Content

CHAPTER I

The role of foreign investment and domestic capital in the development of financial technologies

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Introduction

Advances in internet and communication technologies bring about significant and radical changes in finance, as in every aspect of life. While in the past, collecting and compiling data, determining communication channels and designing communication protocols in financial transactions were much more difficult processes, today, financial communication and technologies are much more effective and faster (Al-Sartawi et al, 2022; Farida et al, 2021; Suryono et al, 2020). The development and spread of financial technologies have brought about globalization in finance and easier and faster international circulation of capital (Jalal et al, 2023; Li and Xu, 2021).

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Capital theoretically and theoretically focuses on whether the highest return is possible with the least risk, and has a structure that opens up to global markets, mostly for low risk and high income. In other words, capital can move to narrower and local markets for higher and optimal returns (Dunz et al, 2021; Begenau, 2020). In this respect, the concept of international circulation of capital, which is described as foreign investment, comes to the fore.

Although there are many different definitions in the literature on foreign capital, the most agreed upon issue regarding an investment being considered foreign is that more than half of the investment is foreign. In some sources, the investment is called direct foreign investment in this case, while foreign investment, regardless of its size and value, can generally be characterized as capital coming from external countries and markets, other than domestic resources (Jumaniyazov and Mahmudov, 2022; Abdurakhmanova and Rustamov, 2020). Depending on the proportion of this capital, it can be defined as direct or partial. However, the fundamentally important determining factor in foreign investment is that the source of the investment is outside the country in question (Encarnation and Wells, 2021; Alfaro and Chauvin, 2020). When approached from this perspective, domestic investment refers to investment whose source is within that country.

Countries support foreign investment and put various obstacles in front of foreign investments in order to keep wealth and cash flow alive within their own economic systems (Tag and Degirmen, 2022; McGrattan and Waddle, 2020). However, in addition to this general approach, it is possible to state that there are many variables in global and international markets in terms of product or service. Only the entry of foreign capital into the system is not enough, and in order to benefit from international capital in the most effective way, it is necessary to focus on the entry of this capital and its relationship with other types of capital within the country.

Financial technologies are of great importance in ensuring communication and interaction between investors and financial actors, both domestically and internationally, in terms of foreign

capital. However, in order to see how effective and valid financial technologies are, and what kind of gaps they have globally today, the interaction of different types of capital is needed. This section aims to examine the role of domestic and foreign capital in the development of financial technologies.

Development of Financial Technologies

It is possible to attribute the development of financial technologies to computer and internet systems. Although the technologies used in economic terms date back much further, the two determining factors in terms of technology and finance are computer and internet technology. In particular, developments such as investors' ability to follow companies, evaluate them, make decisions according to analysis results, and make effective investments in short periods of time form the basis of the concept of financial technologies widely used today (Oyewole et al, 2024; Yudaruddin, 2023; Suryono et al, 2020).

In order to better understand the development of financial technologies, it is necessary to first focus on the concepts of finance and technology. The concept of finance has two meanings in the dictionary: "monetary resource" and "monetary and financial affairs" (TDK, 2024). While concepts such as financing and financing are used more for the meaning of monetary resource; monetary and financial affairs define the function underlying the concept of financial technologies today. While the meaning of monetary resource limits finance only to capital, the meaning of monetary and financial affairs refers to the broader and more widespread form of finance (TDK, 2024). When the word technology is defined as any kind of invention, innovation and discovery that makes daily life easier; it is possible to describe financial technologies as any kind of technological innovation, invention and applications that make monetary and financial affairs easier.

Financial technologies include all digital applications and environments in which monetary and financial transactions are

carried out, such as digital banking applications, payment systems, open banking, investment and stock market applications (Oyewole et al, 2024; Yudaruddin, 2023; Suryono et al, 2020). Financial technologies are systems in which financial and monetary transactions are carried out not only through applications but also through communication protocols. Basically, while the aim of financial technologies is to reach a much larger target audience on the one hand, it is also aimed to maximize information and data sharing in new virtual environments.

The development of financial technologies can be examined under two headings: scope and method. In terms of scope, applications that allow for monetary transactions with new payment and signature tools are being developed in many areas, from the prevalence of financial technology applications to alternative channels, from banking systems to official collection systems. In this way, it is aimed to include both the target customer base and financial applications in a wider scope (Oyewole et al, 2024; Gunawal et al, 2023; Yudaruddin, 2023; Suryono et al, 2020).

In terms of method, since there is an economic value cycle in financial technologies, studies are being conducted on how and in what way the current value transfer methods can be done in the most effective and efficient way. While coverage studies focus on reaching the highest possible number of transactions and applications to the highest possible number of users, method studies focus on the direction, form, variables, system features, system components and requirements for this access and coverage increase to work in coordination with digital technologies.

In short, financial technologies are technological products and methods that include all channels, applications and methods in which monetary and financial transactions are made, are based primarily on computer and internet technologies and have an important place in economic terms with their ever-developing scope and methods. The basic elements of their development are developing based on advances in computer and internet technologies and participation in these areas.

Foreign Investment and Domestic Capital Concepts

In the past, in order to prevent the economic system within a country from deteriorating, serious taxes and restrictions were imposed on foreign capital, products or investments. Today, although some strategic and limited measures are taken against international markets and competition for certain products or services, the international circulation of capital in general has become an unstoppable phenomenon. Going even further, countries have entered into a significant race to attract foreign capital by providing incentives, promotions and support.

As the name suggests, domestic investment refers to investments whose capital and resources come from within the country. Foreign investment is used to define investments whose capital comes entirely or partially from abroad. If the proportion of foreign investment in a capital structure is more than half, that investment is called foreign direct investment (Jumaniyazov and Mahmudov, 2022; Abdurakhmanova and Rustamov, 2020). Although there are studies that make the same definition for domestic investments, it is generally possible to state that domestic investment refers to capital participations that are entirely domestic.

There may be various approaches regarding the balance between foreign investment and domestic investment and the amount of foreign investment, and the benefits or losses of foreign investment may vary depending on the conjuncture. For example, in a bad economic system, in a situation where there is a high risk and high profit environment, due to certain political and policy interests, monopoly market and monopolization or trusts, deliberate obstruction of products or services, and concerted actions in competition law, foreign investment coming to a country may actually create a significant and negative burden on the system economically, contrary to expectations (Ha et al, 2022; Zoyirovna, 2022). Therefore, very serious regulations, practices and controls are needed in the arrival of foreign investment in the country.

The main reason for any investment is actually to make a profit. The primary goal of any investment that will come into the country is to make a profit. In fact, when considered from this perspective, although it does not seem very logical to give areas where profit can be made within the country to foreigners, the situation may be very different than it seems. First of all, foreign investment will contribute to the country's economy not only with its production and profit function, but also with the technology it brings. One of the main reasons why a capital cannot make a profit in its own country is low profit margins and fierce competition with advanced technology in that country (Khoshimov, 2021; Moran et al, 2021). For example, in a country that produces cars, it is more logical in terms of entrepreneurship to produce a new car production business model in a different country due to various reasons such as no production and lower labor costs. Because both theoretically and practically, capital will always want to move to regions where the highest profit is possible and the most ideal reliability is provided. In doing so, it will take its technology and thought system with it to that country.

Another positive contribution brought by foreign investment is the contribution made to employment. Not only in production investments but also in capital investments, there is a positive contribution to employment, albeit indirectly. The degree of this contribution varies according to the time of investment, area, sector, country of origin or maturity and type of intensity. However, what is certain is that, regardless of the form and direction, every foreign investment somehow contributes positively to employment and the economic cycle in the domestic market.

In short, foreign investment makes a positive contribution to the areas where it is invested, both in terms of technology and employment and knowledge. In order for the level of cooperation of domestic capital with foreign capital and for this cooperation to provide positive feedback to the country's economy, foreign capital should be closely monitored and necessary arrangements should be made for this.

The role of foreign investment and domestic capital in the development of financial technologies

Although communication technologies come to mind first when financial technology is mentioned, financial technologies are much more than that, allowing investors to examine, monitor, analyze and invest in different financial instruments, intermediary institutions and financial instruments. While providing this, financial technologies mostly serve their users through an integrated system and application, and the system is supported with high level feedback. This feedback can be both for investors and financial instruments, and for financial solutions with the methods and techniques used. In any case, financial technologies have a constantly developing dynamic structure that offers more than communication and investment functions.

Although the arrival of foreign investment and capital is economically important within the country, this contribution varies depending on market competition. Foreign investment that is not managed properly and whose boundaries and scope are not fully defined may cause the balance of the domestic market to be disrupted and cause very serious economic or financial losses. In addition, foreign capital may either cause domestic capital to suffer in competition or may absorb or assimilate domestic capital. In any case, it can be stated that the balance between domestic capital and foreign investment must be maintained and monitored.

While the financial effects of foreign investment are a phenomenon that needs to be kept under control, its effect on financial technologies is much more positive and developmental. Since financial technologies involve information sharing and transactions between users and financial intermediaries or businesses, their development is an application that is beneficial to both parties. The arrival of foreign investment in an economic system will translate into both technology transfer and positive competition in terms of financial technologies in the systems within that country. This competition will allow for the introduction of much more modern and advanced versions of existing financial

technologies to the markets, the development of new areas and applications, and the direct or indirect gains of internal and external stakeholders of financial technologies.

Another contribution of foreign and domestic investment to financial technologies is that knowledge and capital develop beyond borders and enable the development of increasingly homogeneous and more organized systems in financial markets. When foreign investment comes to a country, it brings some of its own technologies and management ideas to that country, and also directs the gains it has obtained from the country it invested in to its own country. At this point, not only technology transfer but also foreign investment and domestic investment cooperation with all its other important aspects in a broader perspective provides a highly positive contribution to financial technologies.

In short, financial technologies are achieving more positive environments where more homogeneous and more efficient applications are developed, which are positively affected by both the cooperation and competition of foreign investment and domestic capital. While domestic and foreign capital and international criteria in product or service markets can sometimes have destructive results in competition, the situation is the opposite in financial technologies, and the increase in cooperation of foreign investment with domestic capital has an important effect on the further development of financial technologies and their gaining a positive competitive environment.

Conclusion

The most basic reason for foreign capital coming to a country is to make higher profits with lower risk. Investments that are more suitable or have the same profit opportunities in their own country do not tend to go to foreign countries. The movement of capital to a foreign country brings with it many factors, from the country's governance to its legal system, from the guarantors of capital to the security systems.

Financial technologies have an important function not only in the execution of investment transactions and follow-up and analysis processes, but also in terms of trust. Through financial technologies, capital owners of foreign investments in a country have the opportunity to follow and evaluate the current status and future of investments in that country much more effectively. This situation leads to an increase in foreign investments and the international circulation of capital in general. Therefore, in ensuring the attractiveness for foreign capital, financial technologies are important applications that should be followed not only for sectors and domestic investments, but also on a national basis.

Although globalization and developments in communication technologies increase the international mobility of capital, intensive information sharing and complexity in information sources also pose risks of disinformation or manipulation. In order to minimize these risks and enable investors to continue their investments in countries where they will be foreign investors, information sharing should be reliable and transparent. In recent years, more importance has been given to this point in applications developed in financial technologies, and applications are equipped with serious security systems, especially in terms of ensuring investor confidence.

Financial technologies are applications and processes that include advanced technology and information systems knowledge, in addition to their financial functions. In this respect, there is cooperation in different areas such as computer and communication technologies, financial expertise, and cyber security in the development of financial technologies. As a result of this cooperation in the countries where foreign capital comes and the countries where investments are made, there can be a positive contribution and gain in these areas.

To summarize the impact of foreign capital and investment on financial technologies, there is a pragmatic competition process for both countries, primarily positive and creative competition in financial technology applications and systems. In addition, as the characteristics of the developed financial technologies and the

benefits they provide to users increase, and as positive aspects, especially transparency, are developed, foreign investment may both prefer that country and the degree of existing investments may increase. Therefore, it is possible to consider the relationship between financial technologies and foreign capital and investment in a two-way manner in this context.

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CHAPTER II

Factors Affecting Participation Bank Customers' Preferences in the Context of Behavioral Finance

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Introduction

Finance, one of the most important elements of daily life, is a field that concerns almost every individual at a certain level, regardless of their income group. Although many studies have been conducted in the literature on the role of economy and finance in social life, in the studies from past to present, the inferences and discourses regarding finance have been shaped more depending on the capital structure (Sarwar et al, 2021; Jiang et al, 2020; Vogl, 2020). However, the increasing spread of capital to a wider base, the increasing level of people having a say in the system and globalization have increased the weight of investors. As a result, it is possible to say that which investment instruments, financial

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intermediaries or solutions investors will turn to, what kind of trend their general tendencies are and predictive studies have been effective in the emergence of behavioral finance as a sub-discipline.

As its name suggests, behavioral finance is a field of finance that focuses on the behavior of investors. Theoretically, behavioral finance has a methodology that examines the behaviors of players in the market and deviations from the market are caused by irrational behaviors (Nwosu and Ilori, 2024; Almansour et al, 2023; Wong, 2020). In the basic assumption of behavioral finance, the most fundamental reason for situations that occur outside of expectations in investors and all actors in the markets is to move away from rational behaviors and exhibit uncertain behaviors (Valcanover et al, 2020; Wong, 2020). In fact, although it is not possible to clearly separate any behavior as theoretically rational and irrational, deviations from financial expectations and basic financial behaviors can be evaluated as irrational within the framework of finance.

Leaving aside metaphysical sciences and religious sciences, with a purely materialist view, it can also be considered irrational for investors to turn to risky investments while there is a guaranteed deposit profit on one side. If the rate is high in risky investments, this behavior can be considered rational, relatively and up to a certain level of risk, like gambling for high profit. However, with the same profit rate, or even lower profit rates in some cases, avoiding deposit interest on the grounds that interest is forbidden, is also irrational in a materialist context. However, this behavior has continued in many belief systems throughout human history with the weight of religious elements, and especially in recent years, participation banks have emerged in response to this sensitivity of the Islamic segment.

Although participation banks are not very different from modern and traditional banking activities, they are also seen as Islamic banking in terms of the transactions and contracts made and the terminology used. This banking system, which produces alternatives to all kinds of religiously prohibited transactions, especially interest, has attracted great attention and has reached a very serious economic value and volume in the world.

While in the traditional banking system, individuals' investment transactions, economic and financial decision-making processes and financial behaviors in general can be predicted relatively more easily, the situation is a bit different in participation banks. First of all, since participation banks have less history than traditional banks, statistical data and scientific studies in this area are relatively limited. In addition, when compared to the basic philosophy and implementation stages of the traditional banking system, participation banks are subject to more red lines, limitations and rules. For this reason, it is possible to say that the behaviors of investors and financial actors who are interested in participation banks are more limited than the actors in the traditional banking system. In this section, general information is given within the framework of the literature knowledge on behavioral finance and preferences in participation banking.

Behavioral Finance Overview

Considering the emergence of finance as a science and its basic arguments, it can be defined as a discipline that examines the tools necessary for the provision of the economy, unlike economics (Nwosu and Ilori, 2024; Almansour et al, 2023; Wong, 2020). Although there are various different approaches and theories regarding economics, it is generally accepted as a basic postulate that the economy is based on the effective use of limited resources. Therefore, when we say limited or scarce resources, we include money, capital, foreign exchange or securities that express the right to labor on resources, as well as the financial values of real estate that can be converted into securities. From this point of view, it is possible to define finance as the management of all indicators and assets that have a monetary value. Finance acts as a kind of intermediary in the provision of the economy.

In all financial approaches and the essence of the theory of utilitarianism, individuals tend to choose the most ideal path to achieve the highest profit and benefit. In other words, individuals or parties within a financial system aim to achieve the highest possible benefit. In fact, although this situation may seem like a pragmatic

assumption that is extremely simple to understand at first glance, it is quite difficult to achieve in reality. Because in an environment where all actors in a market expect the highest profit and benefit, the limits of benefits and the effects of risk factors come to the fore (Agudelo Aguirre and Agudelo Aguirre, 2024; Nwosu and Ilori, 2024; Almansour et al, 2023; Wong, 2020). When it is considered that higher risk means higher returns or losses, what is logical and rational in the financial sense and what is rational becomes relatively relative.

In this context, behavioral finance is a discipline that examines the deviations of actors within a market from rational behavior and tries to explain this with various behaviors. In behavioral finance, actors within the financial system, especially investors, are expected to constantly take rational steps and make decisions (Noreen et al, 2022; Hilbert and Metzner, 2021; Sattar et al, 2020). However, deviations from rational behavior in markets are generally very high and therefore, ideal markets remain mostly theoretical.

In essence, deviations from rational behaviors must be due to certain reasons, and by understanding the underlying reasons, it is possible to rationally change or accept these irrational financial behaviors. However, in order to examine these behaviors, first of all, all situations and behaviors that may affect the decisions of the investor, especially other disciplines, must be considered together. For example, instead of high and certain yield term deposit accounts, keeping money under the pillow or investing it in a lower-rate, risky place may seem irrational (Nwosu and Ilori, 2024; Almansour et al, 2023; Noreen et al, 2022; Hilbert and Metzner, 2021; Sattar et al, 2020; Wong, 2020). However, the fact that interest is forbidden both in cultural and sociological terms and in religious terms shows that this behavior is rational in its own field. This situation can be described as the basis of the basic activities of participation banks today.

To summarize briefly, behavioral finance is a finance sub-discipline specialized in examining behaviors that do not comply

with its own theory and are therefore considered irrational in decisions made in its field, and analyzing the underlying reasons for these behaviors. It can be stated that behavioral finance, whose application examples are seen in more and more areas today, will expand its scope and basic assumptions with new studies and literature research every day.

Participation Banking

Participation banking is one of the common application areas of sociology and religion, as well as finance and economics, which is also within the scope of behavioral finance (Coşkun et al, 2024; Erbaşı et al, 2023; Yılmaz and Turanlı, 2022; Yel et al, 2022; Zulfahmi et al, 2021). Earning money from money or interest has been forbidden by many religious teachings from past to present and has been considered an inappropriate behavior. Although there are many reasons for this, it is possible to state that the main reason is that earning interest from money can cause sociological problems such as usury or moral risks in determining credit in the markets. Therefore, many banking activities, especially interest, should be revised with new discourses and methods from a religious perspective.

Although the level of compliance with this rule is limited in two of the three main religions that have the most believers throughout history, these rules are followed very much in Islam. So much so that it can be said that even an individual who does not have a very serious religious life in daily life has serious reservations when it comes to interest (Junaidi et al, 2022; Faha et al, 2022; Herliansyah et al, 2020). The emergence of participation banks or a financial instrument against the prohibition of interest, as a participation bank, based on Islam, also supports this argument.

