time to the best of our knowledge, for individual investors who make most of the trades in the market, and for a five-year period including both ‘normal’ and ‘crisis’ times.

4.3 The reasons for local bias: information vs. familiarity

As almost all of the studies in the literature, we find that the equity investors in Turkey have tendency to weigh local stocks more. The next question in the literature

is what the reason for such a tendency is. There are two main candidates, as we mentioned in the Introduction and the Literature Review sections. First, the investors may have informational advantage due to their proximity to the companies. Second, on the opposite, they may not have any extra valuable information; instead, they may basically be familiar with these stocks.

The standard way to answer this question in the literature is comparing return performances of local and non-local investments. As Hau (2001) suggests, to learn more about information asymmetry, we must look directly at investment profitability. If the investors earn money from their local investments, we may imply that they have additional information on these investments.

4.3.1 Local vs. non-local returns

Accordingly, we first calculate daily returns of equity investments for each stock. Next, we calculate weighted average of the returns (portfolio returns) for each investor. We both calculate raw and market-adjusted returns (adjusted with the benchmark index, BIST 100).

As shown in Table 16, we find that local and non-local investments' average raw returns are very close to each other (0.41% and 0.43%, respectively). However, when it comes to adjusted returns, first we observe that the positive returns disappear. Second, local investments' adjusted return (-0.21%) is lower than that of non-local investments (-0.12%), and this difference is significant. This finding implies that investors buying local stocks do not have informational advantage with respect to the non-local investors. Our results support behavioral motivations (i.e. familiarity hypothesis).

Table 16: Return performance of local investments

Sample	Number of investors	Average return	t-value	Significance
Raw return	8,026	0.42%		
-Local	2,364	0.41%		

-Nonlocal	5,662	0.43%	-1.04	
-Difference (Local-Nonlocal)				-
Adjusted return	8,026	-0.15%		
-Local	2,393	-0.21%		
-Nonlocal	5,662	-0.12%		
-Difference (Local-Nonlocal)			-3.92	***

In Table 17, we provide the comparison of local and non-local investments' returns across years. There is mixed evidence throughout the years. In 2014 and 2023, adjusted returns of local investments is lower than non-local investments. On the other hand, for the period of 2017 to 2021, adjusted returns of local investments is higher than non-local investments.

Table 17: Return performance of local investments (by years)

	Local adjusted return	Non-local adjusted return	Local- Nonlocal Difference (t-value)	Signifi- cance
2014	-0.18%	-0.10%	-2.73	***
2015	0.019%	-0.005%	0.89	-
2016	-0.08%	-0.08%	-0.07	-
2017	0.01%	-0.18%	5.77	***
2018	-0.09%	-0.15%	1.65	*
2019	0.15%	0.06%	2.42	**
2020	0.11%	-0.06%	4.42	***
2021	-0.18%	-0.37%	5.01	***
2022	-0.27%	-0.26%	-0.13	-
2023	-0.43%	-0.23%	-5.43	***

Table 18 provides the return performances of local and non-local investments at the city level. The results give mixed evidence again. In Amasya, Antalya, Bolu, Kocaeli, Kahramanmaraş, Sakarya, Samsun, and Şanlıurfa, local investments have higher adjusted returns than that of non-local investments.

On the other hand; in Adana, Ankara, Bilecik, Çanakkale, Denizli, Gaziantep, Hatay, Isparta, İzmir, Kırşehir, Manisa, and Yalova non-local investments have higher adjusted returns. In the remaining cities, there is no significant difference between the returns of local and non-local investments. We may argue that in relatively small cities, local bias may incorporate local information. To sum up, the results in total do not consistently support the hypothesis that local bias has an informative component.



Table 18: Return performance of local investments (by cities)

Local adj. return	Non- Local adj. return	Local- Nonlocal Difference (t-value)	Signifi- cance
----------------------	------------------------------	---	-------------------

Adana	-0.56%	-0.14	-2.75	***
Afyon	0.06%	-0.22	-1.00	-
Amasya	0.93%	-0.08%	3.50	***
Ankara	-0.24%	-0.10%	-3.56	***
Antalya	0.29%	-0.12%	2.89	***
Aydin	-0.25%	-0.18%	-0.51	-
Balikesir	-0.11%	-0.15%	0.27	-
Bilecik	-0.58%	-0.09%	-3.24	***
Bolu	0.10%	-0.22%	2.03	**
Bursa	-0.13%	-0.09%	-0.39	-
Canakkale	-0.65%	-0.15%	-2.49	**
Denizli	-0.79%	-0.14%	-3.86	***
Eskisehir	0.23%	-0.20%	1.51	-
Gaziantep	-0.95%	-0.12%	-3.09	***
Hatay	-0.76%	-0.11%	-3.02	***
İsparta	-0.64%	-0.21%	-3.11	***
Mersin	-0.29%	-0.18%	0.55	-
İzmir	-0.30%	-0.08%	-5.01	***
Kayseri	0.10%	-0.19%	1.78	*
Kirsehir	-1.35%	-0.09%	-1.90	*
Kocaeli	0.10%	-0.14%	3.62	***
Konya	-0.15%	-0.03%	-1.03	-
Kutahya	-0.51%	-0.17%	-1.43	-
Manisa	-1.19%	-0.16%	-5.59	***
Kahramanmaras	1.88%	-0.20%	5.23	***
Nigde	-0.29%	-0.19%	0.29	-
Rize	0.21%	-0.12%	0.69	-
Sakarya	0.70%	-0.17%	3.75	***
Samsun	0.18%	-0.17%	2.19	**
Siirt	-0.62%	0.042%	-1.56	-
Tekirdag	-0.34%	-0.27%	-0.28	-
Trabzon	-0.10%	-0.17%	0.27	-
Sanliurfa	2.20%	-0.10%	4.21	***
Usak	-0.23%	-0.12%	-0.88	-
Zonguldak	0.03%	-0.10%	1.02	-
Kirikkale	-0.84%	-0.04%	-0.99	-
Yalova	-0.66%	-0.22%	-1.79	*
Karabuk	0.02%	-0.13%	1.31	-

4.3.2 Local vs. non-local returns and information asymmetry

We further make additional analysis to deepen our analysis on informational advantage. In this regard, we may argue that if information is a key here, we expect that local investors may reach information easier in stocks with high level of information asymmetry. If informational advantage is a reason for local bias, stocks with high level of information asymmetry may have higher level of local bias, and they may generate more return for local investors.

We use several proxies for information asymmetry as we summarized in the previous sections. We classify stocks with respect to their inclusion in the benchmark index and the corporate governance index, free float rate, and institutional investor base.



Table 19 presents the results. We expect that blue chips (those with the largest market capitalization and highest traded value) are liquid and visible stocks and there will be less information asymmetry. However, we do not find any significant difference between local returns of BIST 30 stocks and the other stocks. By local returns, we mean that local investors' returns only for local stocks. This finding does not confirm some studies in the literature. Coval and Moskowitz (1999), Jacobs and Weber (2012), Ivkovic and Weisbenner (2005) and Ivkovic et al. (2008) document that local bias is stronger in small stocks. The last two of these studies further find that local investments outperforming non-local investments is particularly evident in these stocks. Our finding does not confirm these previous results explained by information asymmetries.

Similarly, we may expect that high level of corporate governance practices leads to lower information asymmetry. Bae et al. (2008) argue that if there is an advantage due to locality, it would be lower for firms with better disclosures and for firms with international activities. They find evidence supporting this hypothesis. In their cross-country setup, they find that the local advantage is strong in countries where disclosures are weaker, where institutional investors are less important, and where accounting information is less informative. On the contrary, we do not find significant difference between local returns for stocks included in the corporate governance index and the others.

High level of free float rate may be a clue for a lower level of information asymmetry because in general stocks with greater market cap and liquidity have higher free float rates. Bae et al. (2008) find that local bias is more pronounced in stocks where corporate ownership is more concentrated. We find that return of local investments is higher in stocks with higher free float ratios. This finding is interesting as higher free float rate may lead to larger investor base. If this is the case, companies with higher free float rates and higher number of investors may exhibit lower information asymmetries, which is expected to lead to lower local advantage. Our finding that local investments generate higher returns for higher-free-float-rate-companies supports our general finding that the reason of local bias is not the informative advantage.

Last, we again expect that higher share of institutional investors may imply lower information asymmetry since these investors are sophisticated and are expected to invest in credible, robust stocks. We find that there is not any difference in the level of local bias across stocks with institutional investors and those without.

Table 19: Local bias across characteristics of equities

	Sample	Adjusted return of local investments	t-value	Significance
BIST 30	5,488 7,022	2.25% 2.27%	0.02	
Included Not included Difference				
Corporate Governance Index	5,104 7,378	2.31% 1.61%	-1.22	
Included Not included Difference				
Free float rate	6,689 6,101	2.56% 1.79%	2.38**	
Above median Below median Difference				
Institutional ownership ratio	7,917 2,721	2.23% 2.28%	0.14	
>0 =0 Difference				

To sum up, we find no evidence supporting the existence of informational advantage in local investments. Our findings contradict with those of Coval and Moskowitz (2001), Hau (2001), Ivkovic and Weisbenner (2005), Massa and Simonov (2006), Hong et al (2008), Ivkovic et al. (2008), Bae et al. (2008), and Bodnaruk (2009)

whereas support the findings of Zhu (2002), Pirinsky and Wang (2006), Seasholes and Zhu (2010), Liao et al. (2012), and Baltzer et al. (2015).

