TRADABLE AND NON-TRADABLE LOANS, PROVINCIAL GROWTH AND STATE-OWNED BANKS

A Master's Thesis

by
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Ankara
July 2025

To those who choose not to remain in the dark.

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The Graduate School of Economics and Social Sciences
of
İhsan Doğramacı Bilkent University

by

AYLİN ÇOĞALMIŞ

In Partial Fulfillment of the Requirements for the Degree of
MASTER OF SCIENCE IN BUSINESS ADMINISTRATION

THE DEPARTMENT OF
MANAGEMENT
İHSAN DOĞRAMACI BİLKENT UNIVERSITY
ANKARA

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TRADABLE AND NON-TRADABLE LOANS, PROVINCIAL GROWTH AND STATE-OWNED BANKS
By Aylin Çoğalmış

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science in Business Administration.

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ABSTRACT

TRADABLE AND NON-TRADABLE LOANS, PROVINCIAL GROWTH AND STATE-OWNED BANKS

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M.S., Department of Management

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July 2025

This thesis examines the dynamic relationship between sectoral credit allocation and provincial GDP growth in Turkey, with a special focus on tradable and non-tradable credits, as well as the influence of state-owned bank lending. For this purpose, I use panel data across 81 provinces in Turkey and employ local projection methodology over five-year horizons covering the period between 2007 and 2023. The results reveal that a one standard deviation increase in three-year non-tradable credit change initially boosts GDP growth, also measured over a three-year window, by approximately 1.9%, but this effect reverses and becomes significantly negative in the medium term, with peak adverse effects of nearly $\breve{}4.9\%$ after four years. On the contrary, three-year tradable credit change yields moderate but consistent gains, with a one standard deviation increase associated with approximately 1.7% higher GDP growth in the medium term. The analysis restricted to state-owned bank credit allocation reveals the boom-bust dynamic in non-tradable lending. Further controlling for firm entry and credit intensity, the study finds that new firm formation—particularly in the

non-tradable sector—enhances growth, whereas credit expansion alone, in the absence of new firm entry per capita variable, fails to produce durable economic gains. Overall, the results underscore the critical role of credit composition and institutional lending channels in shaping long-term provincial growth. Sectoral biased lending or politically driven credit allocation, especially when concentrated in the non-tradable sector, may deliver short-lived gains at the cost of future stability and sustainable development.

Keywords: Credit expansion, Tradable loans, Non-Tradable loans, Provincial GDP growth, State-owned banks, Boom-Bust.

ÖZET

TİCARETE KONU OLAN VE OLMAYAN KREDİLER, İL BAZINDA BÜYÜME VE DEVLET BANKALARI

Çoğalmış, Aylin
Yüksek Lisans, İşletme Bölümü
Tez Danışmanı: Doç. Dr. Süheyla Özyıldırım

Temmuz 2025

Bu tez, Türkiye'de sektörel kredi tahsisi ile illerin GSYİH büyümesi arasındaki dinamik ilişkiyi incelemekte, özellikle ticarete konu olan ve olmayan krediler ile kamu bankalarının kredi tahsisindeki rolüne odaklanmaktadır. Bu amaçla, 2007 ve 2023 yılları arasında Türkiye genelindeki 81 il için panel veri kullanılarak beş yıllık ufuklar üzerinden yerel projeksiyon (local projection) yöntemi uygulanmıştır. Bulgular, üç yıllık ticarete konu olmayan kredilerdeki bir standart sapmalık artışın yine üç yıllık bir pencere üzerinden ölçülen GSYİH büyümesini başlangıçta yaklaşık $\%1,9$ oranında artırdığını, ancak bu etkinin orta vadede tersine dönerek dördüncü yıl itibarıyla yaklaşık $\%4,9$ ile belirgin biçimde negatif hâle geldiğini göstermektedir. Buna karşılık, üç yıllık ticarete konu olan krediler daha ılımlı fakat istikrarlı kazançlar sağlamakta; bir standart sapmalık artış, orta vadede yaklaşık $\%1,7$'lik bir GSYİH artışıyla ilişkilendirilmektedir.

Sadece kamu bankaları tarafından sağlanan kredilerin analiz edildiği durumda ise, ticarete konu olmayan kredilerdeki bu "patlama-durgunluk" di-

namiğinin daha da belirgin olduğu görülmektedir. Firma girişi ve kredi yoğunluğu gibi kontrol değişkenleri eklendiğinde, özellikle ticarete konu olmayan sektörlerde yeni firma girişlerinin büyümeyi desteklediği, buna karşın yeni firma açılış değişkeni olmaksızın gerçekleşen kredi genişlemesinin uzun vadeli ekonomik kazanımlar sağlayamadığı ortaya konmuştur.

Genel olarak sonuçlar, kredi kompozisyonunun ve kredi tahsisinde rol oynayan kurumsal kanalların, uzun vadeli bölgesel büyümenin şekillenmesinde belirleyici olduğunu vurgulamaktadır. Sektörel olarak dengesiz ya da siyasi motivasyonlarla yönlendirilen kredi tahsisi, özellikle ticarete konu olmayan sektörlerde yoğunlaştığında, kısa vadeli kazanımlar sağlasa da uzun vadede ekonomik istikrar ve sürdürülebilir kalkınma pahasına gerçekleşmektedir.

Anahtar Kelimeler: Kredi dağılımı, Ticarete konu olan borçlar, Ticarete Konu olmayan borçlar, İl bazında GSYİH büyümesi, Devlet bankları, Patlama-çöküş döngüleri.

ACKNOWLEDGMENTS

As a priority, I wish to extend my heartfelt thanks to my supervisor, Assoc. Prof. Dr. Süheyla Özyıldırım, for her guidance, kindness, patience, and for teaching me the enduring value of maintaining hope even in the face of challenges.

I would like to show my appreciation to my examining committee members, Prof. Dr. Oğuzhan Özbaş and Prof. Dr. Jülide Yıldırım Öcal, for their remarkable suggestions, comments and feedback. I am truly honored to have such distinguished scholars on my committee; their invaluable insights and guidance have greatly enriched my work and inspired me deeply for my academic journey.

I wholeheartedly thank my dearest friend Özge Yüksel, who lights a candle in my darkest moments when I am too weary to do so myself, never once letting me feel the weight of solitude along the way.

Last but not least, I sincerely thank my family, whose unwavering belief in me and constant presence have been my greatest source of strength throughout this journey. I often find myself wondering what I could have possibly done to deserve such boundless love and faith. Especially, to my sister, who taught me what it means to fight with grace and never give up—I carry that strength with me every day.

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CHAPTER 1

INTRODUCTION

In recent decades, there has been a notable increase in capital flows to emerging market economies, particularly after the 2008 global financial crisis. Data from the Bank for International Settlements (BIS) on aggregate cross-border claims of reporting banks indicates a significant upward trend in cross-border lending to banks in emerging markets from 2007 to 2019. This trend is especially noticeable in Turkey, where foreign capital flows into banks surged sharply until 2016 (Figure 1.1). After that, there was a plateau, followed by a slight decline starting in 2018. Özatay (2020) demonstrates that the increase in cross-border lending to Turkey led to a rapid rise in domestic credit growth. Additionally, Giovanni et al. (2021) documented the interconnection between global liquidity, capital flows, and domestic credit expansion in Turkey. They show that excessive foreign capital inflows led to credit booms in Turkey from 2003 to 2013. As financial globalization, defined by the cross-border movement of various forms of financial capital, continues to expand, it is reasonable to expect an increase in these flows from developed countries to emerging economies, ultimately benefiting those nations (Prasad et al., 2007). However, if credit allocation is heavily focused on specific sectors of the economy, this surge in credit may not promote the best investment opportunities, potentially resulting in stagnated economic growth. In this thesis, my aim is to investigate the sectoral allocation of bank loans in Turkey and its impact on provincial output growth during the

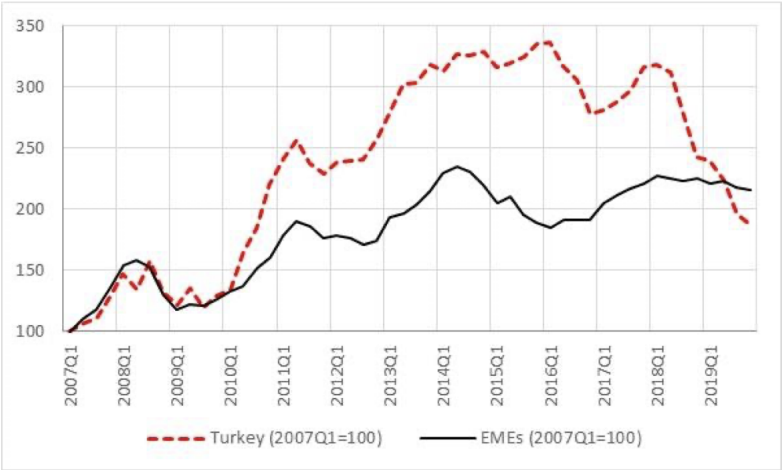

Figure 1.1: Banks cross-border claims: 2007Q1-2019Q4 (index, 2007Q1=100) using BIS Locational Banking Statistics. Source: Özatay (2020). “Paving the way for an economic crisis with high leverage and currency mismatches: 2018-19 crisis in Turkey."

period of 2007-2023.

A recent study by Dai et al. (2025) reveals a strong correlation between the distribution of credit across various sectors and economic growth, using new sectoral loan data from a sample of 120 countries. The researchers demonstrate that as countries become wealthier, credit shifts from the manufacturing sector (tradable) to the real estate sector (non-tradable). They find that credit directed towards manufacturing is linked to higher long-term growth, whereas credit allocated to real estate is associated with slower future growth.

Similarly, Müller and Verner (2023) highlight that the allocation of credit among different sectors—specifically, who receives the credit—is essential for understanding the relationship between credit booms, macroeconomic fluctuations, and financial crises. Many models of open economies suggest that the direction of credit—whether it flows to households and firms in the non-tradable sector or to firms in the tradable sector—can influence whether the real economy experiences boom-bust cycles (Kalantzis, 2015; Schmitt-Grohé & Uribe, 2016; Schneider & Tornell, 2004). However, the practical significance of these

distinctions remains unclear, as mainstream theories of credit cycles often focus on factors such as the capitalization of financial institutions or differing beliefs, rather than on who is actually borrowing (Brunnermeier & Sannikov, 2014; He & Krishnamurthy, 2013).

Ozhan (2020) highlights that following the establishment of the Economic and Monetary Union (EMU) in the European Union, southern European countries experienced significant capital inflows from core countries to the periphery of the euro area. A substantial portion of these loans was directed toward domestic non-traded sectors, such as construction and services. This influx of capital contributed to an asset price boom in these non-traded sectors, leading to higher wages and costs. Consequently, the export competitiveness of some member countries was undermined, resulting in a deterioration of their current account positions. Baldwin and Giavazzi (2016) share a similar perspective, stating, "Capital flows tended to feed non-tradable sectors in the periphery of the Eurozone, and when investors lost trust in deficit nations, the effects of a sudden stop were amplified due to the predominance of bank financing."

Several other studies have shown that in various European countries, low interest rates combined with easy access to credit led to housing booms (see, for example, Sá et al. (2011)). This situation encouraged banks to increase funding for the real estate sector, resulting in a rapid rise in house prices. Consequently, this contributed to the onset of the financial crisis as debt levels soared. Müller and Verner (2023) conducted a case study on credit allocation during these credit booms, highlighting that significant cycles of credit expansion occurred in the Eurozone during the European debt crisis. With the establishment of the European Monetary Union, the interest rate spreads between countries decreased substantially, leading to a flow of capital from larger economies to smaller ones. This surge of capital mainly funded credit growth in smaller countries, particularly in the construction and real estate sectors, while lending

to the manufacturing sector stagnated. Ozhan (2020) calibrated a standard open economy using data from Spain and demonstrated how changes in the frictions of cross-border deposits lead to an uneven allocation of bank credit towards non-traded sectors. This results in declining bank lending, reduced investment, and lower output, as well as a persistent and growing current account deficit.

Diebold and Richter (2021) conducted a cross-country analysis involving 33 countries and found that credit allocation to the domestic household sector, which is financed by foreign capital inflows, often leads to slower economic growth in the future. Additionally, Benigno et al. (2015) identified 155 instances of significant capital inflows across a sample of 70 middle- and high-income countries from 1980 to 2014. They found that during these periods of substantial capital inflows, both capital and labor tend to shift away from the manufacturing sector. In a more comprehensive database covering 117 countries, Müller and Verner (2023) demonstrate that credit expansions to the non-tradable sector consistently predict subsequent growth slowdowns and financial crises. In contrast, credit expansions to the tradable sector are linked to sustained output and productivity growth, without significantly increasing the risk of financial crises.

While evidence on the interplay between sectoral credit allocation and production growth presented in the global literature is compelling, it is still pertinent to look at this dynamic in particular national contexts because the correlation between sectoral credit distribution and GDP growth can differ depending on the economic structure, policy environment and level of financial liberalization of the country. In this regard, Turkey is a particularly relevant case given its evolving credit patterns and variations in sectoral composition over the years.