In Islam, in matters based on business law between individuals and shopping, market freedom has been adopted and no price mechanism has been established in the markets. However, since interest is closely related to the concept of human rights, it has been strictly prohibited (Islam, 2024; Gaol et al, 2023; Islam and

Shafiuddin, 2020). Participation banks basically come into play at this point, while on the one hand, interest, which disrupts markets and social environments, is being fought, on the other hand, they are developing financial alternative tools related to the second issue, which is problematic in terms of banking, to obtain guaranteed profits. Because participation banks and conventional banks state that they cover the excess money they will give to monetarists by financing trade or production, in this case, the loss should be valid as much as the profit. In terms of having profit and loss in a basic sense, not having interest, and following both verses and hadiths and Islamic lines, it is possible to describe participation banks as Islamic banks.

In short, participation banks represent a system that brings investors to the economic system similar to the financial intermediary services of traditional banks, but while doing so, integrates with social and cultural values, primarily religious sensitivities. Despite the fact that participation banks do not have a very old history compared to traditional banks, they are of great importance today in terms of both adding under-the-mattress savings to the economic cycle and contributing to cash flow in the credit and financial cycle. In terms of behavior, participation banks are important in terms of implementing the underlying reasons for behaviors that are considered irrational in terms of traditional banks and basic financial arguments, with multi-disciplinary and different perspectives, under religious teachings that determine the majority of people's behaviors.

Behavioral Finance and Preferences in Participation Banking

Although it is stated that they basically appeal to all kinds of faiths, participation banks can be described as Islamic banks in essence. Although interest and many banking transactions are considered haram in other major religious teachings, it is possible to say that this sensitivity is not very serious in religious groups other than Islam. Another indicator supporting this argument is that participation banks operate mainly in Islamic regions. Therefore, it should be stated that when using the expressions participation bank

or participation bank customer, it is also necessary to state that the Islamic thought system is also significantly referred to.

Islam, one of the most widely believed religions in the world, claims to encompass all social and individual lives of people, address all areas and undertake a regulatory task, like all other religions and teachings. Although the target is determined on the world after death in the teachings related to Islam, all the transactions and every stage of the exam required for this are aimed at today's world and the social lives of individuals. Therefore, religious teachings are among the most important determinants of behavioral finance in participation banks. Religious teachings, on the other hand, direct all physical, spiritual and hedonic feelings and thoughts of people.

It is possible to briefly address the basic thoughts in the economy, which is one of the most fundamental elements of the Islamic faith, on the level of halal earning, sharing and avoiding. Halal earning refers to the fact that all incomes that individuals will earn do not directly or indirectly infringe on the rights of people or the public. In fact, although this situation does not seem to contradict the banking system at first glance, except for interest, banks' taking and giving money with high interest, and lending to the state at high rates, are areas that should be avoided behaviorally, even though they are considered legitimate within the legal and judicial system. Here, it is possible to express the weight in the behavioral sense as being afraid of committing sins or being an intermediary.

Sharing in Islamic belief is another of the most important foundations of financial behavior. Giving one-fortieth of every income as zakat and giving fitra, alms and all expenses made in the way of Allah, regardless of their situation, during Ramadan, form the basis of the idea of sharing. Studies conducted on this subject indicate that these sharing systems, which also effectively form the basis of participation banks, can keep the economy very strong and vibrant.

Conclusion

In financial studies, field applications and theories from the past to the present, it is emphasized that individuals and financial actors want to achieve the highest possible return with the least loss or cost within a financial system. In fact, this manifests itself not only in financial systems but also in positive sciences, in the form of maximum entropy and minimum enthalpy, that is, the highest comfort and movement with the least energy. However, the most important point that is overlooked at this point is that the equation put forward for these systems can only be necessary for systems with one variable. However, in real life, no equation or system is single-variable, and many factors are involved in a system.

In fact, behavioral finance should be considered and evaluated in this respect. In behavioral finance, there is a situation where the effect of these variables is examined, in what direction they are and the predictability levels of the systems in which these variables are included. In this respect, regarding investors and market actors, which behavioral finance perceives as irrational but later develops new research topics and fields on the reasons behind them, sociology and religion are the fields most related to behavior. In this respect, participation banks can be described as financial intermediary institutions that offer new financial derivatives instead of consumers, whom the traditional banking system initially accepts as irrational, by understanding the reason for these irrational behaviors.

However, unlike behavioral finance, it is relatively easier to predict the behavior of investors and actors in the market in participation banking. Because the basis and essence of participation banks is to exist within the economic system as a part of the living standards that individuals' religious lives advise them. Or at least, it can be stated that the instinct to be protected from the harsh and severe punishments of religious discourses while entering an economic or financial system is also effective in determining the behaviors of participation bank customers. In this case, although investor behaviors are very diverse, it is possible to explain the

situations that finance cannot respond to and that it accepts as irrational by utilizing areas other than finance in participation banks.

It can be stated that the behavioral tendencies and preferences of financial actors, especially investors in participation banks, are related not only to Islamic discourses and religious teachings, but also to the current conjuncture and developments. However, while the main arguments and values of traditional banking are derived from financial theories, in participation banks, although there are minor differences according to the subjects, the most effective source in general is religious teachings.

As a result, when participation banks are examined in terms of behavioral finance, an approach that is based on religious teachings should be adopted. In cases where this is not taken into account, the behaviors of participation bank customers and stakeholders will be considered irrational, like other behavioral finance situations, and the development of financial hypotheses and theories on this subject will be prevented. However, identifying religious teachings with the rational behavior cluster in behavioral finance can bring about more successful financial applications in daily life.

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CHAPTER III

An Overview of Traditional and Modern Finance Theories

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1. Introduction

The emergence of modern finance theory can be traced back to Markowitz's groundbreaking work in 1958, which laid the foundation for portfolio theory and its application in investment portfolio selection. Concurrently, Modigliani and Miller made significant contributions to the understanding of capital structure and debt dynamics during the same period. Central to this framework is the Efficient Markets Hypothesis (EMH), which posits that market prices fully reflect all available information. Originating independently in the 1960s, Eugene Fama and Paul Samuelson played pivotal roles in developing and applying this concept to theoretical models and empirical studies on financial security pricing (Lo, 2007:1-3).

Critiques of the EMH have been particularly pronounced among psychologists and behavioral economists, who argue that the

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hypothesis relies on unrealistic assumptions about human rationality. Despite their disparate research focuses, Fama and Samuelson arrived at a shared foundational principle of market efficiency. The concept of informational efficiency within the EMH exhibits a counterintuitive quality reminiscent of Zen philosophy; as market efficiency increases, price changes become more random, with the epitome of efficiency characterized by complete unpredictability in price fluctuations (Alexeev and Tapon, 2011:662).

The Equity Asset Pricing Model serves as a tool for asset valuation, aligning expected returns with the inherent risk associated with a specific stock, typically represented by systemic risk or beta. When utilizing this model for portfolio analysis, selecting an appropriate stock index that mirrors the actual portfolio is crucial. The Capital Asset Pricing Model aims to elucidate the relationship between risk and return stability, while the Arbitrage Pricing Theory seeks to explain asset pricing mechanisms and guide optimal investment decisions through risk-free profit opportunities, such as arbitrage strategies leveraging price differentials (Sindhuarta et al., 2023:50).

Fundamental to contemporary portfolio theory, the Capital Asset Pricing Model and Arbitrage Pricing Theory inform the pricing of risk by delineating the interplay between expected return and risk. These theories find application in diverse domains like capital budgeting, investment performance assessment, and securities valuation. Systematic and unsystematic risks are classified by these theories, with the Capital Asset Pricing Model focusing on a single risk factor, making it a special case within the broader framework of the Arbitrage Pricing Theory (Li, 2023:1903).

Diverging in their assumptions, the Arbitrage Pricing Theory incorporates multiple factors to explain expected returns and advocates for diversified asset portfolios, correlating beta values with expected returns. Conversely, the Capital Asset Pricing Model is a simplified single-factor iteration of the Arbitrage Pricing Theory,

positing a relationship between expected returns and beta values primarily within the market portfolio (Hatipoğlu, 2013:28).

This study offers a comprehensive overview of traditional and modern finance theories, exploring concepts such as market efficiency, the Efficient Markets Hypothesis, rational expectations theory, Capital Asset Pricing Model, and Arbitrage Pricing Theory. By delving into these theories and comparing their models, the study provides theoretical insights into the dynamics of financial markets. The concluding section offers a general evaluation within the broader context of finance theory.

2. Market Efficiency Concept

Market efficiency is a concept with various definitions in the finance literature. This concept is based on the idea that the equity value of a firm traded in capital markets is reflected in the prices of all information about its business and market value. Market efficiency, also known as the random walk theory, asserts that market participants by utilizing all available information to the best of their ability, influence prices thus suggesting that the market is efficient. This concept was first introduced by Eugene Fama in 1965. This approach advocates for stocks always trading fairly, or at their intrinsic value. Market efficiency makes it impossible for investors to buy undervalued stocks or sell stocks at high prices. The most important principle used to measure market efficiency is the correlation between prices and all information available in a market. This principle suggests that prices in markets are based on available information and that this information influences market prices. Therefore what is important in terms of market efficiency is that prices react appropriately to this information (Rossi, 2018:183).

An efficient capital market is one in which security prices are rapidly updated with new information so that current prices accurately reflect all information. In this case, investors access information at current prices and these prices accurately reflect current market conditions and the true value of assets. Therefore in an efficient capital market, market participants quickly integrate new

information into prices so that prices adjust fairly. This increases the efficiency of the market and enables investors to make the right decisions. In other words, an efficient capital market emphasizes that no investor should use readily available information fast enough to predict price movements in order to profit from stock trading. This implies that all information available in the market is quickly reflected in prices and that this information is accessible to everyone (Howe et al 2004:48).

The Efficiency of The Capital Market Depends on Certain Conditions:

- ✓ Share prices should reflect the equilibrium state of the market resulting from the balanced use of all information available in the market.
- ✓ Share prices should react immediately, or at least with little delay and objectively, to new information inputs.

The rapid and accurate reflection of new information flow into asset prices relies on the presence of a group of specialized investors who are adept at gathering, analyzing, and interpreting information about firms operating in the capital markets. These professionals ensure that information is fully and timely reflected in asset prices by tracking market trends and conducting data analysis (Bayraktar, 2012:38).

2.1. Historical Development of Efficient Markets

Theory Financial economists have long examined the origins of random variables or covariances in equity markets and have shown great interest in this subject. In the early 1970s economists in the field of finance reached a consensus that stock prices could be more accurately modeled with the random walk model and that changes in stock returns were fundamentally unpredictable. The Efficient market hypothesis is derived from the random walk theory of financial asset prices and was developed by Paul Samuelson in 1965. In his work, Samuelson emphasized that changes in market prices should be unpredictable from an information perspective. Kendal (1953), Cowles (1960), Osborne (1959-1962) and other

researchers have found statistically significant evidence regarding the random nature of stock price changes in equity markets. However Samuelson's most significant contribution lies in ensuring the acceptance and credibility of the random walk hypothesis in the academic realm despite its long-standing existence. French mathematician Louis Bachelier, in 1900 was one of the first to discover that stock prices move randomly. While a series of studies on the random walk hypothesis have found some statistically significant results regarding the random movement of stock prices, these findings have generally not been accepted due to their lack of economic significance and reliability. The Efficient market hypothesis, proposed and developed by Eugene Fama in the 1960s gained wide acceptance in the fields of finance and economics with his highly influential research on efficient capital markets published in the 1970s (Pesaran, 2005:1-2).

The Efficient market hypothesis was first defined by Fama (1970). This hypothesis refers to a financial market where prices accurately reflect all relevant information about value and where investors cannot consistently achieve excess returns (Zwang, 2012:5).

Fama argues that any price changes in the market should be random and independent of each other. If prices include all available information and are randomly reflected in the market, they are expected to show no particular trend or pattern. In other words he argues that past price movements should not have any effect on predicting future price changes. Therefore Fama associates the efficient market hypothesis with a fair game model and argues that investors can rely on the belief that the current market price accurately reflects all information about a security and that this price is based on the expected return consistent with risk (Radikoko, 2009:4)

2.2. Efficiency Theories

The theory of market efficiency asserts that stock prices always accurately reflect all publicly available information about a

company. However the information influencing stock prices is not limited solely to quantitative and financial data; social, economic, and political events can also have a significant impact. Therefore market efficiency occurs when the price of a stock accurately reflects the relevant company's available information at a given time and point (Bencick and Bacon, 2017:1).

2.2.1. Efficient Market Theory

The fundamental characteristic of an efficient market is that all known and expected information is already reflected in prices. However what typically causes changes in prices is new information that is usually unforeseeable beforehand. If this information could be predicted, it would already be part of the existing information and would have been reflected in prices. Therefore price changes in the market are often associated with the emergence of unexpected information. The unpredictability of price changes associated with new information reveals that stock prices exhibit a random walk, and that prices change randomly and unpredictably. This indicates that price formation in the market differs from rationality. Rational investors are in constant competition to access information that can influence the market before others. However this competition leads to prices changing randomly.

Assumptions of The Efficient Market Hypothesis
- ✓ Rationality prevails among investors.
- ✓ Investors have access to all available information in the market and evaluate this information objectively.
- ✓ Investors attempt to maximize their own interests by considering the balance between risk and return when making investment decisions
- ✓ Market prices accurately reflect all available and expected information, indicating that prices are fairly determined.
- ✓ It is difficult for an individual to achieve above-average returns in the market since prices are shaped based on all available information.
- ✓ Market prices change randomly and unpredictably with the emergence of new information.

✓ New information is quickly and promptly reflected in prices.

Fama (1965) argues in his article titled "Random Walks in Stock Prices" that stock prices reflect all past information and that this information is incorporated into current prices. In other words past prices determine current prices by reflecting all information available in the market. Therefore he contends that price movements in the market are random and unpredictable (Gündoğdu, 2018:84)

Characteristics of The Efficient Markets Hypothesis

✓ In the market, there are numerous participants, and none of them can single-handedly dictate the market.
✓ The cost of accessing information on securities is low.
✓ The markets have high liquidity and low trading costs.
✓ The institutional structure of markets is highly developed, and regulatory legislation ensures the orderly functioning of markets.
✓ Prices should reflect the market equilibrium point, which is formed through the balanced utilization of all information available in the market.
✓ Market prices should reflect the immediate or short-term unbiased dissemination of new information into the market.

In efficient markets, the immediate reflection of new information onto prices is inevitable. With the evolution of the internet, the speed of accessing and sharing information has incredibly increased. Now, with just a few clicks, one can instantly access information from anywhere in the world. This facilitates the rapid dissemination of information in financial markets and its quick reflection in prices. The rapid spread of information leads to investors reacting more swiftly and increases market efficiency (Gündoğdu 2018: 84).

According to Fama, market efficiency can be classified into three different categories depending on the type of information included in the current price: weak form efficiency, semi-strong form efficiency, and strong form efficiency (Zwang, 2012:5).

✓ Weak Form Efficiency
✓ Semi-Strong Form Efficiency
✓ Strong Form Efficiency

2.2.1.1. Weak Form Efficiency

The weak form efficiency hypothesis argues that price movements in financial markets cannot be predicted based on past data. According to this hypothesis, past price movements do not contain sufficient information to forecast future price changes. Therefore it is not possible to consistently generate abnormal returns on the market either in the short term or long term using technical analysis or other forecasting methods (Zwang, 2012:5).

The weak form of market efficiency theory suggests that share prices contain all information that can already be reflected by available market data, such as past prices, trading volume or interest rate. Therefore it is not possible to predict future price movements based on past price movements. According to this theory, prices are shaped according to the information and expectations already available in the market It is not possible to achieve long-term extra gains through investment approaches based on past stock prices or other historical data. Technical analysis methods cannot consistently provide additional returns; however, some fundamental analysis techniques may potentially yield excess profits. In other words, stock prices are not dependent on their past performance and because there is no specific pattern in asset prices, prices can fluctuate unpredictably. The weak form of the efficient market hypothesis does not specify the necessity for prices to be in equilibrium or close to equilibrium; rather, the emphasis is on market participants not being able to systematically profit (Prasarnsith, 2010:33).

Weak form market efficiency posits that current stock prices already reflect all past prices, trading volumes, and other relevant data. This implies that there are no arbitrage opportunities in the market and that investment strategies based on past price movements, trading volume, or other historical data cannot generate returns higher than normal (Tripathi and Kumar, 2014:15).

In this approach, it is believed that historical price movements are already incorporated into stock prices, making it impossible to use technical analysis to predict future price changes.

While most developed markets are weak form efficient but weak form efficiency is observed less in emerging markets. This suggests evidence of significant autocorrelation and dependence in consecutive securities price changes in developing countries, indicating that stock prices do not follow a random walk model (Radikoko, 2009:5-6). Tests of weak-form efficiency are typically examined using methods such as the random walk model, run test, serial correlation analysis, and variance ratio test.

2.2.1.1.1. Random Walk Model

The efficient market hypothesis, which has been discussed in the finance literature for a long time but has not yet reached a consensus, is actually based on the random walk logic, which argues that market prices change randomly. The fundamental concept of random walk theory can be defined as the instantaneous reflection of information flow in stock prices. In this sense, any change in price that might occur tomorrow is entirely independent of today's price changes, as it would only be related to news relevant to tomorrow. Therefore, when stock prices traded in the market follow a random process, market participants cannot predict returns based on historical price changes, and the current stock price reflects its true value (Malkiel, 2003:59-60).

In his 1965 study titled "Random Walks in Stock Market Prices," Fama argued that the random walk theory serves as an optimal example for an efficient market, where many rational investors compete with each other to predict the efficient market and maximize profit. He defined the stock market as a place where the future value of stocks and important current information are easily accessible to all participants. Additionally Fama noted that the primary concern of experimental research related to the random walk theory is to test whether consecutive price changes are independent of each other (Gemici and Polat, 2018: 129-130).

The easiest way to test the random walk model is to calculate the change in stock price on each day "t" (ΔP_t) and determine the

regression equation between the current price change and the previous day's price change (ΔP_{t-1}).

$$\Delta P_t \qquad = a + b \qquad P_{t-1} \qquad + \qquad \varepsilon_t \qquad (1)$$

a: The change in price occurs independently of previous price changes.

b: Shows the relationship between consecutive price changes.

ε_t: It is a random number and indicates the variability of the current price change independent of the previous price change.

After establishing the equation, the correlation coefficient is calculated. The changes in ΔP_{t-1} and ΔP_t are explained through hypothesis tests, determining whether they are statistically significant. If these analyses fail to find a relationship between consecutive daily prices of a financial asset, the market is weak-form efficient. Conversely, if the market cannot be characterized as weak-form efficient (Adalı, 2006: 16-17).