Looking at the arguments of the studies supporting the informational advantage hypothesis, Coval and Moskowitz (2001), Massa and Simonov (2006) and Gaspar and Massa (2007) argue that local investors do have opportunities (e.g. ability to visit the firm and talk to employees) to reach information on local firms easily and cheaper.

Massa and Simonov (2006) argue that familiarity is an information based phenomenon and a way of accessing information easier, through the analysis of informed and non-informed investors (they use wealth of the investors as proxy). Here, we develop a company-based approach and find that easy access to information does not lead to excess return for locals.

Ivkovic et al. (2008) points out that the ease of reaching information in a local network is not only related to geographical closeness, but also to cognitive limitations of human being: local investors may limit themselves with local stocks –for which they have favorable information- in stock selection process. We may argue that, based on our results, even there exists available relevant information in a local network, the process of acquiring and assessing local information may be biased or subjective.

Such bias or subjectivity may be explained by various arguments, two of which are illusion of control (Goetzmann and Kumar, 2008) and overconfidence (Dorn and Huberman, 2005). Hong et al. (2008) and Huberman (2001) note familiarity as a key aspect. The former points out loyalty among local investors and a lack of awareness with respect to non-local stocks. The latter argues that a general sense of comfort with the known and discomfort with –even distaste for and fear of- the alien and distant may have a role in local investing.

Another reason for local bias may be coordinated trading of local investors –they share the same belief- based on speculative motives (Dorn et al., 2008). Dorn et al. (2008), Goetzmann and Kumar (2008) and Foad (2010) document that there is a link between local familiarity and under-diversification. We may expect that in the Turkish market, like other markets in which individual investors are dominant in trading

activity, investors concentrate their portfolios on a few number of stocks. Therefore, the above-mentioned approach may be appropriate for Turkish market as well.

Indeed, we may claim that equity investment is not very common in Turkey, as is the case in other emerging markets and to some extent in continental Europe. Therefore, informative dynamics of locality may not be the main determinant since the limited number of investors –with respect to the population- may tend to access information at the national level. In this respect, Turkey is a more unified country compared to, for instance, the United States, which have very different local regions. Almost all the financial activity is concentrated to Istanbul, which possibly leads to the fact that information channels of the market may be developed mostly through Istanbul. Jaaskelainen and Maula (2014) may support this view since they argue that investors' lack of connectedness is a more important problem than physical distance.

Put another way, the biggest companies in the market –blue-chips- and their brands are widely known at the national level –even at the international level for some of them. Jaaskelainen and Maula (2014) point out that even though Microsoft is located in the state of Washington, we might not expect its stock price to be too strongly affected by local market conditions in Washington, since Microsoft is so well-known to investors everywhere. Consistent with this hypothesis, in the Turkish case, we may expect that information on these companies spreads out nationally instead of locally. The fact that the largest 30 companies constitute around 70 percent of total market capitalization also support this view. We do not find evidence of information advantage even we exclude İstanbul, which is home to most of well-known brands in Turkey.

We are also aware from the previous studies that Turkish individual investors are prone to several behavioral biases like overconfidence and disposition effect (Fuertes et al., 2014; Erdem et al., 2014; Tekçe et al., 2016). To sum up, our findings show that the reason of individual investors' tendency to invest in local stocks are not motivated by informational advantages. The reason for their tendency to invest in local stocks seems behavioral, namely, familiarity.

4.4 Local bias and investors' characteristics

Since our findings imply that the reason of local bias is behavioral, it may be meaningful to check several individual characteristics of investors which are used in other behavioral studies. Specifically, we test the effect of age, gender, experience, portfolio size of the investors on their local bias. In addition, we also test the role of investors' cities: population and level of development and accessibility.

The results of the cross-sectional analysis are presented in Table 17. We find that gender does affect local bias. Male investors have higher tendency to local trades. As we show evidence that the reason behind local bias is not informative but behavioral, our finding on gender difference is in line with previous studies on gender differences in behavioral finance. Previous literature shows that men are more exposed to behavioral biases (e.g., Barber and Odean, 2001).

Second, as the investors get older, their tendency to invest in local stock decreases, which seems contradictory to the argument that they may have possible stronger ties with the local environment. However, based on our previous findings, if local bias is a behavioral issue, getting older may lead to more rational investment decisions.

We find that experience does not affect local bias whereas portfolio size affects local bias positively. It may be argued that wealthier investors may have more local ties and higher level of overconfidence, which may force them trade more in local stocks.

Table 20: Cross Sectional Regression of Local Bias (dependent variable is city-based local bias measure [LB1])

Independent variables		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Variables related to investor characteristics	Gender (d, female=1)	-0.72 (-5.94)***	-0.68 (-5.62)***	-0.68 (-5.62)***	-0.33 (-2.80)***	-0.31 (-2.56)***	-0.31 (-2.61)***	-0.32 (-2.60)***	-0.34 (-2.87)***
	Age (age/10)		-0.29 (-6.23)***	-0.28 (-5.76)***	-0.19 (-3.93)***	-0.19 (-3.92)***	-0.19 (-3.93)***	-0.19 (-3.89)***	-0.19 (-3.92)***
	Experience (log of # of days since account opening)			0.005 (0.02)	-0.09 (-0.48)	-0.07 (-0.35)	-0.07 (-0.36)	-0.07 (-0.39)	-0.08 (-0.42)
	Portfolio size (log of average portfolio size)				0.33 (15.00)***	0.34 (15.33)***	0.34 (15.30)***	0.34 (15.15)***	0.33 (15.00)***
Variables related to cities	Population (log of pop. in the city centre)					-0.14 (-2.13)**			
	Large city (d, one of the largest 10 cities=1)						-0.20 (-2.01)**		
	Development index (inverse, the lowest is the most developed)							0.005 (1.63)	
	Distance to İstanbul								-0.26 (-2.85)***
R2		0.07%	1.49%	1.49%	6.34%	6.43%	6.41%	6.38%	6.47%
Number of observations		4720	4720	4720	4720	4720	4720	4720	4720

Note: Reported are the estimated coefficients for the dependent variable city-based local bias measure (LB1). Standard errors are adjusted for heteroskedasticity. The city-related variables are added separately since the strong relationship among each other except distance to İstanbul.

Our two population measures (population and large city) do not confirm our previous finding that local bias is higher in large cities. We do not find evidence that that local bias is higher in more developed cities. Last, distance to the economic capital of the country, İstanbul, has negative effect on local bias.

Coval and Moskowitz (2001) document that local bias is modest in large cities and stronger in remote cities, which contradicts our findings. However, they argue that local bias would be expected to be the weakest in small, remote cities since firms in these areas constitute a smaller fraction of the market and tend to be dominated by particular sectors. We argue that this may be the case for our findings. Furthermore, as we mentioned before, financial awareness and connections to the financial network may be stronger in small and remote cities.

4.5 Discussion

Individual investors tend to hold only a few stocks in their portfolios. Local bias, which is defined as tendency to overweight geographically closer firms in the portfolios, may be regarded as a reflection of the portfolio underdiversification. This view assumes that a rational investor's goal is to maximize portfolio return and minimize variance of portfolio return.

On the other hand, we are aware that individual investors' preferences may be different. As Statman (2017) suggests, some investors may want to get top returns even if it means chance for low returns or losses. Therefore, although our starting point is deviation from portfolio diversification, it is not necessarily the case for individual investors in the light of behavioral finance. Statman (2002) also states that individual investors may prefer to invest in a way similar to lottery playing, e.g. tend to invest in limited number of stocks with the expectation of high returns. This view may have an explanatory power on examples of portfolio under-diversification, including local bias.

Existence of local bias is a well-documented phenomena for various markets throughout the world. We find that Turkish individual investors are prone to local bias as well. We utilize different approaches to reach reliable results. Indeed, we use five different definitions of local investment and corresponding local bias definitions. We

cover both city/region- and distance-based measures. As a robustness check, we further calculate a sixth measure based on number of investors.

The level of local bias varies across the cities. We find that the level of local bias is the highest in cities where there is a very big firm which have large employee base. Such an employee base seems an important reason for these cities. Furthermore, we find that local bias is higher in cities which have relatively more companies operating in these cities. We may argue that local bias may require a kind of local market, i.e. if an investor does not have sufficient alternatives locally, it is difficult to invest in limited stocks since we do not expect that the locality is the only factor in investing decision. We also notice that most of the cities where we do not observe local bias are far from the big cities of the country, which may imply that investors in such cities are not aware of the Equity Market itself sufficiently.

Next, we focus on the reason of local bias as the central question of the dissertation, which is still an open question in the literature. Does the existence of local bias stem from informational advantage or simply behavioral biases (e.g. familiarity)? We test the answer in a comprehensive manner. First, we simply compare the returns from local investments and non-local investments, which is the standart method in the literature. We do not find any evidence favoring local investment returns.

We further compare local and non-local returns across several proxies representing different levels of information asymmetry. Our view is that if there is an informational advantage, it is expected to observe in stocks with higher level of information asymmetry. We do not find such evidence. We again do not find evidence that local investors exploit local information. Coval and Moskowitz (2001) and Massa and Simonov (2006) argue that local investors have opportunities to visit the companies or to talk to employees. In the era of internet and social media, this factor may be less relevant for the investors.