Turkey presents an interesting case for examining the effects of credit expansion on the real economy, particularly as an emerging market. In contrast to

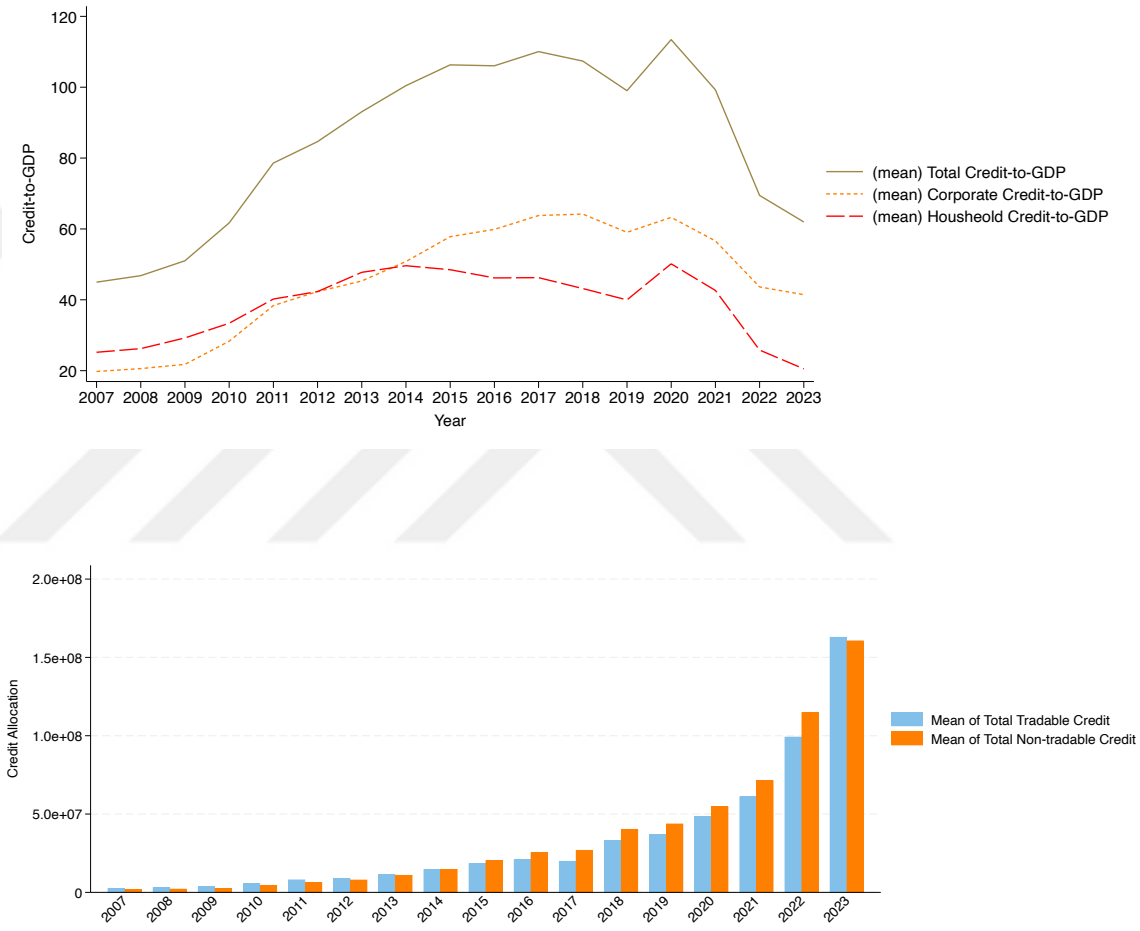

Figure 1.2: Author's own calculation. Source: FinTürk from Banking Regulation and Supervision Agency (BRSA)

advanced economies, where housing credit typically exceeds corporate credit,[1] Turkey displays a common characteristic of emerging economies: corporate credit has consistently grown at a faster rate than housing credit (Figure 1.2a). Interestingly, in the area of corporate credit, the simultaneous increase in loans across both the tradable and non-tradable sectors (excluding housing loans) reveals a noteworthy trend (see Figure 1.2b). This trend provides an opportunity to compare how the distribution of loans among different sectors affects long-term economic growth at the provincial level. On the tradable side, industries such as manufacturing, textiles, agriculture, and mining are highly export-oriented and directly engaged with international markets, contributing to long-term GDP growth. In contrast, the non-tradable sectors—such as construction and real estate, retail, and domestic services—have been the mainstays of Turkey's economy over the last two decades, even though they have limited export potential. In this thesis, I provide reduced-form evidence using local projection methodology on how the sectoral allocation of corporate credit affects economic development in Turkey.

Furthermore, our comprehensive banking credit data from Turkey enables me to suggest expanding the sectoral data coverage to include sub-national dimensions (see Figure 1.3). Incorporating regional or provincial-level credit data would facilitate a more in-depth analysis of credit and its impact on regional economic activities . With such detailed data, I can better capture the effects of various provincial economic and financial structures, including financial development, access to finance, sectoral composition of the local economy, workforce size, and productivity levels, on provincial economic growth. The insights gained from this provincial-level analysis allow me to identify areas that may be more vulnerable to financial system instability. Therefore, utilizing

[1]This pattern is documented by several authors, including Jordà et al. (2016) and Müller and Verner (2023). This pattern is referred to as "too much of the wrong sort of debt" by Turner (2016)

sub-national credit data in our analysis results in more nuanced, reliable, and policy-relevant outcomes.

The economic and geographical duality in Turkey is significant. For example, provinces in the Marmara region, located in Northwest Turkey, tend to be more industrialized and export-oriented. Here, manufacturing, industry, finance, services, and trade activities contribute more to the economy. In contrast, the Aegean Region to the west predominantly focuses on agriculture and tourism. Central Anatolia, as well as Eastern and Southeastern Anatolia, are characterized by strong sectors in manufacturing, construction, and agriculture. Meanwhile, the Mediterranean Region relies heavily on tourism and agriculture. The Black Sea Region, on the other hand, sees forestry, fishing, and agriculture playing vital roles in its economic activities. This disparity in regional economic activities underscores the importance of provincial-level analysis to understand the relationship between credit distribution and GDP growth in Turkey. While excessive credit flow to the non-tradable sector in underdeveloped provinces may provide a short-term economic boost, it could hinder long-term growth and potentially lead to financial instability.

As I mentioned above, Turkey has strategically pursued economic growth by significantly increasing cross-border borrowing, particularly since the early 2000s. This strategy has led to short-term benefits, such as urbanization, rising domestic demand, and job creation linked to credit expansion. However, a substantial portion of this credit has been directed toward non-tradable sectors, especially in construction and real estate (Özatay, 2020). In the long run, these sectors do not provide a strong foundation for sustainable economic growth because they have limited access to international trade and global markets. An increasing body of research examines this perspective, highlighting the structural limitations of non-tradable sectors, the potential of the tradable sector to enhance growth, and the crucial role these sectors play in long-term economic

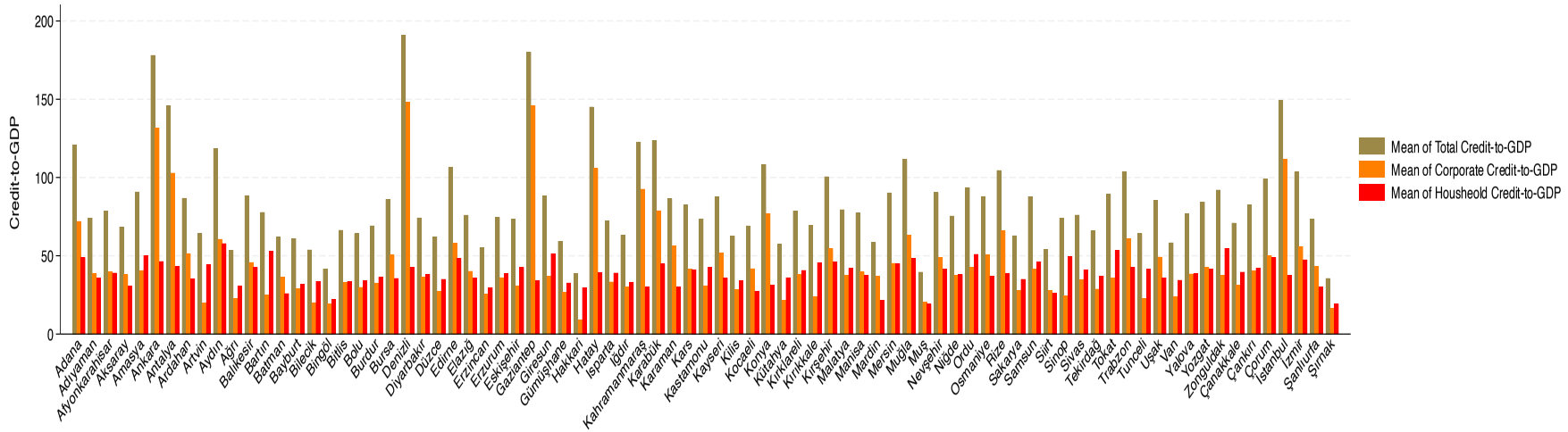

Figure 1.3: Province

development.

Duarte and Restuccia (2010) analyze productivity growth at the sectoral level using data from 29 OECD and developing countries spanning from 1956 to 2004. They find that productivity increases more rapidly in manufacturing and agriculture—two sectors commonly associated with the production of traded goods—compared to services, which primarily produce non-traded goods. The same conclusion is drawn by Hlatshwayo and Spence (2014) using U.S. data from 1990 to 2013, even after taking into consideration the fact that certain services are tradable. He et al. (2014) use relative price movements of non-tradable sectors as compared to the tradable sectors to study total productivity growth of the non-tradable sectors and they conclude that the total productivity growth of the non-tradable sector is lower than the tradable sector.

Anderson et al. (2015) build a structural dynamic general equilibrium model of growth and trade. In their model, a decline in trade frictions significantly support economic growth through more capital accumulation led by better investment opportunities. Their results also align with standard trade-growth theory: increased trade sustains efficiency, and raises investment, all contributing to growth. Focusing only on Turkey, Can et al. (2016) examine the relationship between developments in the credit market and the transformation of non-tradable and tradable sectors, finding a statistically significant connection between credit growth and the non-tradable to tradable ratio in Turkey. Their analysis indicates that, during the 2000s, the domestic services sector saw a notable increase, while the manufacturing sector—constituting the largest segment of the tradable sector–experienced a decline. They conclude that access to credit varies across regions in Turkey, and inefficient distribution of credit and resources could lead to future declines in growth and productivity.

As briefly mentioned above, regional disparity in Turkey, especially western

and eastern part of Turkey has persisted and even increased until recently. Aşık et al. (2023) states that:

> *"The timing and intensity of urbanization, industrialization, and economic growth in Turkey during the last two centuries have been broadly similar to those in other developing countries. Moreover, since the late Ottoman era, the West–East economic differences within Turkey have been accompanied by ethnic polarization and conflict and large demographic shocks involving Armenians, Greeks, and Kurds as well as Turks. Notably, the West–East income disparities in Turkey are still amongst the highest in the world and one of the leading issues in national politics."*

Based on data covering the time between 2007 and 2023, from the Turkish Statistical Institute (TurkStat), the per capita GDP in the western provinces, such as Istanbul, Kocaeli and Ankara, is more than twice the national average. By contrast, provinces in eastern and southeastern Anatolia, such as Ağrı, Hakkari and Şırnak, have a per capita GDP below half that of the country as a whole. İstanbul plays an important role in the Turkish economy, accounting for around 30 percent of the country's GDP. By contrast, many eastern provinces contribute less than one percent of the total.[2] More industrialized provinces in Turkey typically feature a more robust banking system and better access to capital and credit markets. Bozkurt and Karakuş (2020) compute an index of financial inclusion for 81 provinces in Turkey between 2011 and 2016. In their study,

[2]According to the OECD's 2022 report, Turkey has the highest regional disparities among the 29 OECD countries measured by GDP per capita. According to the OECD Regional Outlook 2023 report, polarization (expressed as the per capita GDP ratio between the top and bottom 20% of provinces) has increased in 14 of the 27 OECD countries for which data are available. Despite the decrease over the last two decades, the ratio between the top and bottom regions in 2020 was still the highest in Turkey (3.2), followed by Slovakia (2.9) and Poland (2.8). Income levels also vary across different provinces, with less developed areas experiencing higher poverty rates and lower educational services. Meanwhile, more developed provinces tend to concentrate high employment and productivity sectors.

while an index of financial inclusion (IFI) value of 1 represents a perfect financial inclusion level, the value of 0 demonstrate a poor level for financial inclusion. According to their analysis, provinces, such as Muş, Gümüşhane, Ağrı or Tunceli, have a very low IFI score compared to others. In contrast, less developed provinces often rely on state-owned banks for financing and have limited access to long-term borrowing, which further hampers economic activity in these regions. The earlier mentioned provinces are the very provinces that rely heavily on state-owned bank finance based on our data,[3] which we document with the following figure, ranking the the cities by the share of state banks in total credit allocated (Figure 1.4). Majority of the cities with low IFI score in Bozkurt and Karakuş (2020) study show a high dependence on state-owned banks compared to provinces with better financial inclusion score.

This thesis centers on economic growth in Turkey's provinces. I specifically analyze how provincial output is influenced by having an excessive or insufficient amount of the "wrong" type of debt. In other words, I investigate whether the allocation of credit between tradable and non-tradable sectors has an impact on provincial growth. Dai et al. (2025) explain structural shift in resource allocation led by economic development through two channels: economic forces, such as elevated demand for housing, and financial forces, such as mitigated collateral requirements. They show that although at the initial stages where the level of development is lower, credit is allocated mainly toward manufacturing sector, with increasing productivity and decreased collateral constraints, real estate sector becomes more appealing for lending. Hence, due to both financial and economic forces, credit is allocated disproportionately towards real estate sector, usually in financially developed economies. In a similar vein, in this thesis I created my hypotheses such that similar finance-growth nexus at the

[3]Akgündüz et al. (2024) document that state-owned banks accounted for more than 50% of the market share in Turkey by 2023 (Figure A.1). Alongside this rising share, they emphasize that the role of state-owned banks in investment and export financing is also growing.

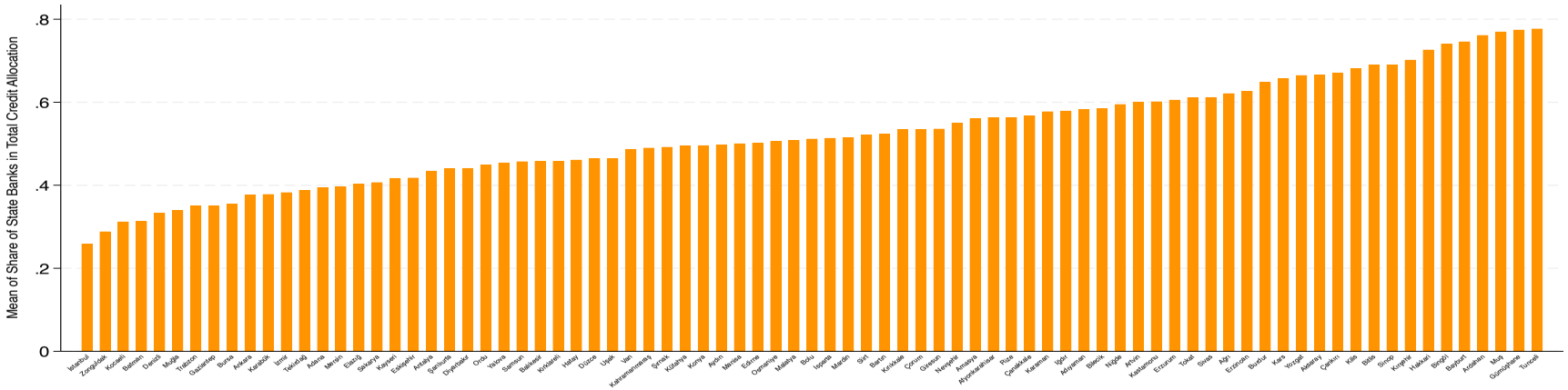

Figure 1.4: Average Provincial Share of Commercial Credits Granted by State-Owned Banks During 2007-2023

sectoral level for countries is valid at the sub-national level, among provinces in Turkey. I hypothesize that financially developed provinces are expected to be better equipped to allocate credit based on productivity incentives and innovative strategies, primarily directing funds toward firms in the tradable sector. However, structural changes in the economy emerging with rising financial development may drive an increasing share of credit toward the construction and real estate sectors, namely non-tradable sector in more advanced provinces.

I analyze data on provincial bank lending by sector from 2007 to 2023 to explore the empirical relationship between tradable and non-tradable lending and its impact on provincial GDP growth. Additionally, I investigate the role of government in this context, focusing on the tradable and non-tradable loans provided by state-owned banks. To estimate this relationship between sectoral credit allocation and GDP growth across provinces of Turkey, I employ Local Projection (LP) method introduced by Jordà (2005). Frequently proposed as a substitute for vector autoregression method, the LP approach enables a solid framework to identify dynamic response of provincial economic activity to changes in tradable and non-tradable credit allocation in Turkey, without strict assumptions on the data. By generating separate regressions for each time horizon with province fixed effects, the LP method demonstrate short-, medium- and long-term dynamic relationship between sectoral credit allocation at the province level and provincial output growth.