2.2.1.1.2. Serial Correlation Analysis

Auto-correlation or serial correlation is the expression of similarity between observed values as a function of temporal lag. Auto-correlation coefficients, calculated from series values indicate the relationship between observation values at different time points. These coefficients are important indicators of the characteristics of time series and demonstrate the level of mutual dependence between neighboring values in a series. This mutual dependence in time series can be measured by auto-correlation coefficients (Beşel and Kayıkçı, 2019: 182).

Serial correlation test utilizes various statistical techniques to evaluate the existence of a relationship between time intervals. Positive serial correlation indicates a tendency for increasing returns to follow each other across time intervals, whereas negative serial correlation suggests that increasing returns are followed by decreasing returns. In cases of low or no correlation, it can be concluded that price changes are random (Gündoğdu, 2018: 89).

Autocorrelation refers to the influence of a time series data on its own past values. Tintner defined autocorrelation as the relationship between a specific series and its own past values, with a certain time lag. Additionally, the term serial correlation denotes the correlation between different series with a time lag. The autocorrelation of an x series at lag k is calculated as follows:

$$AC_K = \frac{\sum_{t=k+1}^{T}(X_t - X)(X_{t-k} - X)}{\sum_{t=1}^{T}(X_t - X)^2}$$

(2)

In this context, ACK represents the autocorrelation coefficient of the series at lag k, while x represents the sample mean. If $AC1$ is different from zero, it indicates first-order serial correlation in the series. An autocorrelation coefficient that falls outside the calculated limit is considered approximately twice the standard error and significantly different from zero; it is also significant at the 5% level of significance (Hailu and Vural, 2020: 240).

2.2.1.1.3. The Variance Ratio Test

The variance ratio test was developed by Lo and Mackinlay to analyze the random walk model. It represents a simple random walk process with a non-zero constant magnitude and can be expressed as follows.

$$P_t = P_{t-1} + \varepsilon_t$$

(3)

Random walk, alternatively referred to as a non-stationary time series, persists as such even if autocorrelations occur in the error term (ε_t), deviating from the serial random walk model while remaining non-stationary. The variance of this series:

$Var(P_t) = t\sigma^2$ is calculated in this manner. Therefore, the variance of prices, which indicates the characteristics of a random walk, exhibits a linear relationship across periods.

$$VR(q) = \frac{1}{q}\frac{Var(P_t - P_{t-q})}{Var(P_t - P_{t-1})} = 1$$

(4)

If the equality in the equation shown above cannot be rejected in applied analyses, the randomness in price formation cannot be

denied. Therefore, this result would constitute evidence supporting the weak-form efficient market hypothesis. As stated by Lo and MacKinlay, if the variance ratio is greater than 1, it indicates positive correlation between price series, while if it is less than 1, it indicates negative correlation. Both scenarios suggest that financial asset prices influence each other, implying that prices are not randomly generated. If the variance ratio is 1, there is no correlation between prices. This situation demonstrates the potential utility of variance ratio analysis in weak-form efficiency studies. Because it indicates that prices are randomly generated, implying that prices do not influence each other (Çelik and Taş, 2007:16).

2.2.1.1.4. Run Test

Run Test is a non-parametric test developed considering the potential influence of outliers on the correlation coefficient calculated in parametric tests. Also known as the Wald-Wolfowitz run test, it is a popular non-parametric test used to detect non-random patterns in time series data. For instance, in a time series with two or more signal types, a run is defined as one or more similar sequences of signals followed and managed by separate signals. The run test depends on the extent of similar runs. It is possible to find the critical value of the Z-score from the normal distribution table to calculate a Z-score for significant samples. The following formulas can be used to calculate the Z-score for the run test for large samples.

$$\bar{Y}R = \frac{2n1\,n2}{n1+n2} + 1$$
(5)

In this context, $\bar{Y}R$ represents the mean value of the runs, $n1$ denotes the number of records where the first event occurred, and $n2$ represents the number of records where the second event occurred.

$$Z^* = \frac{R+h-\bar{Y}R}{SR}$$
(6)

Here, z* represents the z-score for a normal approximation of the data, R denotes the number of runs, and h signifies the

continuity correction. *SR* stands for the standard deviation of the runs (Hailu and Vural, 2020:240).

In serial correlation testing, the significant deviation of a particular observation from others can diminish the reliability of the test by affecting the correlation coefficient. To mitigate these effects, the run test is employed. The run test considers not the values of a particular asset but rather whether the differences between prices are positive or negative. This test necessitates the formation of a long run for asset price changes to be correlated with each other (Karan, 2011:279).

2.2.1.2. The Semi-Strong Form Efficiency

The semi-strong form of market efficiency hypothesis claims that current stock prices reflect not only historical price information but also all publicly available information related to a company's securities. If markets are efficient, fundamental analysis techniques, such as analyzing balance sheets, income statements, dividend changes, stock splits, announcements, or other publicly available information about a company, will not yield abnormal economic profits. İf markets are efficient, conducting fundamental analysis techniques, such as analyzing balance sheets, income statements, dividend changes, stock splits, announcements, or other publicly available information about a company, will not result in abnormal economic profits. For a market to be semi-strong form efficient, stock prices must reflect both historical and publicly available information, rendering fundamental analysis futile for earning abnormal profits. Semi-strong tests involve event studies and predictability tests using firm characteristics. Event studies examine the speed of stock price adjustments to specific announcements related to the economy or the firm, whether positive or negative. The events under investigation include stock splits, initial public offerings (IPOs), firm (earnings/dividend announcements), and other unexpected economic/world events. In other words, semi-strong form efficient markets posit that all publicly available information regarding a firm's expectations, such as earnings

forecasts, top management quality, accounting practices, company product lines, balance sheet composition, patents, and intellectual property rights, are already reflected in stock prices and volumes in addition to past data. Thus, if investors can access such information from public sources, it is already expected to be incorporated into stock prices (Radikoko, 2009:7; Tripathi and Kumar, 2014:15; Prasarnsith, 2010:33).

2.2.1.3. The Strong Form Efficiency

Fama proposed that a stock market is strong-form efficient when security prices fully reflect all available information (Tripathi and Kumar, 2014:16).

A strong-form efficient market is one where all information, whether public or not, is reflected in security prices and investors cannot achieve returns greater than those offered by both securities and the market through any additional analysis (Korkmaz, 1999:13).

The strong form of the efficient market hypothesis asserts that all information known to any market participant about a company is fully reflected in market prices. Therefore even those with privileged information cannot exploit it to achieve superior investment outcomes, as all private information is perfectly revealed in market prices. Studies in this regard have shown that stock splits, dividend increases, and merger announcements have significant effects on stock prices. Insiders trading on such information can clearly profit before making announcements. While such transactions are often illegal, the fact that the market often anticipates announcements at least partially demonstrates that it is indeed possible to profit based on privileged information. Thus, the strongest form of the efficient market hypothesis is clearly refuted (Malkiel, 1991:211-215).

3. Rational Expectations Theory

Although first introduced to economic theory in 1961, the rational expectations theory has been primarily debated since the

mid-1970s. The formal nature of the rational expectations hypothesis was utilized by John F. Muth in his work "Rational Expectations and the Theory of Price Movements," published in 1961. In his paper, Muth used the term rational expectations to describe numerous scenarios based on individuals' expectations about the future. The development of the Rational Expectations Theory was significantly influenced by the works of Sargent and Wallace in 1971 as well as Sargent's publications in 1972. Lucas, in his 1972 publication "The Expectations and the Neutrality of Money," argued that only unexpected monetary shocks could have real effects. Advocates of the rational expectations theory have grounded their methodologies in econometric tests and microeconomic foundations. By challenging the inadequate explanations of the Keynesian approach and the macroeconomic concept of deficient aggregate demand equilibrium, they have sought to develop implications for the entire economic system (Gaytancıoğlu, 2010:141; Tobón, 2014:39-41).

According to the rational expectations theory, economic agents such as workers and firms do not possess perfect foresight about the future and therefore make decisions based on their expectations of the future. If economic agents, like workers and firms, use all available information to make the best predictions, they form rational expectations about the future. In this context, new classical economics is based on the rational expectations hypothesis proposed by Robert Lucas, a significant contributor to the conceptualization of the rational expectations theory from the University of Chicago. Before Lucas, testing the relationship between inflation and unemployment relied on the simple Phillips curve model, which showed that higher inflation led to lower unemployment. However, in Robert Lucas's new economics approach, the fundamental point is based on individuals' rational expectations regarding various macroeconomic variables such as money supply, price level, and GDP. These expectations are formed through rational examination of current economic data.

Assumptions of The Rational Expectations Hypothesis:
- ✓ According to the theory of rational expectations, individuals continuously learn from past experiences and mistakes

- ✓ when making decisions, people make unbiased predictions using economic concepts and available information.
- ✓ People understand how the economy works by observing macroeconomic variables such as prices, unemployment levels, and total output.
- ✓ Economic units and individuals understand how government policies and the overall state of the economy affect macroeconomic variables such as total output, unemployment, and the general level of prices by predicting changes (Agarwal, 2024, 1-3).

The rational expectations theory, one of the most important elements of modern macroeconomic theory, is characterized as an approach assuming that individuals optimally use all available information, including knowledge about current and future policies, to predict the future. The theory of rational expectations assumes that individuals make decisions about the future based on their rationality, available information, and past experiences. This approach, which assumes that individuals optimally use all available information, including knowledge about current and future policies, to predict the future, is considered a forward-looking approach. The widely accepted rational expectations hypothesis in macroeconomic theory does not imply that all individuals accurately predict future developments. According to the theory, any individual expectation can be incorrect. Since individual errors should not occur only in one direction, individual expectations should be distributed around the mean value of the variable. Therefore, expectations are unbiased on average, as individual errors should cancel each other out (Frömmel, 2017:5-6).

In his groundbreaking paper published in 1961, John Muth argued that individuals' expectations about future events are essentially the same as the predictions of relevant economic theories, as individuals are knowledgeable about potential future events. The theory of rational expectations assumes that the expectations of individuals and economic units are formed rationally. For example, if economic units and individuals believe that the inflation rate is determined by the rate of monetary expansion, they will optimally utilize all publicly available information regarding the rate of

monetary expansion to form expectations about future inflation rates. With rational expectations, economic units and individuals' expectations about economic variables will, on average, be correct and equal to their true values. This approach implies that individuals will not systematically form erroneous or biased expectations over time. If expectations were systematically wrong, individuals would learn from their mistakes, adjust their ways of forming expectations, and thus eliminate systematic errors (Prasarnsith, 2010:34-36).

4. Capital Asset Pricing Model

The capital asset pricing model which is one of the most significant models in the pricing of financial assets, was initially introduced by William Sharpe in 1964. This model suggests a linear relationship between market returns and the returns of financial assets. It was further developed by John Litner in 1965 and refined by Jan Massin in 1966. The foundation of capital asset pricing model rests upon the Modern Portfolio Theory proposed by Harry Markowitz in the 1950s. The capital asset pricing model plays a crucial role in determining the value of financial assets because it simplifies the modeling of systematic and unsystematic risks. This approach makes the valuation of financial assets more understandable mathematically. The model provides a simple mathematical framework for pricing financial assets, taking into account both systematic and unsystematic risks, thus aiding in the understanding of market performance. A significant development underpinning the model and playing a vital role in the advancement of modern finance has been the recognition that systematic risk cannot be mitigated through diversification. The capital asset pricing model utilizes the concept of beta, which measures the relationship between asset returns and the market, to model the contribution of systematic asset risk to diversified portfolio risk. Therefore unlike Markowitz's work, the capital asset pricing model addresses the concept of systematic risk in a more detailed and precise manner (Gündoğdu, 2018:6).

In the 1960s, theorists such as William Sharpe, John Litner, and James Tobin developed the capital asset pricing model (CAPM), which scientifically grounded the relationship between the expected return and risk of a financial asset. The capital asset pricing model is defined in the field of finance and economics as a model that establishes the relationship between the expected return and risk of a financial asset based on scientific principles. The capital asset pricing model has been defined in numerous ways. The financial asset pricing model not only determines the optimal risk level for a financial asset and establishes the relationship between the return and risk of a financial asset but also provides the functionality to compare the expected return of an investment at certain risk levels with its actual return. Additionally it enables the prediction of the price of a financial asset that has not yet formed under market conditions (Sümer and Hepsag, 2007:3-6).

According to another definition, the capital asset pricing model is an average variance model of security pricing that assumes returns can be entirely defined by the mean and variance of financial assets (Wagner and James, 1989:15-16).

The capital asset pricing model (CAPM) particularly for stocks is a model that explains the linear relationship between the expected return of a financial asset and its systematic risk. It generally measures the relationship between the expected returns of risky financial assets and the expected market return (Tansuchat, 2018:23).

$$E(\quad r_{it} \quad)- \quad r_{ft} = \beta_0 + \beta_1 E(r_{Mt} - r_{ft}) + \varepsilon_{it}$$
(7)

r_{ft} = Risk-free rate

ε_{it} = Asset-specific risk (unsystematic risk

β_i = The beta (β) of asset i (the relationship between the expected return of the asset and the market return)

r_{it} = Expected asset return

r_{Mt} = Expected market return

The model argues that the market portfolio, which encompasses all financial assets, is the fundamental determinant of an asset's return, or in other words, asserts that the value of a financial asset is determined by the market portfolio return (Elhossiny, 2005:6-7).

The mathematical explanation for calculating the cost of equity using the single-period capital asset pricing model is as follows:

$$R_i = R_f + (R_m - R_f) * \beta_i \quad (8)$$

Where:

R_i = Expected return on the stock (cost of equity)

R_f = Risk-free rate

β_i = Beta of the stock (the sensitivity of the stock's returns to the market returns

R_m = Expected market return

This formula indicates that the expected return on a stock is equal to the risk-free rate plus the product of the stock's beta and the market risk premium (the difference between the expected market return and the risk-free rate). As the beta coefficient increases or in other words, as the systematic risk level of a financial asset increases, the expected return from the financial asset will also increase (Düzakın, 2013:250).

4.1.Market Portfolio

The market portfolio, which comprises all risky and risk-free securities traded in the market, holds significant importance in the capital asset pricing model. It encompasses all securities subject to commercial transactions in the market and constitutes a potential investment portfolio. According to another definition, the market portfolio is a portfolio where each financial asset is weighted proportionally to its total market value in the market, encompassing all financial assets traded in the market. The expected return of the market portfolio equals the market return. To determine the market portfolio, the expected returns, standard deviations and risk-free

rates of all financial assets traded in the market must be known (Mottogrotto, 2017:3-6, Kulalı, 2016:277-280).
Assumptions of the Capital Asset Pricing Model (CAPM)

- ✓ All investors trading in the market hold homogeneous expectations. In other words, investors have similar views regarding the expected returns, volatilities, and correlations of financial assets.
- ✓ Since the capital market operates under perfect competitive conditions, there are no transaction costs in the market.
- ✓ The market operates efficiently and effectively.
- ✓ Investors trading in the market are rational
- ✓ Investors can engage in unlimited short selling.
- ✓ All borrowing and lending are assumed to be done at the same risk-free interest rate
- ✓ Investors are assumed to choose the portfolio with lower risk if the expected returns are equal between two portfolios with a certain risk level and if the risk levels are the same, they are expected to choose the portfolio with higher expected returns (Wagner and James, 1989:15-16, Elhossiny, 2005:6-7).
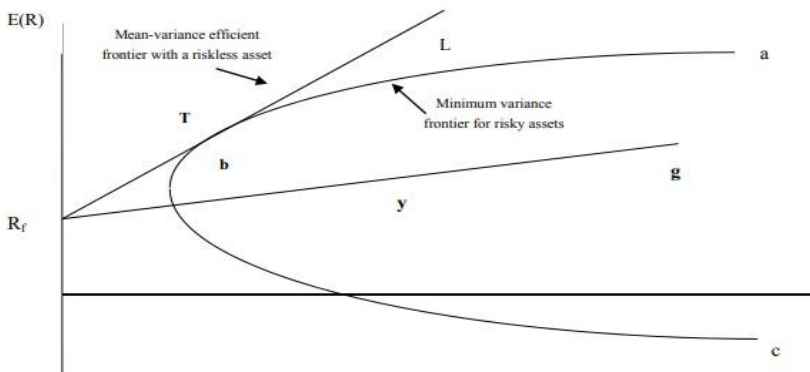

Figure 1. Investment Opportunities

Source: (Elbannan, 2015:217).

In Figure 1, the capital asset pricing model depicts the efficient frontier, connecting the risk-free rate point on the y-axis. Portfolio risk is measured by the standard deviation of portfolio

returns and displayed on the horizontal axis, while the expected return of the portfolio is shown on the vertical axis. The curves a, b and c represent the minimum variance frontier, encompassing different expected return levels, minimizing risk or maximizing return at different risk levels. Portfolios lying on the efficient frontier involve borrowing and lending strategies without including the risk-free rate. Investors will take various positions on the efficient frontier depending on their risk preferences, balancing risk and expected return. For instance, point (a) indicates an investor profile seeking high returns and accepting high risk accordingly. At point (b), a more moderate risk may be targeted with a mid-level expected return. When there is no risk-free borrowing or lending, only portfolios above point (b) along points (a, b, and c) are considered efficient portfolios because they maximize expected return at the same risk level. If investors allocate all their capital to a risk-free security, they will position themselves at point RF in Figure 1, representing a portfolio with zero risk and the risk-free rate of return. However, if investors allocate a portion of their investments to risk-free assets and the rest to a risky portfolio, they will take a position along the RF-g line. Along this line, combinations of risk-free lending and borrowing are possible. Specifically, the set of points between RF and y represent combinations of lending at the risk-free rate and investment, while the set of points along the straight line between y and g represent borrowing at the risk-free rate, with the income from borrowing used to augment investment in the portfolio g. Moreover, Figure 1 illustrates portfolios along the straight line between RF and g, where investors can borrow at the risk-free rate and utilize these borrowings to invest in portfolio g. This represents risk-free lending or borrowing investments (Elbanan, 2015:218).

The capital asset pricing model consists of two fundamental concepts. The first one relates to the present value of money. The risk-free interest rate represents the minimum return expected by an investor for any investment, in other words, zero risk. Zero risk, also known as the risk-free rate, is the interest rate on government bonds or treasury bills that investors perceive as having no risk. The second concept is the risk calculated with beta risk. Beta risk indicates how

risky a financial asset is compared to the overall market risk. It's a measure of the relationship or volatility between a financial asset and the market.

$$\beta_{İ} = \frac{Cov(r_{it}-r_{Mt})}{\sigma_M^2} \qquad (9)$$

r_{it}= The return of a financial asset.

r_{Mt}= The market return

$\sigma_M^2 =$ The variance of the market return

β_i= The beta of asset i, systematic risk (the relationship between the expected return of the asset and the market return)

$\beta_i > 1 =$ It means the financial asset is more variable than the market

$\beta_i < 1$= It means the financial asset is less variable than the market

The beta coefficient is a coefficient that tests the sensitivity of a financial asset's expected return to the market return in the capital asset pricing model (Tansuchat, 2018:23).