Ivkovic et al. (2008) argue that cognitive limitations (limited attention) create local bias since investors may have local advantages to reach information about the companies. If this is the case, we may argue that information sources on internet and brand names of the companies may have greater effect on the perception of the investors. Based on this view, as Hong et al. (2008) and Huberman (2001) suggest,

familiarity may be a better explanation. General sense of comfort about the firms may create local bias, which is subjective to investors. Goetzmann and Kumar (2008) and Foad (2010) argue that local familiarity and under-diversification is related to each other, which may be the case for Turkish investors. Heath and Tversky's (1991) competence hypothesis may be another explanation. They argue that people prefer to bet when they consider themselves competent than in a context where they feel uninformed. The authors argue that this hypothesis may also help to explain under-diversification.

We argue that informative dynamics of locality may not be valid in Turkey. Turkey is a more unified country compared to the U.S. for instance, and the financial activity is concentrated on one city, Istanbul. Therefore information channels may be developed mostly through Istanbul. Most of the biggest companies are located in Istanbul and well-known at the national level. Hence, we may expect that most of the information spreads out through national channels. Furthermore, several economic factors other than geographical variables may reflect information channels better than that of geographical proximity (e.g. air fares or telephone conversations between the cities as Coval and Moskowitz (2001) and Diyarbakırlıoğlu (2011) suggest).

As we find evidence that the roots of local bias are behavioral, we further check the effects of individual characteristics on local bias. We find that age has a negative effect on local bias, which is contradictory to the argument of stronger ties of older people with the local community.

Portfolio size has a positive relationship with local bias. If portfolio size is a proxy of wealth and investor sophistication, this result may be surprising. However, we may argue that wealthier people may have stronger links with the local community. We further confirm that local bias is lower in larger cities, which may be explained by the fact that local bias may be stronger in smaller networks.

5 CONCLUDING REMARKS

Utilizing daily trade and balance of individual investors in Turkish stock market, we explore tendency of the investors to invest in stocks geographically closer to them. We confirm the well-documented finding that investors have tendency to weigh stocks geographically closer to them for the Turkish equity market. This dissertation is the first one focusing on local bias and its reasons to the best of our knowledge. We check our results with different local investment measures provided in the previous literature.

We further focus on the motivation behind the local investments. The reason of local bias is still an open question in the literature. Our answer to this question is that investors' tendency to invest in local stocks is not informational, but behavioral. We do not only compare the returns of local and non-local investments, we also classify stocks with respect to several criteria which reflect different levels of information asymmetry. In all analyses, we do not find evidence supporting the role of extra information on local investments.

Therefore, we find evidence that information advantage does not explain the tendency to invest in geographically close firms. Our findings support the view that local investors do not have informational advantage. As a last analysis, we find some evidence that individuals' and cities' several characteristics affect the existence of local bias.

Our findings may imply that the roots of local bias are in behavioral biases such as familiarity, limited attention or ambiguity aversion. People may simply be attracted by word-of-mouth effect around them. Alternatively (or complementarily), their cognitive limitations may lead to focusing on limited number of stocks which they hear or see in their cities. This may also be way of avoiding ambiguity of firms located far away.

Concerning the scarcity of individual data, we enrich the debate on local bias and its reasons to a new market –most of the previous studies cover data of developed markets-, which may contribute to future research on cultural differences in investor behavior. Creating new links between local bias and the other documented behavioral biases may be another line for the future research, especially to reach more

comprehensive theory of behavioral finance. As another possible way for future research, exploring effects of brand names or advertising may add an interesting dimension to the literature.

One limitation of the dissertation is that our dataset does not include all assets of the investors. Instead, we only utilize equity portfolios. Investors' savings in other instruments (fixed income, time deposits etc.) may provide new findings.

Our findings on the investing behavior of Turkish individual investors may have implications for policy makers to enhance equity culture in the country. Documentation of the reasons for selecting stocks –other than rational, informative motives- may be meaningful in order to increase financial awareness throughout the whole country. Policy makers working for increasing long-term saving in the country may benefit from the findings on behavioral patterns of individual investors. The study also gives several implications on regional differences throughout the country.

Besides, whether local trading activity around corporate events varies across investors' behavioral characteristics may be an interesting research direction.

6 REFERENCES

Aabo, Tom, Suin Lee, Christos Pantzalis, and Jung Chul Park. "Know thy neighbor: Political uncertainty and the informational advantage of local institutional investors." *Journal of Banking & Finance* 113 (2020): 105762.

Adler, Michael, and Bernard Dumas. "International portfolio choice and corporation finance: A synthesis." *The Journal of Finance* 38, no. 3 (1983): 925-984.

Ahern, Kenneth R. "Information networks: Evidence from illegal insider trading tips." *Journal of Financial Economics* 125, no. 1 (2017): 26-47.

Akben-Selcuk, Elif. "Do mergers and acquisitions create value for Turkish target firms? An event study analysis." *Procedia Economics and Finance* 30 (2015): 15-21.

Alessandri, Todd M., Jan Mammen, and Kimberly Eddleston. "Managerial incentives, myopic loss aversion, and firm risk: A comparison of family and non-family firms." *Journal of Business Research* 91 (2018): 19-27.

Almaghrabi, Khadija S. "Local product market competition and investment home bias." *Journal of International Financial Markets, Institutions and Money* 88 (2023): 101846.

Altdörfer, Marc, Andre Guettler, and Gunter Löffler. "Analyst distance and credit rating consistency." *Journal of International Money and Finance* 143 (2024): 103055.

Andrade, Gregor, Mark Mitchell, and Erik Stafford. "New evidence and perspectives on mergers." *Journal of economic perspectives* 15.2 (2001): 103-120.

Andre, Paul, Maher Kooli, and Jean-Francois L'her. "The long-run performance of mergers and acquisitions: Evidence from the Canadian stock market." *Financial Management* (2004): 27-43.

Angerer, Martin, and Wiebke Szymczak. "The impact of endogenous and exogenous cash inflows in experimental asset markets." *Journal of Economic Behavior & Organization* 166 (2019): 216-238.

Arkes, Hal R., David Faust, Thomas J. Guilmette, and Kathleen Hart. "Eliminating the hindsight bias." *Journal of applied psychology* 73, no. 2 (1988): 305-307.

Arslan, Hasan Burak, and Serif Aziz Simsir. "Measuring takeover premiums in cross-border mergers and acquisitions: Insights from Turkey." *Emerging Markets Finance and Trade* 52.1 (2016): 188-203.

Asimakopoulos, Ioannis, and Panayiotis P. Athanasoglou. "Revisiting the merger and acquisition performance of European banks." *International review of financial analysis* 29 (2013): 237-249.

Asquith, Paul, and E. Han Kim. "The impact of merger bids on the participating firms' security holders." *The Journal of Finance* 37.5 (1982): 1209-1228.

Aw, M. S. B., and R. A. Chatterjee. "The performance of UK firms acquiring large cross-border and domestic takeover targets." *Applied Financial Economics* 14.5 (2004): 337-349.

Bae, Kee-Hong, René M. Stulz, and Hongping Tan. "Do local analysts know more? A cross-country study of the performance of local analysts and foreign analysts." *Journal of Financial Economics* 88, no. 3 (2008): 581-606.

Baele, Lieven, Crina Pungulescu, and Jenke Ter Horst. "Model uncertainty, financial market integration and the home bias puzzle." *Journal of International Money and Finance* 26, no. 4 (2007): 606-630.

Baker, H. Kent, and John R. Nofsinger. "Psychological biases of investors." *Financial services review* 11, no. 2 (2002): 97.

Baker, Richard W., J. G. Wijmans, and Yu Huang. "Permeability, permeance and selectivity: a preferred way of reporting pervaporation performance data." *Journal of Membrane Science* 348, no. 1 (2010): 346-352.

Baker, Malcolm, Xin Pan, and Jeffrey Wurgler. "The effect of reference point prices on mergers and acquisitions." *Journal of Financial Economics* 106.1 (2012): 49-71.

Balasubramanian, R., and Brajesh Kumar. "Equity home bias in emerging and advanced economies: Trend before and during COVID-19." *International Advances in Economic Research* 29, no. 4 (2023): 261-275.

Baltakys, Kęstutis, Margarita Baltakienė, Hannu Kärkkäinen, and Juho Kanninen. "Neighbors matter: Geographical distance and trade timing in the stock market." *Finance Research Letters* 31 (2019).

Baltzer, Markus, Oscar Stolper, and Andreas Walter. "Is local bias a cross-border phenomenon? Evidence from individual investors' international asset allocation." *Journal of Banking & Finance* 37, no. 8 (2013): 2823-2835.

Banz, Rolf W. "The relationship between return and market value of common stocks." *Journal of financial economics* 9, no. 1 (1981): 3-18.

Barber, Brad M., Yi-Tsung Lee, Yu-Jane Liu, and Terrance Odean. "Is the aggregate investor reluctant to realise losses? Evidence from Taiwan." *European Financial Management* 13, no. 3 (2007): 423-447.

Barber, Brad M., and Terrance Odean. "Boys will be boys: Gender, overconfidence, and common stock investment." *The quarterly journal of economics* 116, no. 1 (2001): 261-292.

_____. "Online investors: do the slow die first?." *The Review of Financial Studies* 15, no. 2 (2002): 455-488.

Barberis, Nicholas, and Ming Huang. "Preferences with frames: a new utility specification that allows for the framing of risks." *Journal of Economic Dynamics and Control* 33, no. 8 (2009): 1555-1576.

Barberis, Nicholas, Ming Huang, and Tano Santos. "Prospect theory and asset prices." *The quarterly journal of economics* 116, no. 1 (2001): 1-53.