The results of this thesis suggest that while credit expansion in the non-tradable sector supports short-term provincial GDP growth, its positive effects phase out over time, resulting in a slowdown in the medium term. In contrast, credit directed toward the tradable sector contributes more robustly to medium-term growth.[4] The analysis of state-owned banks shows that their sectoral

[4]These results remain consistent even when household credit is included.

lending behavior has a lagged and asymmetric impact on provincial GDP growth. Initially, it was found that the output growth was negatively correlated with the tradable credit extended by state-owned banks. Later, in the short to medium term, the relationship became positive, but then reversed to negative in the long term. In contrast, non-tradable state bank credit is negatively correlated with provincial output growth across most horizons but its statistical significance diminishes in the long term. These patterns in lending by state-owned banks in Turkey highlight a systemic misallocation of credit, which may be the result of political bias. Further investigation is necessary to understand the inefficiency of credit extended by state banks.

The results highlight the downside of excessive dependence on the non-tradable sectors such as construction and real estate in the Turkish economy with a special focus on provincial economic activity as such over-reliance could cause unsustainable growth. In the event of abrupt credit contraction, increased financial distress could disproportionately affect economically vulnerable regions where credit allocation to these sectors is more severe. This could amplify indebtedness, causing disparities in employment levels across provinces and lead to financial instability in these regions, further affecting the overall economy. The dynamic relationship between sectoral credit allocation and provincial output growth is a crucial element in achieving stable local and overall economic development through a more balanced and productively enhancing credit allocation in the Turkish provinces. As Bahadir and Gumus (2016) state, Turkey is often considered a typical emerging economy because of its large swings in consumption, counter-cyclical net exports and volatile business cycles. There is a tendency to borrow excessively in periods of high output and to experience a shortage of credit supply in periods of low output, a common feature of emerging economies. The Turkish case therefore provides valuable insight in understanding the right allocation of sectoral credits at the provincial level and draws lessons for other emerging economies.

CHAPTER 2

LITERATURE REVIEW

2.1 Credit Access and Economic Growth

The relationship between finance and growth has been widely investigated as financial development plays a critical role in economic growth by increasing investment opportunities, strengthening productivity, and controlling the allocation of resources across sectors. In the early 1990s, economists began to explore the causal relationship between finance and economic growth. King and Levine (1993) were the first to demonstrate that financial development can predict economic growth. Rajan and Zingales (1998) provided further evidence of a causal link from financial development to economic advancement by showing that industrial sectors that are more reliant on finance–due to technological reasons–tend to grow more rapidly in countries with larger financial sectors. Further studies document that the positive impact of financial development on growth depends on various factors such as inflation level, allocation of credit, variations in industrial characteristics, and financial stability (Arcand et al., 2015; Boyd et al., 2001; Rousseau & Wachtel, 2002, 2010).

The evidence on the relationship between financial development and eco-

nomic growth is both complex and contradictory. For example, De Gregorio and Guidotti (1995) highlight that, particularly in high-income countries, increases in financial development fail to significantly improve the efficiency of investment. They found that from 1960 to 1985, there was a positive correlation between financial development and output growth; however, this dynamic shifted to a negative correlation between 1970 and 1985. Moreover, various studies suggest that financial development can actually hinder economic growth (Khan & Abdelhak, 2003; Shen & Lee, 2006; Shen et al., 2010). Among those, Cecchetti and Kharroubi (2012) examined a sample of 50 countries and revealed that the size of the financial sector exhibits an inverted U-shaped relationship with productivity growth. They suggested that beyond a certain threshold—approximately 90% of GDP for private sector credit extended by banks—further development of the financial system may impede economic growth, particularly in advanced economies. Additionally, Cecchetti and Kharroubi (2019) demonstrate that financial booms can lead to a decline in overall productivity growth, as the expansion of the financial sector adversely affects industries that rely heavily on financial resources. Focusing on sectoral output growth instead of aggregate growth, Aizenman et al. (2015) show that while financial development does not significantly benefit the manufacturing sector, it actually hinders growth in the construction sector. Diekmann and Westermann (2012) examine the key factors that drove economic growth across different sectors in Germany from 1870 to 1912. They find that the development of the banking system has an influence on all sectors, with the most significant impact seen in services, transportation, and agriculture.

2.2 Credit Constraints and Economic Fluctuations

Credit constraints refer to the restrictions imposed on borrowing, often due to collateral requirements, lenders' concerns about borrowers' risk profiles, or imperfections in the market. When firms or households face credit constraints, their ability to invest and consume is reduced compared to a situation without such limitations. This decline in investment and consumption can slow down economic growth. In economies where most businesses rely on external financing, tightening credit conditions can lead to a significant decrease in capital accumulation. Ultimately, this hinders overall economic development. A sudden tightening of credit can lead to lower GDP growth rates, which may worsen economic stance. Conversely, when there is a positive credit shock in the economy, a rapid increase in the availability of credit can boost GDP growth. In this scenario, credit-constrained businesses gain more opportunities for investment, and household consumption levels rise.

A substantial body of literature indicates that reducing financial frictions can significantly lessen macroeconomic volatility and promote economic growth.[1] Bernanke et al. (1996) demonstrate that negative shocks to the economy can be intensified by deteriorating credit market conditions, a phenomenon known as the "financial accelerator." In their seminal work, Kiyotaki and Moore (1997) theoretically show how small economic disruptions can be heightened by credit constraints, eventually leading to large fluctuations in output. They emphasize that credit constraints form a mechanism between asset prices and investment, through which minor economic shocks transform into large fluctuations in business cycles. They also explore whether sector-specific shocks can be contagious, meaning their effects may spill over to other sectors and become amplified over

[1] See Brunnermeier et al. (2013), Claessens and Kose (2017), Sufi and Taylor (2021) for surveys.

time. Liu and Zha (2013) demonstrate the empirical relevance of the Kiyotaki and Moore framework with the DSGE model and the assumption that when there are credit constraints, the debt, investment, and output level of the borrower are directly affected by the price of the collateral asset. Similarly, Chatterjee et al. (2024) conclude that during periods of declining economic activity, an increase in credit uncertainty results in a significant contraction in overall consumption and GDP, worsening the recession. In contrast, during periods of economic expansion, higher credit uncertainty does not impede real activity.

2.3 Credit Booms

Credit booms are periods in the economy characterized by a significant increase in overall credit supply. During these phases of credit expansion, both the direction and source of the credit flows play a crucial role in determining sustainable future economic growth. Whether this credit growth occurs in the private sector or among households affects the future trajectory of the economy and the nature of its business cycles. The ongoing debate surrounding whether easier access to credit stimulates economic growth or contributes to banking crises–which can lead to recessions–demands careful consideration.

In the literature, there has been a growing body of research investigating credit expansions, sectoral credit allocation, and drivers of credit booms to understand their impact on macroeconomic outcomes. For example, Müller (2018) finds that although the surge in private credits has been less pronounced for emerging economies, corporate credit and household credit showed similar growth until the 1980s, after which they started to differ in magnitude. Using a comprehensive dataset on credit allocation across 116 countries, Müller and Verner (2023) show that the private credit has grown rapidly and broadly since the 1960s–a finding consistent with earlier research by Schularick and Taylor (2012) in advanced economies. This upward trend in private credits raises

important questions about the underlying drivers and it has been established that there can be numerous drivers of credit expansions.

One of the primary factors driving an increase in credit growth is monetary policy, which influences lending conditions through various channels, including adjustments to interest rates, fluctuations in asset prices, and the availability of liquidity. Such measures can make borrowing cheaper and encourage financial institutions to extend more credit, even to high-risk customers.

Also, as extensively examined in the literature, credit booms often occur following financial liberalization, especially in an open economy context. The argument that financial liberalization significantly contributes to credit booms is presented by Kindleberger and Aliber (2005). They state that "a particular recent form of displacement that shocks the system has been financial liberalization or deregulation in Japan, the Scandinavian countries, several Asian countries, Mexico, and Russia. Deregulation has led to monetary expansion, foreign borrowing, and speculative investment." A substantial amount of research focusing on the experiences of Latin America in the 1970s and 1980s, as well as the Scandinavian countries in the 1980s and 1990s, underscores the role of financial liberalization in explaining the boom-bust cycle in both credit markets and the real economy (see Mian and Sufi (2018) for a summary of this literature).

Another contributing factor is economic optimism, which may boost banks' confidence in issuing more loans. The papers by Minsky (1977) and Kindleberger (1978) suggest that excessive optimism about future economic conditions, coupled with a disregard for potential risks, can lead to rapid credit growth. Baron and Xiong (2017) analyze the predictability of bank credit expansion in 20 developed economies and empirically demonstrate that over-optimism is a crucial factor in this credit expansion. As credit availability increases, firms in various sectors may take on debt at differing levels based on their financial

constraints, risk profiles, or labor productivity. A loosening of credit access conditions and a reallocation of credit toward specific industries can heighten the risk of financial crises.

Finally, a part of the literature examines how the entry of foreign capital into a domestic economy can ultimately increase the availability of credit. A clear example of this is the introduction of the Euro, which led to significant integration and transformation within the eurozone economy, with banks playing a crucial role (Bris et al., 2014). The euro not only facilitated cross-border lending and borrowing by reducing exchange rate risk but also enhanced credit availability, largely due to the low interest rate policy implemented by the European Central Bank to maintain price stability. As a result, there was a notable increase in credit flows to peripheral Eurozone countries, including Greece, Spain, and Ireland.

2.4 Sectoral Credit Allocations

Credit expansion has been widely discussed in the literature as a driver of both economic growth and heightened macrofinancial vulnerabilities. Nevertheless, the majority of empirical research concentrates on the general development of credit without making a distinction between credit to various sectors. Theories of credit cycles that account for differences among sectors identify several channels through which growth in credit can lead to boom-bust cycles in the real economy. The evidence shows that lending to households and non-tradable firms can create unsustainable demand booms that ultimately result in busts. (Benigno & Fornaro, 2014; Kalantzis, 2015; Müller & Verner, 2023; Reis, 2013; Schmitt-Grohé & Uribe, 2016; Schneider & Tornell, 2004). As a result, there is empirical evidence that the direction of credit flows –whether towards households, the private sector, or firms in tradable or non-tradable sectors– has important implications for assessing the impact of credit booms on future economic performance.

Since the global financial crisis of 2007-08, abundant evidence has emerged that household indebtedness played a key role in the 2000s boom and bust cycle in the US (Mian & Sufi, 2009, 2010). The cross-country panel data showed that household and mortgage indebtedness growth predicted the downturn in the business cycle and the financial crisis (Büyükkarabacak & Valev, 2009; Jordà et al., 2016; Mian et al., 2017). and the slow recovery after the crisis (Jordà et al., 2015, 2022). Beck et al. (2008) constructed a dataset that encompasses 45 developed and developing economies to differentiate between business credit and household credit. Their analysis reveals that while business credit positively influences future economic growth, household credit does not have a significant impact. Using a new dataset on sectoral credit exposures in financial and non-financial sectors across 115 economies between 1940 and 2014, Ivashina et al. (2024) found that corporate credit is as significant as, if not more significant than, household credit for the macroeconomy, due to its connection to systemic financial crises.

Based on data from 417 banks in 46 countries between 2000 and 2014, Andrieş et al. (2024) document a positive correlation between system-wide distress and lending to firms and households in the non-tradable sector. In contrast, there is a negative correlation between the systemic behavior of banks and the credit extended to firms and the tradable sector. Sub-sample analysis reveals that while non-tradable lending is conveyed through large banks, household lending risks are transmitted through small banks.

2.4.1 Household Credits

All forms of credit extended to households and individuals, such as personal loans, auto loans, student loans, credit card debt, and mortgages, are called household credit. Household credit is usually positively influenced by low

interest rates, rising incomes, economic expansion, and changing consumer risk aversion, which lead consumers to increase their demand for goods and services. The downside of household credit allocation becomes lethal for the economy when households borrow more than their income levels, which ultimately results in financial instability due to rising defaults on these loans. Although high levels of household consumption can stimulate economic growth in the short term through a rise in consumer spending, excessive leverage in households can become a burden in the long term as meeting debt obligations might be grueling, especially if interest rates increase or income levels fall.

The 2008 Global Financial Crisis is an unquestionable example, which was primarily caused by an excessive rise in household debt and the subsequent collapse of the US mortgage market. Homeowners went into default on their debt due to a steep drop in real estate asset values, and bank losses and an abrupt shutdown of the credit markets caused the global recession. Following a country-wide analysis, Mian and Sufi (2010) show that the main cause of the 2008 global financial crisis was the increase in household debt levels. They show that the allocation of household loans from 2002 to 2006 played a significant role in averting the 2008 financial crisis. By providing empirical support for the strong upward trend in household lending by banks, they show that when such a rapid increase in household lending occurs, it creates financial instability that may anticipate future banking crises. Likewise, according to Büyükkarabacak and Valev (2009), the main driver of the banking crisis, preceded by the rapid credit expansion of the sector, is household borrowing.

Investigating factors that have an impact on financial sector growth, Greenwood and Samuel (2013) demonstrate that mortgage debt rose significantly in the US between 1980 and 2007. Jordà et al. (2016) also document the striking upward-sloping mortgage credit in a sample of 17 advanced economies between 1870 and 2013 and the plateau in non- mortgage debt to firms. The breakdown

of banks' loan portfolios shows a sharp increase in credit-to-GDP ratios relative to the value of assets in most of the sample, mainly due to the high level of mortgage lending. They conclude that the high credit-to-GDP ratio resulting from the increase in mortgage lending is correlated with the risk of financial instability. They also point out that recessions tend to be more prolonged and negative when driven by mortgage debt rather than non-mortgage debt.

Similarly, studying household credit in 30 countries for the time between 1960 and 2012, Mian et al. (2017) demonstrate that rapid increases in household credit lead to a rise in consumption and imports, which eventually bolsters GDP. However, they state that the impact is only short-lived. In particular, three and four years after the household credit boom occurred, the elevated household debt-to-GDP ratio forecasts a slowdown in economic growth and an increase in unemployment levels in the following years. In contrast to the majority of the studies concerning credit booms, which state that credit-to-GDP has experienced a surge in all countries, Müller (2018) shows that the ratio had been stagnant in emerging economies while it is household credit which had undergone a strong buildup in all economies. He notes that the average percentage of household debt compared to all private credit has risen more than threefold between the 1950s and 2014.

Mamonov and Pestova (2023) investigate the drivers of business cycle shocks and find that boom-bust recessions associated with bank credit are solely linked to rapid increases in household debt, specifically if these booms in household credit are resulting from shocks to aggregate demand in advanced economies. Bahadir and Gumus (2016) examine the business dynamics supported by different credit types by discriminating between household and corporate credit in emerging economies. They find that household credit has a negative correlation with net exports and a strong positive comovement with output, consumption, investment, and real exchange rate appreciation. Conversely, there are less

strong associations between business credit and each of these factors. They also show that in comparison to business credit, household credit is more deeply intertwined with business cycles.

Finally, Müller and Verner (2023), using more extensive data spanning 140 years and 190 countries, show that credit growth in relation to GDP has increased significantly over the past 50 years. While private credit, or credit to businesses, has been steadily increasing since the 1980s, household lending is a major contributor to the notable increase in total lending.

2.4.2 Business Credits

Debt instruments such as bank loans, corporate bonds, trade credit, and other types of credit lent to firms and businesses to fund operational costs, expand production capacity, finance investments and employment, and handle shocks or downturns by financial institutions are called business or corporate credit. Although the measure of private credit includes lending to households and lending to firms, in this thesis, we use the term "private credit" to measure only lending to the corporations.

