



SELINUS UNIVERSITY
OF SCIENCES AND LITERATURE

THE ROLE OF TAX INCENTIVES IN ECONOMIC GROWTH: EVIDENCE FROM TURKEY

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A DISSERTATION

Presented to the Department of Economics program at Selinus
University

Faculty of Business & Media in fulfillment of the requirements
for the degree of
Doctor of Philosophy in International Economics

June, 2023

DECLARATION

I do hereby declare that the thesis titled “THE ROLE OF TAX INCENTIVES IN ECONOMIC GROWTH: EVIDENCE FROM TURKEY” submitted for the award of Doctor of Philosophy in International Economics at Selinus University of Sciences and Literature, Faculty of Business and Media is my original work.

I hereby declare that all the information has been written according to all aspects of publication ethics. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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DEDICATION

This research work is dedicated to my loving family, especially to my three kids

ACNOWLEDGMENTS

I would like to express my deepest gratitude to my supervisor Dr. Salvatore Fava for his guidance, support and patience through this study.

I also would like to thank Assoc. Prof. Natalia Lytvyn for her useful comments and advices about methodology.

This study could not be possible without TURKSTAT and micro database. I am grateful to all staff of TURKSTAT Data Research Center for their help during my research process.

Last but not least, I would like to thank my big and friendly family for their patience and the strength during the process.

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In Turkey, there are state investment incentive programs to encourage domestic and foreign investments and the country is divided into different tax incentive regions.



Map 1 Turkey: Regional Development under Tax Incentive Zones

ABBREVIATIONS AND ACRONYMS

BEPS -- Base Erosion and Profit Shifting Standards
BITI – Banking and Insurance Tax Incentives
BITTI -- Banking and Insurance Transaction Tax
CIT -- Corporate Income Tax
CITI – Corporate Income Tax Incentives
FDI -- Foreign Direct Investment
GDP – Gross Domestic Product
GloBE -- Global Anti-Base Erosion
GNP – Gross National Product
IGTI -- Insurance and Gift Tax Incentive
OECD – Organization of Economic Cooperation and Development
PIT – Personal Income Tax
PITI – Personal Income Tax Incentives
SDG – Strategic Development Goals
SDP – Strategic Development Plan
SDTI -- Stamp Duty Tax Incentive
SSCI -- Social Security Contributions Incentives
VAT – Value-added Tax
VATI – Value-added Tax Incentives

ABSTRACT

This study aims to examine the alignment between economic growth and tax incentives in Turkey, as well as to explore the tools and instruments of tax incentive tax policy through the analysis of fiscal and strategic policy data. Tax incentives are widely used worldwide to promote domestic and foreign investment, which in turn fosters expected economic growth. To conduct this study, the method of content and document analysis was employed. The data sources included government policies, tax codes, economic surveys of Turkey, and relevant research articles.

Upon reviewing various tax-related aspects of government tax policies and the existing tax incentives provided by the tax authority, it was observed that the suggested incentives in the government policies closely align with the actual tax incentives provided. Additionally, there has been a shift in the priority sectors, with a focus on infrastructure, power, and technology sectors. Analysis of taxes, tax incentives and GDP-related data reveals that the contribution of the importance of well-designed, targeted tax incentive policy has consistently increased over the past 19 years. These findings shed light on the importance of tax incentives in promoting strategic development policy and driving economic growth in Turkey.

The aim of this study is to investigate the economic role of tax incentives in economic growth in Turkey by assessing the impact of tax incentives on GDP growth using the descriptive analysis, and applying the regression GMM (Generalized Method of Moments) model by using OLS (Ordinary Least Squares) to prove the dependence of GDP and different types of tax incentives. For this purpose, the hypothesis that “Tax incentives increase GDP growth” is tested and the effectiveness of tax incentives is examined in the context of their types. The questions of whether tax incentives effectively encourage economic activities and is there any relationship between tax incentives and GDP growth are answered. According to the results only three types of tax incentives has an impact on GDP growth: VATI, CITI and PITI.

Keywords: Tax incentive policy, tax incentives, Economic growth, GDP growth, Strategic development plan.

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Turkey's economic development has undergone significant changes over the years. After gaining independence in 1923, the country faced various economic challenges, including a lack of infrastructure and underdeveloped industries. The government, under the leadership of Mustafa Kemal Atatürk, introduced several economic reforms, including the establishment of the Turkish Central Bank, modernizing the tax system, and promoting industrialization.

During the 1950s and 1960s, Turkey experienced a period of rapid economic growth, known as the "Turkish Miracle." The country pursued an import substitution industrialization policy, promoting domestic production and reducing reliance on imported goods. This led to the establishment of various industries, including textiles, iron and steel and automotive manufacturing.

In the 1970s and 1980s, Turkey faced several economic challenges, including high inflation, government debt, and political instability. In response, the government implemented several economic reforms, including liberalizing the economy and promoting exports. These reforms helped to stabilize the economy and restore growth.

Turkey is classified as an emerging market economy, with a mix of both modern and traditional economic sectors. It has a predominantly free-market economy that includes traditional agriculture, high-tech industry, and a dynamic services sector. This economic model has resulted in Turkey having one of the largest economies in Europe and the MENA region, with a current GDP ranking of 19th in the world according to the World Bank database, measured in terms of US dollar value [1]. Investors often view Turkey as having a large and skilled workforce that is cost-effective, which is reflected in the OECD's ranking of Turkey as the 7th largest labor pool globally and the 3rd largest in Europe. Since the 1990s, Turkey has experienced sustained economic growth, with the country's GDP increasing by an average of 5% per year. The country has pursued a policy of economic liberalization, encouraging foreign investment and trade. Turkey has also expanded its industrial base, focusing on high-value-added sectors such as information technology, aerospace, and pharmaceuticals [2].

The Turkish government has implemented several economic policies to boost growth and development, including investment in infrastructure, tax incentives for businesses, and support for

small and medium-sized enterprises. However, concerns have been raised about political interference in economic decision-making and lack of transparency in government policies.

Turkey's tax system is broadly based on the OECD model, with some modifications to suit its domestic needs. Over 135 countries and jurisdictions are implementing 15 Actions to tackle tax avoidance, improve the coherence of international tax rules, ensure a more transparent tax environment and address the tax challenges arising from the digitalization of the economy [3]. The OECD model is a framework for designing and implementing tax policies that promote economic growth, investment, and social welfare according to the Base Erosion and Profit Shifting Standards (BEPS). Since 2020 Turkish Tax Authorities has been implementing BEPS's recommendations. Here are some of the key features of Turkey's tax system under the OECD model:

- PIT system is based on the OECD model, with tax rates ranging from 15% to 35% for individuals. The tax-exempt income threshold is also set at a level similar to other OECD countries;
- CIT rate is 25%, which is lower than the OECD average. The country also offers tax incentives for businesses in certain sectors, such as research and development;
- VAT system is based on the OECD model, with a standard VAT rate of 18%. However, the country has also introduced reduced VAT rates for certain goods and services, such as books and public transportation;
- Excise tax system is also based on the OECD model, with taxes imposed on goods such as tobacco, alcohol, and fuel. The country also offers tax incentives for the production and consumption of renewable energy;
- transfer pricing rules implemented in Turkey are in line with the OECD guidelines, which aim to prevent multinational companies from shifting profits to low-tax jurisdictions;
- tax administration reforms include improving taxpayer services, increasing tax audits, and promoting electronic tax filing and payment systems.

Governments worldwide utilize tax incentives to pursue various objectives, such as promoting investment, encouraging specific industries, and attracting foreign direct investment (FDI). In developing countries, tax incentives play a crucial role in supporting industrial and economic development. However, careful design, implementation, and monitoring of tax incentive policies are necessary to maximize their benefits while mitigating the risks of revenue erosion and inefficiency. Striving for a balance between creating an attractive investment climate and safeguarding public finances is essential for ensuring the long-term success and sustainability of tax

incentive programs.

Between 2009 and 2015, with the exception of South Asia, most developing countries witnessed the introduction of new tax incentives or an increase in their generosity. This surpassed or equaled the number of countries repealing or reducing incentives during that period [4]. Conversely, among OECD countries, the count of jurisdictions offering support for innovation-related income has multiplied fivefold in 2021 compared to 2000, accompanied by an increase in the generosity of tax incentives (Chart 1.1).

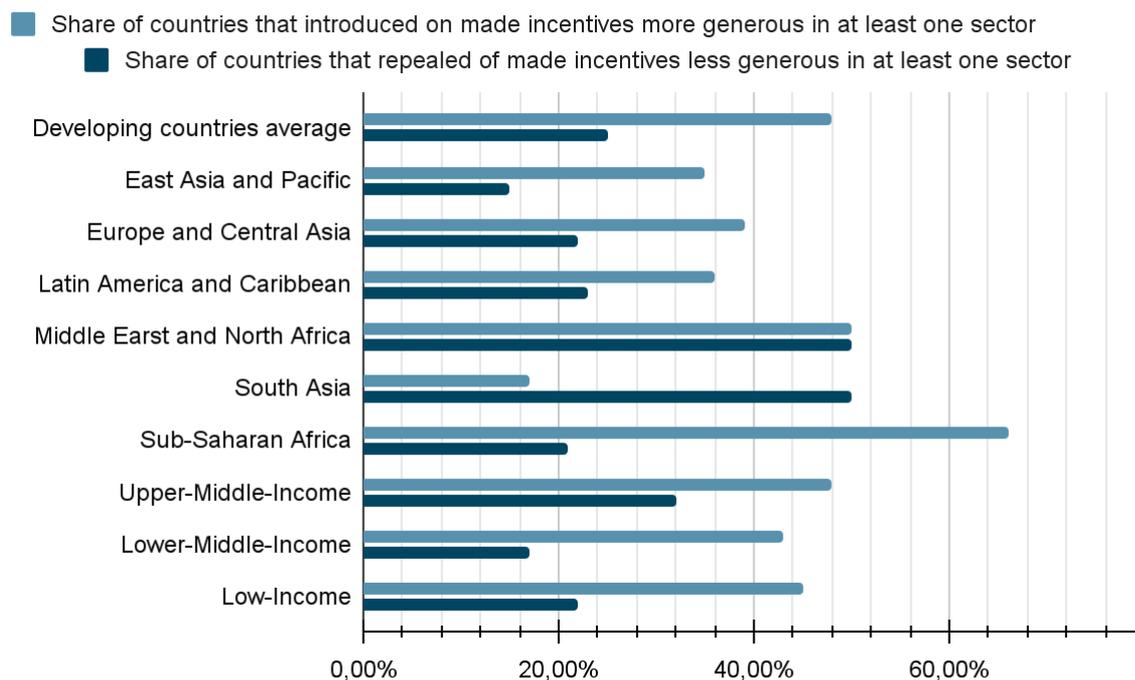


Chart 1.1. Tax incentives as a common policy tool across developing economies

These trends could be attributed to changes in government preferences, but evidence suggests that governments strategically respond to shifts in tax policy within other jurisdictions [5, 6, 7]. The rising use of income-based tax incentives is occurring alongside a global decrease in CIT rates, often referred to as a "race to the bottom" (Chart 1.2)

Research indicates that the effectiveness of tax incentives for investment heavily relies on their design and the specific context in which they are implemented. Empirical evidence underscores the significance of comprehending the design of tax incentives in evaluating their effectiveness, efficiency, and their contribution to sustainable development outcomes.

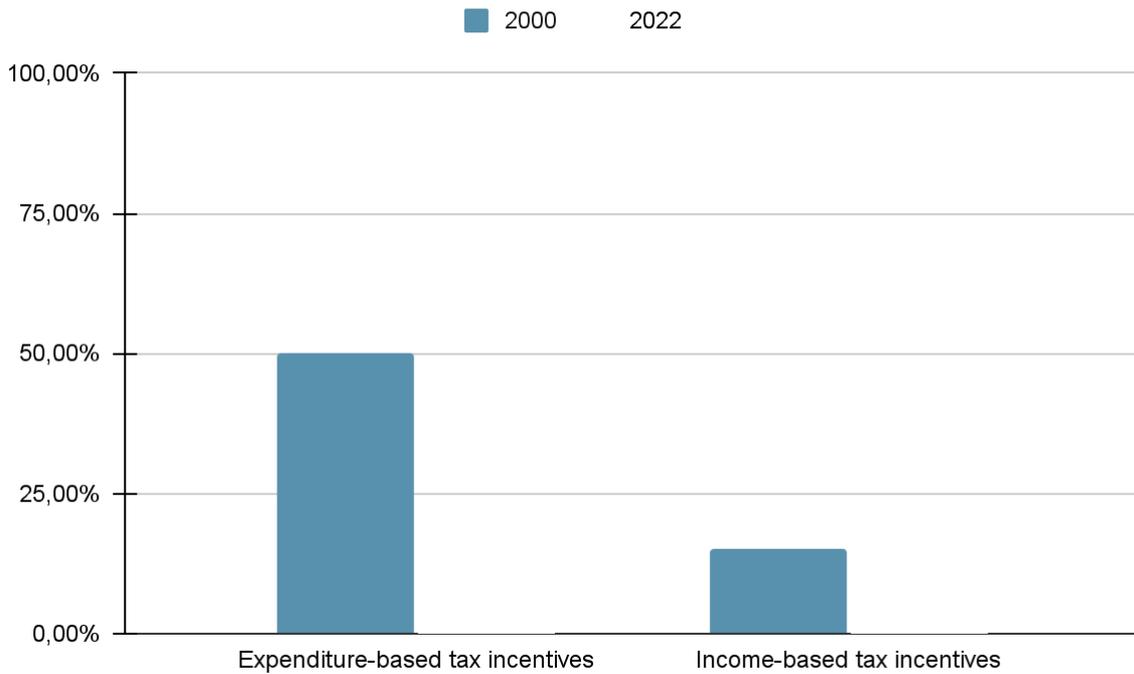


Chart 1.2. Increasing use of tax incentives for innovation among OECD countries

Source: OECD R&D tax incentives database [9]

Evidence supports the superior performance of expenditure-based tax incentives over income-based incentives. Expenditure-based incentives, such as accelerated depreciation or investment allowances, directly target investment expenses and have a higher likelihood of stimulating additional investment. Conversely, income-based incentives, like exemptions or reduced tax rates, are tied to a firm's profit rate and primarily benefit successful companies, potentially providing advantages to firms that would invest even without preferential treatment. Some studies have indicated limited investment responses to income-based incentives in developing economies [5, 11].

Accelerated depreciation and immediate expensing have proven effective in boosting investment in OECD countries [12]. Similarly, among developed countries, there is more conclusive evidence regarding the effectiveness of expenditure-based research and development (R&D) tax incentives compared to income-based incentives, which can result in tax-driven behaviors [6, 13, 14, 15]

In a global context, particularly concerning mobile activities, tax incentives can act as "beggar-thy-neighbor" instruments, leading to no significant increase in global investment but rather a relocation of investment across different jurisdictions. Apart from incentive design, other framework conditions such as political and institutional stability, infrastructure availability, and a skilled workforce influence the effectiveness and adoption of tax incentives. In the absence of an attractive

economic environment, tax incentives may have limited cost-efficiency and effectiveness. Countries with unfavorable investment climates are unlikely to attract additional investment, even with generous incentives [8, 6] indicates that FDI are less responsive to taxation in countries with unfavorable investment climates.

Furthermore, studies demonstrate that while there is a correlation between generous R&D tax incentives and observed subsidies for firms, the relationship is not one-to-one due to varying levels of uptake [14]. Tax incentives are most effective when well-designed and implemented within a conducive investment climate [15]. However, tax incentives alone cannot compensate for weak investment conditions [16, 17]. Factors such as the quality of infrastructure and the regulatory framework are often considered more important by investors in determining investment location decisions compared to tax incentives [18, 19].

In October 2021, the G20 Leaders Declaration welcomed the historic Two-Pillar international tax package, a consensus reached by the OECD/G20 Inclusive Framework on Base Erosion and Profit Shifting. Pillar Two of this package aims to address concerns related to profit shifting, harmful tax competition, and the race-to-the-bottom on corporate tax rates. At the request of the Indonesian G20 Presidency, this report examines the implications of Pillar Two on the use and design of tax incentives, with a specific focus on developing countries.

Pillar Two establishes a global minimum effective corporate tax rate of 15% for large multinational enterprises (MNEs). This measure is intended to limit tax competition and reduce the pressure on jurisdictions to offer tax incentives. The Global Anti-Base Erosion (GloBE) Rules, a crucial component of Pillar Two, outline that MNEs with an effective tax rate below 15% in a jurisdiction may be subject to top-up taxes. Historically, many jurisdictions have employed tax incentives to attract investment, but these incentives have often proven to be ineffective and wasteful, particularly in developing countries. Pillar Two aims to discourage profit shifting by MNEs and help jurisdictions strike a better balance between attracting investment and generating domestic revenues.