Barberis, Nicholas, Andrei Shleifer, and Robert Vishny. "A model of investor sentiment." *Journal of financial economics* 49, no. 3 (1998): 307-343.

Barberis, Nicholas, and Richard Thaler. "A survey of behavioral finance." *Handbook of the Economics of Finance* 1 (2003): 1053-1128.

Baron, Robert A. "Behavioral and cognitive factors in entrepreneurship: Entrepreneurs as the active element in new venture creation." *Strategic Entrepreneurship Journal* 1, no. 1-2 (2007): 167-182.

Bauer, Florian, and Kurt Matzler. "Antecedents of M&A success: The role of strategic complementarity, cultural fit, and degree and speed of integration." *Strategic management journal* 35.2 (2014): 269-291.

Baule, Rainer, Olaf Korn, and Laura-Chloé Kuntz. "Markowitz with regret." *Journal of Economic Dynamics and Control* 103 (2019): 1-24.

Bell, David E. "Regret in decision making under uncertainty." *Operations research* 30.5 (1982): 961-981.

Benos, Alexandros V. "Aggressiveness and survival of overconfident traders." *Journal of Financial Markets* 1, no. 3 (1998): 353-383.

Bernoulli, Daniel. "Exposition of a New Theory on the Measurement of Risk." *Econometrica*, Vol. 22, No. 1. (1954): 23-36.

Biais, Bruno, and Martin Weber. "Hindsight bias, risk perception, and investment performance." *Management Science* 55.6 (2009): 1018-1029.

Bick, Patty, Crook, M. D., Lynch, A. A., & Walkup, B. R. "Does distance matter in mergers and acquisitions?" *Journal of Financial Research* 40.1 (2017): 33-54.

_____. "Proximity to urban centers in mergers and acquisitions." *Managerial Finance* 43.11 (2017): 1292-1308.

Biljanovska, Nina, and Spyros Palligkinis. "Control thyself: Self-control failure and household wealth." *Journal of Banking & Finance* 92 (2018): 280-294.

Billett, Matthew T., and Yiming Qian. "Are overconfident CEOs born or made? Evidence of self-attribution bias from frequent acquirers." *Management Science* 54, no. 6 (2008): 1037-1051.

Black, Bernard S. "Bidder overpayment in takeovers." *Stan. L. Rev.* 41 (1988): 597.

Black, Fischer. "Capital market equilibrium with restricted borrowing." *The journal of business* 45, no. 3 (1972): 444-455.

Black, Fischer. "International capital market equilibrium with investment barriers." *Journal of Financial Economics* 1, no. 4 (1974): 337-352.

Black, Fischer. "Noise." *The journal of Finance* 41, no. 3 (1986): 528-543.

Bodnaruk, Andriy. "Proximity always matters: Local bias when the set of local companies changes." *Review of finance* 13, no. 4 (2009): 629-656.

Bonaparte, Yosef, Alok Kumar, and Jeremy K. Page. "Political climate, optimism, and investment decisions." *Journal of Financial Markets* 34 (2017): 69-94.

Bondt, Werner FM, and Richard Thaler. "Does the stock market overreact?." *The Journal of finance* 40, no. 3 (1985): 793-805.

Boyce, Christopher J., Alex M. Wood, James Banks, Andrew E. Clark, and Gordon DA Brown. "Money, well-being, and loss aversion: Does an income loss have

a greater effect on well-being than an equivalent income gain?." CEP Occasional Papers 39, Centre for Economic Performance, LSE.

Branikas, Ioannis, Harrison Hong, and Jiangmin Xu. "Location choice, portfolio choice." *Journal of Financial Economics* 138, no. 1 (2020): 74-94.

Brown, Jeffrey R., Zoran Ivković, Paul A. Smith, and Scott Weisbenner. "Neighbors matter: Causal community effects and stock market participation." *The Journal of Finance* 63, no. 3 (2008): 1509-1531.

Buehler, Roger, Dale Griffin, and Michael Ross. "Exploring the" planning fallacy": Why people underestimate their task completion times." *Journal of personality and social psychology* 67, no. 3 (1994): 366-381.

Cahill, Daniel, Choy Yeing Chloe Ho, and Joey W. Yang. "The COVID-19 pandemic: How important is face-to-face interaction for information dissemination?." *Global Finance Journal* 54 (2022): 100674.

Carpio, Ronaldo, Meixin Guo, Yuan Liu, and Ju Hyun Pyun. "Wealth heterogeneity, information acquisition and equity home bias: Evidence from US household surveys of consumer finance." *Journal of Banking & Finance* 126 (2021): 106100.

Cave, Joshua, and Sandra Lancheros. "Local peer influence on dividend payout decisions." *Journal of Banking & Finance* 164 (2024): 107206.

Cerqueira Leal, Cristiana, Manuel J. Rocha Armada, and Joao C. Duque. Are all individual investors equally prone to the disposition effect all the time? New Evidence from a Small Market. New Evidence from a Small Market (October 1, 2010). *Frontiers in Finance and Economics*, 7(2), 38-68.

Chan, Wesley S., Richard Frankel, and Sri P. Kothari. "Testing behavioral finance theories using trends and consistency in financial performance." *Journal of Accounting and Economics* 38 (2004): 3-50.

Chang, Tom Y., David H. Solomon, and Mark M. Westerfield. "Looking for someone to blame: Delegation, cognitive dissonance, and the disposition effect." *The Journal of Finance* 71, no. 1 (2016): 267-302.

Charness, Gary, and Uri Gneezy. "Strong evidence for gender differences in risk taking." *Journal of Economic Behavior & Organization* 83, no. 1 (2012): 50-58.

Chen, Gongmeng, Kenneth A. Kim, John R. Nofsinger, and Oliver M. Rui. "Trading performance, disposition effect, overconfidence, representativeness bias, and experience of emerging market investors." *Journal of Behavioral Decision Making* 20, no. 4 (2007): 425-451.

Chen, Tsung-Cheng, and Mei-Ying Lai. "Are investors rational? Evidence on the impact of industrial framing reclassification on stock market reaction." *Journal of Behavioral Finance* 14.1 (2013): 1-8.

Cheng, Peter, Lin Li, and Wilson HS Tong. "Target information asymmetry and acquisition price." *Journal of Business Finance & Accounting* 43.7-8 (2016): 976-1016.

Chhaochharia, Vidhi, Alok Kumar, and Alexandra Niessen-Ruenzi. "Local investors and corporate governance." *Journal of Accounting and Economics* 54, no. 1 (2012): 42-67.

Choi, James J., David Laibson, and Andrew Metrick. "How does the Internet affect trading? Evidence from investor behavior in 401 (k) plans." *Journal of Financial economics* 64, no. 3 (2002): 397-421.

Coval, Joshua D., and Tobias J. Moskowitz. "Home bias at home: Local equity preference in domestic portfolios." *The Journal of Finance* 54, no. 6 (1999): 2045-2073.

_____. "The geography of investment: Informed trading and asset prices." *Journal of political Economy* 109, no. 4 (2001): 811-841.

Coval, J., and T. Shumway. "Do behavioural biases affect prices?. Working Paper. University of Michigan." (2000).

Cybo-Ottone, Alberto, and Maurizio Murgia. "Mergers and shareholder wealth in European banking." *Journal of Banking & Finance* 24.6 (2000): 831-859.

Daniel, Kent, David Hirshleifer, and Avanidhar Subrahmanyam. "Investor psychology and security market under-and overreactions." *the Journal of Finance* 53, no. 6 (1998): 1839-1885.

Daniel, Kent, David Hirshleifer, and Siew Hong Teoh. "Investor psychology in capital markets: Evidence and policy implications." *Journal of monetary economics* 49.1 (2002): 139-209.

Dawson, Chris, and Andrew Henley. "Something will turn up? Financial over-optimism and mortgage arrears." *Economics Letters* 117.1 (2012): 49-52.

De Bondt, Werner FM, and Richard H. Thaler. "Financial decision-making in markets and firms: A behavioral perspective." *Handbooks in operations research and management science* 9 (1995): 385-410.

De Long, J. Bradford, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann. "Noise trader risk in financial markets." *Journal of political Economy* 98, no. 4 (1990): 703-738.

_____. "The Survival of Noise Traders in Financial Markets." *Journal of Business*, 64(1) 1990: 1-19.

Del Gaudio, Belinda Laura, Serena Gallo, and Daniele Previtali. "Exploring the drivers of investment in Fintech: Board composition and home bias in banking." *Global Finance Journal* 60 (2024): 100944.

DeLong, Gayle. "Does long-term performance of mergers match market expectations? Evidence from the US banking industry." *Financial Management* (2003): 5-25.

Dean, Mark, Özgür Kıbrıs, and Yusufcan Masatlioglu. "Limited attention and status quo bias." *Journal of Economic Theory* 169 (2017): 93-127.

Ding, Xiaoya, Mengmeng Guo, and Tao Yang. "Air pollution, local bias, and stock returns." *Finance Research Letters* 39 (2021): 101576.

Dlugosch, Dennis, Kristian Horn, and Mei Wang. "New experimental evidence on the relationship between home bias, ambiguity aversion and familiarity heuristics." *Journal of Economics and Business* 125 (2023): 106131.

Dodd, Peter, and Richard Ruback. "Tender offers and stockholder returns: An empirical analysis." *Journal of financial economics* 5.3 (1977): 351-373.