Since the ultimate goal of business credit is to finance enterprises and firms to invest in projects that promote productivity, expand in size, and support innovation and development in the industry, it plays a crucial role in economic activity. Nevertheless, the relationship between corporate credit and business cycles is intricate —while both the cost and availability of corporate credit fluctuate depending on business cycles, this very instability in credit supply revolves back to intensify the cycles themselves. For instance, in economic expansion periods, credit availability increases, and firms borrow more. While it is believed to enhance economic growth in the subsequent years because of expansion in investment opportunities, excessive credit accumulation in certain sectors can create asset price bubbles. In contrast, during economic slowdown

periods, credit conditions are usually tightened, and rapid credit contraction might result in liquidity shocks. Liquidity shocks might escalate into a larger financial instability when enterprises struggle to meet the overburdened debt obligations, which triggers stalls in capital allocation and investment, leading to downturns in overall economic activity. Building on this conceptual foundation, a substantial body of literature has emerged to explore both empirically and theoretically this link between corporate credit and macroeconomic cycles. Yet, the findings remain mixed, reflecting variation across countries, sectors, and credit structures with context-dependent relationships.

Examining the drivers of credit expansions that end in a bust in the context of Latin America, Gourinchas et al. (2001) argue that credit booms can be ordinary repercussions of financial development and volatility. Yet, they find that credit expansions are correlated with both booms in domestic investment and a downward trend in output growth. Likewise, Schneider and Tornell (2004) present theoretical support in explaining the relationship between credit booms and financial crises in middle-income countries. They state that rapid credit growth in the private sector is associated with financial crisis risks in these countries through misallocation of credit and bailout guarantees.

In their seminal paper, focusing on 14 advanced economies since 1870, Jordà et al. (2013) show that financial crises are outcomes of credit expansions that end in bust. In particular, they find that growth slowdowns in the economy, decreases in investment, and the probability of subsequent financial crises are highly associated with credit expansion in the private sector. Jordà et al. (2016) consider a long-run disaggregated dataset on mortgage credit and non-mortgage credit allocated by banks in 17 advanced economies, and show that while non-mortgage debt played a stronger role in the triggering of financial crises in the period before World War II, mortgage credit became a more statistically significant predictor for the crises. In the same vein, conducting a regional-level

study in the US, Giroud and Mueller (2018) investigate the effect of increasing firm leverage on economic growth through employment levels. They find that elevated firm leverage is positively correlated with economic growth in the short term but negatively in the long run, concluding that firm credit precipitates a boom-bust cycle in the economy. In addition, by focusing on 24 European countries, Sever (2023) explores the association between firm credit and real outcomes and shows that an increase in firm credit is correlated with employment growth in the short run; however, in the medium term, the correlation becomes negative, generating a boom-bust cycle. Moreover, he obtains similar results considering the relationship between firm credit and growth in investment. On the contrary, Mamonov and Pestova (2023) show that while corporate credit does not generate boom-bust cycles, it causes a sudden increase in the risk of economic downturn resulting from banks' exogenous credit expansions.

Finally, analyzing data covering sectoral credit from financial and non-financial sectors in 115 countries between 1940 and 2014, Ivashina et al. (2024) provide empirical evidence that before the financial crises, corporate credit comprised approximately two-thirds of the overall credit allocation in the economy, and during economic slowdown periods, it makes up about three-quarters of the nonperforming loans. They highlight the fact that, similar to household debt, a surge in corporate credit also has the predictive power for the financial crisis, and that amelioration in the economy, followed by the financial crisis, is much lagging when the credit expansion occurred in the corporate sector.

2.4.3 Tradable and Non-Tradable Sector Credits

The pivotal consequences of credit growth on business cycles have long been presented in the literature. Although a majority of the research had been focused on aggregate private credit without discrimination of households or corporations, in recent years, it became clear that different components of private credit,

especially corporate credit, are of crucial importance in explaining the nature, reasons, and depth of output fluctuations resulting from credit allocation. If the excessive concentration of lending activity is heavily skewed toward particular sectors, disruptions or slowdowns in those sectors can trigger large-scale losses and financial crises. Hence, the separation of corporate credit into tradable sector credit and non-tradable sector credit has become significantly important and relevant.

The tradable sector refers to industries whose products, goods, and services are either exported or directly compete with imports, such as manufacturing and agriculture, while the non-tradable sector consists of those driven by local demand and consumption with restricted exposure to international trade (e.g., construction, real estate, and retail services). As a result, credit allocation to the tradable sector is expected to lead to enhanced productivity, growth in the export of goods, and an increase in the trade balance. On the other hand, given their comparably low activities in global markets, non-tradable sector firms might not produce sufficient profitability to maintain long-term increases in credit. Credit concentrated in the non-tradable sectors is frequently linked to asset price bubbles, business cycle volatility, a surge in non-performing loans, and even the risk of financial crises with prolonged recoveries, as the literature has demonstrated.

Tornell and Westermann (2002) conducted a study on middle-income countries and show that countries that have implemented the liberalization of their financial markets have recorded a notable increase in credit supply. Although these credit expansions tend to decrease over time, there are cases where these booms are followed by currency and banking crises, a sudden credit contraction, and eventually recession. Moreover, they find that there is a real exchange rate appreciation during credit expansion periods and N-sectors, which they refer to as non-tradable, experience a more rapid growth than the tradable sector.

According to their conclusions, this interaction between credit booms and macro variables is attributed to the link between the two financing patterns in the middle-income countries: risky currency mismatch and misallocation of sources between the tradable and non-tradable sectors.

Schneider and Tornell (2004) theoretical examine the boom-bust cycles argued by Tornell and Westermann (2002). In their model, the tradable sector has no credit constraints because its expansion is linked to investment opportunities, and it has other external sources for finance. However, they argue that the non-tradable sector is characterized by financial constraints and faces enforcement problems. During credit booms, even though the non-tradable sector receives the majority of the guaranteed credit and leads to growth in the economy, this growth is not sustainable, and the non-tradable sector suffers a more severe downturn during the financial crisis and prolongs the recovery. They show that the non-tradable sector is more fragile when it comes to credit shocks because of its heavy dependence on credit and domestic factors. They also show that the non-tradable sector aggravates the depth of financial crises because it heightens the impact of financial deepening and institutional weaknesses.

Bahadir and Gumus (2016) find that while household credit shows a significant correlation with business cycles through its positive association with output, consumption, and investment, corporate credit does not show any strong co-movement. Therefore, by decomposing business credit into two components, tradable and non-tradable credit, they disentangle the dynamic relationship between these types of credit and business cycles. Using a small open economy model with two credit-constrained sectors, tradable and non-tradable,Bahadir and Gumus (2016) adjust their model for productivity shocks in both sectors, interest rates, and credit shocks. They show that while credit booms in the tradable sector lead to real appreciation, an increase in the allocation of credit to the non-tradable sector leads to real depreciation because excessive credit

accumulation in this sector leads to an increase in output. Moreover, they find that credit booms in the household and non-tradable sectors cause contractions in the tradable sector and generate imbalances in sectoral output.

Müller and Verner (2023) find three striking results regarding sectoral credit allocation and its impact on macroeconomic outcomes. First, they show that credit booms concentrated in the non-tradable sector are correlated with a higher risk of subsequent banking crises, while credit expansions in the tradable sector show only moderate evidence of such a prediction. Growth slowdowns, defined as a significant deviation from the previous growth pattern, then emerge from the occurrence of banking crises. Second, they find that banking crises are adversely associated with credit growth in the non-tradable sector. Using the dataset of disaggregated non-performing loans (NPLs) following ten major systemic banking crises in the sample, they show that NPLs peak in the aftermath of banking crises and that the share of NPLs accumulated in the non-tradable sector is about 1.5 times that of the tradable sector, which is seen as a consequence of excessive credit flowing to the non-tradable sector during booms. In addition, their results indicate that a much smaller share of credit defaults is concentrated in the tradable sector and households. Third, they present empirical evidence that sectoral inequality increases during credit booms due to credit accumulation in the non-tradable sector and the shift of labor and value added to the non-tradable sector. Consistent with the findings of Reis (2013), Benigno and Fornaro (2014), and Kalantzis (2015), Müller and Verner (2023) conclude that credit expansions in the non-tradable sector tend to precede a decline in future productivity, while credit booms in the tradable sector coincide with rising productivity growth.

Andrieş et al. (2024) have examined the relationship between sectoral credit allocation, household and corporate credit, and bank-level systemic risk using the dataset of 417 banks from 46 countries between 2000 and 2014. They show

that bank-level systemic risk is positively correlated with household credit and corporate credit to the non-tradable sector, while it is negatively associated with credit to the tradable sector. Interestingly, they conclude that in emerging and developing economies, banks are more resilient to increases in household credit and credit to the tradable sector, while in advanced economies, credit to the non-tradable sector leads to an increase in systemic bank fragility.

2.4.3.1 Drivers of the non-tradable sector to increase borrowing during credit booms and experience sharper downturns aftermath

There are significant functional and structural differences between the non-tradable sector firms and the tradable firms, which might pose the underlying factors for the firm leverage buildup of the non-tradable sector. The most important discrimination lies in market orientation: while tradable firms compete in international markets, causing them to undergo high productivity pressures, non-tradable firms serve only domestically. Global market exposure leads the tradable sector to foster economic growth through exports, innovation, and sustainable productivity in the long term. On the contrary, the non-tradable sector bolsters output growth only in the short term through employment and consumption, in particular during credit booms. Empirical evidence validates the differentiation: tradable credit booms are associated with long- term growth, whereas credit expansions toward the non-tradable sector result in output growth fluctuations. Non-tradable firms tend to be less productive. When credit is misallocated to this sector, it can divert resources away from more efficient firms, increasing the risk of loan defaults (Benigno & Fornaro, 2014; Bleck & Liu, 2017; Reis, 2013). This misallocation may lead to banking crises, a contraction in credit supply, and slowdowns in output growth. According to Müller and Verner (2023), they are indeed small, decidedly bank-dependent, more opaque,

and have restricted access to external finance, unlike the tradable sector. This aligns with the findings of Gertler and Gilchrist (1994), who show that small firms–often referring to the non-tradable sector–are more financially constrained than large firms.

Due to a lack of external funding opportunities, a high level of dependence on credit markets, and collateral constraints, the non-tradable sector is at the advantage of credit booms excessively. As credit supply becomes abundant, domestic demand for both tradable and non-tradable goods increases, and collateral values drive up, especially in non- tradable sectors like real estate and construction. Eventually, this reinforces the credit cycle. Because the non-tradable sector relies on domestic consumption, increasing capital accumulation is reflected in growth in output and employment, at least in the short term. This short-term economic expansion can also fuel credit allocation to the non-tradable sector (Ozhan, 2020). However, when the credit supply is tightened, domestic demand and value of firm collateral decrease. Then, the non-tradable firms are placed under heavier financial constraints, and without exposure to international capital markets, these firms become more sensitive to fluctuations in credit availability and macro-financial instability, which can cause adverse financial crises eventually.

Providing empirical evidence from middle-income countries, Tornell and Westermann (2005) show that because the non-tradable sector has limited access to international capital markets, they have strict financial frictions. Thus, a high level of credit supply might encourage non-tradable firms to borrow more, increasing their default risk and financial distress for the banks. In the presence of systemic bailout guarantees, Tornell and Westermann (2005) demonstrate that excessive credit allocation to the non-tradable sector is likely to result in a stall in economic growth. Similarly, Varela (2017) shows that the non-tradable sector faces more financial frictions because of its dependence on the domestic credit

market, and this might make up for large- scale downturns in the non-tradable sector.

Müller and Verner (2023) show that excessive credit allocation towards the non-tradable sector is significantly correlated with a rise in real estate prices and subsequent slowdowns in economic growth. In their seminal research, Kiyotaki and Moore (1997) explain this scheme as follows. The non-tradable sector borrows significantly more during episodes with loosened credit conditions because, in normal times, they use real estate collateral to secure their debt. However, this surge in credit towards the non-tradable sector causes the firms in this sector to struggle with tightening borrowing constraints and face an increased risk of fire sales during a bust. Similarly, Kannan (2010) demonstrates a more significant variation in growth across industries that are more financially constrained industries, such as those characterized by small firm size, limited tangible assets, or produce goods with restricted tradability, and concludes that sectors that are external finance dependent recover slower in the aftermath of a crisis. In summary, dependence on domestic demand, consumption, and production, strict collateral constraints, and heavy reliance on credit markets explicate the overall reasons for which the non-tradable sector levers excessively during credit booms. Furthermore, these exact factors are the reason for the increased risk of financial crises due to the high level of corporate lending to the non-tradable sector.

2.5 State-Owned Banks and Credit Allocation

The role of the banking system in an economy is crucial, mainly because it is a channel for the transmission of monetary policy to the economy. However, the lending practices and characteristics of various banks, including state-owned banks, private banks, and foreign banks, differ significantly depending on their objectives as financial institutions, including risk management, political affilia-

tions, and target industries for lending. Private and foreign banks are merely financial organizations that put profit maximization first, whereas state-owned banks may put profitability aside in order to finance firms or regions that are aligned with the incumbent political party. Unlike private or foreign banks, state-owned banks may have as their main lending objective the promotion of economic development, the lending to strategic sectors that the government favors, or the support of small enterprises that may be too risky to lend to because of collateral constraints (Behr et al., 2013).

Private and/or foreign banks are reluctant to lend to sectors based on political affiliations (Khwaja & Mian, 2005) and instead target the financially strong and more profitable sectors (Demirguc-Kunt & Huizinga, 1999; Micco et al., 2007). In particular, both private and foreign banks avoid lending to politically sensitive or volatile sectors (Detragiache et al., 2008) unless subsidized or guaranteed. Similarly, state banks might fuel credit supply during elections to boost economic activity or stabilize it by lending to firms or projects that align with the government and attend to the requirements of electoral incentives (Baum et al., 2010; Dinc, 2005; Fungáčová et al., 2023; Marcelin et al., 2024).

In addition, unlike private and/or foreign banks, state-owned banks are willing to allocate credit without strict collateral requirements. State-owned banks have a higher tolerance for default risk because they are often backed by the government, especially if the allocated credit attains political or social purposes. Moreover, due to strong political relations with governments and funding for households, energy, and exports, state banks have more dominance across regions than private/foreign banks, allowing them to have a strong presence in rural or less developed areas. This is mainly because these banks act as a tool through which the economy is stimulated in less financially active regions. Thus, state-owned banks supply credit for the agriculture sector, infrastructure activities, the construction sector, and small firms. On the contrary, private banks do

not have an economy-boosting orientation while lending and prefer to remain in more financially healthy markets. Moreover, state banks and private/foreign banks differ in their interest rate policies. State banks often have low to medium interest rates and lower profitability, and larger non-performing loans compared to private/foreign banks (Farazi et al., 2013), which indicates their flexible and cheaper lending, and why it favors strategic firms, boosting investment with long-term loan supply. Private banks, being competitively profit-driven, keep interest rates at a moderate level, medium to high, and tend to supply the short-medium term loans. Foreign banks, being more risk-averse, have the highest cost for borrowers (Demirguc-Kunt & Huizinga, 1999; Micco et al., 2007). Furthermore, they usually lend for the short term and require collateral (Beck et al., 2017), and lend to international and large companies (Detragiache et al., 2008).