While jurisdictions can still utilize the tax system to attract investment under the GloBE Rules, the rules will discourage the use of harmful tax incentive policies. Corporate Income Tax (CIT) incentives are commonly used by jurisdictions to achieve various objectives. However, poorly designed incentives can be limited in their effectiveness and result in significant revenue losses. The GloBE Rules will impact different tax incentives in different ways, with some experiencing

minimal or no effect. Incentives that successfully attract tangible investment and create jobs will be less affected. However, if incentives enable MNEs to generate substantial low-taxed profits without significant tangible investment or job creation, the GloBE Rules will protect the corporate tax base.

The revenues generated through Pillar Two can be utilized by jurisdictions to support economic development and enhance their investment environments. This can include investments in physical infrastructure and the development of labor force skills. In a post-Pillar Two environment, non-tax factors that are valued by investors will become increasingly important as jurisdictions strive to enhance competitiveness through policies beyond taxation.

Jurisdictions should initiate preparations for the implementation of Pillar Two, including a comprehensive assessment of existing tax incentives. The introduction of Pillar Two presents a unique opportunity for tax incentive reform, particularly for developing and emerging economies. Delaying action or proceeding too slowly may result in missed tax revenues as other jurisdictions impose top-up taxes. Tax incentive reform may pose challenges due to the complex governance of such incentives in certain jurisdictions. When considering reform options, jurisdictions should also consider stabilization clauses in contracts and obligations that may arise from specific investment agreements.

Turkey, as an acceding candidate country of the European Union (EU), has been actively preparing and submitting its Economic Reform Program (ERP) to the European Commission since 2001, in response to the request of the Economic and Financial Affairs Council (ECOFIN Council) dating back to November 26-27, 2000. The current Economic Reform Program (2023-2025) has been developed under the coordination of the Presidency of the Republic of Turkey and the Presidency of Strategy and Budget, with valuable contributions from relevant ministries and institutions, and has been officially approved by the President.

The preparation of the Economic Reform Program (2023-2025) was guided by the Medium Term Program (MTP, 2023-2025) and the 2023 Presidency Annual Program. This program holds significant importance for the transition period leading up to the Twelfth Development Plan (2024-2028), which is currently being formulated. The priorities of structural reforms will be reassessed once the Development Plan is implemented. The costing of structural reform measures and their alignment with existing guidelines were finalized through constructive discussions held in workshops organized in collaboration with the Presidency of the Republic of Türkiye, the Presidency of Strategy and Budget, and the Center of Excellence in Finance (CEF).

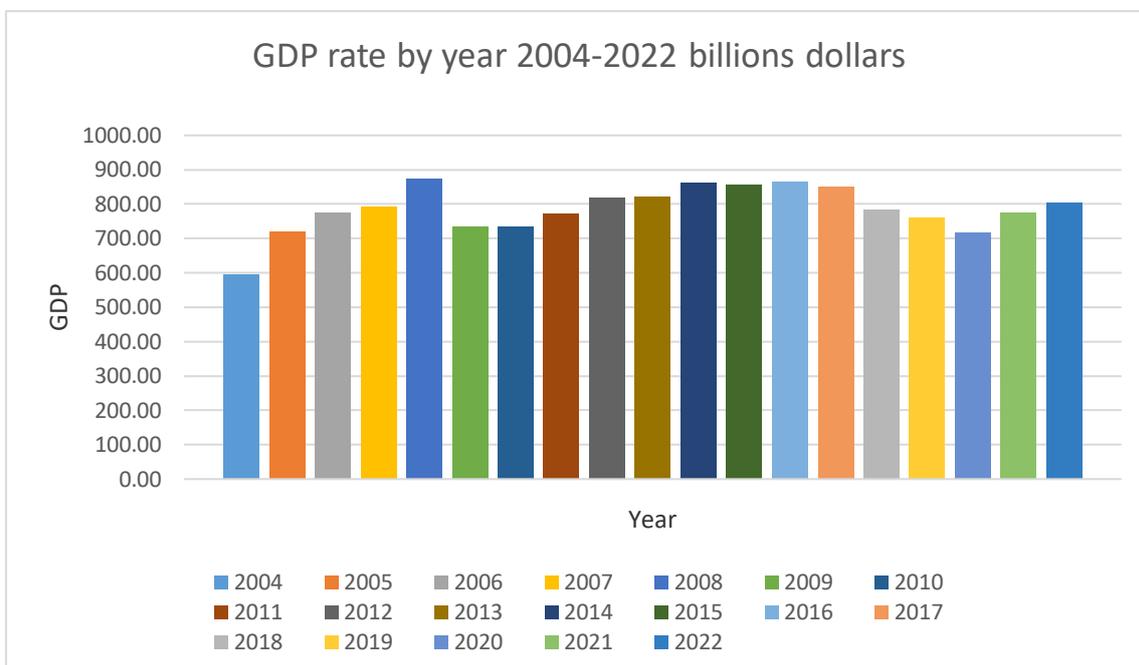
The macroeconomic framework of the ERP has been formulated in a global context characterized by widespread and persistent inflation in the post-pandemic period, simultaneous tightening of global monetary and fiscal policies in response to this trend, economic and social risks arising from the Russia-Ukraine conflict, and increasing expectations of a global recession. Diplomatic efforts and international reconciliatory actions aim to mitigate the negative consequences of these events. Türkiye, with its advantageous geographical location and dynamic and flexible production capabilities, has the potential to become a significant contributor to the global economy. Given the rising internal and external risks, the main objective of the ERP is to foster growth with a focus on investment, employment, production, and exports. It aims to strengthen the efficient and competitive production structure, reduce import dependency, achieve sustainable price stability, enhance human capital and workforce quality, improve the business and investment environment, and achieve sustainable and inclusive growth through economic transformation based on the Türkiye Economy Model.

Within this framework, monetary policy will be complemented by fiscal policy, income policy, and macro-prudential measures. Fiscal policy will be implemented in a manner that contributes to inclusive and sustainable distribution of economic welfare, maintains the current account deficit at a sustainable level, and supports domestic savings and investments. Structural reforms will be pursued to strengthen physical, human, and technological infrastructure, with a particular emphasis on addressing three main challenges identified by stakeholders for inclusive growth and competitiveness: enhancing workforce quality and formal employment, improving the education system, and increasing the share of high value-added production in the industry.

Throughout the program period, steps will be taken to adapt and transform all sectors and areas of the economy, aligning with development priorities and considering the multifaceted impacts of climate change on the environment, society, and economy. A medium-term low-carbon growth strategy will be developed to progress towards the net zero emission target. The additional investment requirements for sectors undergoing green transformation will be identified, and various support mechanisms will be established to maintain their competitiveness.

An updated investment incentive framework will be introduced, with a focus on digital transformation and its extensive influence. Efforts will continue to facilitate and support women's business establishment and development, encouraging their participation in decision-making mechanisms and e-commerce platforms. Measures will be implemented to facilitate the entry of young people into the labor market and enhance their skills. This includes expanding internship

opportunities, part-time and flexible working models, and emphasizing training programs and activities to increase their career awareness.

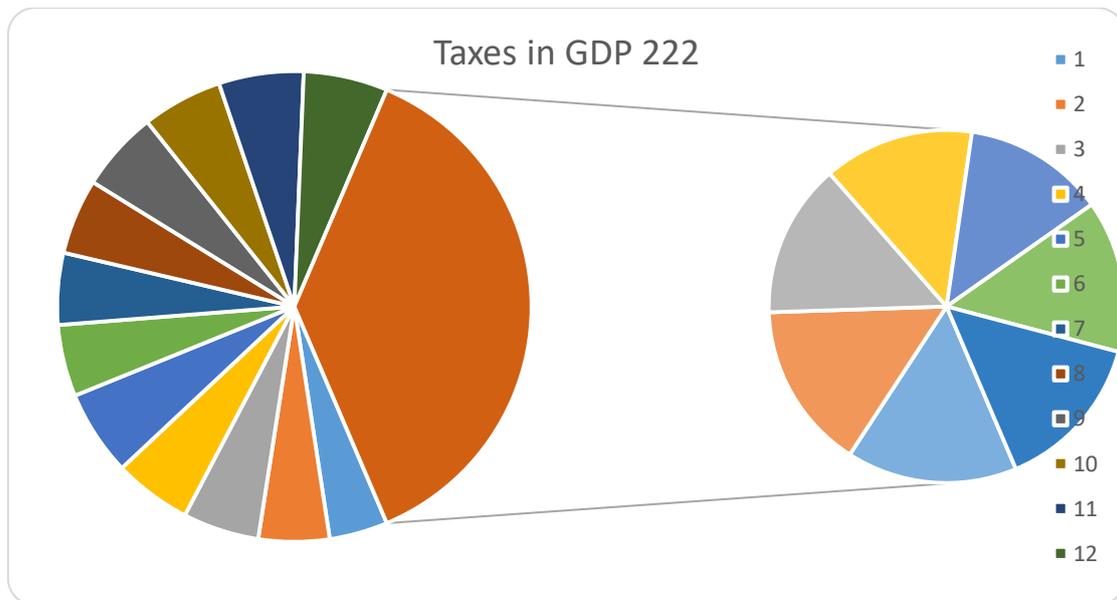


Source: Authors estimates

Chart 1.3. Dynamics of GDP rate

The analysis of the GDP rate in Turkey from 2004 to 2022 reveals a mix of growth, challenges, and recovery. The economy experienced significant expansion until 2008, followed by a period of economic difficulties. However, Turkey managed to recover and resume growth from 2012 onwards, albeit at a slower pace compared to the pre-crisis period. The recent GDP figures reflect the resilience of the Turkish economy, demonstrating its ability to overcome challenges and maintain a steady growth trajectory. From 2004 to 2008, Turkey experienced significant economic growth, with the GDP reaching \$873 billion USD in 2008. This period marked a notable high in the GDP rate, with Turkey's economy expanding rapidly. Following the global financial crisis in 2008, Turkey faced economic challenges that impacted its GDP rate. Until 2011, the GDP declined, reaching \$772 billion USD. The country struggled with slower growth and economic instability during this period. From 2012 onwards, Turkey's GDP started to recover and resume growth. The GDP gradually increased, reaching \$851 billion USD in 2017.

Analyzing GDP rate in Turkey 2004- 2022 it is important to highlight that this period reflected a positive turnaround in the economy, with Turkey regaining momentum and experiencing economic expansion. In 2022, Turkey's GDP stood at \$804 billion USD.

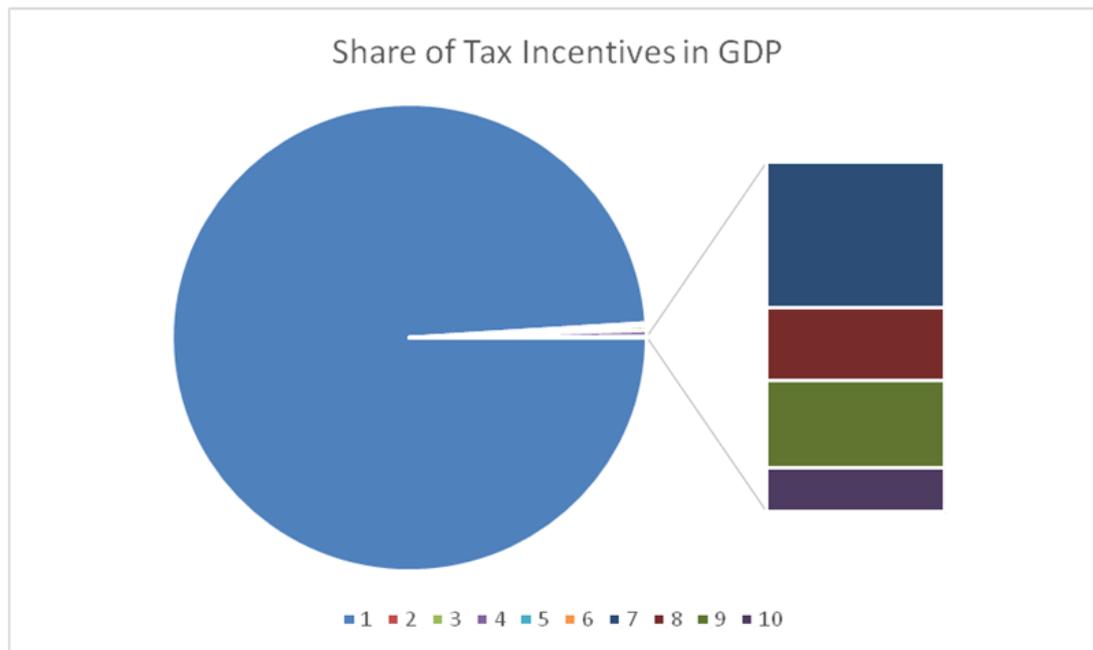


1 – PIT; 2 – CIT; 3 – VAT; 4 - Taxes on Goods and Services; 5 – SCC; 6 - Taxes on Foreign Trade; 7- Excise; 8 - Property tax; 9 - Motor Vehicle tax; 10 - Estate, inheritance, and gift taxes.

Source: Authors estimates

Chart 1.4. Share of tax revenues by type of tax in GDP (mean 2004-2022)

Let's consider the diagram "Share of main taxes in Turkey's GDP." In 2004, the GDP amounted to \$595 billion USD, and in 2008, it reached \$873 billion USD. Such a high level of GDP has not been observed until 2022. Until 2011, the GDP declined and amounted to \$772 billion USD, but starting from 2012, it began to grow and reached \$851 billion USD in 2017. In 2022, the GDP stood at \$804 billion USD. If in 2004 the share of main taxes in the GDP structure was 28 percent, in 2022 it was 53 percent, which corresponds to \$168 billion USD and \$422 billion USD, respectively. The amounts of taxes collected by the government have been increasing by 5-10 percent annually since 2008, and their share in the GDP has also been rising. For instance, in 2004, the Personal Income Tax (PIT) was \$22 billion USD, while in 2022, it amounted to \$42 billion USD. VAT was \$28 billion USD in 2004 and \$87 billion USD in 2022. CIT stood at \$7 billion USD and \$49 billion USD, respectively. Taxes on Goods and Services were \$29 billion USD in 2004 and \$88 billion USD in 2022. Social Contribution and Solidarity Fund (SCC) amounted to \$49 billion USD and \$90 billion USD. Excise tax accounted for \$26 billion USD and \$49 billion USD.



1 – PIT!; 2 – CITI; 3 – VATI; 4 - BITI; 5 – SSTI; 6 - Taxes on Foreign Trade Incentives; 7- Excise Tax Incentives; 8 - Property Tax Incentives; 9 – Motor Vehicle tax Incentives; 10 - IGITI

Source: Authors estimates

Chart 1.5 Share of Tax Incentives in GDP 2022

Comparing the growth or decline of GDP with the amounts of tax incentives provided by the government, a direct correlation can be observed (chart 1.5). For example, in 2008, when GDP was at its highest, tax incentives were also at their peak, while in 2004, both GDP and tax incentives were at their lowest. This proves that tax incentives directly impact the level of GDP.

Let's examine the diagram. At first glance, the share of tax incentives in the GDP structure may seem insignificant, but it has a substantial influence on its growth. In 2004, Turkey's GDP was \$595 billion USD, with tax incentives amounting to \$5.5 billion USD. In 2008, GDP reached \$873 billion USD, with tax incentives totaling \$8.5 billion USD. In 2022, GDP stood at \$804.5 billion USD, while tax incentives amounted to \$7.8 billion USD. Throughout the period from 2004 to 2022, the share of tax incentives in the GDP structure varied. The largest incentives were provided by the government for VAT, CIT, and PIT. In 2022, incentives related to these tax types accounted for 90% of all incentives.

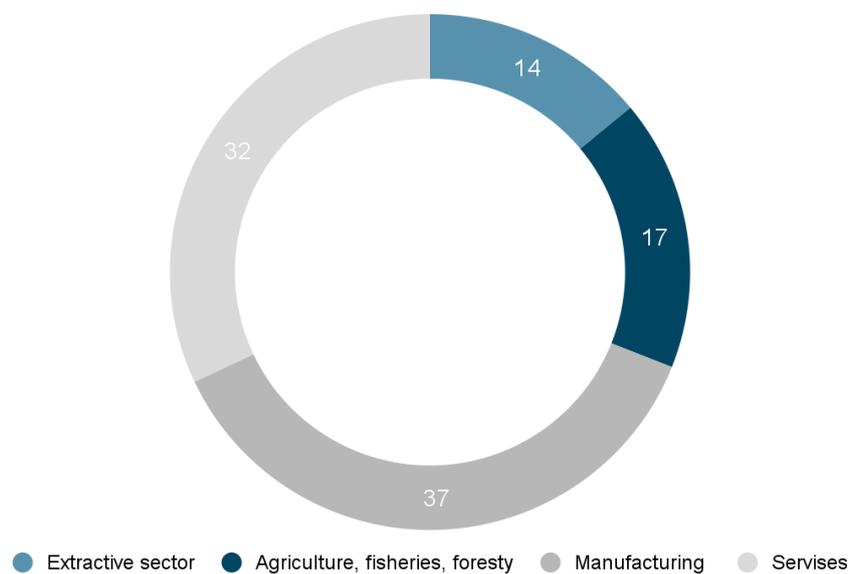
Comparing the growth or decline of the GDP with the amounts of tax incentives provided by the government, one can observe a direct correlation. For example, in 2008, when the GDP was at its highest, the tax incentives were also the largest. This proves that tax incentives directly impact the

level of GDP.