Dong, Ming, et al. "Does investor misvaluation drive the takeover market?." *The Journal of Finance* 61.2 (2006): 725-762.

Dorn, Daniel, and Gur Huberman. "Talk and action: What individual investors say and what they do." *Review of Finance* 9, no. 4 (2005): 437-481.

Dorn, Daniel, Gur Huberman, and Paul Sengmueller. "Correlated trading and returns." *The Journal of Finance* 63, no. 2 (2008): 885-920.

Dyer, Travis A. "The demand for public information by local and nonlocal investors: Evidence from investor-level data." *Journal of Accounting and Economics* 72, no. 1 (2021): 101417.

Edwards, Ward. "Conservatism in human information processing." *Formal representation of human judgment* 17 (1968): 51.

Ellsberg, Daniel. "Risk, ambiguity, and the Savage axioms." *The quarterly journal of economics* (1961): 643-669.

Erdem, O., Arık, E., and Yüksel, S. (2014). Trading Puzzle, Puzzling Trade (İktisat İşletme ve Finans (2014): Aralık 29(345).

Fama, Eugene F. "The behavior of stock-market prices." *The journal of Business* 38, no. 1 (1965): 34-105.

_____. Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2) (1970): 383-417.

Fama, Eugene F. "Market efficiency, long-term returns, and behavioral finance." *Journal of financial economics* 49, no. 3 (1998): 283-306.

Fellner, Gerlinde. "Illusion of control as a source of poor diversification: Experimental evidence." *The Journal of Behavioral Finance* 10, no. 1 (2009): 55-67.

Feng, Lei, and Mark Seasholes. "A profile of individual investors in an emerging stock market." Harvard Business School and University of California at Berkeley (unpublished) (2003).

Feng, Lei, and Mark S. Seasholes. "Do investor sophistication and trading experience eliminate behavioral biases in financial markets?." *Review of Finance* 9, no. 3 (2005): 305-351.

_____. "Individual investors and gender similarities in an emerging stock market." *Pacific-Basin Finance Journal* 16, no. 1 (2008): 44-60.

Festinger, Leon. "A theory of cognitive dissonance Evanston." IL: Row, Peterson 1 (1957).

Fischhoff, Baruch. "Hindsight is not equal to foresight: The effect of outcome knowledge on judgment under uncertainty." *Journal of Experimental Psychology: Human perception and performance* 1, no. 3 (1975): 288.

Florentsen, Bjarne, Ulf Nielsson, Peter Raahauge, and Jesper Rangvid. "Turning Local: Home-bias dynamics of relocating foreigners." *Journal of Empirical Finance* 58 (2020): 436-452.

Foad, Hisham. "Familiarity bias." *Behavioral Finance: Investors, Corporations, and Markets*, Wiley (2010).

Fox, Craig R., and Amos Tversky. "Ambiguity aversion and comparative ignorance." *The quarterly journal of economics* 110, no. 3 (1995): 585-603.

French, Craig W. "The Treynor capital asset pricing model." *Journal of Investment Management* 1, no. 2 (2003): 60-72.

French, Kenneth R., and James M. Poterba. Investor diversification and international equity markets. No. w3609. National Bureau of Economic Research, 1991.

Friedman, Milton The case for flexible exchange rates. **Essays in positive economics**. University of Chicago Press, 1953.

Frisancho, Verónica. "The Impact of Financial Education for Youth." (2019).

Fuertes, Ana-Maria, Gulnur Muradoglu, and Belma Ozturkkal. "A behavioral analysis of investor diversification." *The European Journal of Finance* 20, no. 6 (2014): 499-523.

Fuller, Russell J. "Behavioral finance and the sources of alpha." *Journal of Pension Plan Investing* 2.3 (1998): 291-293.

Gambetti, Elisa, and Fiorella Giusberti. "Personality, decision-making styles and investments." *Journal of Behavioral and Experimental Economics* 80 (2019): 14-24.

Gaspar, Jose-Miguel, and Massimo Massa. "Local ownership as private information: Evidence on the monitoring-liquidity trade-off." *Journal of Financial Economics* 83, no. 3 (2007): 751-792.

Gathergood, John. "Self-control, financial literacy and consumer over-indebtedness." *Journal of economic psychology* 33.3 (2012): 590-602.

Gemmill, Gordon, and Dylan C. Thomas. "Noise Trading, Costly Arbitrage, and Asset Prices: Evidence from Closed-end Funds." *The Journal of Finance* 57, no. 6 (2002): 2571-2594.

Gervais, Simon, and Terrance Odean. "Learning to be overconfident." *the Review of financial studies* 14, no. 1 (2001): 1-27.

Gigerenzer, G., & Selten, R. (2001). *Bounded rationality: The adaptive toolbox*. MIT Press, Cambridge, Massachusetts, London, England. Kitap formatı olacak bu. Ch.3 The Adaptive Toolbox. Gerd Gigerenzer.

Gilovich, Thomas, Robert Vallone, and Amos Tversky. "The hot hand in basketball: On the misperception of random sequences." *Cognitive psychology* 17, no. 3 (1985): 295-314.

Di Giovanni, Julian. "What drives capital flows? The case of cross-border M&A activity and financial deepening." *Journal of international Economics* 65.1 (2005): 127-149.

Glaser, Markus, et al. "Framing effects in stock market forecasts: The difference between asking for prices and asking for returns." *Review of Finance* 11.2 (2007): 325-357.

Gomes, Emanuel, et al. "Critical success factors through the mergers and acquisitions process: revealing pre-and post-M&A connections for improved performance." *Thunderbird international business review* 55.1 (2013): 13-35.

Gossé, Jean-Baptiste, and Camille Jehle. "Benefits of diversification in EU capital markets: Evidence from stock portfolios." *Economic Modelling* 135 (2024): 106725.

Graham, John R., Campbell R. Harvey, and Hai Huang. "Investor competence, trading frequency, and home bias." *Management Science* 55, no. 7 (2009): 1094-1106.

Grinblatt, Mark, and Matti Keloharju. "The investment behavior and performance of various investor types: a study of Finland's unique data set." *Journal of financial economics* 55, no. 1 (2000): 43-67.

_____. "How distance, language, and culture influence stockholdings and trades." *The Journal of Finance* 56, no. 3 (2001): 1053-1073.

Grinstein, Yaniv, and Paul Hribar. "CEO compensation and incentives: Evidence from M&A bonuses." *Journal of financial economics* 73.1 (2004): 119-143.

Goetzmann, William N., and Alok Kumar. "Equity portfolio diversification." *Review of Finance* (2008): 433-463.

Graham, John R., Campbell R. Harvey, and Hai Huang. Investor competence, trading frequency, and home bias. No. w11426. National Bureau of Economic Research, 2005.

Grinblatt, Mark, and Matti Keloharju. "How distance, language, and culture influence stockholdings and trades." *The Journal of Finance* 56.3 (2001): 1053-1073.

Guidolin, Massimo. "International asset prices and portfolio choices under Bayesian learning." *Research in Economics* 57, no. 4 (2003): 383-437.

Han, Pengfei, Chunrui Liu, Xuan Tian, and Kexin Wang. "Invest local or remote? The effects of COVID-19 lockdowns on venture capital investment around the world." *The Effects of COVID-19 Lockdowns on Venture Capital Investment around the World* (November 14, 2022) (2022).

Hankir, Yassin, Christian Rauch, and Marc P. Ueber. "Bank M&A: A market power story?." *Journal of Banking & Finance* 35.9 (2011): 2341-2354.

Haselton, Martie G., Daniel Nettle, and Damian R. Murray. "The evolution of cognitive bias." *The handbook of evolutionary psychology* (2005).

Hau, Harald. "Location matters: An examination of trading profits." *The Journal of Finance* 56, no. 5 (2001): 1959-1983.

Heath, Chip, and Amos Tversky. "Preference and belief: Ambiguity and competence in choice under uncertainty." *Journal of risk and uncertainty* 4.1 (1991): 5-28.

Heger, Stephanie A., and Nicholas W. Papageorge. "We should totally open a restaurant: How optimism and overconfidence affect beliefs." *Journal of Economic Psychology* 67 (2018): 177-190.

Herger, Nils, and Steve McCorriston. "Horizontal, vertical, and conglomerate cross-border acquisitions." *IMF Economic Review* 64.2 (2016): 319-353.

Hilary, Gilles, and Charles Hsu. "Endogenous overconfidence in managerial forecasts." *Journal of Accounting and Economics* 51, no. 3 (2011): 300-313.

Hiraki, Takato, Akitoshi Ito, and Fumiaki Kuroki. "Investor familiarity and home bias: Japanese evidence." *Asia-Pacific Financial Markets* 10, no. 4 (2003): 281-300.

Hirshleifer, David. "Behavioral finance." *Annual Review of Financial Economics* 7, no. 1 (2015): 133-159.

Hoffmann, Arvid OI, Hersh Shefrin, and Joost ME Pennings. "Behavioral portfolio analysis of individual investors." (2010).

Hong, Harrison, Jeffrey D. Kubik, and Jeremy C. Stein. "The only game in town: Stock-price consequences of local bias." *Journal of Financial Economics* 90, no. 1 (2008): 20-37.

Hu, Chenyue. "Industrial specialization matters: A new angle on equity home bias." *Journal of International Economics* 126 (2020): 103354.

_____. "What explains equity home bias? Theory and evidence at the sector level." *European Economic Review* 160 (2023): 104585.