The beta coefficient indicates the relationship between a financial asset and the market or market portfolio. Beta coefficient, which measures the tendency of a stock, financial asset, or security to move in coordination with the market, is a crucial factor. Stocks or financial assets with a beta coefficient greater than 1 are called active financial assets. These financial assets are more variable and risky compared to the market, offering higher returns. Stocks with a beta coefficient less than 1 are considered more conservative as they are less variable and less risky. The expected return rate from these stocks is lower than the increase or decrease in the market portfolio return rate (Düzakın, 2013:250).
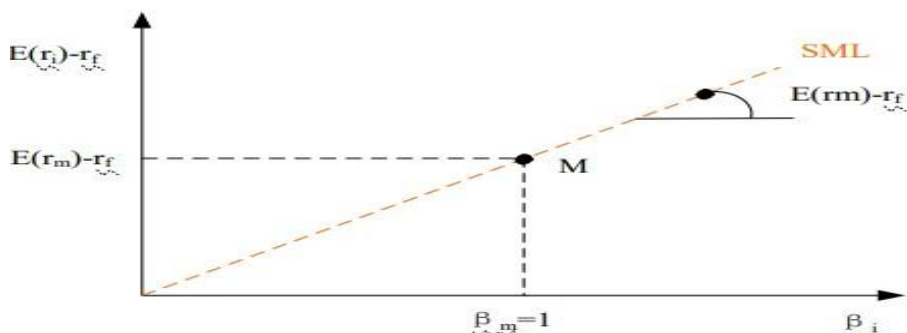
Figure 2. *Stock Market Line*

Source: (Li, 2023:1901)

In Figure 2, the horizontal axis of the coordinate plane represents the risk measure β, while the vertical axis depicts expected return. The straight line market (SML), which is a straight line that combines the market risk premium with the risk-free interest rate, illustrates the risk-return relationship of portfolios. At point M, where the market portfolio resides, $\beta m = 1$, meaning the deviation from the mean is 1 unit. The higher the beta value of a security, the greater the expected return it is expected to provide; however, low beta values indicate less potential return. The capital market line (CML) depicts the expected return of an investor in proportion to their risk. When the market is in equilibrium, the risk and return of any asset or portfolio are consistent with this line, meaning that actual prices are equal to theoretical equilibrium prices. However, when the market is not in equilibrium, points outside the capital market line represent the relationship between expected return and risk. The factors that cause deviations in the return rate of an asset from the expected return rate are referred to as sources of risk. These factors can be categorized into risks influenced by general market conditions and those arising from the characteristics of the asset. Risk factors influenced by general market conditions are termed systematic risk, while risks arising from the characteristics of the asset are called non-systematic risk (Sabuncu, 2005:4).

4.2. Sistematic Risk

William Sharp, who made significant contributions to the development and formulation of the Capital Asset Pricing Model, defined systematic risk as the portion of the variability of a financial asset that can be attributed to a common factor. Also referred to as variable risk or market risk, systematic risk is the minimum level of risk that can be achieved for a portfolio through diversification among a large number of randomly chosen financial assets. It represents the risk of holding the market portfolio and thus is a risk factor beyond the control of individual firms. Systematic risks are those that affect all financial assets in the market to some extent as market activity occurs (Grant, 2001:29).

4.3. Non-Systematic Risks

William Sharp defined the portion of variability of a financial asset that can be diversified as non-systematic risk. In the literature, this type of risk is also referred to as diversifiable risk, specific risk or company-specific risk. Non-systematic risks include events such as natural disasters and strikes. In this context, the tampering incident involving Johnson & Johnson's Tylenol capsules in October 1982 and the tragic chemical explosion at the Union Carbide factory in Bhopal, India, in December 1984 both had negative impacts on the stock prices of these companies. In summary, non-systematic risks arise from internal operational, managerial, production and human resources issues within companies. These risks specific to individual firms can be mitigated by diversification or altering the number of assets in the portfolio to minimize them (Grant, 2001:29-30; Elhossiny, 2005:6-7).

The financial asset pricing model argues that specific risks can be diversified away by market portfolios and therefore, the market can compensate investors for only taking systematic risks, also known as a premium or compensation (Elhossiny, 2005:6-7).

The capital asset pricing model not only allows for the prediction of the price of a financial asset that is traded in the market

but has not yet formed a price, but also reveals the relationship between the expected return and risk of a financial asset. The model indicates what the return on an investment should be at a certain level of risk. Therefore it provides the opportunity to compare the theoretical value of an investment with its realized value (Sümer and Hepsağ, 2007:6).

5. Arbitrage Pricing Model

Arbitrage pricing model introduced in 1976 by Stephen Ross and developed and formulated by the same author in the following years, it is one of the most preferred multifactor asset pricing models for calculating the returns of assets traded in capital markets. The assumptions and ideas of the arbitrage pricing theory were largely formulated by Stephen Ross in response to inefficiencies and criticisms of the capital asset pricing model in areas such as inflation, GDP, interest rates, foreign exchange, tax rates, energy prices, diversified stock indices, international finance, and human capital. The primary assumption of the arbitrage pricing theory, alternatively expressed as its underlying fundamental assumption, is that only a small number of factors are significant. Stephen Ross developed the fundamental valuation principle in pricing financial assets using linearity, positivity, and risk-free valuation concepts (Cochran, 1988:7-10).

The concept of arbitrage can be defined as the act of buying and selling the same commodity in different markets to exploit existing or potential price differences, thereby generating profit without being exposed to any risk. Arbitrage is based on the law of one price. According to the law of one price, a good has a single price in a market under perfect competition conditions where there is no restriction. However, if the same security, precious metal, money or commodity has different prices in two different markets, this situation provides risk-free return, i.e. arbitrage opportunity for investors trading in the market. Arbitrageurs can profit without assuming any risk by buying commodities such as securities, currencies, goods or precious metals from markets where they are

cheaper and selling them in markets where they are more expensive. Arbitrage opportunities arise from the different pricing of identical securities or from the trading of the same securities at different prices in different markets, leading to risk-free profit opportunities (Gündoğdu, 2018:143; Radikoko, 2009:4).

The primary objective of engaging in arbitrage transactions is to capitalize on fluctuations in the prices of financial assets in the market and achieve risk-free returns. The foreign exchange market is the most prominent market for arbitrage transactions. The most distinguishing feature of arbitrage transactions is the simultaneous exploitation of price differences in the market without assuming any risk, making it fundamentally distinct from speculation. Therefore, its risk-free nature is the most significant characteristic that sets arbitrage apart from speculation (Çakır, 2012:34).

The arbitrage pricing theory is a theory that posits that the expected return of a financial asset can be modeled as a linear function of various macroeconomic factors or theoretical market indices, with the sensitivity to changes in each factor represented by a factor-specific beta coefficient. In financial literature, the Arbitrage pricing model posits a linear relationship between the return of a security and certain specific macroeconomic factors. In the case of a balanced capital market, according to the Arbitrage pricing model, the expected return of a stock is calculated as follows

$$E\ (R_i) = R_{FR} + \beta_{i1}(F_1 - R_{FR}) + \beta_{i2}(F_2 - R_{FR}) + L + \beta_{in}(F_n - R_{FR}) \qquad (10)$$

In the equation

$E(R_i)$ = Expected rate of return for stock i

β_{i1} = Sensitivity of stock i to economic factor 1

β_{i2} = Sensitivity of stock i to economic factor 2

F_1 = Expected value of factor 1

F_2 = Expected value of factor 2

F_n = Expected value of the factor n

β = Beta Coefficient

R_{FR} = Risk-free rate of return

Arbitrage pricing theory relates the expected return of a security to factor sensitivities and argues that factor risk is crucial in the pricing of financial assets (Uwubanmwen and Obayagbona, 2012:2-3).

According to another mathematical formulation, the market return generation process of the arbitrage pricing model can be formulated as follows (Christofi et al, 1993:68).

$$r_i = E(r_i) + \sum_{j=1}^{k} b_{ij} f_i + \varepsilon_i \qquad (11)$$

f = Vector of common factors with zero mean
b_i = Vector of factor loadings on asset i
$E(r_i)$ = Expected return of asset i
ε_i = Shocks specific to asset i or asset-specific risks (unique portion of asset return)

The arbitrage pricing model differs from the capital asset pricing model in its interpretation of risk factors for financial assets. The rate of return obtained from the arbitrage pricing model is used to linearly price financial assets. The price of a financial asset should be discounted to the expected end-of-period price indicated by the model; if the price diverges, investor arbitrage behavior will bring the price back to the same level (Uwubanmwen and Obayagbona, 2012:2-3).

The Arbitrage Pricing Model is Based on The Following Assumptions

- ✓ Investors always prefer a higher return.
- ✓ Investors are risk averse
- ✓ Investors are homogenous and have the same risk expectations.
- ✓ The capital market is under conditions of perfect competition; therefore, there are no transaction and tax costs in the market.
- ✓ There is no arbitrage opportunity in the market.
- ✓ Financial asset returns are generated by a linear factor.
- ✓ There are many assets in the market (Elhossiny, 2005:7, Handa, 1986:6).

Although the arbitrage pricing model is a multi-factor model, i.e. a multi-beta model, it does not emphasise the identity of the factors as

the number and nature of the factors may change over time (Uwubanmwen and Obayagbona, 2012:2-3).
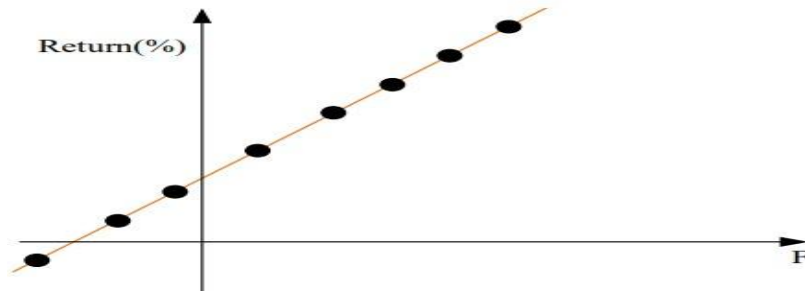

Figure 3. Returns Versus Systematic Risk

Source: (Li,2023:1903).

For a well-diversified portfolio, the relationship between return and systematic risk is depicted by the straight line in Figure 3. The arbitrage pricing theory contends that there are no arbitrage opportunities in the market. According to this theory, when arbitrage opportunities arise, every investor in the market seeks to take as many positions as possible to exploit the opportunity for risk-free returns. This situation leads to market imbalance; however, as new arbitrage opportunities emerge, this imbalance diminishes and eventually disappears. At this point, the trading space for arbitrageurs narrows, and opportunities in the market become limited. Consequently, the price of the security eventually reaches equilibrium. In market equilibrium, the returns of all completely diversified portfolios are determined solely by systemic factors, and all these factors lie along the security market line depicted in Figure 3. Otherwise, arbitrage opportunities may arise.

5.1. Different Versions or Alternative Models of Arbitrage Pricing Theory

Arbitrage pricing models are categorised according to the number of risk factors affecting stock returns. These models can be

analysed under three main headings: Single Risk Factor, Two Risk Factor and Multi-Risk Factor arbitrage pricing models.

5.1.1. Arbitrage Pricing Model with One Risk Factor

The simplest version of Arbitrage Pricing theory is called the Single Factor Arbitrage Pricing Model. This model suggests that only a single systemic risk factor determines financial asset returns. The relationship between the systematic risk factor and the expected return is expressed linearly. This model is used as a basic tool for valuing financial assets and measuring risk.
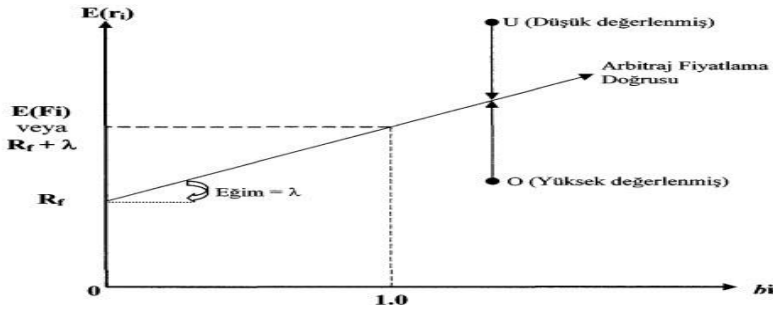

Figure 4. *Arbitrage Pricing Line*

Source*: (Sürmeli,2004:23)*

Figure 4 presents the arbitrage pricing figure illustrating the relationship between risk and return. In this diagram, "bi," representing the risk of the financial asset, is plotted on the horizontal axis, while "E(ri)," representing the expected rate of return, is measured on the vertical axis. This figure is an important tool for asset pricing and risk management because it visually illustrates the expected rate of return corresponding to a certain level of risk. The point where the vertical axis of the arbitrage pricing figure intersects is called "Ri," representing the risk-free rate of return. The slope of the line is determined by the term λ in the equation. According to the arbitrage pricing theory, in equilibrium, all financial assets with the same risk level are fully interchangeable with each other, and although these assets are expressed in different

terms, they have the same rates of return and should be on the arbitrage pricing figure (Sürmeli, 2004:23).

5.1.2. Arbitrage Pricing Model with Two Risk Factors

In the model that predicts that two separate systemic risk factors affect asset return rates, the formula expressing the link between these two risk factors and expected return is as follows:

$$E\ (\ R_t\ )\ =\ R_F\ +\ \beta_{t1}\ \ \ \delta_1\ +\ \beta_{t2}\ +\ \delta_{t2} \quad (12)$$

$E\ (R_t)$ = x projected return on financial asset
R_F = Risk-free return
β_{t1} = Sensitivity of financial asset x to risk factor 1
β_{t2} = Sensitivity of financial asset x to risk factor numbered 2
δ_1 = Risk premium for risk element 1
δ_2 = Risk premium for risk element 2

The two-factor arbitrage pricing model is a frequently used analytical tool in financial asset pricing. This model acts based on two main factors to determine the return of an asset. These factors are a certain risk factor, which usually reflects the overall performance in the market and affects the return of a specific asset.
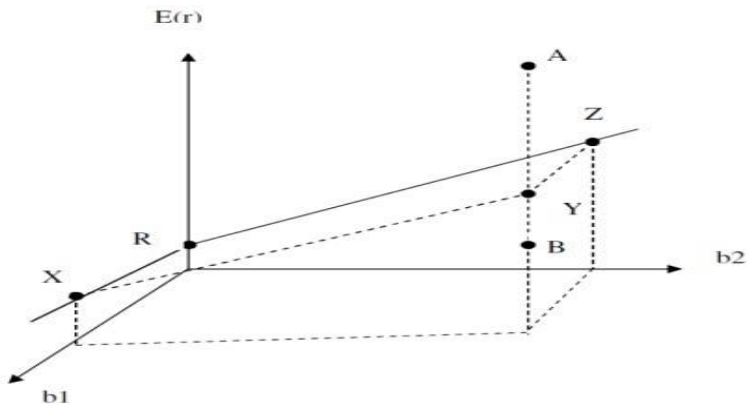

Figure 5. *Two Factor Arbitrage Pricing Model With Two Factor*
Source: *(Bıtırak,2010:88)*

In Figure 5, the arbitrage pricing plane graphically summarises the complex relationship between the asset expected rate of return and the two systemic risk factors. In equilibrium, all financial assets should be in a certain position on this plane. Point A represents an undervalued asset with a higher expected rate of return than level b1. Point B is considered a highly valued asset as it has a lower expected rate of return than level b2. Assets located above the pricing axis are all being sold at low prices. Arbitrageurs will attempt to normalize their expected returns by increasing their price bids to raise the values of these undervalued assets. All assets located below the arbitrage pricing plane exhibit high prices. Arbitrageurs will endeavor to bring their expected returns to normal levels by reducing their price offers to decrease the values of these overvalued assets (Bıtırak, 2010:88).

5.1.3. Multi-Risk Factor Arbitrage Pricing Model

Various risk factors affecting prices can have varying effects on financial assets at different times and under different conditions. When the risk factors of a model change or cease to exist, transitioning to a multifactor model occurs by adding new risk factors; this model is defined as a k-factor model. Different risk factors (F_1, F_2, $F_3...F_k$) are defined and they are associated with sensitivity coefficients (b_1, b_2, $b_3...b_k$) representing the impacts of these factors on assets.

$$E(R_i) = R_F + F_1\, b_{i1} + F_2 b_{i2} + \ldots\ldots + F_k b_{ik} + \varepsilon_{it} \tag{13}$$

or

$$E(R_i) = \lambda_0 + \lambda_1 b_{i1} + \lambda_2 b_{i2} + \ldots\ldots + \lambda_k b_{ik} + \tag{14}$$

in the equations

$E(R_i)$ = Expected return of asset i

R_F = Yield on government bonds

b_{ik} = Parameter sensitivity

λ_0 = Expected return of asset i for unsystematic risk

λ_k = Market value of risk for factor k

F_k = Macroeconomic factor

Since arbitrage pricing theory is based on systemic factors, the variables that best represent these risks naturally rely on macroeconomic indicators that can potentially influence the overall economy, i.e., indicators affecting the general performance of the business. Arbitrage pricing theory typically reflects major risks based on large-scale economic indicators. Studies in financial literature often emphasize real economic indicators such as gross national product, industrial production and investment expenditures, along with macroeconomic variables including inflation, interest rates, money supply, and exchange rates (Sabuncu, 2005:63-64; Çetin and Bıtırak, 2015:8).

6. Comparison of Capital Asset Pricing Model and Arbitrage Pricing Theory Model

✓ Although the capital asset pricing model and arbitrage pricing theory express the relationship between expected return and risk linearly, they adopt fundamentally different modelling approaches. Markowitz's mean-variance model underpins the capital asset pricing model as a consequence of market equilibrium. However, arbitrage pricing theory assumes that prices are related to certain factors and risk premiums may vary depending on these factors.

✓ Arbitrage pricing theory uses a multifactor approach based on the theory of equilibrium without arbitrage. It derives returns from the process of generating stock returns and uses the concept of arbitrage to explain equilibrium formation, which is a variable process. Investors seek to maximise their positions when arbitrage opportunities arise in the market, preferring to actively trade arbitrage portfolios to achieve risk-free returns.