Turkey has seen an increase in GDP and, accordingly, an increase in taxes paid to the budget for the period 2004 - 2022. The biggest jump was in 2008. GDP has grown over 4 years by 300 billion US dollars. For the next three years, there was a slight decline in the level of GDP, and starting from 2012, its gradual growth began. In 2017, GDP reached the level of 2008. In subsequent years, GDP declined slightly. At the same time, the amount of taxes paid for the period 2004-2022 almost doubled. The largest percentage in the structure of all taxes collected belongs to VAT, CIT and PIT.

Comparing the growth or decline of GDP with the amounts of tax incentives provided by the state, one can observe a direct relationship. In 2008 the GDP was at its highest level. Tax incentives were at their highest level, too. This proves that tax incentives directly affect the level of GDP.

In Turkey, 57 per cent of all tax-related investment policy measures more favourable to investment are sector-specific. In particular, 70 per cent of implemented reduced-CIT incentives are based exclusively on sectoral requirements. Most sector-specific tax incentives for investment introduced in the last decade target manufacturing and services in 2022 (Chart 1.6)



Source: UNCTAD, Investment Policy Monitor [20]

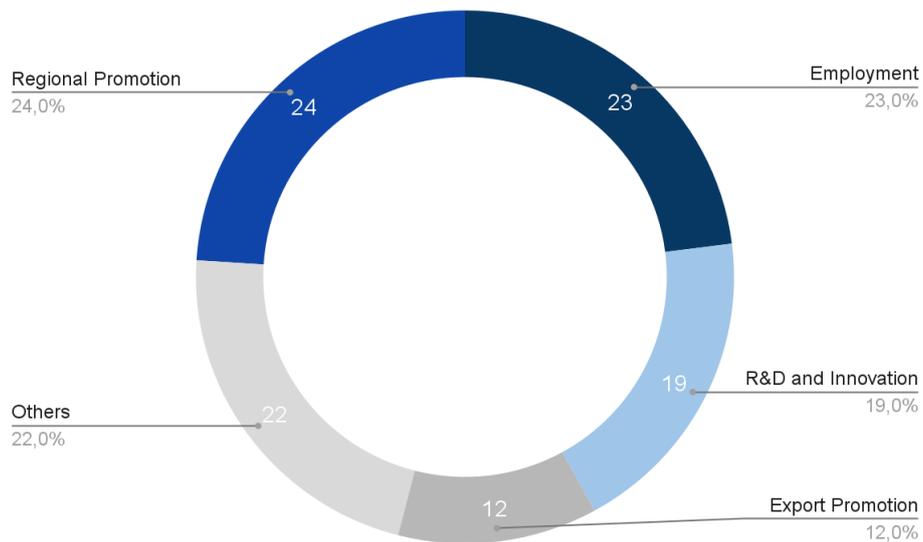
Chart 1.6. Most sector-specific tax incentives for investment in Turkey 2022

The majority of tax incentives targeting manufacturing industries are designed to apply broadly across all manufacturing activities, accounting for 79 percent. However, a significant portion of

these incentives is specifically directed towards the manufacturing of transport equipment (44 percent), the production of computer and electronic equipment (33 percent), and the production of pharmaceuticals (22 percent). When examining tax incentives targeting the services sector, 73 percent are applicable to the entire sector. The remaining incentives demonstrate a policy emphasis on information technology (32 percent), tourism (27 percent), and transport (22 percent).

In the past decade, more than 60 percent of tax-related measures that provide favorable conditions for investment have been introduced with specific policy objectives in mind. These objectives include the development of particular regions within a country, promoting exports, reducing unemployment, enhancing skills, encouraging research and development, and facilitating the transfer of innovative technologies.

When examining these tax incentives individually, those aimed at regional development are the most prevalent worldwide (24 percent), particularly in Africa (33 percent) and Asia (27 percent). Among these incentives, 70 percent were designed to promote the development of Special Economic Zones (SEZs), while 30 percent targeted specific locations within a country. Employment promotion is the primary policy objective associated with incentives in Europe, North America (35 percent), and Latin America and the Caribbean (33 percent) (Chart 1.7)



Source: UNCTAD, Investment Policy Monitor [20]

Chart 1.7. Share of tax incentives in policy objectives

1.2. Statement of the Problem

In Turkey, tax incentives have been widely utilized as a policy tool to stimulate economic growth and attract investment. However, the effectiveness of these tax incentives in promoting sustained and robust economic growth remains a subject of debate and uncertainty. The need to understand the true impact of tax incentives on economic growth in Turkey has become increasingly crucial, given the country's economic goals and aspirations.

The problem at hand revolves around assessing the effectiveness of tax incentives in driving economic growth in Turkey. It involves understanding whether the current tax incentive policies in place are achieving their intended objectives and whether they provide an optimal balance between promoting economic growth and ensuring sufficient government revenue. It is important to determine whether there are unintended consequences or trade-offs associated with tax incentives, such as potential revenue losses or distortionary effects on resource allocation.

By examining the empirical evidence and conducting a rigorous analysis of the relationship between tax incentives and economic growth in Turkey, this study aims to contribute to the existing body of knowledge. The findings will help inform policymakers in making evidence-based decisions regarding tax incentive policies, potentially leading to more effective measures that foster sustainable and inclusive economic growth in Turkey.

1.3. Objectives of the Study

The Turkish economy is facing significant challenges, with a decline in business activity and a limited number of new companies emerging. Proponents of tax incentives argue that these measures can stimulate economic growth and development. However, an opposing viewpoint suggests that tax incentives can lead to reduced government revenue, potentially straining fiscal resources if not properly targeted. This raises the need to investigate the economic impact of tax incentives on growth in Turkey.

The objective of this study is to assess the effectiveness of tax incentives in promoting economic growth in Turkey. The study aims to achieve the following objectives:

- i. Quantify the relationship between tax incentives and GDP rate using by analyzing historical data collected from sources such as the Central Bank of Turkey, TURKSTAT and the Turkish Revenue Administration.
- ii. Determine whether the effects of tax incentives vary across different types of incentives in the Turkish economy.

iii. Investigate where tax incentives have a more substantial influence on economic growth, providing insights for targeted policy interventions.

iv. Provide Policy Recommendations based on the findings for policymakers to enhance the effectiveness of tax incentives in fostering sustainable and robust economic growth in Turkey.

1.4. Research Questions

During the statement of the objective of the study several key questions have been raised in this context:

1. Are tax incentives efficiency depends on their interconnection with targets of government policy measures in Turkey?
2. To what extent are tax incentives contributing: economic, social or ecological development?
3. Is there any relationship between tax incentives and GDP growth?
4. Are tax incentives an effective tool in government tax policy?
5. Should tax incentive policy be connected with Strategic Development Plan of Turkey?

1.5. Hypotheses of the Study

The following hypotheses was written in null form:

HO1: There is no autocorrelation between Corporate Income Tax Incentives (CITI) and GDP growth in Turkey

HO2: There is no autocorrelation between Personal Income Tax Incentives (PITI) and GDP growth in Turkey

HO3: There is no autocorrelation between VAT Incentives (VATI) and GDP growth in Turkey

HO4: There is no autocorrelation between Social Security Contributions Incentives (SSCI), Banking and Insurance Transaction Tax (BITTI), Stamp Duty Tax Incentive (SDTI), Property Tax Incentives, Motor Vehicle Tax Incentives, Insurance and Gift Tax Incentive (IGITI) and GDP growth in Turkey

H5: Tax incentives are not an effective tool in government regulation tax policy

HO6: There is no cross-sectional dependence between tax incentive policy and strategic development plan in Turkey.

1.6. Significance of the Study

The study's examination of the revenue implications and potential trade-offs associated with tax incentives contribute to the broader discussion of macroeconomic stability. By understanding the impact of tax incentives on GDP and investments, policymakers can make informed decisions that strike a balance between promoting economic growth and ensuring fiscal stability. This balance is crucial not only for national economies but also for the stability and resilience of the international economic system. The findings of this study will provide valuable insights for policymakers in designing and implementing tax incentive policies that effectively stimulate economic growth in Turkey. By understanding the impact of tax incentives, policymakers can make informed decisions to optimize the allocation of resources and promote sustainable economic development.

The significance of the study on the effectiveness of tax incentives on economic growth in Turkey extends beyond the national context and holds implications for the international economy. The study's insights can facilitate knowledge exchange and collaboration among researchers, economists, and policymakers globally. Findings can provide valuable policy lessons for other countries facing similar economic challenges and considering the implementation of tax incentives policy. A well-designed and effective tax incentive regime has the potential to make Turkey a more attractive investment destination, promoting cross-border investment flows and strengthening economic ties with other countries.

Turkey's position as a bridge between Europe, Asia, and the Middle East makes it an important player in international trade and economic integration. Understanding the impact of tax incentives on economic growth in Turkey can contribute to discussions and initiatives aimed at promoting regional economic integration. The findings can help policymakers in neighboring countries or those engaged in regional economic partnerships to explore potential synergies and harmonize tax incentive policies to drive collective growth and development.

1.7 Scope of Study

The study used panel data as from 2004 to 2022 for Turkey. Information on GDP, tax revenues and tax incentives by type of tax was considered in the analysis. Information on GDP growth rates, sums of collected taxes by type of tax and sums of tax incentives provided was considered in the analysis.

1.8 Theoretical Framework

This study is based on two theories: Supply-Side Theory and Economic Growth theory.

The term “supply-side economics or supply-side fiscalists” according to [21] was first used by Herbert Stein, a former economic adviser to President Nixon, in 1976. It is able to explain the relationship that exists between income tax rates and economic growth. Supply-side theorists also believe in the importance of deregulation and reducing government spending in order to promote economic growth. They state that corporate tax reductions increase private spending in companies, facilities and equipment. They argue that excessive regulation and government intervention can create barriers to entry for businesses and reduce incentives for entrepreneurship and innovation. By reducing regulations and limiting government spending, supply-side theorists believe that businesses will have greater freedom to operate and invest, leading to increased economic growth and development.

Economic growth theory emphasizes the importance of increasing productivity and output to stimulate economic growth. The theory suggests that as firms strive to increase profits, they will look for ways to gain a competitive advantage over their competitors, which leads to more innovation and investment in research and development. Classical growth theorists believe that population growth is temporary, and that eventually the growth rate will decrease as real GDP per capita increases.

The reduction in the CIT rate and other incentives can also help to increase output and economic growth. In order to interpret the theory, classical growth theorists introduced the concept of a subsistence level. This refers to the level of output at which people feel they have enough to meet their basic needs, and any further increase in output leads to population growth and a decrease in the real GDP per person. However, this concept is controversial, and there are different interpretations of how it affects economic growth.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter reviews works of theoretical and empirical literature. The structure of this chapter consists of three topics:

1. The Research Conceptual Model
2. Conceptual Framework
3. Empirical literature review

2.1 Research Conceptual Model

The use of econometric methods is appropriate for this study, as it allows for the specification and estimation of model that can capture the relationship between GDP and various types of tax incentives. Econometric methods involve the use of statistical techniques to estimate the parameters of economic model, and can help identify the key drivers of economic growth in a given context.

Research is made in two stages:

1. Assessment of relationship between each type of tax incentive and GDP with pair linear regression model
2. Assessment of relationship between all significant tax incentives and GDP with multiple linear regression model

2.2 Concept of Economic Growth

Economic growth is defined as the progressive expansion of an economy's production output over a period of time. This constant rise in the net national product or per capita national output is typically quantified using conventional measures such as GNP or GDP.

This study defines economic growth as a continuous increase in a nation's real GDP and per capita real GDP. Real GDP is a metric used to measure the market value of all final goods and services produced in a country during a year. GDP is a widely used economic indicator to gauge the overall health of an economy and measure living standards. Economic growth is driven by an upsurge in aggregate demand and supply, which can be achieved through physical capital goods expansion, technological advancement, labor force growth, and enhancing human capital. Tax incentives may be employed to decrease tax rates, increase disposable income, encourage businesses to hire more labor, and invest more in their enterprise, ultimately generating more government revenue in the long run. However, efficient and equitable tax collection is the government's more sustainable way to raise revenue to attain its developmental objectives in the long run.

Each year, the real sector of the economy, which constitutes a significant part of the country's exports and GDP, faces an increasing tax burden [23]. The Laffer Curve serves as an economic indicator that illustrates the relationship between budget revenue growth and tax rate increase. When the tax rate rises to point T_{max} , it diminishes the incentives for labor and investment, decelerates scientific and technological progress, and slows down economic growth, ultimately leading to a decline in budget revenue. Conversely, reducing the tax rate can stimulate investment, savings, employment, total income, and result in a boost of budget revenue. However, determining the optimal scale of taxation is theoretically impossible and can only be determined empirically (Chart 2.1)

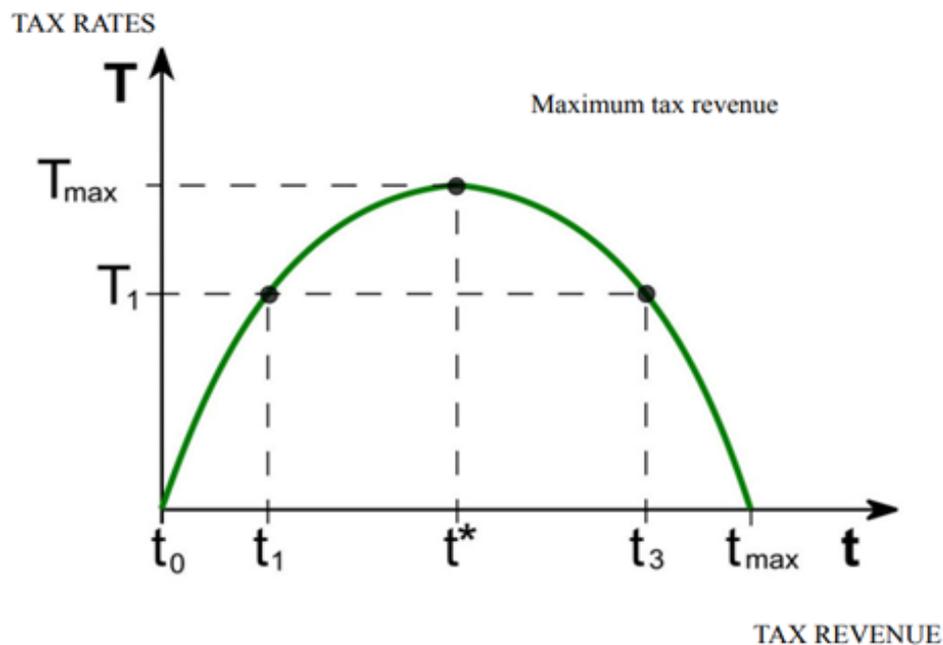


Chart 2.1. Laffer Curve

The Laffer Curve indicates that tax rate growth before a certain point can result in an increase in budget revenues. However, after surpassing a certain level, revenues begin to decline, indicating an excessive tax burden that may push businesses into the informal economy. To prevent this, the Ministry of Treasury of Turkey must conduct an assessment of all taxes to ensure that the tax burden is proportionate to the current business environment [24].

2.3 Concept of Tax Incentives

2.3.1 Meaning of Tax Incentives

Tax incentives are policies implemented by governments to encourage certain economic activities by reducing the amount of taxes that individuals or businesses are required to pay. They are designed to stimulate economic growth and investment in specific sectors or industries, and to promote desirable behaviors such as saving, research and development, and job creation. According

to economists and researchers, tax incentives can be an effective tool for government's fiscal policy to influence the behavior of taxpayers and promote economic development, but their effectiveness depends on a variety of factors, including the design of the incentive, the target audience, and the overall economic conditions.

A literature review of the definition of tax incentives reveals that there are varying perspectives on the concept, depending on the specific focus and discipline of the research. According to European Center for the Development of vocational training CEDFOP tax incentives are the concessions in tax codes that mean a conscious loss of government budgetary revenue. They are usually intended by public authorities to encourage particular types of behavior (in relation to education and training, in this case) and/or to favor specific groups (certain companies, e.g. SMES, in this case). Tax incentives reduce either the tax base (tax allowance) or the tax due (tax credit) [25].

In the UN report (2018) tax incentives are defined as special provisions that allow for exclusions, credits, preferential tax rates or deferral of tax liability. Tax incentives can take many forms: tax holidays for a limited duration, current deductibility for certain types of expenditures or reduced import tariffs or customs duties [26]. These incentives are designed to encourage certain behaviors or activities, such as investment in specific industries, research and development, environmental protection, or job creation. Tax incentives can also be used to attract foreign investment or to support small and medium-sized enterprises.

Alexander Klemm (2021) in his IMF working paper defines tax incentives as all measures that provide for a more favorable tax treatment of certain activities or sectors compared to what is granted to general industry [27].