Huang, Peng, Micah S. Officer, and Ronan Powell. "Method of payment and risk mitigation in cross-border mergers and acquisitions." *Journal of Corporate Finance* 40 (2016): 216-234.

Huang, Shu-Chun, Wei-Da Chen, and Yehning Chen. "Bank liquidity creation and CEO optimism." *Journal of Financial Intermediation* 36 (2018): 101-117.

Huberman, Gur. "Familiarity breeds investment." *The Review of Financial Studies* 14, no. 3 (2001): 659-680.

Ivković, Zoran, Clemens Sialm, and Scott Weisbenner. "Portfolio concentration and the performance of individual investors." *Journal of Financial and Quantitative Analysis* 43, no. 3 (2008): 613-655.

Ivković, Zoran, and Scott Weisbenner. "Local does as local is: Information content of the geography of individual investors' common stock investments." *The Journal of Finance* 60, no. 1 (2005): 267-306.

Jääskeläinen, M., & Maula, M. (2014). Do networks of financial intermediaries help reduce local bias? Evidence from cross-border venture capital exits. *Journal of Business Venturing*, 29(5), 704-721.

Jacobs, Heiko, and Martin Weber. "The trading volume impact of local bias: Evidence from a natural experiment." *Review of Finance* 16, no. 4 (2011): 867-901.

Jacobsen, Ben, et al. "Gender differences in optimism and asset allocation." *Journal of Economic Behavior & Organization* 107 (2014): 630-651.

Jensen, Michael C., and William H. Meckling. "Theory of the firm: Managerial behavior, agency costs and ownership structure." *Journal of financial economics* 3.4 (1976): 305-360.

Jiang, Cuixia, Li Zhou, Qifa Xu, and Yezheng Liu. "Home bias in reward-based crowdfunding and its impact on financing performance: Evidence from China." *Pacific-Basin Finance Journal* 76 (2022): 101858.

Jiang, Jiajun, Yu-Jane Liu, and Ruichang Lu. "Social heterogeneity and local bias in peer-to-peer lending—Evidence from China." *Journal of Comparative Economics* 48, no. 2 (2020): 302-324.

Jones, Bryan D. "Bounded rationality." *Annual review of political science* 2, no. 1 (1999): 297-321.

Kahneman, Daniel. "Maps of bounded rationality: Psychology for behavioral economics." *The American economic review* 93, no. 5 (2003): 1449-1475.

Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler. "Anomalies: The endowment effect, loss aversion, and status quo bias." *Journal of Economic perspectives* 5.1 (1991): 193-206.

Kahneman, Daniel, and Amos Tversky. "Subjective probability: A judgment of representativeness." *Cognitive psychology* 3, no. 3 (1972): 430-454.

_____. "Prospect theory: An analysis of decision under risk." In *HANDBOOK OF THE FUNDAMENTALS OF FINANCIAL DECISION MAKING: Part I*, pp. 99-127. 2013.

_____. "Choices, values, and frames." *Handbook of the fundamentals of financial decision making: Part I*. 2013. 269-278.

Kahyaoğlu, Mehmet Burak, and Ü. L. K. Ü. Sema. "Temsililik Hevristikinin Algılanan Risk Üzerindeki Etkisi: İMKB Bireysel Hisse Senedi Yatırımcıları Üzerine Bir Uygulama." *Uluslararası Alanya İşletme Fakültesi Dergisi* 4.1 (2012).

Kaniel, R., Liu, S., Saar, G., and Titman, S. (2012), Individual investor trading and return patterns around earnings announcements, *The Journal of Finance*, 67(2), 639-680.

Karlsson, Anders, and Lars Nordén. "Home sweet home: Home bias and international diversification among individual investors." *Journal of Banking & Finance* 31.2 (2007): 317-333.

Kedia, Simi, and Xing Zhou. "Local market makers, liquidity and market quality." *Journal of Financial Markets* 14.4 (2011): 540-567.

Kho, Bong-Chan, René M. Stulz, and Francis E. Warnock. "Financial globalization, governance, and the evolution of the home bias." *Journal of Accounting Research* 47.2 (2009): 597-635.

Kim, Donghyun, Qinghai Wang, and Xiaoqiong Wang. "Geographic clustering of institutional investors." *Journal of Financial Economics* 144, no. 2 (2022): 547-570.

Kiyamaz, Halil, and H. Kent Baker. "Short-term performance, industry effects, and motives: evidence from large M&As." *Quarterly Journal of Finance and Accounting* (2008): 17-44.

Kocaarslan, Baris, Ramazan Sari, and Ugur Soytaş. "Are there any diversification benefits among global finance center candidates in Eurasia?." *Emerging Markets Finance and Trade* 53, no. 2 (2017): 357-374.

Korniotis, George M., and Alok Kumar. "Do older investors make better investment decisions?." *The Review of Economics and Statistics* 93.1 (2011): 244-265.

Kuchler, Theresa, Yan Li, Lin Peng, Johannes Stroebe, and Dexin Zhou. "Social proximity to capital: Implications for investors and firms." *The Review of Financial Studies* 35, no. 6 (2022): 2743-2789.

Kudryavtsev, Andrey, Gil Cohen, and Shlomit Hon-Snir. "'Rational' or 'Intuitive': Are Behavioral Biases Correlated Across Stock Market Investors?." *Contemporary economics* 7.2 (2013): 31-53.

Kumar, Alok. "Who gambles in the stock market?." *The journal of finance* 64, no. 4 (2009): 1889-1933.

Kumar, Archana, and Heejin Lim. "Age differences in mobile service perceptions: comparison of Generation Y and baby boomers." *Journal of services marketing* 22.7 (2008): 568-577.

Kwabi, Frank Obenpong, Agyenim Boateng, Chizindu Wonu, Charles Kariuki, and Anna Du. "Political uncertainty and cross-border equity portfolio allocation decisions: International evidence." *International Review of Financial Analysis* 87 (2023): 102562.

Lai, Sandy, and Melvyn Teo. "Home-biased analysts in emerging markets." *Journal of Financial and Quantitative Analysis* 43.3 (2008): 685-716.

Langer, Ellen J., and Jane Roth. "Heads I win, tails it's chance: The illusion of control as a function of the sequence of outcomes in a purely chance task." *Journal of personality and social psychology* 32.6 (1975): 951.

Langer, Ellen J. "The illusion of control." *Journal of personality and social psychology* 32, no. 2 (1975): 311.

Lee, Byunghwan, John O'Brien, and Konduru Sivaramakrishnan. "An analysis of financial analysts' optimism in long-term growth forecasts." *The Journal of Behavioral Finance* 9.3 (2008): 171-184.

Levy, Haim, and Marshall Sarnat. "International diversification of investment portfolios." *The American Economic Review* 60.4 (1970): 668-675.

Lewis, Karen K. "Trying to explain home bias in equities and consumption." *Journal of economic literature* 37.2 (1999): 571-608.

Li, Bing, Zhenbin Liu, Wei Qiang, and Bohui Zhang. "The impact of XBRL adoption on local bias: Evidence from mandated US filers." *Journal of Accounting and Public Policy* 39, no. 6 (2020): 106767.

Liang, Quanxi, Qi Jin, Meiting Lu, and Yaowen Shan. "When school ties meet geography: Education-province bias in mutual fund portfolios." *Journal of Banking & Finance* 157 (2023): 107021.

Liao, Li, Li, Z., Zhang, W., & Zhu, N. "Does the location of stock exchange matter? A within-country analysis." *Pacific-Basin Finance Journal* 20.4 (2012): 561-582.

Lim, Kian-Ping, Wei Liu, and Yee-Ee Chia. "Firm location, investor recognition, and the liquidity of Chinese publicly listed SMEs." *Borsa Istanbul Review* 23, no. 2 (2023): 334-349.

Lin, Wen-Chun, et al. "The over-optimism of financial analysts and the long-run performance of firms following private placements of equity." *Finance Research Letters* 10.2 (2013): 82-92.

Lindblom, Ted, Taylan Mavruk, and Stefan Sjögren. "East or west, home is best: The birthplace bias of individual investors." *Journal of banking & finance* 92 (2018): 323-339.

Lindsay, Luke. "Adaptive loss aversion and market experience." *Journal of Economic Behavior & Organization* (2019): 43-61.

Lintner, John. "The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets." *Stochastic Optimization Models in Finance*. 1975. 131-155.

Liu, Yi, and Justin Jin. "Social distancing and local bias." *Finance Research Letters* 51 (2023): 103446.

Loewenstein, George, and Daniel Kahneman. "Explaining the endowment effect." Working Paper, Department of Social and Decision Sciences, Carnegie Mellon University (1991).

Loomes, Graham, and Robert Sugden. "Regret theory: An alternative theory of rational choice under uncertainty." *The economic journal* 92.368 (1982): 805-824.

Lovall, Dan, and Daniel Kahneman. "Delusions of success." *Harvard business review* 81, no. 7 (2003): 56-63.

Markowitz, Harry. "Portfolio selection." *The journal of finance* 7.1 (1952): 77-91.

_____. "Foundations of portfolio theory." *The journal of finance* 46.2 (1991): 469-477.

Maroney, James J., and Clodagh McGarry. "Familiarity, home bias and investors' reactions to 20-F reconciliation gains and losses and perceptions of the

quality of accounting principles." *The British Accounting Review* 40.2 (2008): 103-122.

Marra, Antonio, Angela Pettinicchio, and Ron Shalev. "Home Sweet Home: CEOs Acquiring Firms in Their Birth Countries." *Journal of Accounting Research* (2024).