Another distinction between state-owned banks and other types of banks occurs in lending behavior during business cycles. During economic downturn periods, state-owned banks are likely to increase lending in order to stabilize volatility or increase economic activity through job creation or boosting domestic demand (Bertay et al., 2014). This might help decrease the high volatility in politically sensitive industries during slowdown episodes. However, neither private banks nor foreign banks have the purpose of economic stimulation. Thus, often both private and foreign banks contract lending during times when economic volatility is high, because of elevated riskiness in credit allocation. Since state-owned banks are often allowed to receive bailout guarantees by the government, they are usually argued to take on more risk and surge in lending during economic expansion episodes. Hence, state-owned banks lend to high-risk borrowers as well. In contrast, private banks and foreign banks are obliged to manage their risk without the intervention of the government and thus, lend according to strict credit assessments and avoid lending to risky borrowers.

Yet, the empirical evidence presents the relationship between different bank structures and their role in the economy. To illustrate, Galindo and Micco (2004) examine whether government-owned banks play a role in the development of economic growth in the context of the manufacturing sector. They show that state-owned banks do not influence the development of bank-dependent manufacturing sectors or the ones that have strict collateral constraints. Instead, they indicate that it is the private banks that promote the growth rates of such industries significantly.

Supporting theories related political affiliation of firms, in their seminal study, Porta et al. (2002) show that a large portion of the banking system is dominated by the government in countries with low income levels and an underdeveloped financial system. Moreover, as government ownership in the banking sector increases, subsequent financial development, productivity, and GDP growth suffer. Körner and Schnabel (2010) confirm this relationship with the condition that poor financial development and low institutional quality exist. They conclude that the negative association dissipates in the countries where financial and political systems are well- developed. Upon considering the effect of state-owned banks on firm decisions, Carvalho (2013) studies Brazilian data and finds that firm-level decisions are affected by political authorities, especially by government banks. He concludes that during elections, some firms borrow more from state-owned banks but experience a decline in subsequent employment growth rates. Hence, the government has a prominent influence on employment levels in politically associated regions through state banks. Similarly, Bertay et al. (2014) find that state-owned banks lend less pro-cyclically than private banks. Moreover, in countries with high income levels, state banks even lend counter cyclically. They conclude that there is evident support for the role of state banks in business cycles, such as stabilizing credit supply during episodes of financial instability. Finally, Coleman and Feler (2015) investigate the role of government-owned banks in lending during the global financial crisis in Brazil. They find two

things: first, government banks lent counter-cyclically, substantially increased lending, and boosted the economy through creating job opportunities during the crisis, especially in the regions with a high share of state banks. Second, they show that the rise in state-owned bank lending was politically motivated and misallocated towards less productive firms, which eventually reduced the growth rate of productivity in the following periods.

The disparities among state-owned banks and private/foreign banks are particularly more pronounced in Turkey. State-owned banks dominate a vast majority of the banking system in Turkey, almost 50%, which makes the whole banking sector even more inclined to respond to government policies. For instance, during economic downturns, state banks often increase credit supply in order to sustain public investment and prevent certain sectors from being affected by instability in the economy. In contrast, private and foreign banks do not exhibit such cyclical lending behavior. Therefore, the role of state-owned banks in the Turkish economy is prominent as they serve as tools through which government policies, such as fiscal and monetary objectives, are implemented in the economy. They become a transmission channel of policies for fostering growth in politically and economically strategic sectors.

The empirical evidence also supports the crucial role of state-owned banks in Turkey's economic activity. For instance, Bircan and Saka (2021) study the consequences of political impact on banks and economic outcomes in Turkey, focusing only on corporate loans rather than consumer loans, particularly during elections. Two of their findings based on the province-fixed effect specifications are striking. First, the state-owned banks, compared to private banks, lend strategically during local elections: in provinces where the incumbent mayor shares institutional alignment with central authorities, credit supply during local elections increases, while the reverse holds for the provinces when the sitting mayor has an opposite standing with the government. Hence, Bircan and Saka

(2021) conclude that political lending cycles exist in Turkey. Second, providing evidence for the effect of state-owned banks on business cycles, they show that corporate lending decreased substantially in the opposition provinces while there is a rise in the aligned provinces, and the results are even more sound for the sectors that heavily rely on state-bank lending.

In a similar vein, Önder and Özyildirim (2009) show that there is a correlation between credit allocated by state banks and high growth rates in well-developed provinces in Turkey. Furthermore, Önder and Özyildirim (2009) find that around crisis and election events, state-owned banks increase their market share compared to the periods where there is neither crisis nor election. They conclude that although state banks' lending behavior is politically influenced during election times, it also lessens the adverse results of economic shocks, especially in developed provinces.

State-owned banks can serve as a mechanism for providing political patronage to the government in power (Sapienza, 2002). Through this channel, they play a crucial role in economic activity and affect macroeconomic outcomes. Whether growth-enhancing or growth-dampening, state-owned banks influence economic activity via their lending behavior, motivated by political affiliation or government- driven policy objectives. In this respect, these banks could provide loans to less productive sectors with limited export value and greater political instability, such as non-tradable sectors (see e.g. Ugurlu (2023)). Rather than the productive tradable sector, the non-tradable sector is in more need of external finance, mainly because of dependence on domestic demand, struggles with collateral constraints, export limits, and restricted investment opportunities. Under such circumstances, profit-oriented private banks and trust-based foreign banks might find the non-tradable sector firms insufficient to allocate credit. On the other hand, state-owned banks might be encouraged by governments to lend to this sector because the non-tradable sector boosts output growth

in the short term, and this helps sustain economic growth, even though the growth is short-lived. Hence, the non-tradable sector in Turkey, in particular construction and real estate, has the strongest ties with the government via state banks through government-backed investment projects and development strategies for poor provinces.

In the thesis, I also examine whether the intense credit allocation towards the non-tradable sector might be fueled by the state-owned banks and might disclose a muted effect of state-owned banks in the increase financial instability resulted from the non-tradable credit booms. More specifically, we consider the relationship between provincial GDP growth and sectoral credit allocation in Turkey, with the credit data coming only from state-owned banks, in order to unveil any muffled role that can be played by state-owned banks in the financial instability caused by the credit allocation. While we expect the non-tradable credit flows to influence GDP growth negatively in the long term compared to the tradable credit, credit supply to the non-tradable sector might be fueled by the state-owned bank due to policy-driven objectives.

CHAPTER 3

TESTABLE HYPOTHESES

This thesis expands upon the theoretical and empirical literature regarding the significance of credit distribution at the sectoral level for evaluating its influence on economic growth, and it investigates the relationship between sectoral credit allocation and GDP growth at the provincial level. In particular, we analyze the potential adverse effects of credit allocation directed towards the non-tradable sector on long-term GDP growth.

As discussed in the previous section, the evidence show that due to their high dependence on domestic demand, credit expansions in the non-tradable sectors such as construction and real estate, or retail services, have the power to stimulate the economy in the short term. However, this GDP growth-enhancing effect of non-tradable credit booms is unsustainable in the long run, as it leads to a misallocation of resources to less productive sectors and creates instability in the economy. In contrast, tradable sectors such as manufacturing, agriculture and mining, driven by export-led growth, are said to contribute to economic growth in the long run.

Accordingly, we formulate the following hypotheses:

Hypothesis 1: *Credit allocation to the non-tradable sector has no significant effect on GDP growth.*

Hypothesis 2: *Credit allocation to the tradable sector has no significant effect on GDP growth.*

Using local projection method with a five year horizon, both of the hypotheses will be tested over the short-, medium- and long-term in order to assess the dynamic relationship between sectoral credit allocation and provincial GDP growth. The alternative hypothesis for the effect of the non-tradable credit on GDP growth posits that credit allocation to the non-tradable sector boosts provincial GDP growth in the short term, but dampens the economic growth in the long-term. On the other hand, the alternative hypothesis concerning the tradable credit allocation predicate the reverse, stating that tradable credit boosts provincial GDP growth in the long run.

I also explore whether the non-tradable credit allocation is driven by policy-led objectives, with an aim to reveal the potential role government-owned banks play in slowdown in the provincial GDP growth. Thus, I develop the following hypotheses to study the role of state-owned banks in sectoral credit allocation.

Hypothesis 3: *State-owned bank lending to the non-tradable sector has no significant effect on GDP growth.*

Hypothesis 4: *State-owned bank lending to the tradable sector has no significant effect on GDP growth.*

The alternative hypotheses state that the credit directed toward the non-tradable sector from state banks tend to promote economic growth in the short-term but not in the long-term, while state bank credit flow to tradable sector boosts provincial GDP growth in the long-term.

To study the relationship between different firm credits and economic growth in a richer model, I extend the empirical analysis with the inclusion of control variables such as firm births per capita of each province and three year average of loans-to-GDP ratio. These factors are anticipated to have an impact on the economic performance at the sectoral level. Additionally, I examine the effects of credit allocation to tradable and non-tradable sectors on output growth using only non-tradable GDP growth as an alternative dependent variable to further validate the robustness of the findings.

CHAPTER 4

DATA AND VARIABLES

4.1 Data

This section we describe the dataset, variable construction, and data sources that are used in the empirical analysis. The panel dataset consists of province-level observations and is a combination of several data sources to examine the relationship between sectoral credit allocation and provincial GDP growth from 2007 to 2023. The data for gross domestic product by provinces in chain-linked by kind of economic activity (A10) for 2004 to 2023 and gross domestic product by provinces by kind of economic activity (A10), at current prices for 2004 to 2023 are obtained from the Turkish Statistical Institute (TurkStat), which is available for a total of 11 sectors. Provincial sectoral credit data is accessible for 10 sectors, including non-performing loans of these sectors.

Provincial household credit data includes mortgage loans, auto loans, and other forms of consumer credit. This data, covering the years from 2007 to 2023, is provided by the Banking Regulation and Supervision Agency (Fintürk). Additionally, population statistics for the provinces from 2000 to 2024 can be found on the Turkish Statistical Institute (TurkStat) website. Information

regarding firm births across various sectors is available through the Turkish Union of Chambers and Commodity Exchanges.

4.2 Variable Construction: Credit Variables and Control Variables

Following Müller (2018), we group credit allocated to 10 different sectors at the provincial level: food, beverages, and tobacco; construction; metal and mining; financial institutions; textiles and textile products; wholesale trade and brokerage; tourism; agriculture and fisheries; energy; and shipping. We further categorized these sectors as follows: construction, wholesale trade and brokerage, energy, and shipping as “non-tradable sectors," and food, beverages and tobacco, metal and mining, financial institutions, textiles and textile products, tourism, and agriculture and fishing as “tradable sectors".

The distinction between tradable and non-tradable sectors is difficult to establish. There are several approaches to classify different sectors as “tradable" and “non-tradable". One of the main approaches, widely used in empirical cross-country analysis in Europe, is the traditional (Ameco) approach. According to the traditional (Ameco) approach, the distinction between the two sectors are as follows:

- Tradable Sector: Agriculture, forestry and fishing, manufacturing, mining and quarrying, information and communication, finance and insurance
- Non-Tradable Sector: Construction and real estate, public administration, health, education, retail trade, accommodation and food services, and other personal services

Often used as a benchmark method in policy-related studies, the advantage of the traditional approach is that it does not require data on sectoral exports or trade. Another well-known categorization of sectors is based on the International

Standard Industrial Classification of All Economic Activities (ISIC), Revision 4 (United Nations, 2008), which serves as the global standard in defining and classifying industries in a replicable way. Most of the studies that have been conducted throughout the years concerning tradable and non-tradable sectors use the concept of the so-called "openness ratio." The openness ratio simply refers to the proportion of total trade, overall exports plus imports at the sectoral level, to the total production. It mainly measures the exposure of a certain sector to international trade. While "tradable" sectors are the ones with a high openness ratio, meaning that the goods and products of these sectors are frequently traded internationally, "non-tradable" sectors usually have a lower openness ratio. The fundamental reason for this discrimination among tradable and non-tradable sectors in the context of credit allocation follows from the differential effects of credit in these sectors. Since tradable sector firms are expected to channel credit into investments and projects that are productivity-oriented, the non-tradable sector might result in asset price bubbles, especially through the construction and real estate sectors, and cause financial instability.

In the thesis, we follow a grouping approach similar to that of Piton (2016), where a sector is categorized to be a tradable sector provided that its openness ratio is greater than 10%, on average for the total area (24 countries) and over 1995-2014. Thus tradable and non-tradable sectors are:

- Tradable Sector: Agriculture and Fishing, Food, Beverages and Tobacco, Metal and Mining, Financial Institutions, Textiles and Textile Products, and Tourism
- Non-Tradable Sector: Construction, Wholesale Trade and Brokerage, Energy, and Shipping

In our empirical analysis, we utilize both provincial gross domestic product (GDP) in chain-linked (real GDP) terms by type of economic activity, as well as

provincial GDP (nominal GDP) by type of economic activity at current prices for the years 2004 and 2023. By using nominal GDP, we calculate the changes in the credit-to-GDP ratio for tradable and non-tradable sectors, as well as for households, over a three-year period. Baron and Xiong (2017) explain that the level of credit shows long-term movements related to regulatory factors or structural changes, while the change in credit draws attention to the cyclicality of credit and symbolizes the net new credit to the allocated sector. They mention that considering the change in bank credit helps to separate regulatory movements and distill credit to the essence of cyclical trends related to credit expansions and contractions.

In line with Baron and Xiong (2017), Mian et al. (2017), and Greenwood et al. (2022), I also selected the change in credit-to-GDP over the past three years. Theoretically, credit expansion episodes and their influence on macroeconomic outcomes often unravel over multiple years. While the one-year change in credit allocation might not capture the rise in credit and result in a bias in the analysis, the three-year change enables the assessment of the short-term volatility in credit while still maintaining the sensitivity to dynamic relationships for macro-financial factors. It is often considered not too long, which might mitigate the impact of sudden changes in credit, and not too short, which can cause missing a trend.

In the empirical literature, the three-year framework has been shown to be more successful than the one-year and five-year frameworks in predicting financial crises and output slowdowns. Among several studies using the three-year change framework, it is worth to note that Schularick and Taylor (2012) demonstrate its effectiveness in predicting financial crises preceded by private credit expansions. Moreover, Jordà et al. (2015) used to examine how household credit expansions affect recessions and recoveries, Mian et al. (2017) examined the impact of household debt booms on growth slowdowns, Baron and Xiong

Table 1: Descriptive Statistics

Panel A: Summary Statistics

	Obs.	Mean	Median	Std. Dev.	Min	Max
Δ_3 GDP	1,134	0.138	0.138	0.081	-0.179	0.501
Δ_3 Non-tradable	1,134	0.022	0.024	0.112	-0.906	0.811
Δ_3 Tradable	1,134	0.035	0.030	0.122	-1.058	1.039
Δ_3 Household	1,134	0.006	0.022	0.125	-0.471	0.276
Loans-to-GDP	1,134	0.509	0.423	0.344	0.055	2.561
Firm Entry-to-Population	1,134	0.0005	0.0004	0.00038	0.00005	0.0036

Panel B: Correlation matrix for credit expansion variables

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Δ_3 GDP	1.0000					
(2) Δ_3 Non-tradable	0.0900	1.0000				
(3) Δ_3 Tradable	-0.0419	0.3860	1.0000			
(4) Δ_3 Household	-0.0223	0.4074	0.5121	1.0000		
(5) Loans-to-GDP	0.0041	0.2321	0.2297	-0.0864	1.0000	
(6) Firm Entry-to-Population	0.1076	-0.1579	-0.2300	-0.3842	0.4630	1.0000

Notes: Panel A shows summary statistics for the main estimation sample. Panel B plots Pearson correlation coefficients for variables used in the analysis.