2.3.2 Classification of Tax Incentives

Tax incentives are government programs that provide tax benefits to individuals or businesses that meet certain criteria. Tax incentives can be grouped into a number of categories: tax holidays, investment allowances and tax credits, timing differences, reduced tax rates, and free economic zones. Each type raises different design and drafting issues. General tax incentives can differ markedly in a number of important ways, in particular in terms of the types of companies and activities that are likely to benefit from them, the time profile of the revenue impact on the government for any given level of incentive, the difficulty of administration, and the possibility of tax avoidance. Various types of tax incentives can be classified by different categories (Table 2.1).

Table 2.1. Classification of Tax Incentives

Type	Classification
Government hierarchy	<p>General: They are typically national-level programs that provide tax benefits to individuals or businesses across the country.</p> <p>Provincial: They are specific to a particular province or state and may be designed to target industries or activities that are important to that region.</p> <p>Regional: They are provided by regional governments or economic development organizations and are designed to encourage investment in a particular region.</p> <p>Local: They are provided by cities or municipalities and are designed to encourage economic growth within a particular geographic area.</p>
Incentive	<p>Tax Deductions: Deductions reduce the amount of taxable income, which in turn reduces the tax liability.</p> <p>Tax Credits: Tax credits provide a dollar-for-dollar reduction in the tax liability.</p> <p>Tax Exemptions: Exemptions allow taxpayers to exclude a portion of their income from taxation.</p> <p>Accelerated Depreciation: Depreciation is a tax incentive that allows businesses to deduct the cost of assets over time. This can reduce taxable income and therefore the tax liability.</p> <p>Tax Allowances: Tax allowances are deductions from taxable income that reduce the amount of tax owed by an individual or business.</p> <p>Tax Exclusions: Exclusions allow taxpayers to exclude certain types of income from taxation.</p> <p>Tax Holidays: A tax holiday refers to a temporary period during which certain taxes are temporarily suspended or reduced.</p> <p>Preferential tax rates: Preferential tax rates provide lower tax rates for certain types of income or taxpayers.</p>
Tax	PITI; CITI; VATI: Special Consumption Tax; BITI; Stamp Duty Tax; Property Tax; Motor Vehicle Tax; Inheritance and Gift Tax;
Time	Regular; Temporary
Industry	Energy; Services; Manufacturing; Mining; Agriculture Ets
Incentive holder	Individual; Legal entities
Impact	Social; Economic; Environmental
Target	Investment stimulation; R&D development; Social development; Regional; Credit providing

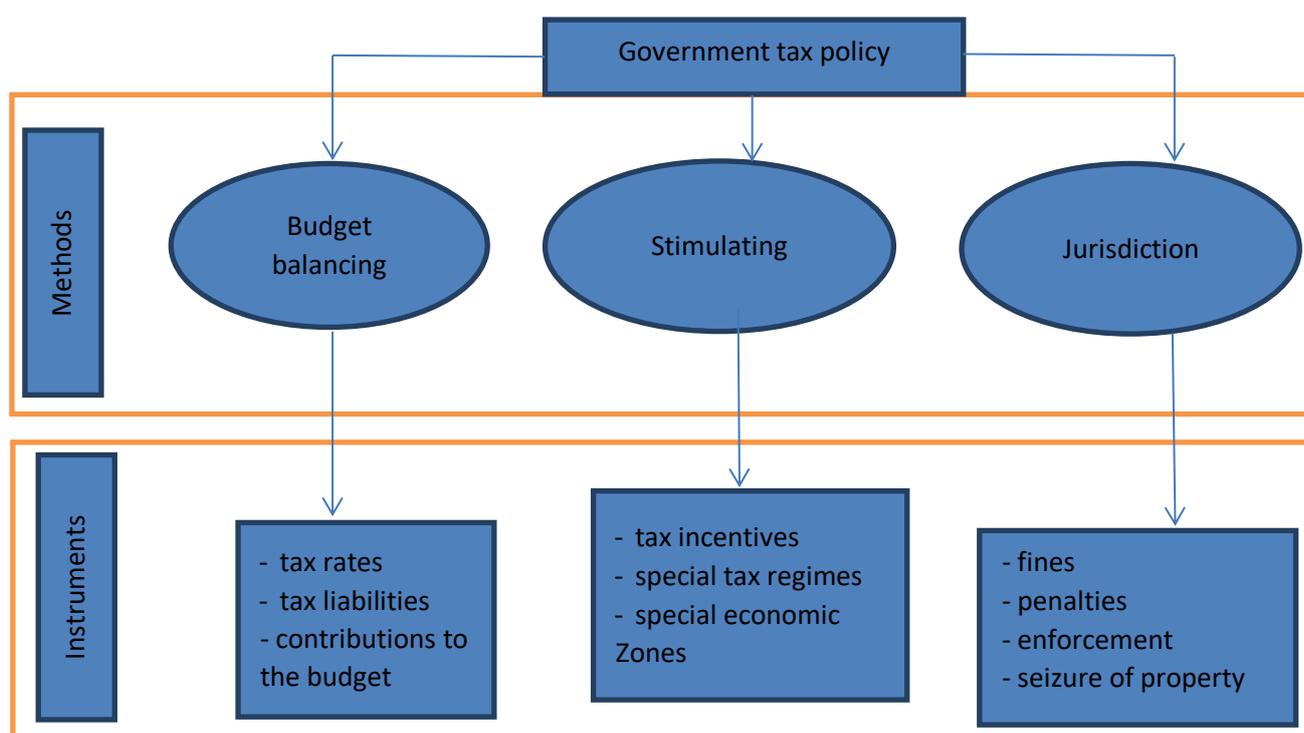
Source: Authors estimates

General, provincial, local, and regional tax incentives can have a significant impact on economic growth. Provincial, local, and regional tax incentives can be more targeted, aimed at specific industries, activities, or geographic regions. These incentives can provide a boost to local economies by attracting new businesses, creating jobs, and promoting economic development in the region. For example, tax incentives for businesses that locate in a particular region can create a cluster of related industries, leading to increased innovation and productivity.

2.3.3 The Place of Tax Incentives in Government Tax Policy

The main method of implementation of tax reforms is the government tax policy. It refers to the set of rules, regulations, and laws that determine how taxes are levied, collected, and distributed by a government. Tax policy can be realized on different levels. These levels can be broadly categorized as follows: government, provincial, regional and local.

Tax policy has its own methods and instruments (Chart 2.2)



Source: Authors estimates

Chart 2.2. Methods and instruments of tax policy

Budget balancing is carried out by establishing certain standards for deductions to the budget of one level or another from the amount of tax revenues. This is often done through the use of fiscal rules, which are specific guidelines that limit government spending or require the government to maintain a certain level of revenue debt. The main instruments of budget balancing are: tax rates, tax liabilities and tax contributions to the budget.

Stimulating is one of key methods to support the policy of economic growth and development. It is implemented through the manipulation of tax rates, the system of tax incentives, as well as through the establishment of special tax regimes.

Tax jurisdiction method of tax policy regulation is aimed at overcoming and eliminating the consequences of tax violations and is implemented through a system of tax sanctions and measures

of administrative intervention of the state in the course of fulfilling tax obligations. The main instruments of tax jurisdictions are: fines, penalties, enforcement and seizure of property.

Governments worldwide employ investment tax incentives as a means to attract investors, foster investment in specific sectors and locations, and shape investor behavior. However, the overall net benefits of these policies remain unclear. While well-designed tax incentives have the potential to increase investment and positively impact output, productivity, and the achievement of Sustainable Development Goals (SDGs), their costs, including their impact on tax revenues, and the risk of distorting resource allocation, can potentially outweigh their benefits. Poorly designed incentives may prove to be of limited effectiveness and may lead to windfall gains for projects that would have materialized even without the incentives.

Achieving the delicate balance between establishing an efficient and attractive tax regime to attract domestic and foreign investment, while ensuring the generation of necessary tax revenue for public spending and development, is of particular concern in developing economies. The lack of transparency surrounding investment tax incentives can hinder investment and complicate assessments of whether the existing incentives effectively achieve their policy goals and at what costs.

The digital economy poses new challenges that must be addressed through innovative solutions to correct structural imbalances. Economies that have embraced digital technologies have emerged as successful players in all markets. Tax incentives have historically been a powerful tool for promoting innovation in economic activity of a country. And Turkey is one of the leaders in this field.

2.3.4 The Role of Tax Incentives in Strategic Development Plan

Tax incentives are the instruments of tax policy that provides tax breaks or other financial benefits to individuals, businesses, or organizations in order to encourage certain types of behavior or investment [28]. Tax incentives are designed to promote economic growth and development by encouraging investment, creating jobs, and stimulating economic activity.

Tax incentives can take many forms, including tax credits, deductions, exemptions, and reduced tax rates [29]. For example, a country may offer a tax credit to businesses that invest in certain industries or geographic areas, or provide a tax deduction to individuals who make charitable donations. The aim of tax incentives is to reduce the tax burden on certain types of activities or

investments in order to encourage them and to promote economic development in specific areas or industries.

Tax incentives are often used by governments to promote specific policy objectives, such as the development of renewable energy, the expansion of exports, or the creation of new jobs [30,31]. However, tax incentives can also have unintended consequences and can be expensive to administer. The tax incentives play a significant role in stimulating the economy based on investments, innovations and growth.



Source: Authors estimates

Chart 2.3. Interconnection of SDP and tax incentive policy goals

A government SDP is a document that outlines a set of goals, objectives, and strategies for achieving desired outcomes in various sectors of the economy and society (Chart 2.3). The plan provides a framework for decision-making and resource allocation to achieve the government's long-term vision for the country's sustainable development and growth. It includes an analysis of the current state of the economy and society, identifies the key challenges and opportunities facing the country, and sets out a roadmap for achieving specific targets and milestones. SDP is sector specific and covers such areas as education, health, infrastructure, industry, agriculture, energy, and environment, military, etc. It covers realization of policies and programs aimed at addressing social and economic inequalities, promoting innovation, and ensuring sustainable development. In Turkey SDP plan is usually updated every 4 years to reflect changes in the country's economic and social landscape and to ensure that it remains relevant and responsive to emerging challenges and opportunities.

Tax policy regulations play a critical role in any government SDP. Taxes are a significant source of revenue for governments, and they help fund public services and infrastructure development, which are essential for economic growth and social development. Well-designed tax policy can have a significant impact on economic growth, job creation, and investment. A government strategic development plan must, therefore, include tax policies and regulations that promote economic

growth, investment, and job creation while ensuring that the tax system is fair and equitable.

The tax policies and regulations included in the government SDP should be designed to encourage business investment, innovation, and entrepreneurship. At the same time the tax system should be designed to be fair and equitable, ensuring that everyone pays their fair share of taxes. Tax policies should be aimed at reducing income inequality and promoting social development, such as by providing tax credits or exemptions for low-income earners or investing in social programs such as education and healthcare.

The tax policy and regulations included in the government SDP must be aligned with the overall economic and social objectives of the plan. They should be regularly reviewed and updated to ensure they remain relevant and responsive to changing economic and social circumstances. SDP is crucial for government policy and regulations for several reasons:

1. **Goal Clarity:** SDP provides clarity of goals, objectives, and the desired outcome of government policies and regulations. It helps policymakers and regulators to articulate clear and measurable targets for achieving specific outcomes.
2. **Resource Allocation:** SDP helps in prioritizing the allocation of resources towards the policies and regulations that are most critical to achieving the desired outcome. It enables to ensure that resources are allocated effectively and efficiently.
3. **Improved Coordination:** SDP helps in improving coordination among different government agencies, departments involved in implementing policies and regulations. It ensures that everyone is working towards the same objectives and helps in avoiding duplication of efforts.
4. **Evaluation and Monitoring:** SDP helps in evaluating the impact of policies and regulations and monitoring progress towards achieving the desired outcomes.

The calibration of tax incentives should be done according to the targeted eligibility criteria. These criteria could be implemented to tax incentives by establishing specific requirements that government must meet in order to qualify for the tax incentive. By targeting the tax incentive towards the program that encourage economic growth in areas where they are most needed and likely to have the greatest impact and achieve its intended goals and results in a measurable impact.

The four crucial targeted eligibility criteria of tax incentives are:

1. **Location:** The program could be targeted towards businesses that invest in specific

regions, such as economically disadvantaged areas or areas with high levels of unemployment.

2. Industry sector: The program could be targeted towards businesses that invest in specific industries, such as manufacturing or technology.

3. Size of the investment: The program could be targeted towards businesses that make investments above a certain threshold, in order to encourage larger investments.

4. Size of the business: The program could be targeted towards small and medium-sized enterprises (SMEs) that may have less access to resources for R&D.

Cost-effective analysis of tax incentives is a critical component of designing tax policies and regulations in a government SDP. Tax incentives are designed to encourage businesses to invest and expand, but they can also have unintended consequences, such as increasing income inequality or creating inefficiencies in the economy. A cost-effective analysis of tax incentives involves examining the costs and benefits of the tax incentive to determine whether it is an effective way to achieve the desired outcome. The analysis should consider the following aspects:

1. Economic Impact: The economic impact of the tax incentive should be evaluated, including its effect on investment, job creation, and economic growth. The analysis should consider the potential long-term impact of the tax incentive on the economy.

2. Revenue Impact: The revenue impact of the tax incentive should be evaluated, including its effect on government revenue. The analysis should determine whether the revenue loss from the tax incentive is worth the potential benefits.

3. Distributional Impact: The distributional impact of the tax incentive should be evaluated, including its effect on income inequality. The analysis should determine whether the tax incentive benefits a particular group of taxpayers or if it is distributed equitably.

4. Administrative Impact: The administrative impact of the tax incentive should be evaluated, including its effect on compliance costs and the complexity of the tax system. The analysis should determine whether the tax incentive is easy to administer and comply with.

5. Alternative Policies: The analysis should also consider alternative policies that could achieve the desired outcome more effectively or efficiently than the tax incentive.

The cost-effective analysis of tax incentives is complete, policymakers can use the information to make informed decisions about whether to implement or modify the tax incentive. The analysis can help ensure that tax policies and regulations in the government strategic development plan are

designed to achieve the desired outcomes effectively and efficiently, while minimizing unintended consequences.

Monitoring compliance in tax incentive policies is essential to ensure that the desired outcomes of the tax incentive are achieved, and the tax system is administered efficiently and fairly. Tax incentives are designed to encourage businesses to invest and expand, but they can also create opportunities for noncompliance and abuse. Monitoring compliance in tax incentive policies is essential to ensure that the tax system is administered fairly, efficiently, and effectively. It helps to prevent fraud and abuse, promote accountability and fairness, and improve the design and implementation of tax incentives. By monitoring compliance, governments can ensure that tax incentives are achieving their intended outcomes and are contributing to the overall development of the economy and society.

Well-designed tax incentive policy is a tax policy that is designed to achieve specific economic or social objectives effectively and efficiently. It should have clear objectives, be targeted towards specific groups or activities, be measurable, transparent, and regularly evaluated. By ensuring that tax incentives are well-designed, governments can promote economic growth, job creation, and social development effectively and efficiently. Well-coordinated tax incentive policy is a tax policy that is aligned with the objectives and priorities of the government strategic development plan. A well-designed and coordinated tax incentive policy should be based on a thorough understanding of the economic and social challenges faced by the country and the potential of the tax system to address these challenges. It should be:

1. Complementary to the SDP. This means that it should focus on sectors or industries that are important to the economic and social development of the country .
2. Clearly Defined. The tax incentive policy should have clearly defined objectives that are aligned with the objectives of the government SDP.
3. Targeted. The tax incentive policy should be targeted towards specific groups, sectors, or activities to achieve the desired outcomes.
4. Coordinated with Other Policies. This means that the tax incentive policy should be integrated with other policies, such as investment policies, industrial policies, and social policies.
5. Regularly Evaluated. The tax incentive policy should be regularly evaluated to ensure that it is achieving its objectives and to identify areas for improvement.

Turkish government is using tax incentives as part of its strategy for realizing the Strategic Development Plan (SDP). It is designed for every 4 years and corrected respectively. The plan includes a range of tax incentives designed to promote investment in key sectors of the economy and support private sector development. Here are some examples of tax incentives being used in Turkey to implement the 11th Development Plan:

1. Corporate tax breaks for R&D: The government offers corporate tax breaks to companies that invest in research and development (R&D) activities. The tax break covers up to 100% of R&D expenses incurred by companies in the form of tax credits, and the aim is to promote innovation and competitiveness in the economy.
2. Reduced corporate tax rate for SMEs: The government has reduced the corporate tax rate for small and medium-sized enterprises (SMEs) to 20% from the standard rate of 22%. This is intended to support SMEs and encourage their growth, which is a priority in the 11th Development Plan.
3. Tax incentives for renewable energy: The government offers a range of tax incentives for companies that invest in renewable energy projects, including tax credits and exemptions from customs duties. This is intended to promote the development of renewable energy sources and reduce Turkey's dependence on fossil fuels.
4. Tax incentives for strategic investments: The government has introduced a range of tax incentives for strategic investments in priority sectors of the economy, such as healthcare, tourism, and technology. These incentives include exemptions from customs duties and reductions in corporate tax rates.