✓ The assumptions of the capital asset pricing model and the arbitrage pricing model are also different. Compared to the arbitrage pricing theory model, the assumptions of the capital asset pricing model are very strict, which leads to the model being limited to only one investment period.

- ✓ To complete the analysis of the capital asset pricing model effectively, it requires an efficient market-based portfolio and assumes frictionless markets, disregarding taxes and transaction costs. Additionally, in terms of constraints on investors, all investors are expected to avoid risk and have the same view on security valuation and economic conditions, a condition referred to as the assumption of consensus expectations. The arbitrage pricing theory model does not have these constraints and does not explicitly specify investors' risk preferences, nor does it require investors to plan and implement investment strategies within a single investment horizon. Additionally, while the capital asset pricing model emphasizes the importance of market portfolios being efficient, the arbitrage pricing theory does not particularly highlight the significance of arbitrage market portfolios.
- ✓ Arbitrage pricing theory does not analyse a single investment period and ignores tax issues. Investors can freely borrow and lend at risk-free interest rates, which is a more realistic approach. The basic assumptions of the capital asset pricing model make the mathematical formulation easy to understand.
- ✓ In terms of risk, the capital asset pricing model explains security risk only by the beta coefficient relative to the market portfolio. While this approach informs investors about the extent of risk, it ignores the source of risk.
- ✓ The capital asset pricing model is a single-index model and assumes that only market forces affect stock returns, thus ignoring the effect of non-market factors.
- ✓ The arbitrage pricing model assumes that security returns are linearly related to various factors (market factors, inflation, industry factors, interest rate changes, etc.). This provides investors with the ability to identify the source of security risk and to assess risk at various levels, thus broadening their horizons of thought. (Li, 2022:1904-1905).

7. Conclusıon

The concept of efficiency in financial markets is based on the idea that prices respond quickly and fairly to current information. This means that they accurately reflect the current state of the market. It is not logical to assume that prices are excessively high or low since they already incorporate all known information. Information is quickly reflected in prices and investors do not have the opportunity to quickly benefit from this information. Therefore markets are considered efficient. The efficient market hypothesis is one of the important theories in modern finance. Market efficiency has formed the basis of many financial models and thus guided investment strategies. If a capital market is not functioning efficiently, the pricing mechanism cannot effectively allocate capital in the economy, leading to adverse consequences in economic activities. With the increasing number of studies based on new statistical data, some financial researchers have overlooked many reports about market inefficiency. The efficient market theory and the Random walk hypothesis are prominent concepts in finance. The Random walk suggests that investors cannot exploit insider information to achieve excessive returns by capitalizing on past price movements, though it does not imply complete market efficiency.

The capital asset pricing model is a financial model for pricing securities that implies a linear relationship between risk and return. According to the capital asset pricing model, the important risk for a financial asset is systematic risk. A measure of systematic risk is the beta coefficient, which represents the sensitivity of the asset's return to a change in the return of the market portfolio. Arbitrage pricing theory does not accept the basic assumption of the efficient market hypothesis. This is because the fact that the response of each financial asset to macroeconomic risk factors varies in different dimensions makes the efficient market concept questionable. As a result, arbitrage pricing theory can be considered as a particular special type of capital asset pricing model, while the capital asset pricing model can be seen as a complement to arbitrage pricing theory. However, the arbitrage pricing theory model has some disadvantages: the model cannot clearly show the relevant risk

factors and risk premiums; the calculation process can become complex with increasing risks, making it difficult to analyse arbitrage opportunities. Both models encapsulate the main ideas of modern finance theory and can offer venture capitalists limited but in-depth insights.

In this context, when formulating investment strategies, it is paramount for portfolio managers, financial institutions, policymakers, and global investors to assess the efficiency of the relevant market. This necessitates a thorough understanding of both traditional and modern finance theories, and in light of this knowledge, it is considered crucial to diversify plans, strategies, and investments. Additionally, the aim of the study is to provide a theoretically meaningful contribution to the financial literature.

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CHAPTER IV

Mutual Funds As An Investment Alternative For Small Investors in Emerging and Volatile Financial Markets: The Case of Turkey

Murat Acet[1]

Introduction

If it is necessary to classify the investments made in financial markets according to their duration, according to the common approach; it is possible to name the investments made for less than one year as Money Market Investments and the investments made for more than one year as Capital Market Investments (Babalos, et.al., 2014:35). Capital markets offer many investment alternatives for investors with longer-term plans. The performance of these investment alternatives also depends on many criteria in terms of current market characteristics. From the investor's perspective, choosing the right financial instrument and making a profit requires

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at least close monitoring of economic and market dynamics and a basic level of financial literacy. One might even say that this is a prerequisite for investment success. For small non-professional investors, achieving high investment performance, or at least preventing asset depreciation in an inflationary environment, is difficult for a variety of reasons, including time constraints, lack of education and knowledge, and diversity of interests (Daniel et al., 1997:52 .)Investment performance becomes a more complex equation in emerging financial markets, especially in the presence of a volatile financial conjuncture. It requires looking at many interacting factors and maintaining psychological control (Emiris, 2002:200).

Therefore, small investors are forced to turn to professional portfolio management services and/or prefer professionally managed investment instruments (Turgut, 2015).

Equity investment has a very important place among capital market instruments. However, in order to improve investment performance, investors need to be able to read the macroeconomic conjuncture, market and sector dynamics, and perform fundamental and technical analysis (Demidenko, 2020). However, Mutual Funds, which are an alternative to stocks, provide convenience to investors in terms of being professionally managed and transferring the above-mentioned work, transactions and competencies to sector professionals.

The distinction between developed and emerging markets in financial markets has a history of approximately a quarter of a century in the literature. The distinction is made based on three criteria. These are financial size, financial depth and financial

integration (Baele et al., 2004:6). Financial Breadth It refers to the quantitative size of financial institutions. Financial Depth relates to the share of financial assets in total income. Financial Integration is an indicator of the extent to which it is integrated with international financial markets (Ayuso & Blanco, 2001:11).

Volatility in financial markets refers to sharp upward and downward movements in the prices of financial assets. In this context, the so-called VIX index, which is an index measured over 500 stocks in the S&P, is a generally accepted index for its ability to predict price volatility.

As an emerging market and affected by fluctuations in international financial markets, the Turkish financial market requires caution for small and non-professional investors. In this respect, it is important and motivating for small investors who want to make long-term and valuable investments to entrust their investments to professionals.

In light of this information, small investors who want to make long-term investments and who do not have professional knowledge and competencies in this field actively turn to mutual funds. Because mutual funds are one step ahead of alternative investment instruments in terms of being managed by professional staff (Metin, 2018).

A-The Place of Turkey's Financial Market in The World

Financial Markets are the markets where financial assets, which are negotiable instruments, are bought and sold. Financial markets have five basic components.

1. Those with excess funds (Savers): These are economic units whose income exceeds their expenses, who make savings and offer these savings to the financial markets.

2. Those with fund deficiency: These are economic units that need funding sources.

3. Intermediary institutions: These are financial actors that serve as a bridge between savers and those who lack funds.

4. Financial Instruments: These are instruments that create a debt or partnership relationship and document the relationship between the parties on a legal basis.

5. Regulatory and supervisory organizations and legislation.

Data on financial markets in Turkey are as follows (TSPB: 2024):

Turkey's Total Market Value as of September 2024 is 17.65 Trillion TL. The total number of investors is 36 million people. The number of investment accounts is 85 million. There are 625 companies issuing shares in the financial markets in Turkey, approximately 570 of which are within the BIST. The total number of shares is 12.1 Trillion TL. The total number of investors of shares is 7,135,238. There is an investment fund size of approximately 4 Trillion TL in Turkey. The number of mutual fund investors is 5,368,165.

There is a total of 1.12 Trillion TL worth of State Domestic Borrowing Securities and the number of investors in this field is 18,432 people. While the total size of Private Sector debt

instruments is 389.5 Billion TL, the number of investors investing in this instrument is 55,097.

There are structured financial products worth 35.33 Billion TL. And the number of investors is 261,033 people.There are 42,058 investors in the crowdfunding system and the total monetary size is 1.07 Billion TL.

In the Turkish agricultural products market, there are 17 products covered by electronic documents issued by agricultural producers representing licensed warehousing products (ELÜS), and 4,459 people are investors in this financial instrument.

There are 3,376 companies registered in the bearer share registration system, with 11,968 shareholders.

In Turkey, 71 Investment Trusts, 5 Portfolio Management Companies, 69 Banks and 64 Intermediary Institutions operate in the Financial Market. BIST ranks 27th in the world according to market value with 418 Billion Dollars. It has a share of 3 per thousand in the total. It ranks 16th in the world in terms of transaction volume and has an annual volume of 1.317 billion dollars with a share of 5 per thousand.

Türkiye ranks 29th in the world in terms of investment funds with 54 Billion Dollars and a share of 1 per thousand in the total. While the ratio of investment fund portfolio size to national income around the world was 77%, for our country this ratio remained around 5 percent.It ranks 22nd in the world with 545 companies listed on the BIST stock exchange. In the light of all this information, it is possible to define Turkey's financial market as a developing financial market.

B-Mutual Funds

Mutual funds are managed by expert staff who can read the macroeconomic conjuncture, sector and company data, and all variables of the investment atmosphere, develop forward-looking projections, know how to avoid risks, and manage the fund during a crisis.

Risk definitions were made in investment funds in 3 main groups and 7 subcategories: low, medium and high. The most basic definition of risk in investment funds is price volatility. According to the price / time chart, the appearance of the investment fund with relatively lower risk is similar to the following. (Özeroğlu, 2014:18)
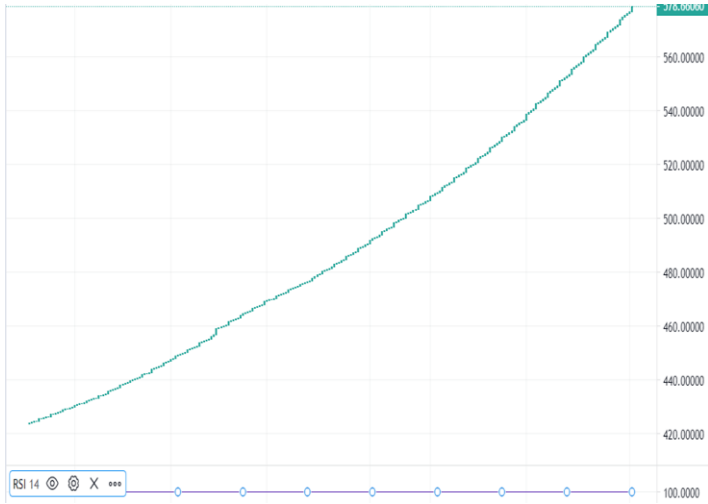

Figure 1. Example price/time chart of a low risk a mutual fund

The price/time graph of mutual funds that fall into the medium-risk group in mutual funds contains relative upward and downward breaks (Saleck, 2018). The following example is a price/time graph of mutual funds with medium-risk characteristics. Trend breaks are limited.

Figure 2. Example price/time chart of a medium risk a mutual fund

High-risk mutual funds have more volatile price/time charts with sharp upward/downward trend breaks. Trend breaks are more clearly distinguishable. The following example shows the price/time chart of a mutual fund in the high-risk group.

Figure 3. Example price/time chart of a high risk a mutual fund

There are 1578 Mutual Funds in Turkey. 678 of these are traded within TEFAS. There are 888 mutual funds that are not traded

in TEFAS. The remaining funds are closed for trading. The mutual fund market has a very active structure. Although the numbers are constantly changing, the table valid as of the time period of the study is presented below.

Mutual Funds can be categorized into 14 main groups, although there are many sub-groups. The names of these mutual fund groups and the number of funds traded are as follows:

1. Debts Mutual Funds (51), traded on TEFAS (51)

2. Fund Mutual Funds (73 units), traded on TEFAS (72 units)

3. Equity Mutual Funds (106 units), traded on TEFAS (105 units)

4. Mixed and Variable Mutual Funds (141 units), traded on TEFAS (129 units)

5. Participation Finance Mutual Funds (79 units), 75 units traded on TEFAS)

6. Precious Metals Mutual Funds (17), traded on TEFAS (17)

7. Money Market Mutual Funds (57 units), traded on TEFAS (35 units)

8. Currency Hedge Funds (468 units), traded on TEFAS (66 units)

9. Equity Hedge Funds (123 units), traded on TEFAS (38 units)

10. Participation Hedge Funds (46 units), traded on TEFAS (23 units)

11. Short-Term Hedge Funds (9 units), traded on TEFAS (4 units)

12. Other Hedge Funds (378 units), traded on TEFAS (67 units)

13. Fund Basket Hedge Funds (4 units), traded on TEFAS (3 units)

14. Money Market Hedge Funds (2 units), traded on TEFAS (2 units)

Mutual Funds are investment instruments that can be traded by authorized brokerage houses as well as banks, depending on an investment account. No special competence is required for buying and selling. As such, they can be easily traded even through banks' mobile applications.

In Turkey, there are 52 joint stock companies that are authorized Institutional Fund Managers.

Mutual funds are subject to three different tax rates (withholding tax).

Those exempt from tax (239), those traded on TEFAS (152),

Those with a withholding tax rate of 7.5% (259 units), and those traded on TEFAS (210 units),

Those with a withholding tax rate of 10% (1080 units), and those traded on TEFAS (325 units).

There is also a distinction based on the interest rate sensitivity of the investor.

There are 125 interest-sensitive mutual funds on TEFAS.

In terms of management style, mutual funds can be divided into two different groups. These types and the number of funds are as follows:

1. Actively Managed Mutual Funds (1345 units), traded on TEFAS (668 units)

2. Index (passive) management based mutual funds (231 units), traded on TEFAS (18 units).

Mutual funds are divided into 7 different Risk groups under three headings.

- Low Risk (1 and 2),

- Medium Risk (3,4 and 5),

- High Risk (6 and 7).

The number of mutual funds included in these risk groups is as follows:

- 1_Low Risk Group (130 units), traded on TEFAS (73 units),

- 2_Low Risk Group (93 units), traded on TEFAS (53 units),

- 3_Medium Risk Group (86 units), traded on TEFAS (44 units),

- 4_Medium Risk Group (89 units), traded on TEFAS (56 units),

- 5_Medium Risk Group (142 units), traded on TEFAS (62 units),

- 6_High Risk Group (609 units), traded on TEFAS (323 units),

- 7_High Risk Group (167 units), traded on TEFAS (66 units).

Management fees of mutual funds can be categorized into 3 groups: Low, Medium and High Level. Mutual Funds with an annual management fee of 1% or less can be classified as "Low", those with an annual management fee between 1% and 2% can be classified as "Medium" and those with an annual management fee above 2% can be classified as "High" Mutual Funds.

- Low Management Fees (746 units), traded on TEFAS (120 units)

- Middle Management Fee (438 units), traded on TEFAS (276 units)

- High Management Fee (387 units), traded on TEFAS (291 units).

Mutual funds are easy to convert into cash. In this respect, it can be said to be a liquid investment instrument. There are buying and selling value dates such as T+0, T+1, T+2, T+3, T+4. Accordingly, it is possible to convert to cash and from cash to assets 0-4 days after purchase and sale.

The investor's share in the fund portfolio is called "Participation Share". In mutual funds within TEFAS, the rights and obligations of the investor's participation share are under the supervision of the state.

The days and hours for the investor to buy and sell mutual funds are predetermined. Transactions made within this period are valid. It may vary from fund to fund. The bank or authorized

intermediary institution informs investors about all these and other issues by issuing bulletins periodically.

Mutual fund bulletins include fund strategy, investor profile, threshold value, information about the fund (Fund code, ISIN Code, date of establishment of the fund, total value of the fund, unit price, fund management fee, principles of purchase and sale), Asset Allocation, Periodic percentage returns, Risk group, Risk performance indicators, Details of the fee to be collected from the fund.

C- Return Performance in Mutual Funds

There are a number of common approaches to measuring return performance in mutual funds. First of all, mutual funds are ranked in all main and subcategories by weighting return and risk metrics. (Blake et al., 1993:66) Returns are based on monthly, quarterly, semi-annual, semi-annual, one-year, three-year and for some mutual funds 5-year periods. As a result of all these studies, an average score is obtained and those above this average are ranked from top to bottom. (Guillaumin, 2009:20)

However, in order to support this process and to provide bidirectional control, the total portfolio size of the fund, the positivity in monetary inflows and outflows, and the total number of investors should be taken into account in the ranking. (Alkan & Kuşaksızoğlu, 2017:3) The evaluation criteria and risk metrics are generally as follows:

1. Standard Deviation

It measures the distance/proximity of the return of the mutual fund for the measured time period to the average return. Monthly

return periods are generally preferred for mutual funds. Standard deviation is important because it takes price volatility into account. In any two consecutive periods, it is preferred that the absolute value difference between the two periods is less, rather than a loss of 8 percent in one period and a gain of 11 percent in the following period. In other words, the lower the standard deviation, the more stable that investment instrument is (Chang & Lewellen, 1984:57).

2. Coefficient of Variability

When calculating the standard deviation of high-priced and low-priced investment funds, misleading results may be obtained. The coefficient of variation is used to eliminate this situation. The coefficient of variation is the calculation of the standard deviation as a percentage. Thus, the confusion created by the misleading standard deviation results between the high-priced and low-priced investment funds is eliminated (Çakırlı, 1991).

3. Sharpe Ratio

Used to analyze the return of mutual funds. It is used to compare the risk-return profile of one mutual fund with another mutual fund. This ratio is desired to be high (Sharpe, 1966:39).

4. Downside Risk Ratio

It looks at the relationship between the realized return and the expected return of the mutual fund. It is undesirable for the expected return to be higher than the realized return. The convergence of these two values is a measure of success (Çetin, et al., 2011:5).

5. Number of Days with Negative Returns

It gives the number of days that the Mutual Fund ended the period with a negative return within the analyzed period. Low is a success criterion.

6. Percentage of Days with Negative Returns

It is the percentage of the number of days with negative returns in the total number of days in the analyzed period.

7. Maximum loss

It usually gives the rate of the largest decline in percentage or value over the last one-year period.

8. Age of the fund

The period of uninterrupted trading of a mutual fund in years, months and days. Mutual funds with a long track record and a steady rise are preferred.

9. Portfolio Size of the Fund

Allows us to see the fund's monetary size comparatively among all and similar mutual funds. It helps us to distinguish the funds preferred by investors.

10. Number of Investors

As the number of investors in a mutual fund increases, the number of investors who trust and invest in the fund gives confidence to potential investors (Oran, et al., 2017:3).

11. Management Fee

Annual percentage expression of the Fund's management fee.

12. Maximum Fund Operating Expense

It refers to the upper limit of the total expenses covered by the Fund.