(2017) showed that excessive credit allocation reflects excessive optimism; and Giroud and Mueller (2021) incorporated the three-year change approach to explain the decline in employment growth that precedes increases in corporate leverage. Baron and Xiong (2017) anchored the historical three-year change framework on the fact that the most powerful and efficient predictive potential is to follow equity returns at the second and third lags of the one-year change in bank credit relative to GDP. Therefore, following the theoretical and empirical evidence, I also construct my empirical model using a three-year change in credit allocated to tradable, non-tradable, and household.

The firm birth or new firm entry data is particularly interesting to account for controlling increases or declines in business credit and its effect on GDP growth. Firm entry data is combined as the number of newly registered firms comparable to the existing number of firms. The inclusion of firm entry data as a control variable is important because it can reflect the dynamics of business creation and entrepreneurial bustle while serving as a proxy for the market supply and ease of

starting a new business. Using firm entry/exit data and calibrating the credit and productivity shocks to the Great Recession, Ayres and Raveendranathan (2021) show that credit shocks have a larger influence on firm entry and exit levels than productivity shocks. They find that credit shocks, also defined as shocks to collateral constraints, are associated with declines in firm entry levels and increases in exits, where the majority of exits of firms cluster around young firms because borrowing constraints deepen and capital accumulation slows down. In a similar vein, during credit expansion episodes, since access to capital becomes easier, the number of a new firm that enters the economy is expected to increase, and when there is a contraction in credit supply, this can result in stagnation in firm entry levels and production, affecting the overall economy. Therefore, we add a provincial new firm entry variable normalized by provincial population to our empirical model to capture the impact of provincial entrepreneurial human capital on provincial growth. Table 1 presents summary statistics for the main variables used in the analysis, offering an overview of their distributions across regions/sectors/years.

CHAPTER 5

EMPIRICAL ANALYSIS

5.1 Research Design

In this thesis, we investigate the dynamic relationship between sectoral credit allocation and provincial GDP growth by adopting the local projection method (LP) introduced by Jordà (2005). LP is particularly well suited for estimating impulse response functions without strict structural model and data requirements, making it a robust alternative to vector autoregressive model. LP simply measures how changes in the explanatory variables affect the future values of the dependent variable, controlling for past values of the outcome variables and fixed effects. Rather than imposing a rigid structure, local projections estimate a separate regression for each forecast horizon h.

We estimate the following specification for projection horizons h = 0,1, . . . , 5, which results in six linear regressions exploring this correlation both in the short, medium and long term:

$$\Delta_3 y_{it+3+h} = \alpha_i + \sum_{k}^{K} \beta_h^k \Delta_3 d_{it}^k + u_{it}^h, \quad h = 0, 1, ..., 5 \tag{1}$$

where $\Delta_3 y_{it+3+h}$ is real GDP growth from year t to $t + h$, α_i is a province fixed

effect, and $\Delta_3 d_{it}^k$ is the change in the credit-to-GDP ratio for sector $k \in$ {Tradable, Non-tradable, Household} from $t-3$ to t. We use three-year sliding windows specification (Giroud & Mueller, 2021; Mian et al., 2017; Sever, 2023) for dependent and independent variables as explained before. We also account for lags of the explanatory variables, which is a standard framework in the local projection method. In the local projection setting, we hold the right-hand-side variable constant as the three-year change in household debt, tradable debt, or non-tradable debt–from three years prior to the current year–while allowing the dependent variable, three-year GDP growth, to vary across different future horizons, starting from the contemporaneous period and extending further forward. Thus, our baseline equation becomes the following:

$$\Delta_3 y_{it+3+h} = \alpha_i + \sum_{k}^{K} \beta_h^k \Delta_3 d_{it}^k + \gamma_h \Delta y_{it+3+h-1} + X_{it} + u_{it}^h, \qquad h = 0, 1, \ldots, 5 \quad (2)$$

where $\Delta_3 y_{it+3+h}$ is real GDP growth from year t to $t+h$, α_i is a province fixed effect, and d_{it}^k is the three year change in the credit-to-GDP ratio for sector $k \in$ {Tradable, Non-tradable, Household} from $t-3$ to t. Although our main focus is on tradable and non-tradable sectors, we also examine the relationship by adding to the right-hand variable of the three year change in household credit (in percentage of GDP) from $t-3$ to t. We are therefore examining whether the dynamic relationship between the allocation of credit to the tradable and non-tradable sectors and provincial GDP growth persists if the dynamic is also accounted for by household credit. $\Delta y_{it+3+h-1}$ is the lagged dependent variable, specifically the GDP growth from year t to year $t+h-1$ (one year prior to the current horizon's GDP growth). We also add two control variables (X_{it}), namely new firm entry per capita in province i at t and a 3-year average of loans-to-GDP. The standard errors are adjusted to account for heteroskedasticity.

In equations (1) and (2), β_h^k captures the relationship between GDP growth

from $t-3$ to t and sectoral credit allocation from $t-3$ to t in the short term ($h=0$). As h becomes larger, the model examines whether the change in credit distribution to different sectors can predict future GDP growth over the medium and long-run. For example, when $h=4$, β_4^k measures the relationship between the three change in the credit allocation to tradable, non-tradable or household from $t-3$ to t and the medium-term growth of GDP from $t+1$ to $t+4$. A positive β_h^k coefficient indicates that there is a positive correlation between sectoral credit allocation and GDP growth, while a negative coefficient indicates that the correlation is negative and that the decline in credit allocation is negatively correlated with future output growth.

We added province-fixed effects to isolate certain time-invariant traits of provinces on GDP growth. Moreover, we add a time trend variable to capture systematic, gradual or long-term changes over time which cannot be captured by other provincial-level variables. There are several advantages in including a time trend variable in the analysis. It is particularly interesting to consider the trend over time as the provinces of Turkey have developed in terms of their financial deepening, absorption and economic structures. The cyclical impact of credit expansions and contractions on GDP growth can be isolated, and the short-, medium- and long-term dynamics in the relationship between credit allocation and GDP growth can be clarified. Moreover, in the case of direct proportionality between credit and GDP growth, which often does not hold but remains a problem, the addition of a trend variable would reduce the spurious relationship.

Finally, we analyze the baseline specification with fixed effects, considering credit provided by state-owned banks. Many governments have historically directed credit to priority sectors, particularly manufacturing, as part of a broader industrial policy agenda. Dai et al. (2025) highlight the role of government policies in influencing sectoral credit allocation. They investigate how changes

in these policies lead to the reallocation of sectoral credits. By utilizing both primary and secondary sources, they identify 37 instances of liberalization that act as triggers for credit booms. Their findings reveal that discontinuing directed credit policies results in a shift of credit from manufacturing towards real estate. I propose that government policies, as proxied by credits from state-owned banks, may influence provincial growth. Therefore, our emphasis is on both trade and non-trade credits provided by state-owned banks at the provincial level.

5.2 Results

The empirical relationship between sectoral credit allocation and subsequent GDP growth at the provincial level is illustrated in Table 2. This analysis employs the local projection method developed by Jordà (2005) and examines the relationship across various time horizons, ranging from the current period ($h = 0$) up to five years ahead ($h = 5$).

The results reveal a distinct pattern in the effects of credit on tradable sectors compared to non-tradable sectors. At $h = 0,$ the allocation of credit to non-tradable sectors is positively correlated to GDP growth, but there is a strong negative correlation between credit to tradable sectors and GDP growth. Frictions in adjustments for productive projects, delays in investments and gains from generation of net positive output might be the underlying reason for the initial negative impact of tradable credit on provincial GDP growth.

The results show that a one standard deviation increase in three-year non-tradable sector credit change is associated with 2.3% increase in provincial GDP growth, but this effect quickly turns negative and intensifies over time.

Table 2: Sectoral Credit Allocation and Provincial GDP Growth

Panel A: Non-tradable and Tradable Credit						
	Dependent Variable: Provincial GDP Growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	0.046**	0.016	-0.048*	-0.103***	-0.173***	-0.070
	(0.020)	(0.023)	(0.026)	(0.031)	(0.039)	(0.05)
Δ_3 ***Tradable***	-0.042**	0.065***	0.086**	0.078***	-0.009	-0.038
	(0.018)	(0.022)	(0.024)	(0.026)	(0.028)	(0.03)
Lagged GDP	0.454***	0.480***	0.479***	0.417***	0.413***	0.387***
	(0.028)	(0.031)	(0.03)	(0.033)	(0.038)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2241	0.23	0.2591	0.203	0.1796	0.1448
Observations	1053	972	891	810	729	648
Panel B: Non-tradable, Tradable and Household Credit						
	Dependent Variable: Provincial GDP Growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	0.039*	-0.02	-0.079***	-0.139***	-0.205***	-0.041
	(0.021)	(0.024)	(0.026)	(0.031)	(0.042)	(0.05)
Δ_3 ***Tradable***	-0.053***	0.008	0.042*	0.045*	-0.027	-0.014
	(0.02)	(0.024)	(0.025)	(0.027)	(0.029)	(0.031)
Δ_3 ***Household***	0.025	0.156***	0.17***	0.136***	0.068**	-0.094***
	(0.02)	(0.026)	(0.028)	(0.029)	(0.031)	(0.033)
Lagged GDP	0.455***	0.471***	0.426***	0.36***	0.385***	0.416***
	(0.028)	(0.031)	(0.031)	(0.035)	(0.04)	(0.042)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2254	0.2609	0.2919	0.226	0.1857	0.1571
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

In contrast, three-year change in tradable sector credit exhibits a delayed yet positive growth impact, with a one standard deviation increase leading to a cumulative gain of around $+0.086$ percentage points at $h = 2$ and $+0.078$ at $h = 3$.

From $h = 1$ to $h = 3$, tradable sector credit has a significantly positive impact on output growth, suggesting that economic growth is sustainable when credits are distributed more to the tradable sector. On the contrary, during the same period, credit to the non-tradable sector has a significant, albeit negative, correlation with provincial GDP growth from $h = 2$ to $h = 4$. In other words, credit flow to the non-tradable sector results in GDP growth slowdowns in the medium term. Both credit types attenuate their effect on output growth and exhibit diminishing statistical significance by $h = 5$, which highlights the fact that credit allocation has the strongest influence on output growth within the horizons $h = 2, 3$, and 4.

In the augmented specification of the baseline model, which includes the three-year change in credit to the household, the results do not dramatically alter the general dynamics of sectoral credit allocation. However, this provides an additional set of empirical implications for our analysis. A one standard deviation increase in non-tradable credit leads to an initial mild boost of $+1.86\%$ in GDP growth at h=0, but significant negative effects emerge from $h = 2$ onward, peaking at approximately $\breve{}4.9\%$ by $h = 4$. For tradable credit, a one standard deviation increase leads to a moderate and statistically significant increase in GDP growth of about $+1.7\%$ at its peak, around $h = 2$ and $h = 3$, with no harmful longer-term effects observed. As argued in the literature, household debt stimulates the economy in the short and medium terms, potentially through consumption and demand channels. From $h = 1$ to $h = 3$, there is a strong positive correlation between changes in household debt and provincial GDP growth. While the impact of non-tradable sector credit strengthens, especially at

$h = 2$ and $h = 3$, tradable credit loses influence and significance, particularly by $h = 4$ and $h = 5$. Supporting the view that household debt accumulation might result in a long-term contraction of economic growth, at $h = 5$, household debt and output growth become negatively associated with statistical significance.

When household credit is introduced (Panel B), its effect is most pronounced in the short run: a one standard deviation increase raises GDP growth by +0.17 percentage points at h=2, but this reverses by h=5, suggesting potential longer-term debt drag or consumption saturation. Across specifications, lagged GDP remains a strong and consistently positive predictor, confirming growth persistence. These results underline the importance of sectoral composition in credit policy, with tradable credit and short-term household credit offering more sustainable contributions to growth than non-tradable credit. To ensure robustness, standard errors were also computed using two-way clustering at the province and year levels. The estimated coefficients and their statistical significance remained mostly unchanged, suggesting that the main results are not sensitive to the choice of standard error correction method.

I analyze the relationship between sectoral credit allocation and provincial output growth by incorporating firm entry per capita into the analysis (Table 3). Various studies have shown the importance of new business establishments in developing economies. For instance, Brandt et al. (2011) provided empirical evidence highlighting the crucial role of entrepreneurial activity from new firms in driving China's economic growth. They found that approximately 72% of the total increase between 1998 and 2007 was attributable to new entrants.

As seen in the Table 3, firm entry has a significant but nonlinear effect on GDP growth: while there is a negative correlation in the short term, the relation changes sign with remaining at a significant level. Although the association remains positive, its statistical significance decreases over time. We conclude

Table 3: Sectoral Credit Allocation, New Firms Entry and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h=0$ (t-3,t)	$h=1$ (t-2,t+1)	$h=2$ (t-1,t+2)	$h=3$ (t,t+3)	$h=4$ (t+1,t+4)	$h=5$ (t+2,t+5)
Δ_3 ***Non-tradable***	0.018	0.043*	-0.034	-0.094***	-0.151***	-0.063
	(0.022)	(0.025)	(0.028)	(0.033)	(0.04)	(0.05)
Δ_3 ***Tradable***	-0.061***	0.085***	0.093***	0.081***	0.004	-0.031
	(0.019)	(0.023)	(0.025)	(0.026)	(0.029)	(0.031)
Firm Entry-to-Population	-35.26***	34.91***	20.02	12.57	53.11***	27.35
	(11.85)	(12.88)	(15.23)	(16.93)	(20.54)	(22.04)
Lagged GDP	0.448***	0.494***	0.485***	0.420***	0.427***	0.388***
	(0.001)	(0.031)	(0.031)	(0.034)	(0.012)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2311	0.2363	0.2607	0.2036	0.188	0.1471
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Sectoral Credit Allocation, Loans-to-GDP ratio and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h=0$ (t-3,t)	$h=1$ (t-2,t+1)	$h=2$ (t-1,t+2)	$h=3$ (t,t+3)	$h=4$ (t+1,t+4)	$h=5$ (t+2,t+5)
Δ_3 ***Non-tradable***	0.063***	0.028	-0.047*	-0.103***	-0.171***	-0.088*
	(0.019)	(0.022)	(0.026)	(0.031)	(0.039)	(0.051)
Δ_3 ***Tradable***	-0.018	0.071***	0.087***	0.078***	-0.011	-0.035
	(0.018)	(0.021)	(0.024)	(0.026)	(0.028)	(0.03)
Loans-to-GDP	-0.144***	-0.145***	-0.037**	-0.008	-0.012	0.027
	(0.014)	(0.016)	(0.016)	(0.016)	(0.017)	(0.019)
Lagged GDP	0.451***	0.399***	0.449***	0.412***	0.408***	0.396***
	(0.027)	(0.031)	(0.033)	(0.035)	(0.039)	(0.042)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2976	0.298	0.2638	0.2032	0.1802	0.1477
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Sectoral Credit Allocation, New Firms Entry, Loans-to-GDP ratio and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	0.056	0.08***	-0.018	-0.089***	-0.133***	-0.079
	(0.021)	(0.024)	(0.028)	(0.034)	(0.041)	(0.053)
Δ_3 ***Tradable***	-0.023***	0.109***	0.1***	0.083***	0.005	-0.031
	(0.019)	(0.022)	(0.025)	(0.026)	(0.029)	(0.031)
Loans-to-GDP	-0.141***	-0.165***	-0.055***	-0.016	-0.042**	0.019
	(0.015)	(0.016)	(0.018)	(0.018)	(0.019)	(0.023)
Firm Entry-to-Population	-9.21	65.45***	40.22**	20.51	77.9***	15.88
	(11.65)	(12.52)	(16.53)	(19.05)	(23.34)	(25.84)
Lagged GDP	0.45***	0.414***	0.447***	0.411***	0.414***	0.394***
	(0.027)	(0.031)	(0.033)	(0.035)	(0.039)	(0.042)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.298	0.319	0.2692	0.2045	0.1941	0.1482
Observations	1053	972	891	810	729	648

Note: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

that firm entry per capita boosts provincial GDP growth in the medium term. The effect of tradable credit maintains its positive and strong relationship with GDP growth in the medium term, although the relation starts strongly negative at $h = 0,$ almost consistent with previous models, showing a temporary decline in economic activity in the tradable sector before leading to an increased production, possibly due to adjustment costs. In contrast, non-tradable credit exhibits a delayed negative correlation with growth in the medium run, also consistent with earlier models. However, the significance level for this negative relation deepens over time. As a result, both tradable credit and the entry of new firms are expected to contribute to economic growth. However, the non-tradable sector seems to hinder long-term growth, suggesting that it is not gaining from the rise of new businesses in the economy.