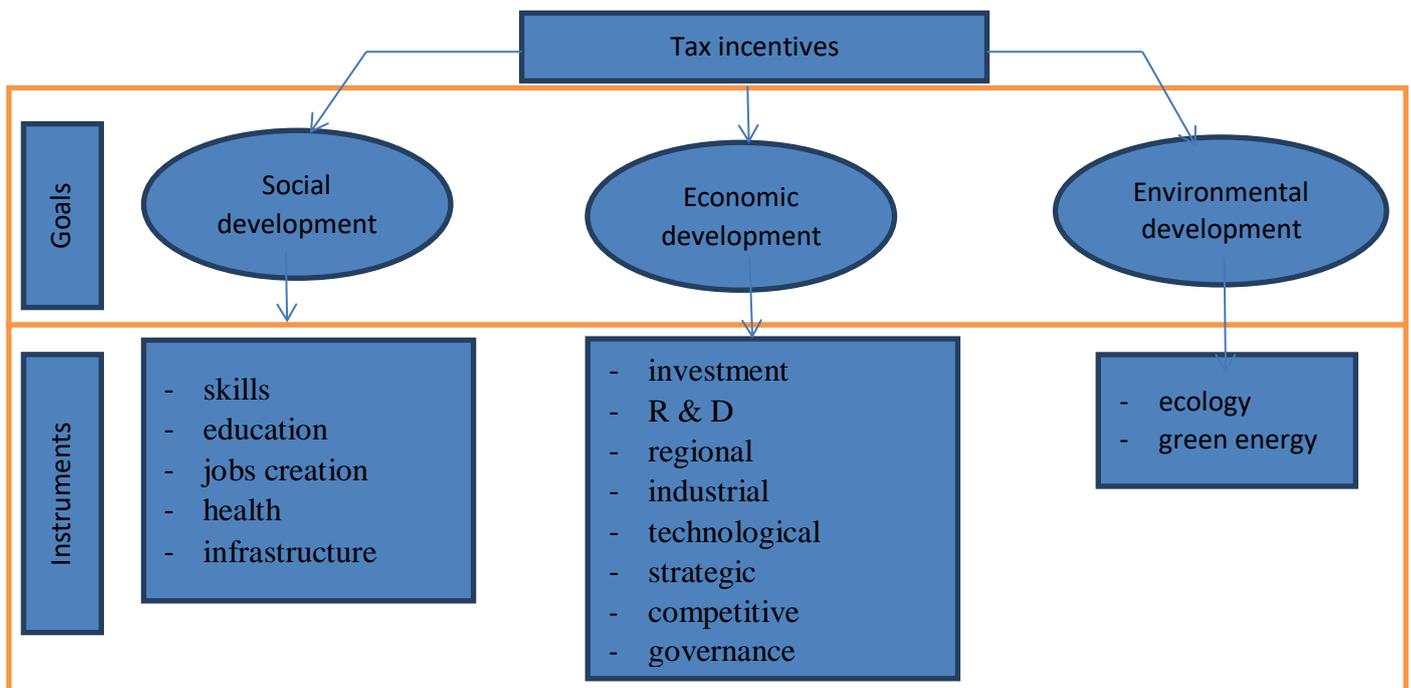
The specific features of the SDP in Turkey vary depending on the plan's period and priorities. The current plan in Turkey is the 11th Development Plan, which covers the period of 2019-2023 [32]. Here are some of the key features of this plan: focus on sustainable development; regional development; human capital development; digital transformation; private sector development; effective governance.

The main goals of a SDP depend on the country that develops it and the specific issues and challenges it seeks to address. But these goals that differ from country to country has a lot of common features. Development plans can also help to ensure that tax incentive policies are aligned with long-term tax policy development goals. By setting out a clear vision for the future and identifying key objectives and targets, tax policy development plans can guide tax incentive decisions and help to ensure that government actions are consistent with broader development

goals.

2.3.5. The main goals of Tax Incentives

Tax incentive to be effective has to be coordinated with SDP. The goals of both tax policy and tax incentive role are closely connected. Three main goals of development of tax incentives can be identified as follows (Chart 2.4)



Source: Authors estimates

Chart 2.4. Goals and Instruments of Tax Incentives

Tax incentive social development policy can be a powerful tool for promoting sustainable social growth. It should be designed to target specific social issues, such as poverty, education, healthcare, jobs creation and infrastructure development. Tax incentives can encourage private investment in social development projects, by providing tax breaks or credits to companies that invest in these areas.

Tax incentive policy should be transparent and accountable, with clear rules and reporting requirements to ensure that incentives are used for their intended purpose. They should be regularly evaluated to assess their effectiveness in promoting social development, and to identify areas for improvement. The complex regulation of tax policy paired with outside political economy pressure to maintain certain tax incentives and the lack of understanding on their effectiveness can be a barrier to reform.

Tax incentives serve a range of purposes and can be implemented for various motives. They can be employed to address market failures and encourage investments that have positive spillover effects on the overall economy, such as investments in research and development (R&D), innovation, high-technology industries, and the transition to a greener economy. Tax incentives can also incentivize specific behaviors or act as a fiscal stimulus tool.

During times of economic crises like the COVID-19 pandemic, governments often utilize tax incentives to support businesses. Developing economies heavily rely on tax incentives to foster industrial and economic development. These incentives can be utilized to promote specific sectors, activities, or investments in particular regions.

Moreover, tax incentives are widely employed in developing countries to attract foreign direct investment (FDI), which can bring capital, technology, and expertise to the domestic economy. However, poorly designed tax incentives can result in excessive gains for investors and a loss of public revenue. Therefore, striking a balance between creating an appealing investment climate and safeguarding public finances presents a significant challenge when implementing tax incentive policies in many developing countries.

Tax incentives are utilized by governments worldwide for various purposes, encompassing addressing market failures, promoting specific industries, stimulating economic growth, and attracting foreign direct investment (FDI). This study delves into the extensive usage of tax incentives and their objectives, with a particular emphasis on developing nations. It also sheds light on the challenges associated with designing effective tax incentive policies while ensuring fiscal sustainability.

Tax incentives serve as policy tools to accomplish a wide range of goals. They are commonly employed to tackle market failures and encourage investments that yield positive spillover effects on the overall economy. Illustrative examples include incentives aimed at fostering research and development (R&D), promoting innovation, supporting high-technology industries, and facilitating the transition towards environmentally friendly and sustainable practices. Tax incentives can also be used to incentivize specific behaviors, provide fiscal stimulus during economic crises, and bolster industrial and economic development in developing countries. In the context of developing nations, tax incentives play a pivotal role in attracting foreign direct investment (FDI), which brings capital, technology, and expertise to domestic economies.

Developing economies heavily depend on tax incentives to promote industrialization and spur economic growth. These incentives are frequently employed to encourage investment in specific sectors, activities, or targeted regions. By offering favorable tax treatment, governments aim to attract both domestic and foreign investors, stimulate economic activity, and generate employment opportunities. The strategic use of tax incentives can assist emerging economies in cultivating competitive advantages, building productive capacities, and fostering sustainable development.

While tax incentives offer opportunities for economic advancement, their design and implementation pose challenges. Poorly designed incentives can result in unintended windfall gains for investors while leading to significant revenue losses for governments. Balancing the need for creating an attractive investment climate with ensuring fiscal sustainability is a crucial challenge faced by policymakers. Striking the right balance between providing incentives and safeguarding public finances requires careful consideration of the costs, benefits, and potential risks associated with different types of incentives. Moreover, monitoring and evaluating the effectiveness of tax incentives is essential to ensure they achieve their intended goals and deliver tangible benefits to the economy.

Tax incentives are widely employed by governments worldwide to pursue various objectives, including promoting investment, encouraging specific industries, and attracting FDI. In developing countries, tax incentives play a vital role in supporting industrial and economic development. However, careful design, implementation, and monitoring of tax incentive policies are necessary to maximize their benefits while mitigating the risks of revenue erosion and inefficiency. Striving for a balance between creating an attractive investment climate and safeguarding public finances is crucial for ensuring the long-term success and sustainability of tax incentive programs.

While tax incentives offer opportunities for economic progress, their design and implementation present challenges. Poorly designed incentives can lead to unintended windfall gains for investors, resulting in significant revenue losses for governments. Balancing the need to create an appealing investment climate while ensuring fiscal sustainability is a critical challenge faced by policymakers. Achieving the right balance between providing incentives and safeguarding public finances requires careful consideration of the costs, benefits, and potential risks associated with different types of incentives. Additionally, monitoring and evaluating the effectiveness of tax incentives is vital to ensure they achieve their intended goals and deliver tangible benefits to the economy.

2.3.6. Tax Incentives in Turkey

In 2012, a new investment incentive system was introduced in Turkey, which created six incentive regions based on the development level of provinces. The investment incentive system includes various regional incentives such as customs duty exemption, VAT exemption, corporate tax reduction, social security premium support for employers, land allocation, property tax exemption, and interest rate support. There are incentives like social security premium support for employees and income tax withholding for the region with the least developed provinces. Many studies have examined the differences and divergences in regional economic growth indicators in Turkey, such as those conducted by [33]. Investment incentives have been the most commonly used fiscal policy to eliminate regional imbalances since the 1980s.

Turkey has been divided into six regions based on the varying levels of development across the cities and districts within them. The first three regions are considered to be more developed, while the last three regions are relatively less developed in comparison. The areas for investment listed in the Investment Incentive Scheme are chosen based on the economic and industrial circumstances of each region. Any investments made in these regions, specifically in the designated areas, may qualify for the incentives offered for investments in those regions.

The current investment incentive scheme in Turkey has undergone significant changes over the years. In 2009, a comprehensive legislation was enacted, introducing three sub-schemes: general, regional, and large investment schemes. These schemes aimed to provide aggressive incentives to attract investments. In 2012, the legislation was further amended taking into consideration macroeconomic perspectives, and the strategic investment scheme was introduced. Additionally, the large investment scheme was replaced with the priority investment scheme at a later stage.

This survey focuses on exploring the framework of the current incentive scheme to gain insights into how the system can effectively address positive results. The existing incentive system consists of four sub-schemes, each offering various types of support measures, as outlined in Table 2.2. Through a thorough investigation, we aim to understand the extent to which the current incentive system promotes inclusivity and equal opportunities for all participants.

Within the investment incentive framework in Turkey, one of the sub-schemes is the regional scheme. This scheme classifies the country into six different regions based on their respective socioeconomic development levels, as determined by the Strategic Development Plan (SDP).

Table 2.2. Current Incentive system

Support instruments	General	Regional	Priority	Large scale	Strategic
VAT exemption	x	X	X	x	X
Custom duty exemption	x	X	X	x	X
Tax reduction		X	X	x	X
Security premium support (employer's share)		X	X	x	X
Income tax withholding allowance*	x	X	X	x	X
Security premium support (employee's share)*		X	X	x	X
Interest payment support [†]		X	X		x
Land allocation [‡]		X	X	x	x
VAT refund [‡]					x

* Provided that the investment is made in Region 6.

[†] Provided that the investment is made in Region 3, 4, 5 or 6 within the framework of the Regional Investment Incentives Scheme.

[‡] Provided that the investment is made within the framework of the Strategic Investment Incentives Scheme with a minimum fixed investment amount over TRY 500 million.

Source: MOIT (2022) [34]

Under the regional scheme, investors have the opportunity to benefit from specific instruments available in their region, depending on the sector of activity and minimum capital requirements. By aligning the incentives with the regional context, this scheme aims to support regional development and address the varying economic needs across different areas of Turkey. Prioritized investments include:

- sea and air transportation,
- railway, automotive and defense-oriented test centers,
- tourism accommodations,
- mining,
- educational facilities,
- R&D projects,
- energy efficiency, waste heat-based electricity generation, carbon and fiber production,
- high technology industries,
- turbine and generator production for renewable energy,
- licensed warehousing,
- nuclear energy, laboratory complexes,
- greenhouse, waste recycling, disposal plant investments,

– elderly/disabled care facilities.

In the regional scheme of the investment incentive framework in Turkey, support levels and durations are increased in underdeveloped regions. This means that regions with lower levels of socio economic development receive more extensive support and longer durations of incentives (Table 2.3). Additionally, the minimum capital requirements for investors in these underdeveloped regions are reduced. This approach aims to stimulate investment and economic growth in these areas, recognizing the need for additional support and flexibility to promote development in regions with lower socioeconomic indicators.

Table 2.3. Regional Incentive Schemes support tools and levels

Incentive instruments			Region					
			1	2	3	4	5	6
VAT exemption			Yes	Yes	Yes	Yes	Yes	Yes
Customs duty exemption			Yes	Yes	Yes	Yes	Yes	Yes
Tax reduction	Rate of contribution to investment (%)	Out of OIZ*	15	20	25	30	40	50
		Within OIZ*	20	25	30	40	50	55
Social security premium support (employer's share)	Support period	Out of OIZ*	2 years	3 years	5 years	6 years	7 years	10 years
		Within OIZ*	3 years	5 years	6 years	7 years	10 years	12 years
Land allocation			Yes	Yes	Yes	Yes	Yes	Yes
Interest support	Local loans	N/A	N/A	3 points	4 points	5 points	7 points	
	Foreign exchange/FX denomination loans			1 point	1 point	2 points	2 points	
Social security premium support (employer's share)			N/A	N/A	N/A	N/A	N/A	10 years
Income tax withholding allowance			N/A	N/A	N/A	N/A	N/A	10 years

*OIZ: Organized Industrial Zones

Source: MOIT (2022) [35]

The priority scheme is designed to prioritize sectors that have a high potential for socioeconomic value-added capacity. By granting them the same incentives and support levels as those provided to underdeveloped regions, regardless of their geographic location, the priority scheme aims to attract investments and stimulate growth in sectors that can contribute significantly to the country's overall economic development. This approach ensures that the benefits of the investment incentives are extended to sectors deemed strategically important, irrespective of their geographical presence (Table 2.4).

Table 2.4. Tax Incentive Measures

INCENTIVE MEASURES		Terms and Rates of Supports *
VAT Exemption		YES
Customs Duty Exemption		YES
Tax Deduction	Rate of Contribution to Investment (%)	40
	Tax Deduction (%)	80
Social Security Premium Support (Employer's Share)		7 years
Land Allocation		YES
Interest Support	Local Loans	5 points
	Foreign Exchange/ FX denominated loans	2 points

* Supports of Region 5 for the Investments that are made in Regions 1-5

* Supports of Region 6 for the Investments that are made in Region 6

Source: MOIT (2022) [35]

Twelve investment categories (see Tables 2.5 and 2.6) are supported by the measures of the Large Scale Investment Incentive Scheme.

Table 2.5. Investment categories supported by the Large-Scale Investment Incentive Scheme.

	Investment subject	Minimum fixed investment amount (million TRY)
1	Production of refined petroleum products	1000
2	Production of chemical products	200
3	Harbors and harbor services	200
4	a) Automotive OEM	200
	b) Automotive supply industries	50
5	Production of railway and tram locomotives and/or railway and tram cars	50
6	Transit pipeline transportation services	
7	Electronics industry	
8	Production of medical, high-precision and optical equipment	
9	Production of pharmaceuticals	
10	Production of aircraft and spacecraft and/or related parts	
11	Production of machinery (including electrical machinery and equipment)	
12	Mining (including metal production)	

Source: MOIT (2022) [35]

In the strategic scheme, producing particular intermediate and final products with high import dependence is targeted to improve international competitiveness and reduce the import bill. It has specific criteria to be fulfilled.

Technology Focused Industry Thrust Program (TFITP) is also combined with the strategic scheme and it has similar goals, particularly on high value-added manufacturing investments. The general scheme covers the projects that do not fall under the abovementioned schemes regardless of the region, provided that certain capacity and minimum investment amount are met. It has no selective preference; traditional lowvalue-added production sectors and specific non-tradable services sectors are excluded. Incentive tools are explained below.

Quasi-tax supports apply to due tax liabilities of the investor and include a certain share or full amount of exemption of tax claims so that production costs are reduced and/or net operating surplus is increased. VAT is exempted on acquisition or leasing of investment goods, software and intangible rights for projects with incentive certificates. The aim is to alleviate the initial cost pressure on investors. When a customs duty is applied to certain equipment under the National Import Regime, it becomes exempt from purchasing or leasing the imported investment machine and equipment under a project with an incentive certificate. If an additional customs duty applies for specific equipment under a particular Decree, it also becomes exempted.

Table 2.6. Terms and rates of support provided within the Large-Scale Investment Incentive Scheme.

Incentive instruments		Region						
		1	2	3	4	5	6	
VAT exemption		Yes	Yes	Yes	Yes	Yes	Yes	
Customs duty exemption		Yes	Yes	Yes	Yes	Yes	Yes	
Tax reduction	Rate of contribution to investment (%)	Out of OIZ*	25	30	35	40	50	60
		Within OIZ*	30	35	40	50	60	65
Social security premium support (employer's share)	Support period	Out of OIZ*	2 years	3 years	5 years	6 years	7 years	10 years
		Within OIZ*	3 years	5 years	6 years	7 years	10 years	12 years
Land allocation		Yes	Yes	Yes	Yes	Yes	Yes	
Social security premium support (employer's share)		N/A	N/A	N/A	N/A	N/A	10 years	
Income tax withholding allowance		N/A	N/A	N/A	N/A	N/A	10 years	

OIZ: Organized Industrial Zones.