13. Number of Fund Shares

Represents the number of shares of the mutual fund in circulation during the period under review (usually daily).

14. Occupancy Rate

The percentage ratio of the number of shares in circulation to the total number of shares.

15. Buying Value Date

It indicates how long after the purchase order is given, the mutual fund will gain value.

16. Sales Value Date

It expresses how long after the sales order is given, the mutual fund will gain value (will be redeemed).

17. Minimum Buying Quantity

The minimum amount (in shares) that the trader can buy during the trading period (daily).

18. Maximum Buying Amount

The maximum amount (in shares) that the trader can buy during the trading period (daily).

19. Minimum Sales Amount

The minimum amount (in shares) that the trader is allowed to sell during the trading period (daily).

20. Maximum Sales Amount

The maximum amount (in shares) that a trader is allowed to sell during a trading period (daily).

D- VIX Index

It is an index that measures the covered volatility in US S&P 500 index options. It is a common and widely accepted measure. It is calculated by the Chicago Board Options Exchange (CBOE). It shows the volatility expectation in financial markets for the next 1-month period with reference to surveys (Yıldız, 2024).

The VIX Volatility index expresses the potential anxiety implicitly present in the market. It is a measure that makes its impact felt in the market after a very short period of time. It is the energy of accumulated volatility. It is particularly effective in near-term call/put option trades on the S&P 500. Unlike many indicators, the VIX is accumulated energy for the future. Many indicators build their future forecasts on the assumption that the same situation will be similar to the same situation by referring to past data. VIX, on the other hand, attempts to measure expectations and concerns about the future. The VIX index tries to measure investor confidence and anxiety. Near-term 30-day measurement is made and the value found is expanded annually (Çoban, 2024).

As concern and volatility expectations about financial markets increase, the VIX Index value increases, and as it decreases, it decreases. As the VIX index value increases, the demand for Put options increases.

An index value above 20 means a high volatility expectation, between 20 and 30 indicates increased risk in the market, and above 60 indicates the potential for serious crisis and turbulence. Below 12% means a normal market risk and volatility expectation (Çoban, 2024).

In the table and graph below, the weekly data of all indices considered over the last one-year period are taken into account. Along with

the VIX index, BIST 100 index, YOT (Yapı Kredi Debt Securities Fund), YKT (Yapı Kredi Gold Fund), XAUTRY (Gold Ounce Turkish Lira Index) are analyzed comparatively. The VIX interaction of financial instruments with different dynamics is analyzed. While selecting mutual funds, the most successful performing mutual funds in the last one-year period and different groups of mutual funds were selected.
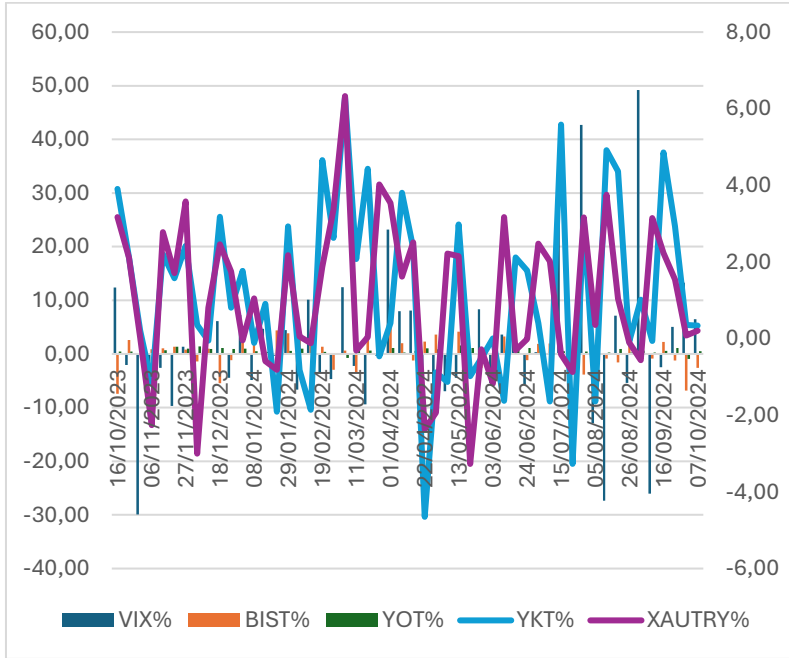

Figure 4. Weekly changes in VIX, BIST, YOT, XAUTRY and YKT.

Table 1. Weekly changes in VIX, BIST100, YOT, XAUTRY and YKT

Week	VIX	BIST 100	YOT	YKT	XAU TRY	XAU TRY (%)
11/03/2024	14.41	8828.70	18.885271	0.314291	69262.01	-0.31
18/03/2024	13.06	9111.50	18.999576	0.328218	69287.32	0.04
25/03/2024	13.01	9142.40	19.217212	0.326692	72075.83	4.02
01/04/2024	16.03	9618.83	19.429645	0.328026	74626.20	3.54
08/04/2024	17.31	9814.19	19.485031	0.340528	75836.80	1.62
15/04/2024	18.71	9693.46	19.594460	0.348569	77738.92	2.51
22/04/2024	15.03	9915.62	19.797679	0.332347	75893.73	-2.37
29/04/2024	13.49	10276.88	19.966739	0.329409	74431.39	-1.93
06/05/2024	12.55	10218.58	20.239965	0.325698	76081.10	2.22
13/05/2024	11.99	10643.58	20.556814	0.335403	77713.50	2.15
20/05/2024	11.93	10676.65	20.784212	0.332105	75174.49	-3.27
27/05/2024	12.92	10400.48	20.864340	0.330416	74967.28	-0.28
03/06/2024	12.22	10138.97	21.061393	0.330450	74092.12	-1.17
10/06/2024	12.66	10471.32	21.037263	0.325098	76442.06	3.17
17/06/2024	13.20	10771.36	21.190183	0.332001	76214.72	-0.30
24/06/2024	12.44	10647.91	21.430323	0.337916	76203.71	-0.01
01/07/2024	12.48	10851.78	21.972191	0.339306	78092.49	2.48
08/07/2024	12.46	11064.85	22.056464	0.333753	79666.63	2.02
15/07/2024	16.52	11156.20	22.168486	0.352420	79336.12	-0.41
22/07/2024	16.39	10891.42	22.250574	0.340885	78647.64	-0.87
29/07/2024	23.39	10473.47	22.348794	0.351470	81132.95	3.16
05/08/2024	20.37	9907.38	22.324912	0.345703	81427.58	0.36
12/08/2024	14.80	9821.96	22.389724	0.362713	84489.91	3.76
19/08/2024	15.86	9668.10	22.599223	0.378561	85369.52	1.04
26/08/2024	15.00	9833.22	22.665165	0.378262	85280.02	-0.10
02/09/2024	22.38	9771.16	22.814174	0.382118	84798.43	-0.56
09/09/2024	16.56	9685.49	22.871453	0.381891	87473.54	3.15
16/09/2024	16.15	9900.25	23.006441	0.400466	89433.29	2.24
23/09/2024	16.96	9777.46	23.258076	0.412214	90809.98	1.54
30/09/2024	19.21	9109.34	23.049771	0.413686	90880.86	0.08
07/10/2024	20.46	8876.22	23.175353	0.415102	91068.51	0.21

According to the data in the table, the change in the VIX index is not accompanied by the BIST100 and XAUTRY indexes. On the other hand, it cannot be said that the change in investment funds is completely independent of the VIX index. However, it can be said that the stock market and gold prices in Turkey are relatively closer to the VIX index (Longin & Solnik, 1995:14).

The correlation coefficient (r), which measures the relationship between two variables, takes a value between (+1) and (-1). The values between (0) and (+1) indicate a positive linear relationship between the two variables, while the values between (0) and (-1) indicate a negative linear relationship. Formula:.

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

In the interpretation of the value found, (r) value;

- Less than 0.20 means that there is no relationship or a very weak relationship between the VIX Index and that independent variable,

- A value between 0.20 and 0.39 indicates that there is a weak relationship between the VIX Index and that independent variable,

- A value between 0.40 and 0.59 indicates that there is a moderate correspondence between the VIX Index and that independent variable.

- A value between 0.60 and 0.79 indicates that there is a strong relationship and similarity between the VIX Index and that independent variable,

- A value between 0.80 and 1 indicates that there is a very strong correspondence or even co-movement between the VIX Index and that independent variable.

E- Analysis and Detection of Found Statistical Values

After the statistical analysis (MS-Excel), the correlation coefficient value between the percentage change values of the BIST100 Index and the percentage change values of the VIX Index was found to be (-0.10217). This coefficient indicates that there is a negative and weak relationship between the VIX index and the BIST100. In other words, as the VIX Volatility index increases, it reveals that the BIST100 index has a weak but decreasing accompaniment. However, since the correlation coefficient is much smaller than 0.20, it can be interpreted as almost no relationship between them.

The correlation coefficient value between the percentage change values of the YOT weekly price index and the percentage change values of the VIX Index was found to be (-0.08966). This coefficient also indicates that there is a negative and very weak relationship between the VIX index and the YOT Index. In other words, as the VIX Volatility index increases, it reveals that the YOT index has a weak but decreasing accompaniment. However, since the correlation coefficient is much smaller than 0.20, it can be interpreted as almost no relationship between them.

The correlation coefficient value between the percentage change values of the YKT Index and the percentage change values of the VIX Index was found to be (0.2421836). This coefficient also indicates that there is a positive relationship between the VIX index and the YKT Index. In other words, as the VIX Volatility index increases, the YKT index has a weak but increasing accompaniment.

According to the statistical analysis, the correlation coefficient value between the percentage change values of the XAUTRY Price Index and the percentage change values of the VIX Index was found to be (0.05665). This coefficient indicates that there is a positive but very weak relationship between the VIX index and XAUTRY. In other words, as the VIX

Volatility index increases, it reveals that the BIST100 index has a weak but increasing accompaniment. However, since the correlation coefficient is much smaller than 0.20, it can be interpreted as almost no relationship between them.

Conclution

According to the results of the study; In developing and highly volatile financial markets such as Turkey, the developments in the Organized Stock Exchange (BIST) indices can be interpreted as follows: Increases in the index are more likely to interact with local dynamics; decreases are strongly interacting with local and international dynamics. It has been observed that the price indices of precious metals (gold etc.) are affected by international dynamics in the same way. However, in the BIST100 index, due to the existence of a shallow market, positive international developments find a weaker response, while it is more strongly affected by negative international developments, especially the course of the VIX Anxiety and Volatility index. The Turkish financial market, which has a shallow financial market characteristic, is strongly and negatively affected by negative international developments and their indicators (VIX). This situation can be explained by psychological effects caused by panic and anxiety.

Despite all these issues, it can be said that mutual funds are more stable. YOT (Yapı Kredi Debt Securities Fund) and YKT (Yapı Kredi Gold Fund), which were selected among the most successful ones in terms of return performance in the last year, did not experience sharp swings in the face of unpredictable and unquantifiable risks and relatively protected their investors more or made less losses. In fact, it is not wrong to argue that debt securities

funds continue to be the preferred choice of small investors because of their relatively shorter-term investment characteristics and in line with the assumption that gold and precious metals funds are more affected by international dynamics.

Therefore, mutual funds, with the privilege of being managed by a professional management approach, are a more serene and calm harbor for small investors who do not have enough knowledge. Considering the disadvantages of not being able to follow the macroeconomic conjuncture, not being able to conduct sectoral and microeconomic analysis, not being able to apply methods such as fundamental and technical analysis, and even not being able to follow the market continuously, mutual funds remain a rational investment for small investors in an emerging and volatile market conjuncture such as the Turkish capital market.

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CHAPTER V

External Factors Affectıng Aırlıne Passengers' Servıce Purchase Decısıons

Sena AVCI[1]
Tunahan AVCI[2]

Introduction

The developments in countries regarding economic growth, inflation, and exchange rates have started to play an important role in the transportation sector, together with the effect of globalization. The aviation sector continues to grow rapidly, especially with business and holiday travel. Developments in economic growth, inflation, and exchange rates shape the commercial cooperation of companies. Again, developments in economic growth and inflation affect the purchasing power of citizens and therefore affect the decisions of holiday travelers. Therefore, developments such as

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economic growth, inflation, and exchange rates experienced in a country directly affect the service purchasing demands of airline passengers.

Air transportation is an important means of transportation today as it facilitates the movement of transportation within a country and connects one region with another (Akinyemi, 2019, p.1239). The air transportation sector, which provides the opportunity to transport a person or an item from one place to another quickly and reliably, has become the most preferred transportation sector by people today. Due to the increasing global mobility in recent years, the air transport sector has developed significantly and accelerated transportation (Öcal, 2021, p.2121). Both in the world and in Turkey, airline transportation has made rapid progress thanks to technological advances and continues to do so. Due to the increasing speed and mobility of transportation, the airline transportation sector has started to be preferred by people more than other sectors. For this reason, it has become important to know in advance the domestic and international travel demands, the service purchases of the passengers, and how these may change over time (Koç and Arslan, 2018, p.1).

As a result of the benefits provided by air transportation, there is a continuous increase in the demand for the sector. The factors affecting the demand for airline selection and the purchasing decisions of passengers are quite complex (Efendigil and Eminler, 2017, p.21). These factors consist of factors that increase or decrease the sales purchases of airline passengers. The factors affecting the demand for air travel and purchasing are divided into three external factors, internal factors, and other factors. External factors include economic growth, exchange rate, inflation, gross domestic product, tourism, and population mobility. In contrast, internal factors include factors such as seat capacity, flight ticket prices, flight season, and flight time. When we look at other factors, epidemics, terrorist attacks, military conflicts, and natural events come to the fore. In this study, it is aimed to examine the external factors affecting the purchasing decisions of airline passengers.

In the study, the country of Turkey was discussed. Among the reasons for this are that it is located in a geographical location that 1.5 billion people can reach in 4 hours by plane, it has the advantage of being in a position that allows transit flights, and it is close to the region where the demand for world air transportation is high (UAB, 2018, p.7). Turkey is also an important strategic point in the air transport sector as an intercontinental transit route (Efendigil and Eminler, 2017, p.14).

6th in the world in the number of airline passengers. Turkey, which ranks 2nd in Europe, has a growth rate close to 3 times the world average in aviation (UAB, 2018, p.6). Due to increasing infrastructure and fleet investments, the Turkish aviation market continues to expand and develop (Koç and Arslan, 2018, p.1). However, although its development continues, decreases may occur from time to time. The reason for these decreases is that the purchases of passengers using the airline tend to decrease. As a result of the factors affecting the purchases of airline passengers, there is a decrease in revenues, which seriously affects airlines. Many factors affect passengers' service purchases in the demand for air travel. Each factor has a quality that affects the purchasing decision, and air transportation causes the demand for travel to grow or limits the demand.

1. The Concept of The Airline Customer

It is defined as all people who buy or have the potential to purchase the product or service produced by customer enterprises (Sönmez, 2021, p.63). As in all businesses, the customer phenomenon is one of the most important issues in the aviation sector, which is a service sector. The increase in the similarities in the features and prices of the services offered to customers in the aviation sector, which entered an intensely competitive environment with the increasing number of airlines after the liberalization movement, put the enterprises in a difficult process during the creation of the customer base. Increasing competition has led airline companies to understand customer demands and needs and to

provide the most appropriate service possible to meet the expectations of customers (Kazanoğlu, 2011, p.131).

In today's conditions, customer relations have become the most important competitive tool of companies. For this reason, businesses should create a good customer base to survive and make a profit (Dökmen, 2003, p.46), and to maintain their current position in the market in an intensely competitive environment, they should turn their passengers into a loyal customer in the long term (Kazançoğlu, 2011, p.137).

The customer portfolio, which is constantly changing in the globalizing world, forces businesses to restructure quite seriously and reconsider their strategies for their customers (Demir and Kırdar, 2007, p.294). Before the 1990s, businesses focused on methods of acquiring new customers rather than retaining their existing customers, but although this strategy was beneficial in the short term, it resulted in customers who did not work in the long term turning to different businesses (Aslan, 2007, p.83).

In the airline industry, customers are divided into two different categories; The first of these is institutions and organizations, that is, corporate customers, that carry passengers and/or cargo from one place to another using airlines and receive technical services and similar professional services. The second is passengers, that is, individual customers, who usually fly from one place to another for holidays, business, education, health, and similar purposes (Sönmez, 2021, p.63).
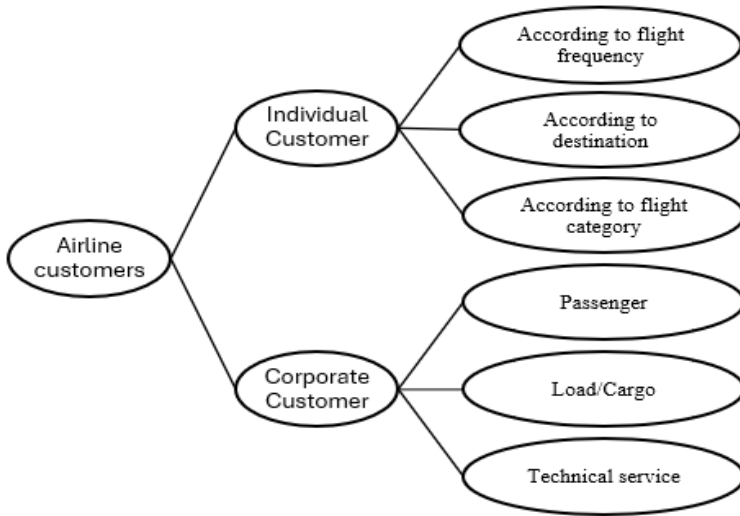
Figure 1: Airline Customers

Source: Sonmez, 2021.

To survive in the aviation market, where there is intense competition, businesses should be able to identify their customers and distinguish them from their consumers (Dökmen, 2003, p.46). F an airline company to be successful in the market and keep up with the competition in the market, it should be able to analyze the wishes, needs, and expectations of the customers it has and will attract and organize its product and service presentation accordingly, because airline customers are very diverse and they all have different wants and needs and these must be met (Sönmez, 2021, p.64). For this reason, it is important to make market segmentation in the airline market at this point. It is a basic requirement for airline operators to make market segmentation in order to segment passengers correctly and to homogenize the market (Yıldız, 2017, p.242).

2. Passengers in The Airline Market

It is a very complex situation to be able to offer full services and products for the wants, needs, and expectations of passengers in the airline market. For this reason, airlines should make market

segmentation in line with their travel purposes to respond to the wishes, needs, and expectations of different customer groups (Aslan, 2007, p.62). These travel purposes are divided into passengers traveling for personal purposes, holiday purposes, and business purposes.