Including a three-year average of loans-to-GDP as a control variable in the baseline fixed-effects regressions and excluding firm entry-to-population also reveals interesting results (Table 4). The coefficient for the loans-to-GDP ratio is strongly negative at shorter horizons (namely, $h = 0$ and $h = 1$), although its

Table 6: Sectoral Credit Allocation and Provincial GDP Growth: Accounting for Structural Trends

	Dependent Variable: Provincial GDP Growth					
	$h = 0$ (t-3,t)	$h = 1$ (t-2,t+1)	$h = 2$ (t-1,t+2)	$h = 3$ (t,t+3)	$h = 4$ (t+1,t+4)	$h = 5$ (t+2,t+5)
Δ_3 ***Non-tradable***	-0.004	-0.017	-0.057**	-0.107**	-0.202***	-0.058
	(0.018)	(0.021)	(0.028)	(0.042)	(0.07)	(0.057)
Δ_3 ***Tradable***	-0.096*	0.024	0.08***	0.076*	-0.025	-0.029
	(0.049)	(0.025)	(0.026)	(0.039)	(0.056)	(0.042)
Trend (Province x Trend) * 100	-0.011***	-0.008***	-0.002	-6.00e-04	-0.005**	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Lagged GDP	0.429***	0.428***	0.468***	0.414***	0.396***	0.397***
	(0.027)	(0.033)	(0.034)	(0.037)	(0.04)	(0.045)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2826	0.2515	0.2601	0.2031	0.1861	0.1472
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

economic significance decreases over time. In the provinces that use more bank credit, we find that its contribution to short-run growth significantly decreases though its negative impact lessens in later stages. With the inclusion of the loans-to-GDP variable, the non-tradable sector continues to fuel short-term growth ($h = 0$), but its effect becomes increasingly negative in the medium term. As before, tradable credit indicates a positive relationship with growth in the medium term despite an insignificant, negative correlation at $h = 0$.

Table 5 displays the estimates from the model that incorporates all variables including control variable. Credit-to-GDP variable sustains its initial negative effect ($h = 0$ and $h = 1$). The non-tradable credit is linked with GDP growth in the early horizons but exhibits a negative correlation with growth in the medium-term horizons. The tradable sector, on the other hand, demonstrates a positive relationship from $h = 1$ to $h = 3$. Moreover, the increase in new firms in the provinces is positively correlated with GDP growth in the medium term.

We further expand our analysis by incorporating a trend variable into the panel regression (see Table 6). The results reaffirm earlier findings that credit extended to the tradable sector fosters medium-term economic growth, whereas

credit to the non-tradable sector impedes growth over a five-year period.

These negative and significant coefficients at the horizons of $h = 0$ and $h = 1$ suggest that, when sectoral credit dynamics and lagged GDP growth is accounted for, provinces in Turkey exhibit declining growth trends. This might be resulted from structural headwinds, demographic changes, or diminishing marginal returns to capital in certain regions. In the short term, there is a notable downward trend in the provincial GDP growth.

5.3 Alternative Analysis

In this section, we present our finding that the baseline model runs separately for tradable and non-tradable firm credit. When we include both tradable and non-tradable corporate credit into the equation, we analyze the relative effect of these credits with respect to housing credits. In this way, we aim to capture which of the sectoral credit supports economic growth more with respect to others.

We begin by focusing exclusively on tradable credit and its effects on provincial GDP growth, using a baseline panel data regression with fixed effects and lagged GDP growth (see Table 7). By isolating the model to focus solely on tradable credit, we find that it has a strong and positive effect on GDP growth after one year and continues to do so in the medium term ($h = 1, 2, 3$) with highly significant results. However, in the long term, the relationship reverses and becomes insignificant.

When we consider the impact of tradable credit on provincial GDP growth controlling for firm entry per population (see Table 8), we observe that at $h = 0$, the impact of tradable credit turned into negative and significant suggesting that the surge of tradable credit might not be immediately translated into output gains—possibly due to lagged production, investment planning, or inventory buildup. In the medium run, from $h = 1$ to $h = 3$, both variables positively

Table 7: Tradable Sector Credit Allocation and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Tradable***	-0.024	0.071***	0.073 ***	0.058 **	-0.043	-0.046
	(0.017)	(0.021)	(0.023)	(0.025)	(0.028)	(0.03)
Lagged GDP	0.462***	0.484***	0.471***	0.41***	0.423***	0.395***
	(0.028)	(0.031)	(0.03)	(0.034)	(0.039)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2197	0.2295	0.2559	0.1908	0.1549	0.1418
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Tradable Sector Credit Allocation, New Firms Entry and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Tradable***	-0.058***	0.093***	0.087***	0.069***	-0.019	-0.037
	(0.019)	(0.023)	(0.024)	(0.026)	(0.028)	(0.03)
Firm Entry-to-Population	-39.52***	26.33**	27.25*	29.76*	69.91***	30.54
	(10.68)	(11.86)	(14.03)	(15.89)	(20.25)	(21.91)
Lagged GDP	0.45***	0.499***	0.482***	0.419***	0.44***	0.395***
	(0.028)	(0.031)	(0.03)	(0.034)	(0.039)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2306	0.2338	0.2594	0.1947	0.1702	0.1447
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 9: Tradable Sector Credit Allocation, Loans-to-GDP ratio and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Tradable***	0.005	0.08***	0.074***	0.058**	-0.044	-0.045
	(0.016)	(0.02)	(0.023)	(0.025)	(0.028)	(0.03)
Loans-to-GDP	-0.139***	-0.144***	-0.038**	-0.007	-0.017	0.018
	(0.014)	(0.016)	(0.016)	(0.016)	(0.017)	(0.019)
Lagged GDP	0.462***	0.405***	0.44***	0.405***	0.415***	0.403***
	(0.027)	(0.03)	(0.033)	(0.035)	(0.04)	(0.042)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2894	0.2967	0.2608	0.191	0.1561	0.1432
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

impact GDP growth. However, the increase in credits to the tradable sector loses its effect at $h = 4$ and $h = 5$, while new firm entries show a significant positive impact.

When we include the three-year average loans-to-GDP variable to control for the level of financial development at province i, the findings show that the tradable sector has a positive and significant influence on GDP growth in the short and medium term, with the effect dissipating through horizons (Table 9). Initially, the effect of the leverage variable suppresses GDP growth, but its influence fades over time.

Finally, bringing all the pieces together by including both the three-year average of loans-to-GDP and firm entry-to-population, we observe that in the short run ($h = 0$), there is a negative association between credit to tradable sector and provincial growth (Table 10). At $h = 1, 2,$ and 3, tradable credit and firm entry correlate strongly positively, whereas the loans-to-GDP ratio negatively affects GDP growth with a high significance. In the long run, the growth effect

Table 10: Tradable Sector Credit Allocation, New Firms Entry, Loans-to-GDP ratio and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Tradable***	-0.016	0.122***	0.097***	0.073***	-0.014	-0.037
	(0.019)	(0.022)	(0.024)	(0.026)	(0.028)	(0.031)
Loans-to-GDP	-0.134***	-0.157***	-0.057***	-0.025	-0.055***	0.007
	(0.014)	(0.016)	(0.018)	(0.018)	(0.019)	(0.021)
Firm Entry-to-Population	-23.12**	48.37***	44.67***	40.25**	99.32***	26.53
	(10.39)	(11.47)	(14.95)	(17.59)	(22.57)	(24.85)
Lagged GDP	0.455***	0.427***	0.444***	0.405***	0.422***	0.398***
	(0.027)	(0.031)	(0.033)	(0.035)	(0.039)	(0.042)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2931	0.3105	0.2689	0.1968	0.1808	0.1449
Observations	1053	972	891	810	729	648

Note: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

from credit diminishes and turns negative suggesting boom-bust pattern.

Overall, the results concerning the impact of tradable credit on provincial GDP growth show that the corporate credit which flows to the tradable sector can boost economic growth in the medium term, supporting the evidence by Rajan and Zingales (1998). The larger-scale sectors, such as manufacturing, are disproportionately affected by financial frictions; therefore, external finance for these sectors positively impacts economic growth.

When considering only the effect of non-tradable sector credit on GDP, we estimate the baseline specification with fixed effects and lagged GDP growth (Table 11). The analysis for the relationship between non-tradable corporate credit and provincial GDP growth demonstrates a clear boom-bust pattern: in the short-to-medium term, non-tradable credit and output growth has a positive and significant association, indicating a boosting impact on the provincial economic activity initially whereas this effect disappears over time and becomes negative toward $h = 5$. In particular, I find that, initially, there is a positive but weak relationship between non-tradable credit and GDP growth. However, in the

Table 11: Non-tradable Sector Credit Allocation and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	0.028	0.041*	-0.021	-0.081***	-0.177***	-0.081*
	(0.018)	(0.022)	(0.025)	(0.03)	(0.038)	(0.049)
Lagged GDP	0.454***	0.477***	0.489***	0.434***	0.411***	0.381***
	(0.081)	(0.031)	(0.03)	(0.033)	(0.038)	(0.041))
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2199	0.2224	0.2474	0.193	0.1794	0.1424
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 12: Non-tradable Sector Credit Allocation, New Firms Entry and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	0.005	0.061**	-0.014	-0.077**	-0.149***	-0.07
	(0.022)	(0.025)	(0.027)	(0.033)	(0.039)	(0.049)
Firm Entry-to-Population	-22.28**	20.05	9.22	5.13	52.56***	31.79
	(11.17)	(12.31)	(15.08)	(16.86)	(20.17)	(21.59)
Lagged GDP	0.45***	0.485***	0.492***	0.436***	0.428***	0.384***
	(0.028)	(0.032)	(0.031)	(0.033)	(0.038)	(0.068)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2231	0.2247	0.2478	0.1931	0.188	0.1456
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

medium term, the relationship reverses. At $h = 3$, credit to the non-tradable sector has a significant, albeit negative, effect on provincial gross domestic product (GDP). The reason for the brief positive effect of non-tradable loans to provincial growth might be due to a temporary increase in consumption, as well as heightened construction and real estate activity, which can lead to job creation. As highlighted by Dai et al. (2025), the non-tradable firms are often less productive and hence misallocation of resources towards this sector might have a negative impact on long-run economic growth, i.e., "wrong debt". As the non-tradable debt burden increases, it can lead to a rise in financial instability and this deterioration in the supply of credit can have a negative impact on the lending of tradable corporate debt as well. These findings also confirm the "boom-bust" cycle found in the literature (Benigno et al., 2015; Gourinchas & Obstfeld, 2012; Müller & Verner, 2023).

Then, adding firm entry-to-population variable as a control to the baseline equation with a lagged variable simultaneously, we find that the non-tradable credit has a significant and positive influence on GDP growth starting from $h = 1,$ whereas in the second and third horizons, the sign reverses and remains significantly negative in the long run (Table 12). Consistent with the previous findings, the coefficient of firm entry-to-population is negative at $h = 0,$ and its significance fades till $h = 4$ and becomes positive suggesting a lagged benefit of new firm entry. Overall, the short-lived benefit of non-tradable sector credit on GDP growth still maintains.

Next, I control for provincial three-year average of the loans-to-GDP ratio, and observe the boom-bust pattern in the non-tradable credits. We find that at $h = 0$ and $h = 1,$ unlike the previous results, non-tradable credit correlates positively and significantly with GDP growth (Table 13).

We also find that the Loans-to-GDP ratio is negatively and significantly associ-

Table 13: Non-tradable Sector Credit Allocation, Loans-to-GDP ratio and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	0.056***	0.055***	-0.02	-0.081***	-0.175***	-0.099**
	(0.017)	(0.021)	(0.025)	(0.03)	(0.038)	(0.05)
Loans-to-GDP	-0.146***	-0.144***	-0.036**	-0.007	-0.011	0.029
	(0.014)	(0.016)	(0.017)	(0.016)	(0.017)	(0.019)
Lagged GDP	0.451***	0.396***	0.46***	0.429***	0.405***	0.392***
	(0.027)	(0.031)	(0.033)	(0.035)	(0.039)	(0.042)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2968	0.2892	0.2519	0.1932	0.18	0.1456
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 14: Non-tradable Sector Credit Allocation, New Firms Entry, Loans-to-GDP ratio and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	0.052**	0.101***	0.001	-0.073**	-0.132***	-0.086
	(0.021)	(0.024)	(0.028)	(0.033)	(0.04)	(0.053)
Loans-to-GDP	-0.145***	-0.157***	-0.048***	-0.012	-0.042**	0.019
	(0.014)	(0.016)	(0.018)	(0.018)	(0.019)	(0.023)
Firm Entry-to-Population	-3.84	45.24***	26.08	10.8	77.17***	20.81
	(10.79)	(11.98)	(16.31)	(18.91)	(22.98)	(25.39)
Lagged GDP	0.45***	0.407***	0.459***	0.43***	0.415***	0.39***
	(0.027)	(0.031)	(0.033)	(0.035)	(0.039)	(0.042)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2969	0.3004	0.2543	0.1936	0.1941	0.1467
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

ated with GDP growth in $h = 0, 1, 2$. In contrast, the non-tradable credit affects output growth negatively starting from $h = 3$ through $h = 5$, with its highest economic significance at $h = 4$. Hence, after controlling for loans-to-GDP, it is confirmed that the non-tradable credit booms hinders economic growth in the long run.

Finally, we control for both firm entry-to-population and loans-to-GDP, and confirm boom-bust pattern that non-tradable credit stimulates growth in the first two years, loses its significance, and eventually becomes negatively correlated in the medium and long term (Table 14). The coefficient for firm entry starts out strongly positive ($h = 1$), loses its significance in the medium term, but maintains a positive relationship. The firm entry per capita variable has a dual effect, implying that firm dynamism can partially offset the medium-term slowdown caused by excessive credit to the non-tradable sector. In line with our previous findings, the association between loans-to-GDP ratio and GDP growth is negative in the short and medium term, becoming positive but insignificant at $h = 5$.