Source: MOIT (2022) [35]

Quasi-tax supports apply to due tax liabilities of the investor and include a certain share or full amount of exemption of tax claims so that production costs are reduced and/or net operating surplus is increased. VAT is exempted on acquisition or leasing of investment goods, software and intangible rights for projects with incentive certificates. The aim is to alleviate the initial cost pressure on investors. When a customs duty is applied to certain equipment under the National Import Regime, it becomes exempt from purchasing or leasing the imported investment machine and equipment under a project with an incentive certificate. If an additional customs duty applies for specific equipment under a particular Decree, it also becomes exempted.

This tool is a certain amount of deduction on accrued CT liability of the investor. Two constraints need to be known under the application of the CTD. The first one is the CTD rate which is used to calculate the exact deduction amount. The second one is the investment contribution rate which refers to the maximum amount of refund that a company could receive. In other words, the total amount of CT refund by no means exceeds the assigned investment contribution ratio of the total fixed investment amount, even if the nominal equivalent of CTD allows for that. If the calculated CTD amount does not reach the investment contribution amount within a year, then the rest of the claims could be carried over to the following year.

The incentive implementation process is worth mentioning to clarify the expected benefit of quasi-tax incentives. Investors apply for an incentive certificate before they start actual investment activity. They are required to submit all documents and information asked for each sub-scheme. Applications are then available for evaluation by Directorate experts and executives. Approved applications obtain incentive certificates and become able to start capital expenditure, enjoying VAT and customs duty exemptions throughout the investment period. All exemption procedures operate through an electronic incentive system and the system interacts with databases of the Ministry of Trade and the Ministry of Finance for VAT and customs duty exemptions. Tax deduction and employment support only become available when the Directorate specialists complete on-site expert inspection of the complete investment. As soon as an on-site inspection takes place, experts confirm that the project complies with the related legislation and terms, companies become eligible to get employment supports and CTD. If a company fails to do so, it might be given additional time to fulfil its commitments; otherwise, they face sanctions for obtaining redundant exemptions [34]

VAT refund is solely available for investment projects carried out under the strategic scheme, with an investment amount over TL 500 million. VAT cost of construction expenses of investors (not

machine and equipment) in the manufacturing industry (US 97 code: 15-37) would be paid back. Ordinarily, construction expenses are not exempted from VAT and customs duty. It is only being added to the aggregated investment expenditure amount, increasing the amount of CTD support [36].

One of the most repeatedly declared criticisms of investment incentives is its distortive effects on factor endowments due to the capital-focused incentive designs around the world. In Turkey, the employment premium burden was 35.9% which overshoots OECD and EU average before the current incentive legislation [37]. However, thanks to the disparity and unemployment vision, the system can be called generous in its employment support, particularly for the 6th region. Employment supports also apply in 1-5th regions, with varying durations depending on their development level.

Within the scope of this support, investors are exempt from their own social security premium share for every single newly hired employee. This tool only covers the minimum wage equivalent premium, even if the actual wage is higher and only applies to new employees hired under the investment project. In order to assign the generated employment number under a project, the Directorate specialists refer to the previously registered employment number of the company.

Income Tax Withholding Support.

Like the premium support, income tax withholding support refunds the minimum wage equivalent to withheld income tax of newly hired employees on their gross salary. This tool only applies to projects in the 6th region Attraction Centers Program and strategic scheme investments under TFITP.

Social Security Premium Employee's Share Support.

This tool has the same application principles as the employer's share premium support. Distinctly, it exempts the employee's share and is only applicable for investments carried out in the 6th region, under Attraction Centre Program or strategic scheme within TFITP.

Other Supports 3.4.1 Interest Subsidies For investments in the 3rd, 4th, 5th and 6th regions, fixed points of interest payments are paid back to the investors depending on the region of investment. Likewise, in the CTD investment contribution rate procedure, only the loans up to 70% of the total capital expenditure are subject to the interest subsidy. In other words, if the investment is entirely financed through loans, the interest payments of 30% of the loan are not subject to the tool.

Investment Site Allocation If a suitable land or plot is found, the site can be allocated to the investor company within the procedures and principles of the Ministry of Environment and Urbanization as a right of easement.

2.4. Empirical literature review

There is a significant body of research exploring the relationship between investment incentives and their economic effects. These studies can be categorized into two main areas: those focusing on the impacts of investment incentives on macroeconomic variables and those examining their effects on regional development policies. Some studies also delve into the effects of different types and combinations of investment incentives on economic variables.

Investment incentives have the potential to directly influence key economic indicators, such as overall economic growth and development on a national scale. However, in developing countries, the concentration of resources, production, income, and economic activities in specific regions can lead to unequal development, with some regions experiencing significant growth while others struggle to progress. In light of this, governments carefully consider regional development and the overall status of the country when designing investment incentive programs. In fact, many countries refer to these incentives specifically as regional investment incentives.

One of the primary motivations for conducting this study is to shed light on the impact of investment incentives on the substantial regional disparities present in Turkey. The examination of the relationship between investment incentives, public expenditures, regional differences, and economic growth and development in Turkey has always garnered attention from researchers and policymakers.

Through this research, we aim to gain a deeper understanding of how investment incentives can contribute to reducing regional disparities and promoting balanced economic growth across different regions of Turkey. By analyzing the intricate interplay between investment incentives, public expenditures, and regional differences, we can identify strategies and policy recommendations that foster more equitable development and bolster overall economic progress in the country [38, 39].

Aleksandra Bal (2016) investigates the conditions under which tax incentives can be an appropriate policy tool to attract economic activity. The author provides an explanation of the reasons why special tax measures may be introduced and describes the challenges and errors that countries can

make when implementing them. Countries that intend to implement tax incentives have a particular objective in mind: to boost employment, stimulate research or to revitalize a certain region. The author's review is focused on investors and discusses what encourages them to select a particular location, i.e. when tax incentives are effective in attracting capital [27].

Ying Sun (2022) examines the correlation between tax incentives, tax enforcement, and R&D investment in Chinese businesses. He aims to evaluate the impact of tax incentives on enterprise R&D investment and explore the influence of tax enforcement on enterprise R&D behavior, as well as its moderating effect on the relationship between tax incentives and enterprise R&D investment. The findings indicate that China's tax policies that offer preferential treatment have a positive effect on enterprise innovation activities, and consistent tax incentives can encourage businesses to increase their R&D investment [40].

According to the opinion of Yawei Qi, Wenxiang Peng and Neil N. Xiong the regulation of fiscal and tax policies is a crucial prerequisite for enhancing regional innovation capability. Fiscal policies and regional innovation capability exhibit significant spatial heterogeneity. Based on the results of the dynamic panel data model, R&D input and industrial structure are the primary sources of improving innovation capability. The group of authors stated that fiscal expenditure for science and technology, fiscal and tax policy texts, macro tax burden, business tax (BT), and VAT have a significant boosting effect on regional innovation capability, while CIT hinders regional innovation capability. They made the robustness test of invention patents and proved that fiscal and tax policy texts, macro tax burden, and business tax still have a positive effect on invention patents, but the role of VAT has changed from promotion to obstruction, and CIT has become a significant obstacle to invention patents. Yawei Qi, Wenxiang Peng and Neil N. Xiong [41].concluded that China should establish a tax system that promotes fair competition, reduces the tax burden of enterprises, encourages independent R&D, and guides the evolution of enterprises from low-tech to high-tech innovation by improving the tax structure and fiscal technology expenditures.

Monica Ferrari, Stefania Tomasini, Tsvetomira Tsenova (2019) [42] examined the effects of corporate taxation policies on Italy's macroeconomic performance and analyzed how future policy changes in this area could affect the economy. Italy, as the third largest economy in the Eurozone with high public debt, weak economic growth, and stringent fiscal rules, faces significant challenges in navigating the global economic crisis. Given Italy's history of frequent changes to its corporate tax system, their study provides a valuable opportunity to assess the effectiveness of corporate taxation as a policy instrument. The author's investigated the potential impact of proposed policy

measures to reduce or eliminate certain corporate taxes, aiming to shed light on their possible effects on the economy.

Yongzheng Liu, Jie Mao (2019) explored a unique firm-level dataset from years 2005–2012 and utilize a quasi-experimental design to test the impacts of tax incentives of the tax reform on firms' investment and productivity. It was found that the reform raised investment and productivity of the treated firms relative to the control firms by 38.4 percent and 8.9 percent, respectively [43].

The report of European Commission “Effectiveness of tax incentives for venture capital and business angels to foster the investment of SMEs and start-ups” (2015) [44] aims to enhance the single market by strengthening investment integration throughout the European Union. An essential aspect of this initiative is to improve the availability of funding, especially for startups, small and medium-sized enterprises (SMEs), and innovative businesses seeking to expand. Traditionally, SMEs in Europe have relied mainly on bank financing, but since the financial crisis, the banking sector's ability to provide funding has been constrained by factors such as risk appetite, capital adequacy, and refinancing capacity. As a result, young and innovative companies have turned to other sources of finance, such as venture capital (VC) and business angels (BA). This study explores the potential role of tax incentives in promoting VC and BA investment, with the aim of encouraging best practices across EU Member States. Tax incentives have become an increasingly critical element of investment and innovation policies globally and typically offer investors a combination of tax benefits at the outset, income relief over the investment's life, and relief on gains realized when the investment is sold.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Area of Study

Turkey is a country located at the crossroads of Europe and Asia, with a population of approximately 84 million people. Over the past few decades, Turkey has experienced significant economic growth and transformation, transitioning from an agrarian economy to a more industrialized and service-oriented one. Turkey has demonstrated robust economic growth in recent years, although it has faced periodic fluctuations and challenges. Between 2010 and 2019, the average annual GDP growth rate was around 5.6%.

3.2. Research Design

Stancuet. al. (2008) provide an introduction into econometrics based on the use of specialized software in econometric analyses [45]. The works of Andrei and Bourbonnais (2008), and Benjamin et. al. (2010), are reference literature for any researcher using econometric model [46,47]. Corbae et.al.(2006), and Anghel (2014) approach the usefulness of econometric models in economic analyses [48,49]. The data processed in this paper are collected from official sources TURKSTAT. Stanciu and Stoicuța (2010) realize a valuation of the interconnection between the same indicators[50,51]. Heathcoteet. al. (2009) apply a quantitative approach on some macroeconomic issues. Piroi and Păunică (2015) develop on the usefulness of modern IT instruments in the activity of the public administration [52]. Goodwin (2008), Dougherty (2007) and Fox and Dodge (2012) offer valuable documentation for macroeconomic studies. Chamberlin (2011) researches the GDP as image of economic welfare [53,54,55,56] .

The econometric model used in this analysis aims to examine the correlation between Gross Domestic Product (GDP) and tax incentives, specifically focusing on the component. GDP is considered as a key macroeconomic aggregate in the National Accounts System and represents the overall economic activity within a specific time interval, regardless of domestic or foreign contributions. To analyze the factors influencing GDP fluctuations, the study adopts the methodological elements. The econometric model takes the form of:

$$Y(X) = a + bX, \tag{3.1}$$

where: Y - represents the per capita GDP per capita in Turkey,

X - represents the amount of tax incentives for any tax type (corporate income tax, personal income tax, property tax, banking transaction tax) taken from the Turkish tax system,
a - represents the coefficient of the regression model,
b - represents the intercept of the equation

To build the pair linear regression model, tax incentive is defined as the independent variable, while GDP is considered the dependent variable. Thus, the regression equation can be represented as:

$$\text{GDP} = a + b \times \text{TI}, \quad (3.2)$$

where: GDP = the dependent variable (explained, endogenous, resulting);
TI = Tax Incentive → independent variable (explanatory, exogenous);
a, b → parameters of the regression model.

To estimate the parameters of this linear regression model, data spanning the period 2004-2022 are utilized for both GDP and tax incentive. The dataset comprises yearly values to capture the correlation between the two indicators accurately and is loaded into specialized software under the series names GDP and TI.

The simple linear regression model offers a relatively straightforward and efficient means to establish the correlation between two economic indicators. When the results obtained through linear regression are insufficient for explaining a particular phenomenon, multiple linear regression can be employed.

$$Y = b_0 + b_1 * X_{1,i} + b_2 * X_{2,i} + b_3 * X_{3,i}, \quad (3.3)$$

where: Y - represents the GDP per capita in Turkey,

X_{1,i} represents the amount of tax incentives for corporate income tax granted by government authorities in year i,;

X_{2,i} represents the amount of tax incentives for personal income tax granted by organizational authorities in year I;

X_{3,i} represents the amount of tax incentives for VAT granted by organizational authorities in year i

In this paper, we emphasize the practical application of linear regression in economic analysis, particularly in studying the factors influencing GDP. As part of an empirical study, we consider tax incentives divided by type of tax as relevant independent variables in understanding GDP evolution. The challenges in attracting foreign investments and funds are evident, as is the limited presence of domestic investments in the Turkish economy. Consequently, understanding the role of these indicators in influencing the increase or decrease of Turkey's GDP is of great importance.

3.4. Data Collection

The use of yearly data from the Ministry of Industry and Technology, the Central Bank of Turkey, TURKSTAT [57-62] and the Federal Inland Revenue Service is also appropriate, as it provides a long-term perspective on economic growth in Turkey, and allows for the analysis of trends and patterns over time. The study's focus on different types of tax incentives that influence economic growth in Turkey is an important area of research. It can inform policy decisions aimed at promoting sustainable economic development in the country. Selected statistical data from 2004 to 2022 was used in the study. The research therefore considered ninety observations for the nineteen year period.

3.5. Specification of the Model

The methodology employed in this thesis involves analyzing the relationship between tax incentives and economic growth in Turkey. To conduct this analysis, several steps were followed.

1. Data Collection: Yearly data were collected from reliable sources such as the Central Bank of Turkey's statistical bulletin and the Federal Inland Revenue Service. The selected time period spans from 2004 to 2022.
2. Econometric Analysis: The chosen method for analyzing the data was econometrics. This approach allows for model specification and the estimation of the parameters governing the relationship between different types of tax incentives and economic growth. Specifically, the model equation was formulated in the Error Correction Form, assuming a linear relationship between the variables.
3. Model Specification: The model equation was designed to examine whether a long-run relationship exists between economic growth and tax incentives. By using the Error Correction Form, the analysis accounts for potential deviations from the long-run equilibrium and measures the adjustment dynamics towards it.

4. Hypothesis Testing: Hypotheses were formulated to test the significance and direction of the relationship between tax incentives and economic growth in Turkey. Statistical techniques, such as regression analysis and hypothesis testing, were employed to evaluate the hypotheses.

5. Interpretation of Results: The results obtained from the econometric analysis were interpreted to assess the strength and significance of the relationship between tax incentives and economic growth. The findings contribute to understanding the impact of tax policies on Turkey's economic performance.

To create a regression model to examine the correlation between GDP and various tax incentives, we need a dataset that includes historical GDP data and the corresponding values of the tax incentives. The model will estimate the relationship between GDP and each tax incentive while considering other factors that may influence GDP growth.

The pair regression model is a statistical analysis technique used to examine the relationship between two variables. It is based on the assumption that there exists a linear relationship between the dependent variable (Y) and the independent variable (X). The model aims to estimate the coefficients that represent the slope (b) and intercept (a) of the regression line.

We will test the hypothesis of the positive impact of tax incentives on economic development using data on the amounts of tax incentives granted for different types of taxes from 2004 to 2022.

During the assessment of pair linear regression model, several tests are conducted to evaluate its performance and validate the statistical assumptions. The commonly used tests include:

1. We build a model of linear regression to analyze the relationship between different types of tax incentives and GDP per capita. We examine how the data is represented on a graph. As a result of the corresponding analysis, we obtain a graph known as a "correlation field".
2. Construction of the equation of the model describing the relationship between GDP per capita and different types of tax incentives.

The data sample is dynamic.

3. Evaluation of the quality of the constructed model. For this purpose, we will assess the significance of the regression equation coefficients using the Student's t-test.
4. Evaluation of the quality of the linear regression model using variance and correlation analysis:

- obtaining the F-test (Fisher's test) statistic to demonstrate the linear relationship between variable Y and X;
- assessing the strength of the relationship using the correlation coefficient r or a measure of the strength of the linear relationship;
- testing the statistical significance of the correlation coefficient;
- determining the percentage of the influence of changes in variable X on the changes in variable Y;

As a result of processing the corresponding data arrays, it was found that significant regression coefficients for X and significant regression equations were obtained when analyzing the impact of incentives for corporate income tax and property tax on corporations. However, it was not possible to assess the impact of incentives granted for the motor vehicle tax on GDP, as the regression coefficient for X does not meet the requirements of the t-statistic, and the equation does not satisfy the Fisher's criterion.