2.1. Passengers Traveling for Business Purposes

Passengers traveling for business purposes travel for purposes such as business meetings and meetings (Sak, 2015, p.24). This part of the market consists of the person who will travel for business purposes, his secretary, or the people assigned by the manager (Dökmen, 2003, p.49). The wishes, needs, and expectations of the passenger traveling for business purposes differ according to whether they fly short or long distance, connect or direct flights. Factors such as tariff availability, punctuality, flight frequency, ticket prices, and waiting times should be taken into consideration for passengers traveling for business purposes (Aslan, 2007, p.67). While business travelers are generally less sensitive to ticket fares and prefer flexible tickets against last-minute schedule changes, punctuality is a very important element for this consumer group (Dik, 2022, p.29). For passengers traveling for business purposes, the frequency and timing of the flight, on-time departure, location of the airport, airport services, facilities and privileges provided to frequent flyers, and in-flight services are very important (Savaş and Duran, 2020, p.48). Because these elements are important for business travelers.

Although business passengers are a small community for airlines, they make the most money for businesses because passengers traveling for business purposes are the most important passenger group in terms of profit for airline businesses, as they are willing to pay more than passengers traveling for leisure purposes (Dik, 2022, p.30). This situation reveals that passengers traveling for business purposes are an important group for airline operators.

There are some characteristics of this market segment and the passengers in this market (Dökmen, 2003, p.41);

- In the business passenger market, the passenger pays the ticket fee himself, so the demands of the passengers show an intrinsic behavior towards the price.
- The age ranges of passengers traveling in this market section are examined in three sections 25-35, 35-50, and after 50 years old.
- The fact that passengers in the business travel market have high incomes is interesting for airline operators, but attracting these passengers can be costly.

2.2. Passengers Traveling for Leisure and Holiday Purposes

The passenger market traveling for leisure and entertainment purposes shows a faster development than the passenger market traveling for business purposes (Dökmen, 2003, p.42). Leisure travelers have traditionally been considered time-free, and price-sensitive, with preferences that exhibit a strong seasonal pattern that peaks during holidays and festive periods of the year (Papatheodorou and Lei, 2006, p.47).

Since passengers traveling for leisure and entertainment purposes are more sensitive to the price phenomenon than passengers traveling for business purposes, ticket prices must be cheap in this respect (Savaş and Duran, 2020, p.49). Passengers in this market segment are highly sensitive to ticket fares as they set their fares according to their own budgets (Sak, 2015, p.31). In holiday trips, the expense increases because a few people from the family are included in that trip. Passengers set their flight times at low prices and are therefore not time-sensitive. For this group of passengers, elements such as the time or duration of the flight are not as important as the price.

There are some characteristics of the leisure passenger market and the customers operating in the market (Dökmen, 2003, p.43);

- They are sensitive to ticket prices because they pay the ticket fees themselves.

- Holiday trips are usually made with the family.
- Unlike business travelers, airline schedule planning is less important.
- They travel longer than business passengers.
- The age distribution is wider than that of business travelers.
- Child passengers who do not travel for business purposes constitute a significant segment of leisure travel. In the gender distribution, although there is more male superiority in business purposes, the ratio of men and women for holiday purposes is equal.
- Since holiday traffic is intense in the summer months, businesses can reach full occupancy rates in the summer months.
- Although the demand for holiday trips is increasing day by day, some negativities such as the increase in the exchange rate are affected from time to time.

2.3. Passengers Traveling for Personal Purposes

In the passenger market where travel is made for personal purposes, it is more difficult to determine who the customers are and to obtain estimates and data about the points where their travels will be made compared to the business and leisure passenger market (Aslan, 2007, p.67). Travels for personal purposes include visiting friends and relatives, educational trips, and religious visits such as pilgrimages.

Persons who travel for personal purposes cover their own travel expenses. For this reason, the frequency of travel and the preference of travel destinations belong to them. For passengers traveling for personal purposes, factors such as tariff availability and on-time arrival are important. People in this group mostly prefer direct flights. The travels of passengers traveling for personal purposes are similar in some ways to the wishes and expectations of passengers traveling for leisure purposes. The most important of these similarities is that it can find a place at a low price at any time.

However, it is similar to the wishes and expectations of business travelers in terms of unplanned travels that need to be made in a short time. In this case, low price loses its importance, and flight frequency and direct flight gain importance (Aslan, 2007, pp.67-68).

3. Economic Factors Influencing Airline Demand

It is possible to express the airline demand as the desire of people to purchase the transportation service offered to provide transportation from one place to another. Many factors affect airline demand, and airline operators determine the number of flights, aircraft capacities, and destinations they will fly to according to demand. For this reason, determining airline demand is a very important issue for businesses (Işıklar, Canöz, and Ertek, 2021, p.243).

As the effects of globalization in the world economy progress rapidly, the airline transportation sector has started to be important. Trade between countries, travel for tourism purposes, changing and developing production, and the desire to reach wider markets contribute to the increase in the demand for air transportation (Eren et al., 2020, p.253).

Air transportation has become the most preferred way of transportation today as it facilitates transportation within a country and between other countries. As a result of increasing travel mobility in the globalizing world, the airline transportation sector, which brings benefits such as speed, comfort, and safety, has gained great importance both in the world and in Turkey. Due to the increasing speed and mobility of transportation, the airline transportation sector has started to be preferred by people more than other sectors. For this reason, it has become an important element to know in advance the domestic and international travel demands, the service purchases of the passengers, and how these may change over time (Koç and Arslan, 2018, p.1).

However, although it is the most preferred mode of transportation for people, there are various factors in the aviation

industry that affect the purchasing demands of passengers from time to time; each factor consists of factors that encourage or restrict the growth of air travel (Abed, Ba-Fail and Jasimuddin, 2001, p.145). Air transport plays a critical role in the world economy and is generally affected by pricing, service, and economic pressures arising from world demand and supply conditions (Adrangi, Chatrath, and Raffiee, 2001, p.338). The main demand for air transport is related to economic activities and is affected by various internal and external shocks as well as proceeding through the price-demand elasticity relationship (Sgouridis et al., 2011, p.1080).

It is possible to divide the factors that play a role in the demand analysis of air travel into two broad groups: those outside the airline industry and those within the industry itself. Factors outside the industry include factors such as inflation, interest rate, exchange rates, and population, which are beyond the control of the airline or even the entire airline industry, while those within the sector itself include elements such as ticket prices, aircraft capacity, and aircraft type (Abed, Ba-Fail and Jasimuddin, 2001, p.145).

In this context, when we look at the literature, we can say that the factors affecting airline demand are divided into three. Them; We can classify them as extrinsic factors, internal factors, and other factors.

3.1. Economic Growth

Economic growth is defined as the increase in the production capacity and amount of economic resources of an economy in a certain time frame and is of great importance for developing countries as well as developed countries (Özel, 2012, p.64). In this context, air transportation plays a critical role in ensuring the economic growth of a country (Eren et al., 2020, p.237). For this reason, economic growth is an important concept for countries at every level of development.

The aviation sector, which is an essential element of the global economy and transportation system, makes it possible to

connect a country to the global economy by facilitating global travel, economic connections, and trade and also increases the productivity levels of the country's economies (Atioğlu, 2021, p.1937).

The airline sector is a sector directly related to the economy and is directly affected by fluctuations in the economy. Economic crises cause a lower-than-expected demand for air transport. This creates the problem of using the capacity at lower levels than the expected rate. If the economy is in a recession, both business and leisure travel will decrease. When the economy grows, along with business trips, plans to go on vacation by air also increase, because as the economy grows, people's purchasing power also increases. For this reason, when the growth in the world economy slows down, the increase in demand for air travel and air transportation also slows down (Gökırmak, 2014, p.2).

3.2. Gross Domestic Product

One of the indicators of the increase in the volume of production in the country is the changes in the Gross Domestic Product. Gross Domestic Product (GDP) is a basic macroeconomic indicator used to track a country's economic strength and performance (Eren et al., 2020, p.247). As a representative of economic growth, it is also widely used in making the forecast of air transport at the national level for all countries. Growth in productivity and gross national product are directly related to an efficient and growing air transportation system (Gökırmak, 2014, p.2).

The increase or decrease in the Gross Domestic Product, which is one of the important indicators of economic growth, stands out as a factor that affects the increase or decrease in passenger demand for air transportation. In general, the factor influencing the increase in demand for air transport is the income falling on GDP. Income also appears as a means of spending for its people and is seen as an important factor in the purchasing phase for passengers who will use the airline.

Figure 3.1: Turkey's Gross Domestic Product (current US$)

As a result, air transport forms an important part of a country's gross domestic product, and the tickets that passengers buy from airlines directly contribute to the growth of the airline industry. Therefore, the number of airline passengers and their expenditures have a significant impact on GDP. The increase in airline passengers is important in this regard.

3.3. National Income Per Capita

When we look at the factors that determine the demand for airline passengers, it is striking that the per capita income, that is, the welfare level of the country, is an important factor affecting the demand (Sarılgan, 2007, p.38). Air transportation requires high costs, high investments, and communication costs. It has been revealed by Valdes (2015) that income significantly affects passenger demands in both middle-income and high-income countries (Kiracı, 2017, p.17). For this reason, when the regions where aviation is developed are examined, it is observed that the per capita income of the regions is quite high (Sarılgan, 2011, p.74). Income increases or decreases are an important factor in passengers' preference for air transportation.

Since the increase in per capita income will increase the welfare levels of people, it will also directly affect people's demands. For this reason, per capita income is an important factor in every sector, especially in the aviation sector, which is the service sector and the biggest capital is passengers because the demand for air transportation increases with the increase in the income of individuals (Kiracı, 2017, p.198).

Per capita income in Turkey is an indicator that varies depending on the economic situation of the country. Looking at Figure 3.2, Turkey's per capita income was 9 thousand 661 dollars in 2021. This figure may increase or decrease depending on Turkey's economic growth and development. However, unexpected events such as economic crises and pandemics can have negative effects on economic growth and per capita income.
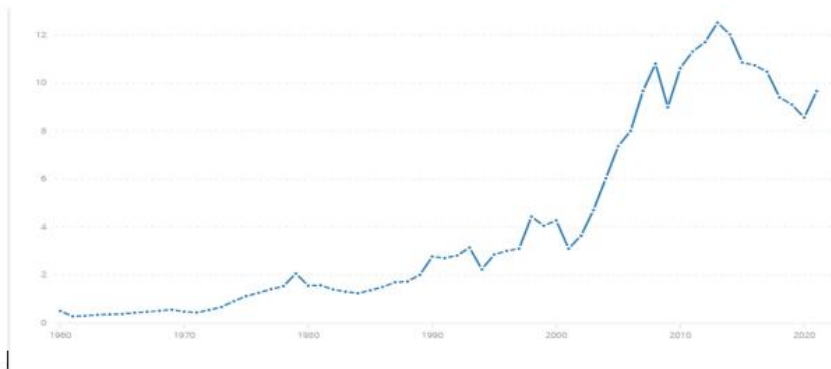

Figure 3.2: Turkey's Gross Domestic Product Per Capita (current US dollar)

Source: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations. Date Accessed: 13.03.2023.

As a result, per capita income is considered an indicator of a country's economic well-being, and people in countries with high per capita income generally have high-income levels and higher living standards. Therefore, the demand for traveling by air may also be higher.

3.4. Inflation

While inflation is defined as the continuous increases in the general level of the prices of goods and services, it refers to the changes in the prices of all goods or services used by an average consumer in a year, not just in the prices of a single or a few goods or services (Adimli, 2020, p.35) and is considered an important factor because it affects economic development (Battal, 2002, p.35).

There is an inverse relationship between air transport and inflation. Since high inflation will reduce purchasing power, it will cause people to give up or postpone the goods or services they decide to buy. Therefore, rising inflation negatively affects the purchasing decision on airline demand. Because inflation causes labor and fuel costs to rise, airline companies are also trying to increase them by reflecting them in ticket prices. In this case, it causes passengers to give up the flight (Battal, 2002, p.35).
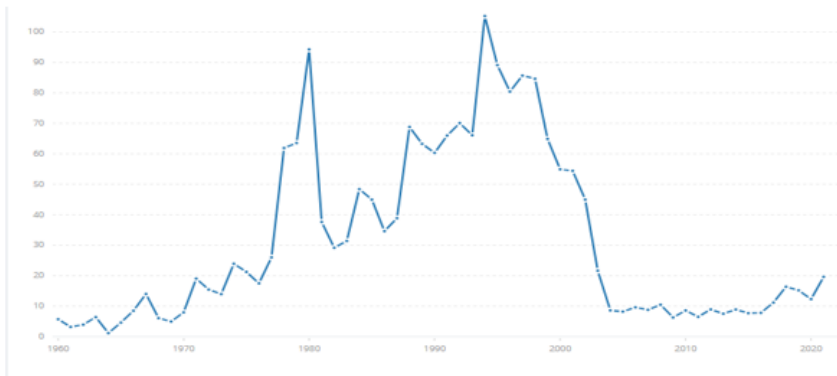

Figure 3.3: Inflation rate in Turkey (%)

Source: https://data.worldbank.org/indicator/NY. INFLATION. PCAP.
CD?locations=EN. Access Date:13.03.2023.

Inflation in Turkey has been high in recent years. In the light of the data obtained from the World Data Bank in Figure 3.3, annual inflation in Turkey was around 12.3 in 2020, but by 2021, the rate increased rapidly and reached 19.6 levels. The high inflation rates seen in Turkey can be caused by various reasons. These include

factors such as high-cost inflation, a constantly increasing high exchange rate, and rising energy prices.

As a result, inflation occurs during a period of rising prices, in general, reducing the purchasing power of consumers. This leads to an increase in air travel costs and a decrease in the tendency of consumers to travel. Although the increase in inflation does not affect people with high incomes very seriously compared to those with low incomes, it may cause the passenger to give up the trip if there is no urgent trip.

3.5. Exchange Rate

All of the payment instruments used in international payments are called foreign currency, and the transactions made by converting a national currency into another national currency are called foreign currency transactions (Rodoplu and Turgut, 2019, p.424). The change of one country's currency against another country's currency is called the exchange rate (Jochumzen, 2010, p.19).

The investments made by countries with each other have increased day by day, and as a result, foreign currency-based transactions have increased, revealing the importance of the exchange rate. Occasional fluctuations in the value of the exchange rate cause uncertainty in the future value of the exchange rate. This situation affects the export volume of the countries and therefore the country's economy (Tarı and Yıldırım, 2009, p.95). The number of enterprises that are not affected by the changes in the exchange rate is very few, and the aviation sector is more affected by the fluctuations than other sectors due to its fragile structure.

The aviation sector is a sector of great importance in both national and international transportation sectors. Due to the international nature of the aviation sector, businesses are traded in different currencies within their bodies, and this situation causes airline companies to be affected by fluctuations in exchange rates. Airline companies, which are constantly traded in foreign currency

in their activities, income, and expenses, are highly affected by the constantly changing exchange rate.

The key determinant of the costs faced by an airline operator and therefore its ability to compete with costs is the exchange rate. The exchange rate that affects the costs is passed on to the passengers, who are the most important sources of income for the airlines, in order to cover those costs, and this causes airline travel to become more expensive. The most important source of income for airlines is passengers, and passengers are also affected by fluctuations in the exchange rate at the purchasing stage. If a country's exchange rate rises, visitors are likely to decrease (Forsyth and Dwyer, 2010, pp.12-13). Because a high exchange rate can reduce the purchasing power of consumers and restrict travel spending. The increase in cost increases the tendency of people who do not have essential transportation needs to give up traveling. However; It can be said that the worthlessness of the currency, that is, the increase in the exchange rate, may increase the demand for international passengers, as it will ensure that the holiday expenditures in our country are less in dollar terms.

4. Purpose and Importance of The Research

Air transportation has become the most preferred way of transportation today as it facilitates transportation within a country and between other countries. As a result of increasing travel mobility in the globalizing world, the airline transportation sector, which brings benefits such as speed, comfort, and safety, has gained great importance both in the world and in Turkey. However, although it is the most preferred way of transportation for people, the factors that affect the purchasing demands of passengers from time to time in the aviation sector affect the choice of this transportation route. For this reason, the factors affecting the purchasing demands of airline passengers have been the subject of this study, and the purpose of this study has been to examine how external factors affect the purchasing demands of total passengers (domestic and international).

4.1. Limitations of The Research

This research was created using quarterly data for the years 2007-2023, and the limitation of this research is that there are no older data on the variables in the databases (DHMI, TUIK, CBRT) from which the data are obtained.

4.2. Data and Sample

In this study, quarterly data for the period between 2007-2023 were used. The sample group of the research consists of the number of passengers taken from DHMI, the economic growth and inflation rates taken from TurkStat, and finally the dollar-based exchange rate taken from the CBRT.

Table 4.1: Data Annotation and Sources

Definition	Variables	Source
PASSENGER	Total Number of Passengers	DHMI Statistics
INFLATION	Inflation	TurkStat
FOREIGN CURRENCY	Dollar-based exchange rate	CBT
GROWTH	Economic Growth	TurkStat

According to the table above, from the variables; PASSENGER refers to the total number of passengers (domestic and international passengers), the INFLATION variable refers to the inflation rate, the FOREIGN EXCHANGE variable refers to the dollar-based exchange rate, and finally, the GROWTH variable refers to the economic growth rates. The data were drawn from the databases of DHMI statistics, the Turkish Statistical Institute, and the Central Bank of the Republic of Turkey

4.3. Method and Model of The Research

The Eviews program was used in the study and the ARDL (Autoregressive Distributed Lag Bound Test) method was selected from econometric methods. In this context, long-term and short-term coefficient estimation, F bounds test, autocorrelation LM test, variable variance test, CUSUM, and CUSUM Q tests were performed on the variables. In addition, whether there is a relationship between the variables was checked with the Granger Causality test.

4.4. ADF Unit Root Tests

As a first step, this study was started with the Augmented Dickey-Fuller (ADF) unit root test to determine the order of integration and stationarity of the variables. Measuring the stationarity of a time series is important because the stationarity of a series can strongly affect the properties of the series (Akinyemi, 2019, p.1244). The model for the ADF unit root test applied in the study is as follows;

$$\Delta Y_t = \alpha + \delta Y_{t-1} + \sum_{i=1}^{m} \theta_i \Delta Y_{t-i} + e_t$$
(1)

In this equation, the Δ sign is symbolized as the difference operator. Y_t denotes the stationarity under study, t denotes the time, e_t denotes the error term, and m denotes the lag length of the dependent variable.