Massa, Massimo, and Andrei Simonov. "Hedging, familiarity and portfolio choice." *The Review of Financial Studies* 19.2 (2006): 633-685.

Meng, Yun, and Christos Pantzalis. "Foreign-born resident networks and stock comovement: when local bias meets home (country) bias." *Journal of Financial and Quantitative Analysis* 57, no. 3 (2022): 1204-1235.

Merton, R. K. (1972). *Insiders and outsiders: A chapter in the sociology of knowledge*. *American Journal of Sociology*, 9-47.

Meyer, Herbert H. "The pay-for-performance dilemma." *Compensation Review* 7.3 (1975): 55-62.

Michenaud, Sébastien, and Bruno Solnik. "Applying regret theory to investment choices: Currency hedging decisions." *Journal of International Money and Finance* 27.5 (2008): 677-694.

Miller, Merton H., and Franco Modigliani. "Dividend policy, growth, and the valuation of shares." *the Journal of Business* 34, no. 4 (1961): 411-433.

Millstein, Rachel A., et al. "Development of the State Optimism Measure." *General hospital psychiatry* 58 (2019): 83-93.

Mitchell, M., Pulvino, T., & Stafford, E. (2002). Limited arbitrage in equity markets. *The Journal of Finance*, 57(2), 551-584.

Modigliani, Franco, and Gerald A. Pogue. "An introduction to risk and return: Concepts and evidence, Part Two." *Financial Analysts Journal* 30, no. 3 (1974): 69-86.

Montier, James. *Behavioural investing: a practitioner's guide to applying behavioural finance*. John Wiley & Sons, 2009.

Morse, Adair, and Sophie Shive. "Patriotism in your portfolio." *Journal of financial markets* 14.2 (2011): 411-440.

Mossin, Jan. "Equilibrium in a capital asset market." *Econometrica: Journal of the econometric society* (1966): 768-783.

Mueller, Dennis C. "A theory of conglomerate mergers." *The Quarterly Journal of Economics* 83.4 (1969): 643-659.

Narayan, Seema, and Mobeen Ur Rehman. "Can home-biased investors diversify interregionally in the long run?." *Economic Modelling* 97 (2021): 167-181.

Netter, Jeffry, Mike Stegemoller, and M. Babajide Wintoki. "Implications of data screens on merger and acquisition analysis: A large sample study of mergers and acquisitions from 1992 to 2009." *The Review of Financial Studies* 24.7 (2011): 2316-2357.

Nofsinger, John R. "The impact of public information on investors." *Journal of Banking & Finance* 25.7 (2001): 1339-1366.

_____. "Social mood and financial economics." *The Journal of Behavioral Finance* 6.3 (2005): 144-160.

Nofsinger, John R., and Abhishek Varma. "Individuals and their local utility stocks: preference for the familiar." *Financial Review* 47.3 (2012): 423-443.

Noor, Jawwad. "Commitment and self-control." *Journal of Economic theory* 135.1 (2007): 1-34.

Odean, Terrance. "Are investors reluctant to realize their losses?." *The Journal of finance* 53.5 (1998): 1775-1798.

Oechssler, Jörg, Andreas Roider, and Patrick W. Schmitz. "Cognitive abilities and behavioral biases." *Journal of Economic Behavior & Organization* 72.1 (2009): 147-152.

Öztürkkal, Belma. "Bireysel Yatırımcı Davranışı Analizi: Anket Çalışması." *İktisat İşletme ve Finans* 28.326 (2013): 67-92.

Pantzalis, Christos, and Erdem Ucar. "Allergy onset and local investor distraction." *Journal of Banking & Finance* 92 (2018): 115-129.

Park, Hyoyoun, and Wook Sohn. "Behavioral finance: A survey of the literature and recent development." (2013).

Parola, Heather, and Kimberly M. Ellis. "M&A negotiation stage: A review and future research directions." *Advances in mergers and acquisitions*. Emerald Group Publishing Limited, 2014. 33-57.

Pirinsky, Christo, and Qinghai Wang. "Does corporate headquarters location matter for stock returns?." *The Journal of Finance* 61.4 (2006): 1991-2015.

Pompian, Michael M. "Behavioral finance and wealth management." *How to build optimal portfolios for private clients* (2006): 28.

Pungulescu, Crina. "Bilateral home bias: A new measure of proximity." *Journal of Neuroscience, Psychology, and Economics* 15, no. 3 (2022): 163.

Rabin, Matthew. "Inference by believers in the law of small numbers." *The Quarterly Journal of Economics* 117, no. 3 (2002): 775-816.

Ramiah, Vikash, Xiaoming Xu, and Imad A. Moosa. "Neoclassical finance, behavioral finance and noise traders: A review and assessment of the literature." *International Review of Financial Analysis* 41 (2015): 89-100.

Rao-Nicholson, Rekha, Julie Salaber, and Tuan Hiep Cao. "Long-term performance of mergers and acquisitions in ASEAN countries." *Research in International Business and Finance* 36 (2016): 373-387.

Reb, Jochen. "Regret aversion and decision process quality: Effects of regret salience on decision process carefulness." *Organizational Behavior and Human Decision Processes* 105.2 (2008): 169-182.

Reilly and Brown, 2010. CFA Level 1 p.76 Efficient Capital Markets.

Rhodes-Kropf, Matthew, David T. Robinson, and Sean Viswanathan. "Valuation waves and merger activity: The empirical evidence." *Journal of Financial Economics* 77.3 (2005): 561-603.

Ritter, Jay R. "Behavioral finance." *Pacific-Basin finance journal* 11, no. 4 (2003): 429-437.

Roll, Richard. "The hubris hypothesis of corporate takeovers." *Journal of business* (1986): 197-216.

Ross, Stephen A. *The Arbitrage Theory of Capital Asset Pricing*. *Journal of Economic Theory*. 13, 341-360, 1976.

Roy, Andrew Donald. "Safety first and the holding of assets." *Econometrica: Journal of the Econometric Society* (1952): 431-449.

Rubinstein, Mark. "Markowitz's "Portfolio Selection": A Fifty-Year Retrospective." *The Journal of finance* 57, no. 3 (2002): 1041-1045.

SEI Commentary. *Behavioral Finance: Loss and Regret Aversion*. (September 2014).

https://seicdrupalcdn.azureedge.net/cdn/farfuture/MLkpThIrWoBosXqomrKu5ok6EY-Q1eNrMfvJ5-NsIlg/1518213000/sites/default/files/inline-files/SEI-Behavioural-Finance-Loss-and-Regret-Aversion_0.pdf

Salzman, Diego A., and Remco CJ Zwinkels. "Behavioural real estate." (2013).

Samuelson, William, and Richard Zeckhauser. "Status quo bias in decision making." *Journal of risk and uncertainty* 1, no. 1 (1988): 7-59.

Sautua, Santiago I. "Does uncertainty cause inertia in decision making? An experimental study of the role of regret aversion and indecisiveness." *Journal of Economic Behavior & Organization* 136 (2017): 1-14.

Savchenko, Sergey, and Olena Sukach. "Home Bias and European Integration." *Economic Studies journal* 5 (2020): 60-78.

Seasholes, M., & Zhu, N. (2005). Is there information in the local portfolio choices of individuals. *The Journal of Finance*, 65(5), 1987-2010.

_____ (2010). Individual investors and local bias. *The Journal of Finance*, 65(5), 1987-2010.

Seru, A., Shumway, T., & Stoffman, N. (2010), Learning by trading. *Review of Financial Studies*, 23(2), 705-739.

Sewell, Martin. "Behavioural finance." *University of Cambridge* (2007): 1-14.

Shanahan, Mackenzie L., Ian C. Fischer, and Kevin L. Rand. "Hope, Optimism, and Affect as Predictors and Consequences of Expectancies: The Potential Moderating Roles of Perceived Control and Success." *Journal of Research in Personality* (2019): 103903.

Shao, Ran, and Na Wang. "Trust and local bias of individual investors." *Journal of Banking & Finance* 133 (2021): 106273.

Sharpe, W. F. (1963). A simplified model for portfolio analysis. *Management science*, 9(2), 277-293.

_____ (1964). Capital asset prices: A theory of market equilibrium under conditions of risk*. *The journal of finance*, 19(3), 425-442.

Shefrin, Hersh. *Beyond greed and fear: Understanding behavioral finance and the psychology of investing*. Oxford University Press on Demand, 2002.

_____. "Explaining investor preference for cash dividends." *Journal of financial economics* 13, no. 2 (1984): 253-282.

Shiller, Robert J., Stanley Fischer, and Benjamin M. Friedman. "Stock prices and social dynamics." *Brookings papers on economic activity* 1984.2 (1984): 457-510.

Shefrin, Hersch M., and Meir Statman. "Explaining investor preference for cash dividends." *Journal of financial economics* 13.2 (1984): 253-282.

_____. "Behavioral portfolio theory." *Journal of financial and quantitative analysis* 35, no. 2 (2000): 127-151.

Shiller, Robert J. "From efficient markets theory to behavioral finance." *Journal of economic perspectives* 17.1 (2003): 83-104.

Shiller, Robert J., Stanley Fischer, and Benjamin M. Friedman. "Stock prices and social dynamics." *Brookings papers on economic activity* 1984.2 (1984): 457-510.

Shleifer, Andrei. "Do demand curves for stocks slope down?." *The Journal of Finance* 41.3 (1986): 579-590.