Next, using the multiple regression model, we will assess the combined impact of tax incentives for different taxes on GDP. When analyzing multiple regression, we will not include data on the amounts of incentives granted for the motor vehicle tax. Let's consider the following relationship

CHAPTER FOUR

EMPIRICAL FINDINGS AND DISCUSSION

4.1 Introduction

This chapter focuses on the Ex Post Facto Research Design and time-series statistical data. The study used regression analysis to test the relationship between Tax Incentives and GDP as the main indicator of economic growth. It encompasses the presentation, analysis, and interpretation of the data using the methodological model established in chapter Three.

4.2 Regression Analysis Correlation

Based on our analysis, we can assert that the tax incentives has a significant influence on the GDP. It is evident that the Turkish economy over the past decade has primarily relied on stimulating tax policy measures promoting a robust government strategy [63-66]. We have proposed a multiple linear regression model that highlights the impact of different types of tax incentives on GDP growth.

Results of correlation regression analysis are presented in the Table 4.1

Table 4.1 Results of pair linear regression analysis between GDP and sums of tax incentives in Turkey

Pair regression model Y (X)	Regression equation coefficients	T		Obs	Evaluation of the quality of the model				
		Statistical	Critical (Student's)		F Criterium Fisher		Multiple R	R ² (%)	
					Stat	Crit			
X – Corporate Income Tax Incentive	$a = 2,65$ $b = 3,31$	2,90 sign. 4,30 sign.	2,11	19	18,48	4,45	4,30 sign.	52	
X – Personal Income Tax Incentive	$a = 3,1$ $b = 3,95$	2,50 sign. 3,31 sign.	2,11	19	17,96	4,45	4,24 sign.	51	
X – Value-added Tax Incentive	$a = 4,44$ $b = 1,89$	3,40 sign. 4,55 sign.	2,11	19	20,70	4,45	4,55 sign.	54	
X – Social Security Contribution Incentive	$a = 3,08$ $b = 18,46$	1,4 non sign. 3,31 sign.	2,11	19	10,96	4,45	3,31 sign.	35	
X – Banking and Insurance Transaction Tax Incentive	$a = 3,08$ $b = 46,16$	1,40 non sign. 3,31 sign.	2,11	19	10,96	4,45	3,31 sign.	35	
X – Stamp Duty Tax Incentive	$a = 3,08$ $b = 92,32$	1,40 non sign. 3,31 sign.	2,11	19	10,96	4,45	3,31 sign.	35	

Table 4.1 Continue

X – Property Tax Incentive	$a = 3,08$ $b = 184,64$	1,40 non sign. 3,31 sign.	2,11	19	10,96	4,45	3,31 sign.	35
X – Motor Vehicle Tax Incentive	$a = 3,08$ $b = 153,86$	1,40 non sign. 3,31 sign.	2,11	19	10,96	4,45	3,31 sign.	35
X – Inheritance and Gift Tax Incentive	$a = 3,08$ $b = 307,74$	1,40 non sign. 3,31 sign.	2,11	19	10,96	4,45	3,31 sign.	35

Source: Authors estimates

Let's consider the constructed models of simple linear regression that determine the degree of influence of various tax incentives on GDP. For convenience, we analyze GDP per capita in the model. The selected tax incentives for analysis from 2004 to 2022 are dynamic observations.

We analyze the impact of VATI on GDP using the constructed equation of the linear regression model, which is:

$$Y = 4.440 + 1.889 * X \quad (4.1)$$

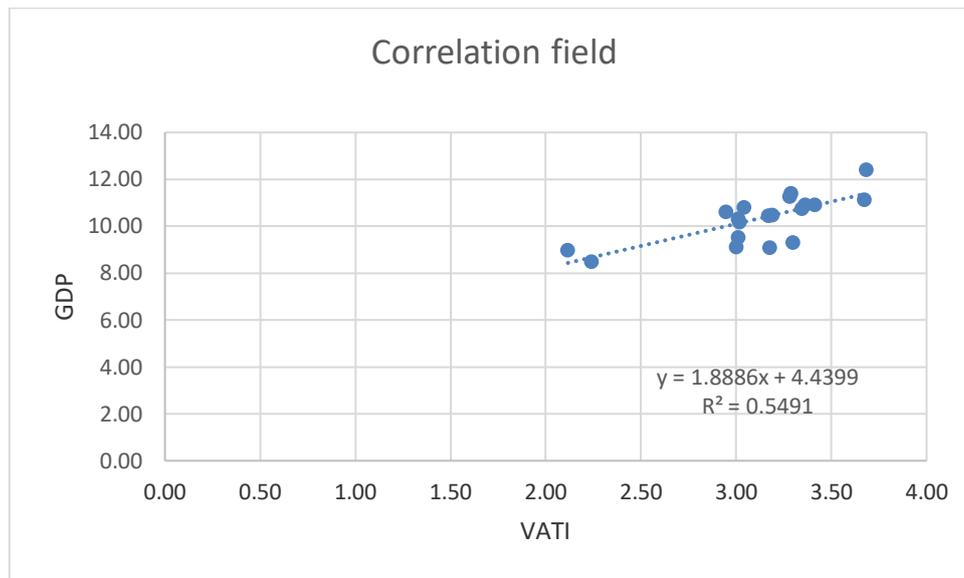
where: Y – GDP rate per capita;

X – Sum of value-added tax incentive.

Let's assess the quality of the constructed model. First, we evaluate the significance of the regression coefficients using the t-test, and then we assess the model's quality through analysis of variance and correlation.

To validate this claim and provide a clearer understanding of the data, we will present them graphically using a two-dimensional coordinate system. In this representation, the final consumption will be depicted horizontally as the independent variable, while the GDP will be the dependent variable.

Outcome of this graphical representation, offering a comprehensive view that enhances our intuition regarding the relationship between the two variables are displayed in (Chart 4.1)



Source: Authors estimates

Chart 4.1 The Correlation GDP – VATI

The scatter plot of paired values, encompassing the GDP and VAT, reveals the tables 4.2, 4.3, 4.4

Table 4.2 Regression Analysis VATI

Multiple R	0,741
R-square	0,549
Adjusted R-square	0,523
Standard deviation	0,692
Observations	19

Source: Authors estimates

Table 4.3 Dispersion Analysis VATI

	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	9,919	9,919	20,700	0,0003
Deviation	17	8,146	0,479		
Total	18	18,065			

Source: Authors estimates

Table 4.4 Correlation Analysis VATI

	<i>Coefficients</i>	<i>Standard deviation</i>	<i>t-statistics</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper95%</i>	<i>Lower 99,0%</i>	<i>Upper 99,0%</i>
Y-crossing	4,440	1,304	3,404	0,0034	1,688	7,192	0,659	8,221
x	1,889	0,415	4,550	0,0003	1,013	2,764	0,686	3,092

Source: Authors estimates

For the t-test, we use the observed t-statistic values for the coefficients: $a = 3.404$ and $b = 4.550$. We find the critical t-value. For this model, the critical t-value is 2.110.

Next, we need to test two hypotheses. The first hypothesis is that the coefficient 'a' is not statistically significant, and the second hypothesis is that the coefficient 'a' is statistically significant. Similarly, we test two hypotheses regarding the coefficient 'b'.

To test the hypotheses, we compare the observed t-statistic with the critical t-value. Since the t-statistic for the coefficient 'a' is greater than the critical t-value ($3.404 > 2.110$), the first hypothesis is rejected with a 95% probability, indicating that the coefficient 'a' is statistically significant.

For the coefficient 'b', the t-statistic is greater than the critical t-value ($4.550 > 2.110$), rejecting the first hypothesis with a 95% probability, indicating that the coefficient 'b' is statistically significant.

Next, we conduct an analysis of the model's quality using the F-test or analysis of variance for regression. To do this, we test two hypotheses. The first hypothesis is that there is no linear functional relationship between GDP and the magnitude of VATI, and the second hypothesis is that there is a linear functional relationship.

We consider the observed F-statistic value and compare it with the critical value. For our model, the observed F-statistic is greater than the critical value ($20.7 > 4.451$). Therefore, the first hypothesis is rejected, indicating that there is a linear relationship between the variables of VATI and GDP.

This indicates the high quality of the obtained model. Next, let's consider the strength of the linear relationship between VATI and GDP.

To do this, we examine two indicators: the multiple R, which is the correlation coefficient value, specifically $R = 0.741$. The correlation coefficient is a measure of the strength of the linear relationship between variables. We see that it falls within the range of 0.7 to 0.9, indicating a high or strong relationship between VATI and GDP. Since the correlation coefficient is positive, this relationship is direct. Therefore, if VATI increase, GDP also increases.

For further analysis of our model, let's test the significance of the correlation coefficient. We find the observed value of the t-test. We test two hypotheses: the correlation coefficient is significant and the correlation coefficient is not significant. We calculate the observed t-value by multiplying the correlation coefficient by the square root of the number of observations minus 1 (degrees of freedom) and dividing it by the square root of 1 minus R-squared. If the obtained value is greater

than the critical t-value, the correlation coefficient is significant. For our model, the observed t-value is greater than the critical t-value, specifically $4.550 > 2.110$. Therefore, the correlation coefficient is statistically significant with a 95% probability.

Let's consider the coefficient of determination (R-squared). For our model, it is 54%. This means that 54% of the variability in GDP is explained by the variability in VATI. The remaining 46% represents other factors that are not accounted for in the model but influence GDP.

By analyzing the model through the significance of the coefficients and the quality of the model itself, we conclude that the model confirms a direct linear relationship between VATI and GDP.

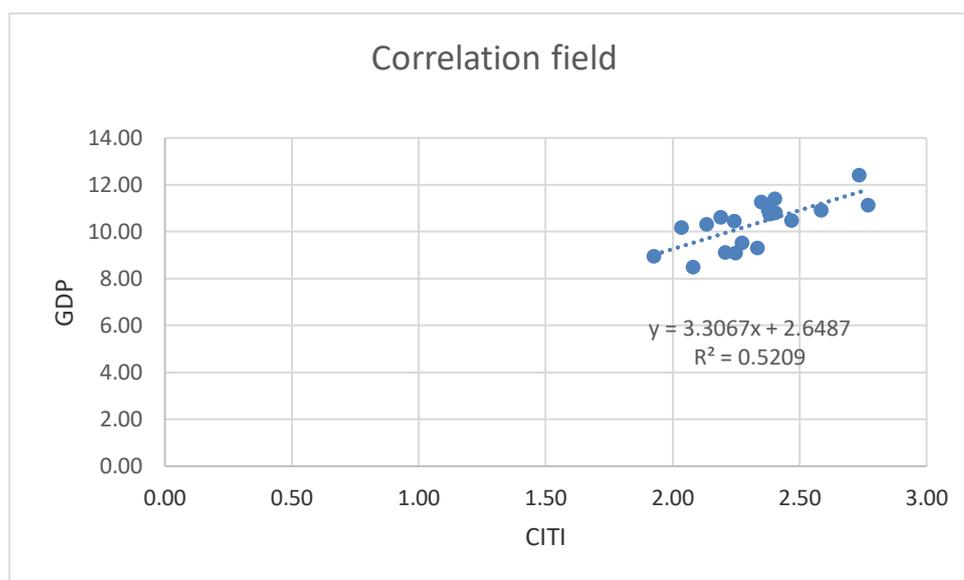
To analyze the influence of tax incentives on CIT on GDP, we analyze the constructed equation of the linear regression model, which is:

$$Y = 2.649 + 3.307 * X , \tag{4.2}$$

where: Y – GDP rate per capita

X – Sum of CITI

Outcome of this graphical representation, offering a comprehensive view that enhances our intuition regarding the relationship between the two variables are displayed in Chart 4.2



Source: Authors estimates

Chart 4.2 The Correlation GDP – CITI

The scatter plot of paired values, encompassing the GDP and CIT, reveals the tables 4.5, 4.6, 4.7

Table 4.5 Regression Analysis CITI

Multiple R	0,722
R-square	0,521
Adjusted R-square	0,493
Standard deviation	0,714
Observations	19

Source: Authors estimates

Table 4.6 Dispersion Analysis CITI

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	9,4097	9,4097	18,4812	0,0005
Deviation	17	8,6555	0,5091		
Total	18	18,0652			

Source: Authors estimates

Table 4.7 Correlation Analysis CITI

	<i>Coefficient s</i>	<i>Standard deviation</i>	<i>t-statistic s</i>	<i>P-value</i>	<i>Lower95 %</i>	<i>Upper95 %</i>	<i>Lower 99,0%</i>	<i>Upper 99,0%</i>
Y-crossing	2,649	1,794	1,476	0,158	-1,137	6,435	-2,552	7,849
x	3,307	0,769	4,299	0,0005	1,684	4,930	1,077	5,536

Source: Authors estimates

We will assess the quality of the constructed model. First, we will evaluate the significance of the regression coefficients using the t-test, and then we will assess the model's quality through analysis of variance and correlation.

For the Student's t-test, we use the observed t-statistic values for the coefficients: $a = 2.976$ and $b = 4.299$. We find the critical t-value for the Student's t-distribution. For this model, the critical t-value is 2.110.

Next, we need to test two hypotheses. The first hypothesis is that the coefficient "a" is not statistically significant, and the second hypothesis is that the coefficient "a" is statistically significant. Similarly, we test two hypotheses regarding the coefficient "b".

To test the hypotheses, we compare the observed t-statistic with the critical t-value. Since the observed t-statistic for coefficient "a" is greater than the critical t-value ($2.976 > 2.110$), we reject the first hypothesis with a 95% probability, indicating that the coefficient "a" is statistically significant. Similarly, for coefficient "b," since the observed t-statistic is greater than the critical t-value ($4.299 > 2.110$), we reject the first hypothesis with a 95% probability, indicating that the coefficient "b" is statistically significant.

Next, we conduct an analysis of the model's quality using the F-test (Fisher's test) or analysis of variance for regression. For this purpose, we test two hypotheses. The first hypothesis is that there is no linear functional relationship between the GDP level and the magnitude of tax incentives for CIT, while the second hypothesis is that there is a linear functional relationship.

We consider the observed F-statistic value and compare it with the critical value. For our model, the observed F-statistic is greater than the critical value ($18.481 > 4.451$). Therefore, we reject the first hypothesis, indicating that there is a linear relationship between the variables of tax incentives for CIT and GDP values. This indicates a high quality of the obtained model.

Furthermore, let's examine the strength of the linear relationship between tax incentives for CIT and GDP. For this purpose, we consider two indicators: the multiple R (coefficient of correlation), specifically $R = 0.722$.

The correlation coefficient is a measure of the strength of the linear relationship between variables. We see that it falls within the range of 0.7 to 0.9, indicating a high or strong correlation between tax incentives for CIT and GDP. Since the correlation coefficient is positive, this indicates a positive relationship. Therefore, if tax incentives for CIT increase, GDP also increases.

For further analysis of our model, let's test the significance of the correlation coefficient. We find the observed value of the Student's t-statistic and test two hypotheses: the correlation coefficient is significant and the correlation coefficient is not significant. We calculate the observed T-value by multiplying the correlation coefficient by the square root of the number of observations minus 1 (degrees of freedom) and dividing it by the square root of 1 minus R-squared. If the resulting value is greater than the critical T-value, then the correlation coefficient is significant.

For our model, the observed T-value is greater than the critical T-value, specifically $4.299 > 2.110$. Therefore, the correlation coefficient is statistically significant with a 95% probability. Let's

consider the coefficient of determination (R-squared). For our model, it is equal to 52%. This means that 52% of the variability in GDP is explained by the variability in tax incentives for CIT. The remaining 48% represents other factors not accounted for in the model that influence GDP.

Analyzing the model based on the significance of the coefficients and the quality of the model itself, we conclude that the model confirms a direct linear relationship between tax incentives for CIT and GDP.