4.5. ARDL Bounds Test

ARDL (Autoregressive Distributed Lag Bound Test) is a test used to reveal the existence of cointegration between variables, revealing that there is a stationary combination of at least two series that are observed to be non-stationary at their levels. In short, it allows to analyze long-term and short-term causality relationships. The advantage of this model over other models is that the series whose cointegration relationship is investigated are not required to be stable to the same degree. In other words, the ARDL bounds test approach allows the desired model to be created and the stationary levels to be realized at I(0) and I(1) (Işık, 2015, p.170). ARDL is

more efficient and gives better performance for smaller sample sizes than other cointegration tests (Akinyemi, 2019, p.1243).

Since the error correction model is used in the ARDL model, it gives more reliable results compared to other existing tests. For this reason, the following ARDL model was used in this study, where long and short term coefficient estimations were made with the ARDL model.

The equation, expressed as Model 1, is the model in which the effect on the total number of passengers (domestic and international passengers) is examined. Inflation, economic growth and foreign exchange variables, which are determined as independent variables on the total number of passengers determined as dependent variables, are examined and the relationship between them is revealed. The equation created for the analysis is as follows;

$$\Delta passenger = \alpha_0 + \beta_0 + \sum_{i=1}^{m}\beta_{1i}\Delta passenger_{t-1} + \sum_{i=0}^{m}\beta_{2i}\Delta lnInflation_{t-1} + \sum_{i=0}^{m}\beta_{3i}\Delta lnforeignexchange_{t-1} + \sum_{i=1}^{m}\beta_{4i}\Delta growth_{t-1} + \mu_t \qquad (2)$$

In the equations created, the passenger shows the natural state of the dependent variables, $\Delta\beta_0$ is the constant coefficient, $\Delta lninflation$ is the logarithm of the inflation variable, $\Delta lndcurrency$ is the logarithm of the currency variable, and growth is the natural state of the economic growth variable. ΔIn the model, et stands for the error term and Δ stands for the difference operator.

4.6. Scope of The Research

The scope of the research consists of calculating the size and direction of the relationship between the total number of passengers (domestic and international passengers), inflation, exchange rate and economic growth variables in the quarterly period between 2007-2023 in Turkey, which is the designated country. The reason why the study started in 2007 is due to the fact that the effects of the economic crisis experienced at that time were not wanted to be reflected in the data.

5. Analysis and Findings

In this section, the combinations of ADF unit root test results applied to variables as trending, non-trending and constant are given. As a result of the fact that some variables in the model were not stationary, the first differences of the non-stationary data were taken and the results of the ADF unit root test at the first difference level were given. Afterwards, F boundary test, Autocorrelation LM test, Variable variance test, Ramsey Reset test, CUSUM and CUSUM Q test tests were performed on the variables respectively and the results are given below.

5.1. Model 1 ADF Unit Root Test Results (Dependent Variable: Total Number of Passengers)

In the first stage of the unit root test, the Phillips Peron unit root test was applied to the variables in the model, and the results are presented in Table 5.1. Phillips Peron unit root test was applied in three alternative models trended, non-trended, and constant. At this stage, the difference of the variables is not taken.

Table 5.1: Phillips Platform Unit Root Test Results

Variables	Fixed	Constant-Trending	Steady-Non-Trendy
Passenger	-11.81872*	-14.93329*	-7.802813*
Inflation	-0.393041	-2.163293	-1.169666
Foreign currency	7.158969	0.529941	12.88482
Growth	-3.923943*	-3.911714**	-2.741497*

Note: *, **, *** represent significance at the level of 1%, 5%, and 10%, respectively.

It is necessary to make sure that the series is stationary due to the emergence of the spurious regression problem in non-stationary series. At this stage, it was determined that the total number of passengers and economic growth variables were stable at

the 1% significance level, while inflation and foreign exchange variables were not stationary. For this reason, the stationarity of the variables was tested by taking the first-degree difference. The test results are given in Table 5.2.

Table 5.2: First-Degree Difference Phillips Peron Unit Root Test Results

Variables	Fixed	Constant-Trending	Steady-Non-Trendy
Passenger	-31.69802*	-31.35102*	-5.393048*
Inflation	-6.954679*	-7.046716*	-6.886338*
Foreign currency	-6.484408*	-7.336469*	-5.132810*
Growth	-9.909559*	-9.832011*	-9.987957*

Note: *, **, *** represent significance at the level of 1%, 5%, and 10%, respectively.

From the data used in the study, the total number of passengers and economic growth variables were stationary at the level, while inflation and foreign exchange variables 1. He is static. This shows that the ARDL model can be applied to examine the cointegration relationship (Akkaya, 2018, p.1869). After the Unit Root Tests, the

ARDL model was established by selecting the Automatic Selection option. It was decided that the most appropriate delay length was ARDL (4,0,0,0,0).

5.2. Autocorrelation LM Test

The autocorrelation LM test results are given in Table 5.3. In the light of the results, it is seen that there is no autocorrelation problem in the estimated model.

Table 5.3: Autocorrelation LM Test

F Statistics	**2.448**	**Probability value F**	**0.0962**

5.3. Harvey Varying Test of Variance

Table 5.4 shows the results of the Harvey Variable Variance Test. In light of the results, it is seen that there is no variance problem in the estimated model.

Table 5.4: Harvey Varying Test of Variance

F Statistics	**1.539**	**Probability value F**	**0.1736**

5.4. Ramsey Reset Test

Table 5.5 shows the Ramsey Reset Test results. In the light of the results, there is no error in setting up the model.

Table 5.5: Ramsey Reset Test

	Value	*Df*	*Probability*
T-statistic	*1.330*	*54*	*0.1888*
F-statistics	*1.771*	*(1,54)*	*0.1888*
Probability Ration	*2.033*	*1*	*0.1539*

Looking at the probability values in Table 5.5, it is revealed that all of the probability values of the T and F tests are at the level of 10% statistical significance. These results support the decision that the exponential variables included in the model have no effect on the dependent variable, and therefore it is appropriate to construct the model in linear form.

5.5. Diagnostic Statistics of The Model

In Table 5.6, the diagnostic statistics of the model are given and the R-squared statistical value was observed as 0.87. The fact that the model has this value is proof that the linear aperture power is quite high. The probe(F-statistical) value is less than 0.05. For this reason, it turns out that the model as a whole is meaningful. The Durbin-Watson probability value was calculated as 1.56 and the calculated value was close to 2. This shows that there is no autocorrelation problem in the model.

Table 5.6: Diagnostic Statistics of the Model

R-squared	*0,870*	*Corrected R-squared*	*0.854*
The sum of Error Squares	*7.932*	*Schwarz Information Criterion*	*1.291*
F-statistic	*53.028*	*Hannan-Quinn Information Criterion*	*1.126*
Probe(F-statistic)	*0.000*	*Durbin-Watson Statistic*	*1.568*

5.6. F Bounds Test

The "k" in Table 5.7 refers to the number of independent variables. When we look at the F statistical value, which is 6.173, it is observed that it is above both the lower limit and the upper limit at 1%, 5%, and 10% significance levels. These results support the existence of a cointegration relationship and reveal the existence of a long-term relationship in the predicted model.

Table 5.7: F Bounds Test Results

F-statistics	k	Significance Level	Lower bound I(0)	Upper limit I(1)
6.173	4	%1	2.84	3.92
		%5	3.43	4.58
		%10	4.69	6.14

Since there is a cointegration relationship in the model, short and long-term relationships can be predicted.

5.7. CUSUM Test

To examine the continuity of the variable coefficients used in the model, CUSUM, and CUSUM Q tests were performed**.**
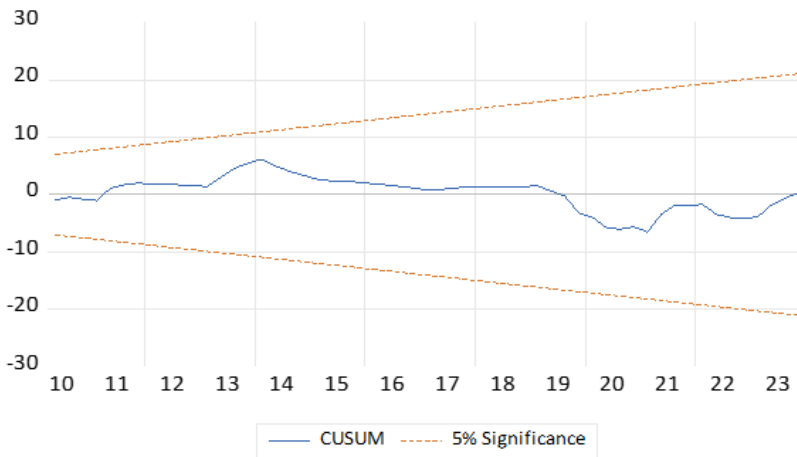

Figure 5.1: CUSUM Test

5.8. CUSUM Q Test

In the first tests, structural breakage occurred in the CUSUM Q test. The pandemic crisis between 2019 and 2021 greatly affected the aviation industry. As a result of the restrictions, the number of

passengers using the airline has sharply decreased. Therefore, there was a break in the analysis due to the data from that period. To eliminate the existence of structural breakage, a dummy variable was created for the 2019:Q1-2021:Q1 periods, which cover the pandemic period. After adding the dummy variable to the model, the CUSUM Q test was performed again and the results are given in Figure 5.2.
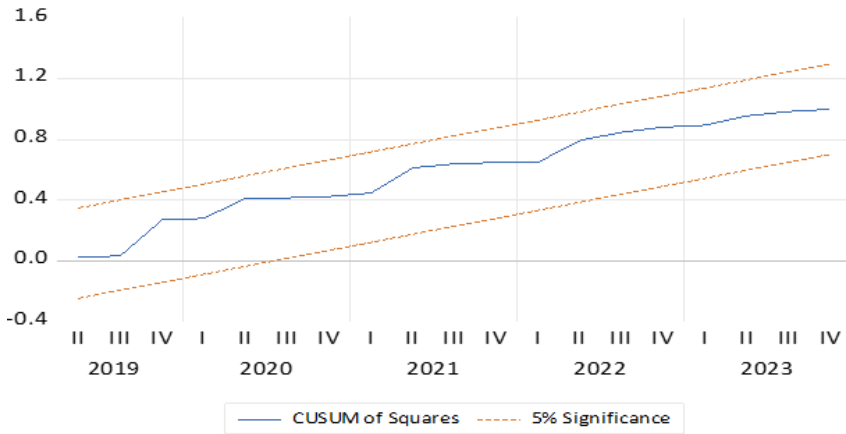

Figure 5.2: CUSUM Q Test

5.9. Long-Term Relationship

In this section, the long-run forecast results of the ARDL model are given in 5.8. Although passengers2 (domestic and international passengers) are the dependent variables, inflation, foreign exchange, and economic growth are the independent variables.

Table 5.8: Long-Term Relationship Estimation Results

Variables	Coefficient	Standard Error	T-Statistics	Probability Value
Inflation	*0.249*	*0.124*	*1.994*	*0.051****
Foreign currency	*-0.341*	*0.106*	*-3.215*	*0.002**
Growth	*0.023*	*0.009*	*2.375*	*0.021***

Note: *, **, *** mean significance at the level of 1%, 5%, and 10%, respectively.

According to the long-term estimates given in Table 5.8, economic growth is statistically significant at a critical value of 5%. In other words, economic growth of 1% leads to an increase of 0.02% in total passenger demand. On the other hand, although the currency has a negative effect, 1% is statistically significant at a critical value. A 1% increase in foreign exchange causes a decrease of 0.34% in total passenger demand, and when we look at the inflation variable, it is observed that 10% is statistically significant at the critical value. In other words, a 1% increase in the inflation variable increases the total passenger demand by 0.24%. Three variables have an impact on the number of passengers in the long run.

5.10. Short-Term Relationship

After the diagnostic tests, short-term coefficient estimation was performed. The short-term coefficient estimation was estimated with the help of the following model. The equation of the model is set up as follows:

$$\Delta ypassenger = \beta_0 \sum_{i=1}^{m} \beta_{1i} \Delta passenger \\ + \sum_{i=0}^{m} \beta_{2i} \Delta lnInflation_{t-1} + \sum_{i=0}^{m} \beta_{3i} \Delta growth_{t-1} \\ + \sum_{i=1}^{m} \beta_{4i} \Delta lnforeignexchange_{t-1} + \sum_{i=0}^{m} ECM_{t-1} \\ + e_t$$

In the equation, the expression ECM refers to the term error. With the addition of the error term to the model, a short-term coefficient estimation was made and the results are given in Table 5.9.

Table 5.9: Short-Term Relationship Estimation Results

Variables	Coefficient	Standard Error	T-Statistics	Probability Value
Inflation	-0.482	0.253	-1.899	0.064***
Foreign currency	1.203	0.790	1.522	0.135
Growth	0.030	0.011	2.540	0.014**
CointEq(-1)	-1.966	0.262	-7.486	0.000
C	1.209	0.164	7.328	0.000

Note: *, **, *** mean significance at the level of 1%, 5%, and 10%, respectively.

According to the error correction regression model, ContEq(-1) is negative and significant with -1.96. A statistically significant relationship was found between total passenger demand, which is the dependent variable, and inflation and economic growth, which are the independent variables, in the short run. In this context, a 1% increase in economic growth increases total passenger demand by 0.03%, while a 1% increase in inflation reduces total passenger demand by -0.4%. The increase in the exchange rate does not affect passenger demand in the short term. In this respect, passenger demand does not react to the exchange rate variable in the short term. In other words, the floating exchange rate has no effect on passenger demand in the short term. Inflation, on the other hand, has a negative effect on passenger demand in the short term and a positive effect in the long term. In this context, this effect of inflation has shown us that as incomes increase, the purchasing power of passengers increases.

5.11. Granger Causality Test

As a result of the tests, the existence of a cointegration relationship between the variables was determined, so the Granger causality test was also applied. The results of the Granger Causality test are given in Table 5.10.

Table 5.10: Granger Causality Test Results

	F statistic value	Probability Value
Enf-Passenger	0.659	0.682
Passenger-Enf	0.638	0.698
Dvz-Passenger	0.929	0.482
Passenger-Dvz	3.541	0.005*
Growth-Passenger	1.898	0.100
Passenger-Growth	0.444	0.845

Note: *, **, *** mean significance at the level of 1%, 5%, and 10%, respectively.

According to Table 5.10, it is concluded that the relationship between inflation to total passenger demand is not the cause of Granger. Likewise, aggregate passenger demand is not the cause of inflation. In this context, there is no bidirectional causality between inflation and total passenger demand. The relationship between foreign exchange to total passenger demand shows us that there is no Granger reason, while the relationship between total passenger demand towards foreign currency reveals that it is the Granger cause. That is, there is a one-way causality relationship between total passenger demand and the exchange rate. The increasing number of passengers increases the sales revenues of the company and it is thought that this situation is reflected in the company in foreign currency. When we look at the economic growth variable, there is

no causality relationship between economic growth and total passenger demand.

6. Conclusion

The aviation sector has become the most preferred sector today because it performs transportation within and between countries in a faster and more reliable way compared to other transportation alternatives. As a result of increasing travel mobility in the globalizing world, the airline transportation sector, which brings benefits such as speed, comfort, and safety, has gained great importance both in the world and in Turkey. Although it is more preferred than other transportation sectors, in some cases, some factors affect the passengers' decisions to purchase this service. These factors are divided into two internal and external factors. While factors such as ticket prices, aircraft type, flight season, and flight time stand out in domestic factors, factors such as gross domestic product, population, economic growth, inflation, exchange rate, crises, and natural events stand out in external factors.

In this study, the exogenous factors affecting passenger purchasing demands in Turkey were examined with 2007Q1:2023Q4 quarterly data. In this study, it was aimed to investigate the extent of the relationship between the total number of passengers using the airline, exchange rate, economic growth, and inflation variables. The effects of the determined external factors on the number of passengers were examined with the ARDL model, and then Granger Causality Analysis was performed to observe the causality relationship between the variables. The analysis was named Model 1 and firstly, the ADF unit root test was performed to determine the stationarity levels of the variables, after the stationarity of the variables was tested, the F boundary test, Autocorrelation LM test, Variable variance test, Ramsey Reset test, CUSUM and CUSUM Q test tests were performed. After the variables passed the tests, the long-term and short-term coefficients between the variables were examined, and finally, the causality

relationship between each other was examined with the Granger Causality Analysis.

Model 1 has passed all the test tests on its variables. After the F boundary test, it was determined that the value obtained was above the lower and upper limit at 1%, 5%, and 10% significance levels, and the existence of cointegration was revealed in line with the finding. In line with the results, the existence of a long-term relationship in the model was also accepted. Looking at the long-run relationship, economic growth is statistically significant at a critical value of 5%. In other words, an increase of 1% in economic growth causes an increase of 0.02% in total passenger demand. On the other hand, although the currency has a negative effect, 1% is statistically significant at a critical value. A 1% increase in foreign exchange causes a decrease of 0.34% in total passenger demand, and when we look at the inflation variable, it is observed that 10% is statistically significant at the critical value. In other words, a 1% increase in the inflation variable increases the total passenger demand by 0.24%. According to the short-term error correction regression model, ContEq(-1) is negative and significant with -1.96. A statistically significant relationship was found between total passenger demand, which is the dependent variable, and inflation and economic growth, which are the independent variables, in the short run. In this context, it has been revealed that a 1% increase in economic growth increases total passenger demand by 0.03%, while a 1% increase in inflation reduces total passenger demand by -0.4%. After the long-term and short-term estimates, Granger Causality Analysis was performed to check whether there was a causality relationship between the variables. As a result of the analysis, it was concluded that the relationship between inflation and total passenger demand is not the cause of Granger. The relationship between foreign exchange to total passenger demand shows us that there is no Granger reason, while the relationship between total passenger demand towards foreign currency reveals that it is the Granger cause. When we look at the economic growth variable, there is no causality relationship between economic growth and total passenger demand.

Looking at the findings, it has been observed that inflation, which is one of the factors affecting the purchasing demands of passengers traveling by air, has a positive effect on total passenger demand, including international flights, in the long run, and has a negative effect in the short term, albeit slightly. It has been shown that this situation reduces the purchasing power of passengers in the short term, and in the long term, it decreases this situation as revenues increase. At the same time, economic growth and exchange rates have an impact on total passenger demand, including international flights. In Model 1, it is revealed that foreign exchange, inflation, and economic growth affect total passenger demand more in the long and short run, respectively. Based on these results, it can be said that foreign exchange is more dominant than the other two variables.

Based on this article, which examines the external factors affecting the purchasing demands of airline passengers in Turkey, a different perspective can be provided by changing the variables and analysis method on the same subject, and a contribution can be made to the Turkish aviation industry in line with the analysis. In addition, the study was analyzed with data from all years, but no seasonal distinction was made. In this context, researchers can be advised to analyze the changes in domestic or external demand in summer and winter by making a seasonal adjustment.

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