Shleifer, Andrei, and Lawrence H. Summers. "The noise trader approach to finance." *Journal of Economic perspectives* 4.2 (1990): 19-33.

Shleifer, Andrei, and Robert W. Vishny. "The limits of arbitrage." *The Journal of Finance* 52.1 (1997): 35-55.

_____. "Stock market driven acquisitions." *Journal of financial Economics* 70.3 (2003): 295-311.

Shu, Hui-Chu. "Investor mood and financial markets." *Journal of Economic Behavior & Organization* 76.2 (2010): 267-282.

Silva, Nadjara Davi, Rodrigo Fernandes Malaquias, and Fernanda Maciel Peixoto. "Home bias and performance: A study with Brazilian mutual funds." *Revista de Administração da UFSM* 13, no. 1 (2020): 58-71.

Simon, Herbert A. "A behavioral model of rational choice." *The quarterly journal of economics* 69.1 (1955): 99-118.

_____. "Theories of bounded rationality." *Decision and organization* 1.1 (1972): 161-176.

Slovic, Paul, and Sarah Lichtenstein. "Comparison of Bayesian and regression approaches to the study of information processing in judgment." *Organizational behavior and human performance* 6.6 (1971): 649-744.

Socaciu, Erzsébet-Mirjám, Bálint-Zsolt Nagy, and Botond Benedek. "No place like home: Home bias and flight-to-quality in Group of Seven countries." *Economic Modelling* 129 (2023): 106549.

Sørensen, Bent E., et al. "Home bias and international risk sharing: Twin puzzles separated at birth." *Journal of international money and finance* 26.4 (2007): 587-605.

Statman, Meir. "Behavioral finance: Past battles and future engagements." *Financial Analysts Journal* 55, no. 6 (1999): 18-27.

_____. "Lottery players/stock traders." *Financial Analysts Journal* (2002): 14-21.

_____. "Countries and culture in behavioral finance." In *CFA Institute Conference Proceedings Quarterly*, vol. 25, no. 3, pp. 38-44. CFA Institute, 2008.

Statman, Meir. *Finance for Normal People: How Investors and Markets Behave*. Oxford University Press, 2017.

Statman, Meir, Steven Thorley, and Keith Vorkink. "Investor overconfidence and trading volume." *The Review of Financial Studies* 19.4 (2006): 1531-1565.

Strömbäck, Camilla, et al. "Does self-control predict financial behavior and financial well-being?." *Journal of Behavioral and Experimental Finance* 14 (2017): 30-38.

Stulz, RenéM. "A model of international asset pricing." *Journal of Financial Economics* 9, no. 4 (1981): 383-406.

Suchanek, Max. "The dark triad and investment behavior." *Journal of Behavioral and Experimental Finance* 29 (2021): 100457.

Sullivan, Edward J. "A brief history of the capital asset pricing model." *Association of Pennsylvania University Business and Economic Faculties* (2006).

Şahin, Arzu, and Hatice Doğukanlı. "TÜRKİYE’NİN HİSSE SENEDİ YEREL YATIRIM TARAFLILIĞININ BELİRLENMESİ." *Finansal Araştırmalar ve Çalışmalar Dergisi* 8, no. 14 (2016): 189-207.

Şimşek, Ahmet. "Erişilebilir Şehirler ve Bölgeler: Erişilebilirliğin Bölgesel Kalkınmaya Etkisi ve İller Bazında Erişilebilirlik Endeksinin Geliştirilmesi". T. C. Kalkınma Bakanlığı (2015).

Tesar, Linda L., and Ingrid M. Werner. "Home bias and high turnover." *Journal of international Money and Finance* 14.4 (1995): 467-492.

Thaler, Richard. "Mental accounting and consumer choice." *Marketing science* 4.3 (1985): 199-214.

_____. "Mental accounting matters." *Journal of Behavioral decision making* 12.3 (1999): 183-206.

_____. "Behavioral economics: Past, present and future." *Browser Download This Paper* (2016).

Thaler, Richard H., and Hersch M. Shefrin. "An economic theory of self-control." *Journal of political Economy* 89, no. 2 (1981): 392-406.

Tobin, James. "Liquidity preference as behavior towards risk." *The review of economic studies* 25, no. 2 (1958): 65-86.

Tong, Lester CP, J. Ye Karen, Kentaro Asai, Seda Ertac, John A. List, Howard C. Nusbaum, and Ali Hortaçsu. "Trading experience modulates anterior insula to reduce the endowment effect." *Proceedings of the National Academy of Sciences* 113, no. 33 (2016): 9238-9243.

Treynor (1962). "Toward a Theory of Market Value of Risky Assets" Unpublished manuscript. "Rough Draft" dated by Treynor to the fall of 1962. A final version was published in 1999, in *Asset Pricing and Portfolio Performance*. Robert A. Korajczyk (editor) London: Risk Books, 15-22.

Tversky, Amos, and Daniel Kahneman. "Availability: A heuristic for judging frequency and probability." *Cognitive psychology* 5, no. 2 (1973): 207-232.

_____. "Judgment under uncertainty: Heuristics and biases." *science* 185, no. 4157 (1974): 1124-1131.

_____. "The framing of decisions and the psychology of choice." *Science* 211, no. 4481 (1981): 453-458.

_____. "Extensional versus intuitive reasoning: The conjunction fallacy in probability judgment." *Psychological review* 90.4 (1983): 293.

Uddin, Moshfique, and Agyenim Boateng. "An analysis of short-run performance of cross-border mergers and acquisitions: Evidence from the UK acquiring firms." *Review of Accounting and Finance* 8.4 (2009): 431-453.

Van Nieuwerburgh, S., & Veldkamp, L. (2009). Information immobility and the home bias puzzle. *The Journal of Finance*, 64(3), 1187-1215.

Vega-Gámez, Fernando, and Pablo J. Alonso-González. "Home bias and the returns of strategic portfolios: Neither always so good nor so bad." *Journal of Behavioral and Experimental Finance* 42 (2024): 100927.

Von Neumann, J. and O. Morgenstern (1944). *Theory of games and economic behavior* (Princeton University Press, Princeton, N J).

Wang, Cong, and Fei Xie. "Corporate governance transfer and synergistic gains from mergers and acquisitions." *The Review of Financial Studies* 22.2 (2008): 829-858.

Wang, Ye, and Sirui Yin. "CEO educational background and acquisition targets selection." *Journal of Corporate Finance* 52 (2018): 238-259.

Wänke, Michaela, Norbert Schwarz, and Herbert Bless. "The availability heuristic revisited: Experienced ease of retrieval in mundane frequency estimates." *Acta Psychologica* 89, no. 1 (1995): 83-90.

Weber, Martin, Hans-Jürgen Keppe, and Gabriela Meyer-Delius. "The impact of endowment framing on market prices—an experimental analysis." *Journal of Economic Behavior & Organization* 41.2 (2000): 159-176.

Wei, Chishen, and Lei Zhang. "Trust and local bias." *Journal of Financial and Quantitative Analysis* 55, no. 7 (2020): 2211-2245.

Weinstein, Neil D. "Unrealistic optimism about susceptibility to health problems." *Journal of behavioral medicine* 5, no. 4 (1982): 441-460.

Williams, C., Hassall, C. D., & Krigolson, O. E. (2015, September). Reward Expectancy and the Reward Positivity: A Non-Linear Relationship. In *PSYCHOPHYSIOLOGY* (Vol. 52, pp. S31-S31). 111 RIVER ST, HOBOKEN 07030-5774, NJ USA: WILEY-BLACKWELL

Xie, Yuxin, Soosung Hwang, and Athanasios A. Pantelous. "Loss aversion around the world: Empirical evidence from pension funds." *Journal of Banking & Finance* 88 (2018): 52-62.

Xu, Limin, Chia-Feng Jeffrey Yu, and Ralf Zurbrugg. "The benefit of being a local leader: Evidence from firm-specific stock price crash risk." *Journal of Corporate Finance* 65 (2020): 101752.

Yousefi, Hamed, and Mohammad Najand. "Geographical diversification using ETFs: Multinational evidence from COVID-19 pandemic." *International Review of Financial Analysis* 83 (2022): 102261.

Zheng, Zunxin, Zhongjie Qiu, Mengjia Li, and Wenjie Ding. "High-speed rail and stock return comovement in China." *Research in International Business and Finance* 67 (2024): 102107.

Zuo, Jingjing, Baoyin Qiu, Guoyiming Zhu, and Guangyong Lei. "Local speculative culture and stock price crash risk." *Research in International Business and Finance* 64 (2023): 101851.



TEZ ONAY SAYFASI

Üniversite : T.C. GALATASARAY ÜNİVERSİTESİ
Enstitü : SOSYAL BİLİMLER ENSTİTÜSÜ
Hazırlayanın Adı Soyadı : Hüseyin Evren ARIK
Tez Başlığı :
Savunma Tarihi : 13 / 08 / 2024
Danışman : Borsa İstanbul Pay Piyasasında Bireysel
Yatırımcıların Yerel
Eğilimleri: Coğrafi Olarak Yakın Şirketlere Yatırım Yapma Eğilimi

JÜRİ ÜYELERİ:**İmza**

Doç. Dr. Oğuzhan BAHADIR

Prof. Dr. Volkan DEMİR

Prof. Dr. Cenktan ÖZYILDIRIM

Prof. Dr. Halil İbrahim ALPASLAN

Dr. Öğr. Üyesi Destan Halit AKBULUT

Prof. Dr. Ulun AKTURAN

Enstitü Müdürü