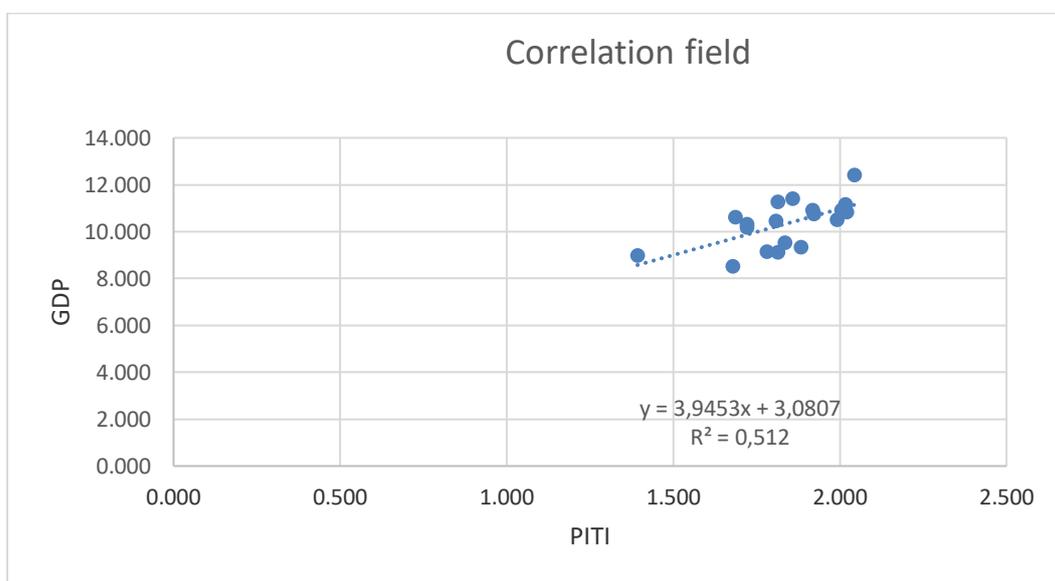
To analyze the impact of tax incentives for personal income tax incentive on GDP, we use the constructed equation of the linear regression model, which is:

$$Y = 3.081 + 3.945 * X , \tag{4.3}$$

where: Y – GDP rate per capita;

X – Sum of PITI

Outcome of this graphical representation, offering a comprehensive view that enhances our intuition regarding the relationship between the two variables are displayed in Chart 4.3



Source: Authors estimates

Chart 4.3 The Correlation GDP – PITI

The scatter plot of paired values, encompassing the GDP and PITI, reveals the tables 4.8, 4.9, 4.10

Table 4.8 Regression Analysis PITI

Multiple R	0,626
R-square	0,512
Adjusted R-square	0,356
Standard deviation	0,804
Observations	19

Source: Authors estimates

Table 4.9 Dispersion Analysis PITI

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	7,081	7,081	10,960	0,004
Deviation	17	10,984	0,646		
Total	18	18,065			

Source: Authors estimates

Table 4.10 Correlation Analysis PITI

	<i>Coefficients</i>	<i>Standard deviation</i>	<i>t-statistics</i>	<i>P-value</i>	<i>Lower95 %</i>	<i>Upper95 %</i>	<i>Lower 99,0%</i>	<i>Upper 99,0%</i>
Y-crossing	3,081	2,198	1,402	0,179	-1,556	7,717	-1,556	7,717
x	3,945	1,192	3,311	0,004	1,431	6,460	1,431	6,460

Source: Authors estimates

Let's assess the quality of the constructed model. First, we evaluate the significance of the regression coefficients using the Student's t-test, and then we assess the model's quality using analysis of variance and correlation analysis.

For the Student's t-test, we use the observed t-statistic values for the coefficients: a = 2.402 and b = 3.311. We find the critical t-value for the Student's t-distribution. For this model, the critical t-value is 2.110.

Next, we need to test two hypotheses. The first hypothesis is that the coefficient "a" is not statistically significant, and the second hypothesis is that the coefficient "a" is statistically significant. Similarly, we test two hypotheses regarding the coefficient "b". To test the hypothesis, we compare the t-statistic to the critical t-value. Since the t-statistic for coefficient "a" is greater than the critical t-value ($2.402 > 2.110$), the first hypothesis is rejected with a 95% probability, indicating that coefficient "a" is statistically significant.

Similarly, for coefficient "b," the t-statistic is greater than the critical t-value ($3.311 > 2.110$), and the first hypothesis is rejected with a 95% probability, indicating that coefficient "b" is statistically significant.

Next, we will analyze the quality of the model using the F-test or the analysis of variance for regression. To do this, we will test two hypotheses. The first hypothesis is that there is no linear functional relationship between GDP and the magnitude of tax incentives for individual income tax, and the second hypothesis is that a linear functional relationship exists.

We will consider the observed value of the F-statistic and compare it to the critical value. For our model, the observed F-statistic is greater than the critical F-value ($17.760 > 4.451$). Therefore, the first hypothesis is rejected, indicating that there is a linear relationship between the variable values of tax incentives for individual income tax and the variable values of GDP.

This indicates a high quality of the obtained model. Next, let's examine the strength of the linear relationship between tax incentives for individual income tax and GDP. To do this, we will consider two indicators: the multiple R, which is the value of the correlation coefficient, specifically $R = 0.726$. The correlation coefficient is a measure of the strength of the linear relationship between variables. We see that it falls within the range of 0.7 to 0.9, indicating a high or strong relationship between tax incentives for individual income tax and GDP. Since the correlation coefficient is positive, this relationship is direct. Therefore, if tax incentives for individual income tax increase, GDP also increases.

For further analysis of our model, we will test the significance of the correlation coefficient. We find the observed value of the Student's t-statistic and test two hypotheses: the correlation coefficient is significant and the correlation coefficient is not significant. We calculate the observed T-value by multiplying the correlation coefficient by the square root of the number of observations minus 1 (degrees of freedom) and dividing it by the square root of 1 minus R-squared. If the resulting value is greater than the critical T-value, then the correlation coefficient is significant.

For our model, the observed t-value is greater than the critical t-value, specifically $4.246 > 2.110$. Therefore, the correlation coefficient is statistically significant with a 95% probability.

Let's consider the coefficient of determination (R-squared). For our model, it is equal to 51%. This means that 51% of the variability in GDP is explained by the variability in tax incentives for VAT. The remaining 49% represents other factors not accounted for in the model that influence the GDP.

By analyzing the significance of the coefficients and the quality of the model itself, we conclude that the model confirms a direct linear relationship between tax incentives for PIT and GDP.

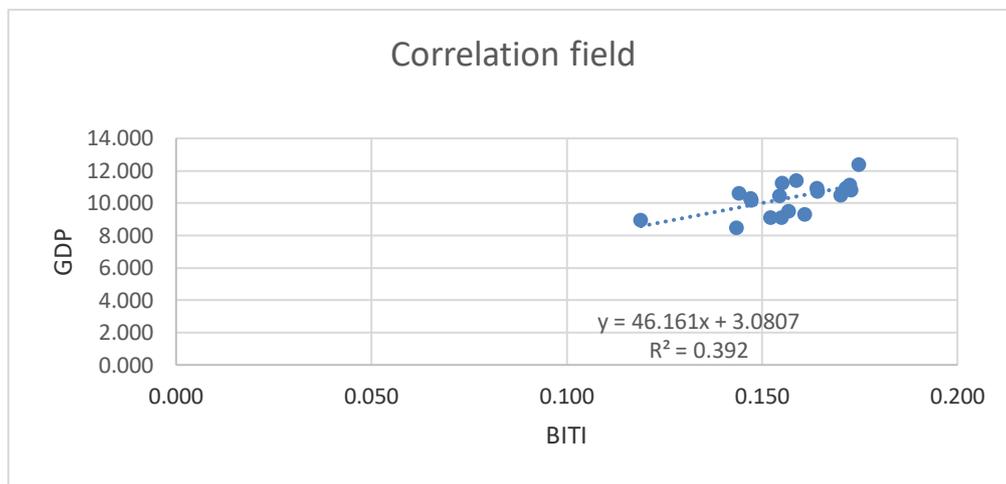
We analyze the impact of BITT incentives on GDP using the constructed equation of the linear regression model, which takes the form:

$$Y = 3.081 + 46.161 * X , \tag{4.4}$$

where: Y – GDP rate per capita

X – Sum of BITT incentive

Outcome of this graphical representation, offering a comprehensive view that enhances our intuition regarding the relationship between the two variables are displayed in Chart 4.4



Source: Authors estimates

Chart 4.4 The Correlation GDP – BITI

The scatter plot of paired values, encompassing the GDP and BITI, reveals the tables 4.11, 4.12, 4.13

Table 4.11 Regression Analysis BITI

Multiple R	0,626
R-square	0,392
Adjusted R-square	0,356
Standard deviation	0,804
Observations	19

Source: Authors estimates

Table 4.12 Dispersion Analysis BITI

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1	7,081	7,081	10,960
Deviation	17	17	10,984	0,646	
Total	18	18,065			

Source: Authors estimates

Table 4.13 Correlation Analysis BITI

	<i>Coefficient s</i>	<i>Standard deviation</i>	<i>t-statistic s</i>	<i>P-value</i>	<i>Lower95 %</i>	<i>Upper95 %</i>	<i>Lower 99,0%</i>	<i>Upper 99,0%</i>
Y-crossing	3,081	2,198	1,402	0,179	-1,556	7,717	-3,289	9,450
x	46,161	13,943	3,311	0,004	16,743	75,578	5,750	86,571

Source: Authors estimates

Let's assess the quality of the constructed model. First, we evaluate the significance of the regression coefficients using the t-test, and then we assess the model's quality using analysis of variance and correlation analysis.

For the t-test, we use the observed t-statistic values for the coefficients: $a = 1.402$ and $b = 2.050$. We find the critical t-value for the t-test. For this model, the critical t-value is 2.110.

Next, we need to test two hypotheses. The first hypothesis is that the coefficient "a" is not statistically significant, and the second hypothesis is that the coefficient "a" is statistically significant. Similarly, we test two hypotheses regarding the coefficient "b".

To test the hypotheses, we compare the t-statistic to the critical t-value. Since the t-statistic for coefficient "a" is smaller than the critical t-value ($1.402 < 2.110$), the first hypothesis is true with a 95% probability, indicating that the coefficient "a" is not statistically significant. Similarly, for coefficient "b," the t-statistic is smaller than the critical t-value ($2.050 < 2.110$), and the first hypothesis is true with a 95% probability, indicating that the coefficient "b" is not statistically significant.

Next, we will analyze the quality of the model using the F-test or analysis of variance (ANOVA) for regression. To do this, we will test two hypotheses. The first hypothesis is that there is no linear

functional relationship between GDP level and the magnitude of BITT tax incentives, and the second hypothesis is that a linear functional relationship exists.

Let's consider the observed value of the F-test statistic and compare it to the critical value. For our model, the observed F-statistic is greater than the critical F-value ($10.96 > 4.451$). Therefore, the first hypothesis is rejected, indicating that there is a linear relationship between the variable values of BITT tax incentives and the variable values of GDP.

This indicates a high quality of the obtained model. Next, let's examine the strength of the linear relationship between VAT tax incentives and GDP. To do this, we will consider two indicators: multiple R, which is the value of the correlation coefficient ($R = 0.6$).

The correlation coefficient is a measure of the strength of the linear relationship between variables. We see that it does not fall within the range of 0.7 to 0.9, indicating that the relationship between BITT tax incentives and GDP is not strong. Therefore, if BITT tax incentives increase, GDP does not always increase.

For further analysis of our model, we will test the significance of the correlation coefficient. We find the observed value of the t-test criterion. We test two hypotheses: the correlation coefficient is significant and the correlation coefficient is not significant. We find the observed t-value. To do this, we multiply the correlation coefficient by the square root of the number of observations minus 1 (degrees of freedom) and divide it by the square root of 1 minus R-squared. If the resulting value is greater than the critical t-value, then the correlation coefficient is significant.

For our model, the observed t-value is greater than the critical t-value, specifically $1.960 < 2.110$. Therefore, the correlation coefficient is not statistically significant with a 95% probability.

Let's consider the coefficient of determination (R-squared). For our model, it is equal to 14%. This means that only 14% of the variability in GDP is explained by the variability in BITT tax incentives. The remaining 86% represents other factors that influence the GDP.

By analyzing the significance of the coefficients and the quality of the model itself, we conclude that the model confirms a direct linear relationship between BITT tax incentives and GDP, but this relationship is insignificant. Changes in the magnitude of BITT tax incentives do not affect changes in GDP.

The analysis of the impact of tax incentives for SCT, Stamp Duty Tax, Property tax, and Motor Vehicle tax on real estate on GDP, using the significance of coefficients and the quality of the model itself, showed that the regression and correlation coefficients of the obtained models are not significant. The research confirms a linear relationship between tax incentives for SCT, Stamp Duty Tax, Property tax, and Motor Vehicle tax on real estate and GDP, but this relationship is not significant. Changes in the magnitude of tax incentives for these taxes do not affect GDP.

4.3 Pair Linear Regression Equations

Here are the equations for the six pair regressions between GDP per capita and each tax incentive:

1. Personal Income Tax (PIT): $GDP = 3,1 + 3,95(PIT)$
2. Value-Added Tax (VAT): $GDP = 4,44 + 1,89(VAT)$
3. BITT: $GDP = 3,08 + 46,16(BITT)$
4. Social Security Contributions (SSC): $GDP = 3,08 + 18,46(SSC)$
5. Stamp Duty Tax (SDT): $GDP = 3,08 + 92,32(SDT)$
6. Property Tax (PT): $GDP = 3,08 + 184,64(PT)$
7. Motor Vehicle Tax (MVT): $GDP = 3,08 + 153,87(MVT)$
8. Inheritance and Gift Tax (IGT)): $GDP = 3,08 + 307,74(IGT)$

4.4 Multiple Regression Model

Thus, to build a multiple linear regression model, we will use data from models where the regression and correlation coefficients are significant, namely data for VAT, CIT, and PIT. Multiple regression will show how changes in the magnitude of tax incentives for VAT, CIT, and PIT affect changes in GDP.

In our case, the general form of the multiple linear regression equation is as follows:

$$Y = B_0 + B_1 * X_1 + B_2 * X_2 + B_3 * X_3. \quad (4.5)$$

The values X_1 , X_2 , X_3 represent tax incentives for VAT, CIT, and PIT, respectively, considered over the time period 2004-2022.

From the constructed matrix, we find the unknown coefficients B_0 , B_1 , B_2 , B_3 and formulate the multiple regression equation that reflects the relationship between GDP and tax incentives for VAT, CIT, and PIT.

Based on the comparative graphical representation in the above chart, we focus on the design of the regression model. By using the least squares method for estimation, the parameters of the model are shown in table 4.14

Table 4.14. Multiple Regression Model Results

b3	b2	b1	b0
-2,24256	2,563872	1,454211	3,959386
2,46935	1,780497	0,829476	1,995794
0,603835	0,69074	#H/Д	#H/Д
7,620996	15	#H/Д	#H/Д
10,90842	7,156823	#H/Д	#H/Д

Source: Authors estimates

The model offers a reasonable degree of accuracy, since both R-squared and adjusted R-squared are above 0.89, giving a probability greater than 89% for the model. In this respect, the model can be written under the following form:

$$Y = 3.96 + 1.45 * X1 + 2.56 * X2 - 2.24 * X3 \quad (4.6)$$

with a Fischer coefficient of 10.90, which is greater than its critical value of 4.451. Therefore, there is a linear relationship between GDP and tax incentives for VAT, CIT, and PIT.

By having the values of coefficients Bo, B1, B2, and B3, as well as the magnitudes of tax incentives for VATI, CITI, and PITI, which influence changes in GDP, it is possible not only to calculate its value but also to make corresponding forecasts and model GDP.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Summary

The present study investigated the tax incentives and GDP rate in Turkey and their impact on the country's economic development. Specifically, we analyzed the corresponding incentives provided under different sections of the tax code and special types of tax incentives over time.

The study identifies various types of tax incentives available to businesses, including tax holidays, reduced tax rates, accelerated depreciation, tax deductions, and tax relief. These incentives play a crucial role in encouraging investment and fostering growth.

Analyzing tax incentives projects from 2004 to 2022, we observe consistent growth influenced by three types of tax incentives: CITI, PITI and VATI. This steady growth signifies the resilience and significance of these developments and the accuracy of the Turkish economy. Over time, the scope of incentives has expanded, attracting more investments and subsequently contributing to the country's GDP. We attribute the increase in GDP to the incentives provided by the tax authority, which have acted as catalysts for economic development.

Our research underscores the significance of tax incentives and fiscal policies in Turkey's economic landscape. The consistency of the strategic development plan and the evolution of tax incentives reflect a strategic approach to stimulate investment and drive economic growth. By offering a range of incentives and fostering a favorable business environment, Turkey can continue to attract investments and nurture its industrial sectors, ultimately contributing to the country's overall development.

5.2 Conclusion

The role of tax incentives in economic growth and recovery has been a subject of extensive research in the fields of economics and public policy. Tax incentives are used by governments to encourage investment and economic activity by reducing the tax burden on individuals and businesses. These incentives can take various forms, such as tax credits, exemptions, and deductions.

The main aim of this research was to investigate the impact of tax incentives on economic growth and recovery. The study examined the theoretical and empirical literature on tax incentives and economic growth and recovery, including the factors that determine the effectiveness of these incentives.

The research analyzed the experiences of different countries in implementing tax incentives and the outcomes of such policies. This analysis will help to identify the best practices and lessons learned in using tax incentives to promote economic growth.

Furthermore, the study examined the potential risks and trade-offs associated with tax incentives, including the impact on revenue collection, income distribution, and public services. It also considered the implications of different types of tax incentives for different sectors of the economy and for different types of investors.

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5.2 Policy implications and recommendations.

The research provides policymakers and stakeholders with a comprehensive understanding of the role of tax incentives in economic growth and recovery, and informs about the key goals and aspects of the design and implementation of effective tax policies

One of the primary goals of tax incentives for policymakers is to stimulate economic growth and to promote sustainable development. Crucial role is to establish a favorable tax environment, particularly through tax incentive policy that stimulate economic activity domestically and attract the necessary foreign capital. Tax incentives within the income tax system have become a pivotal

factor in strategic development policy. Countries that offer investors preferential tax treatment through a wide range of incentives, primarily within the income tax system, and provide favorable economic and social conditions have experienced substantial growth and an influx of foreign capital.

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