5.4 State-owned Banks, Tradable Credits, Non-tradable Credits and Provincial Growth

In order to assess the role of state-owned banks in lending and subsequent change in output growth, we shift our focus to sectoral credit allocation by state-owned banks. We analyze the baseline specification with fixed effects using only loans from state-owned banks. We find that at $h = 0,$ both tradable and non-tradable credit from state banks are negatively correlated with GDP growth (Table 15), while only tradable credit exhibits a statistical significance. At $h = 1,$ tradable state bank credit reverses sign and becomes positively and significantly associated with growth. While the strong positive relationship between tradable

Table 15: Sectoral Credit Allocation by State Banks and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Non-tradable***	-0.051	0.031	0.001	0.043	-0.217***	-0.011
	(0.044)	(0.051)	(0.05)	(0.053)	(0.066)	(0.075)
Δ_3 ***State Bank Tradable***	-0.133***	0.052*	0.109***	0.127***	-0.017	-0.095**
	(0.024)	(0.027)	(0.027)	(0.027)	(0.038)	(0.04)
Lagged GDP	0.455***	0.507***	0.49***	0.399***	0.437***	0.396***
	(0.027)	(0.032)	(0.029)	(0.033)	(0.039)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2597	0.2263	0.267	0.2228	0.1708	0.1496
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

credit and provincial GDP growth continues in the medium term, non-tradable credit does not show significance but remains negatively correlated with output growth. In the long term, at $h = 4,$ the credit allocated by state-owned banks to the non-tradable sector demonstrates a strong negative correlation with GDP growth. Different than previous findings, we find significant and negative effect of tradable credit on provincial output at $h = 5$. Controlling for firm entry-to-population and 3-year average loans-to-GDP ratio (Table 16), the results reveal an S-shaped pattern for tradable credit allocation from state-owned banks on provincial GDP growth: an initial negative effect, a positive impact in the medium term, and a negative effect again in the long term — all statistically significant at conventional levels. With control variables, the baseline equation gives a slight change in the results related to non-tradable credit allocated by the state banks. The non-tradable credit allocation is positively correlated at $h = 1$ but eventually at $h = 4$ it becomes negatively associated with provincial GDP growth in Turkey. The inefficient lending by state-owned in this sector needs further investigation.

Table 17 shows the relationship between the non-tradable corporate credit allocated by state-owned banks and the provincial GDP growth controlling only

Table 16: Sectoral Credit Allocation by State Banks, New Firms Entry, Loans-to-GDP ratio and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Non-tradable***	-0.014	0.096*	0.016	0.05	-0.214***	-0.017
	(0.044)	(0.049)	(0.05)	(0.054)	(0.066)	(0.075)
Δ_3 ***State Bank Tradable***	-0.12***	0.059**	0.107***	0.127***	0.002	-0.085**
	(0.023)	(0.026)	(0.027)	(0.027)	(0.038)	(0.041)
Loans-to-GDP	-0.115***	-0.155***	-0.052***	-0.024	-0.052***	0.002
	(0.014)	(0.016)	(0.017)	(0.018)	(0.019)	(0.021)
Firm Entry-to-Population	-30.21***	27.19***	19.17	5.92	99.18***	24.89
	(9.14)	(10.5)	(14.23)	(17.33)	(21.9)	(24.41)
Lagged GDP	0.445***	0.447***	0.458***	0.384***	0.437***	0.397***
	(0.026)	(0.032)	(0.032)	(0.035)	(0.04)	(0.042)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.3182	0.3012	0.275	0.2248	0.1973	0.1518
Observations	1051	970	889	809	727	646

Note: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

for lagged provincial GDP. We find that initially, at $h = 0$, the non-tradable credit provided by state-owned banks and economic growth are negatively correlated. In the medium term, the relationship reverses sign and becomes positive with a statistical significance by reaching its maximum level after credit allocation at $h = 3$. This might reflect that credit boosts domestic demand or construction-related activities in all provinces of Turkey with a lag. Interestingly, the positive influence is only short-lived because in the long term, at $h = 4$, the correlation between state banks' non-tradable credit and provincial GDP growth becomes negative but significant. The negative coefficients of non-tradable credit allocation by state banks on provincial GDP growth suggest misallocation of credit and possibly motivated by political affiliations. In many circumstances, state-owned banks compete with private banks for the same customers and businesses, in the absence of clearly defined mandates. As a result, state-owned banks may suffer from low operational efficiency and poor risk management. Furthermore, their non-commercial mandates, such as lending to priority sectors, may result in these banks misallocating capital and providing ineffective financial intermediation (Barth et al., 2004; Porta et al., 2002). Nevertheless, the role

Table 17: Non-tradable Sector Credit Allocation by State Banks and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Non-tradable***	-0.182***	0.079*	0.102**	0.164***	-0.228***	-0.092
	(0.038)	(0.044)	(0.044)	(0.047)	(0.062)	(0.067)
Lagged GDP	0.466***	0.493***	0.483***	0.413***	0.432***	0.385***
	(0.028)	(0.031)	(0.03)	(0.033)	(0.038)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2356	0.2222	0.2517	0.1987	0.1694	0.141
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity.***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 18: Non-tradable Sector Credit Allocation by State Banks,New Firms Entry and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Non-tradable***	-0.215***	0.083*	0.099**	0.159***	-0.221***	-0.087
	(0.039)	(0.044)	(0.044)	(0.048)	(0.061)	(0.067)
Firm Entry-to-Population	-35.32***	7.83	9.29	6.34	70.9***	35.21*
	(9.49)	(10.84)	(13.57)	(16.07)	(19.47)	(21.37)
Lagged GDP	0.454***	0.498***	0.488***	0.416***	0.454***	0.386***
	(0.028)	(0.032)	(0.031)	(0.034)	(0.039)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2464	0.2226	0.2521	0.1988	0.1861	0.1451
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity.***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

of state banks in allocating credit across sectors at the provincial level must be investigated further.

The results from the baseline model with the state-owned bank non-tradable credit, while controlling for firm entry-to-population, confirm S-shaped dynamic. Non-tradable credit leads to a short-run contraction and mid-run support, reaching its peak at $h = 3$ with strong positive significance. In the long run, it has negative association with provincial GDP growth (Table 18).

Although the firm entry per capita demonstrates a negative impact with a pronounced significance at the beginning, the relationship becomes sharply positive at $h = 4$. This supports the view that the growth-enhancing effect of firm creation translates into the economy with a lag. However, it is evident that the firm entry-to-population variable attenuates both the magnitude and the effect of the non-tradable credit from state banks, especially at $h = 0$ and at $h = 5$.

When we check for an isolated effect of tradable corporate credit provided by state-owned banks on provincial GDP growth, we see that it clearly shows S-shaped pattern (Table 19). At $h = 0,$ while the correlation is strongly negative, in the medium term, between $h = 1$ and $h = 3,$ it becomes significantly positive, reaching its peak at $h = 3$. This presents evidence for the boosting role of the tradable sector in economic growth. Following the reversal of sign in the long run, the findings show the same pattern that we see in the non-tradable credits.

Finally, we control for firm entry-to-population in the baseline equation containing provincial GDP growth and tradable credit allocated by state-owned banks (Table 20). At $h = 0,$ there is a strong negative relationship, which then becomes positively significant at $h = 1$ through $h = 3,$ again reaching its peak at $h = 3,$ and turns negative at $h = 4$ and $h = 5$ with increasing statistical significance. The firm entry-to-population variable shows a negative correlation at the beginning, which might reflect the financial struggle concerning new

Table 19: Tradable Sector Credit Allocation by State Banks and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Tradable***	-0.148***	0.06**	0.11***	0.137***	-0.064*	-0.098***
	(0.02)	(0.024)	(0.023)	(0.024)	(0.036)	(0.035)
Lagged GDP	0.453***	0.507***	0.49***	0.4***	0.433***	0.397***
	(0.027)	(0.032)	(0.029)	(0.033)	(0.04)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2587	0.226	0.267	0.222	0.157	0.1495
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 20: Tradable Sector Credit Allocation by State Banks, New Firms Entry and Provincial GDP Growth

	Dependent Variable: Provincial GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Tradable***	-0.163***	0.063***	0.109***	0.138***	-0.047	-0.089**
	(0.02)	(0.024)	(0.023)	(0.024)	(0.036)	(0.036)
Firm Entry-to-Population	-37.25***	9.23	5.38	-0.752	70.6***	25.9
	(9.25)	(10.85)	(13.47)	(15.7)	(19.81)	(21.75)
Lagged GDP	0.438***	0.514***	0.493***	0.4***	0.451***	0.397***
	(0.027)	(0.033)	(0.03)	(0.033)	(0.04)	(0.041)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2709	0.2267	0.2671	0.222	0.1734	0.1517
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

firm creation. In the long run, the firm entry-to-population variable becomes positively associated with provincial GDP growth. This indicates the strong, positive, and delayed contribution of new firms to the output growth.

In appendix, we present several more analysis. First, we control for lagged provincial sectoral output, i.e., tradable sectoral output and non-tradable sectoral output (Tables A1-A4). In the short term, a rise in non-tradable credit allocated by state-owned banks is correlated with a decline in GDP growth in the non-tradable sector, as evidenced by a strongly negative association at h = 0 (Table A1). Insignificant coefficients at h = 1 and h = 2 indicate that in the medium term, GDP growth does not react to changes in non-tradable credit. At h = 3, the relationship becomes positive and statistically significant, possibly reflecting the delayed effect of funded projects. However, at h = 4, the association turns negative again, suggesting adverse long-term consequences.

When we control for new firm entries (Table A2), we find similar results: an initial negative effect, a reversal at h = 3, and a return to negative influence at h = 4. Overall, the association follows a non-linear path, potentially due to politically motivated lending behavior. Firm Entry-to-Population becomes significantly positive after a short lag, indicating its role in boosting non-tradable sector growth.

Similar to non-tradable credit allocated by state-owned banks, an increase in tradable credit allocation by state-owned banks is associated with a contraction in provincial tradable GDP growth in the short term (Table A3). The relationship reverses significantly at $h = 1$ and $h = 2$ horizons, which present the lagged boosting effect of tradable credit allocation by state-owned banks on tradable sectoral output growth. While the association becomes statistically insignificant in the medium term, at $h = 5$, the tradable credit allocation starts to be negatively related with tradable GDP growth. This indicates a boom-bust cycle in which

state-owned banks initially boost economic activity but fail to sustain GDP growth due to misallocation of credit.

Controlling for firm creation (Table A4), we again confirm the previous results for the association between tradable credit allocation by state-owned banks and tradable sectoral GDP growth: a negative impact in the short term, statistically significant reversal of sign at $h = 1$ to $h = 3$ and negative correlation by $h = 5$, showing boom-bust dynamic we obtained earlier. Surprisingly, the introduction of new firms demonstrates a strong negative correlation with tradable GDP growth in the short-term and medium-term, with fading effect in the long-term.

In a sector-specific model (Table A5), the relationship between non-tradable credit and non-tradable GDP growth is strongly negative from h = 2 onward. Adding firm entry (Table A6) confirms that while early effects are neutral, the medium and long-term impacts of credit are significantly negative. In contrast, firm creation consistently supports output growth starting from h = 2. Thus, non-tradable credit alone does not sustain long-term growth, whereas firm entry is a robust driver of expansion.

The relationship between tradable credit and tradable GDP growth is strongly positive in the short term ($h = 1$ and $h = 2$), while the coefficient becomes negative on the medium horizon ($h = 3$) and fades out later (Table A7). When we control for the firm entry-to-population variable (Table A8), the positive correlation between the sectoral production of tradables and the allocation of tradable credit remains in the short term ($h = 1, 2, 3$) and becomes insignificant in the later horizons as before. Interestingly, new company creation demonstrates a negative association with tradable GDP growth in the short and medium term, which might result from the fact that there can be a delayed effect of the productivity of new companies.

CHAPTER 6

CONCLUSION AND LIMITATIONS

6.1 Conclusion

In this thesis, using local projection (LP) method, I explore the dynamic relationship between provincial GDP growth in Turkey and sectoral credit allocation, covering the period between 2007 and 2023, with an extended investigation of the role of state-owned banks in the sectoral credit allocation. Within LP framework, I study the association between tradable and non-tradable sector credit allocations, and output growth at the province level across different time horizons. I confirm the asymmetries in credit allocation across different sectors and their varying effects on the provincial GDP growth.

The results indicate that the tradable corporate credit shows an initial negative impact on the output growth in Turkey, followed by a significant positive impact in the medium term. In contrast, the non-tradable credit shows a boom-bust pattern: a positive initial effect which changes sign and becomes negative in the long term. When the analysis was limited to credits from state-owned banks, similar outcomes were seen. Interestingly, boom-bust pattern generated by the non-tradable credit on the provincial GDP growth is more pronounced when only state-owned bank credit is accounted, suggesting politically motivated lending

behavior and its downside effects on the output growth.

Controlling for new firm entry and three year average of loans-to-GDP ratio, the baseline analysis with province fixed effects shows that firm entry-to-population shows a boosting impact on the provincial economic outcomes, especially in the non-tradable sector. On the other hand, the results also show that credit expansion solely, without new firm activity, cannot support long-term output growth with a sustainable pattern.

In summary, the results highlight the importance of sectoral credit allocation, the role played by different banks in credit allocation and long-term economic growth.

6.2 Limitations

There are several crucial limitations to consider concerning the results of this study. First, the association between sectoral credit allocation and provincial GDP growth might be endogeneous due to reverse causality or omitted variable bias. In order to reduce the potential endogeneity, I added few control variables to the baseline equation due to provincial data limitations. Nevertheless, upon adding province fixed effects, I aimed to absorb unobserved time-invariant heterogeneity across regions; with lagged dependent variables, I aimed to mitigate reverse causality and with time trends, I aimed for capturing patterns in structural changes and growth for each province in Turkey.

Although these are a few of the many strategies to lessen the bias led by the factors effecting both dependent and independent variables, they might not be sufficient enough to explain endogeneity problem completely. For instance, lagged dependent variables might not be able to solve reverse causality, because

past output growth can influence both future GDP growth and lending activities. Second, I did not control the time-varying shocks that resulted from political events or natural disasters, both of which are common in Turkey, even though these events can have impact on sectoral credit allocation and economic activity. Third, because of data constraints, I could not include certain data types such as provincial level inflation or provincial level employment data, which would be useful for documenting the robustness of the results. Had more detailed provincial data been available, I would have also employed an instrumental variable methodology. Moreover, a longer time span or a more detailed, e.g. firm level, panel data would also increase the reliability of the results. I could mitigate the identification problem in a more robust way.

Fourth, I have no data about who used the credit. There may be scenarios where the loan is allocated in one province but used in another province. For example, a bank may extend a loan to a firm in Istanbul but it is used in a transaction in a nearby province, such as Kocaeli, an industrial province, thus creating either underestimation or overestimation of the estimated coefficients of the sectoral provincial bank loans.

Finally, although the Local Projection method is flexible compared to vector autoregression through assumption of linearity within all forecast horizons (see for detailed discussion in Plagborg-Møller and Wolf (2021)), it disregard structural breaks or threshold effects in the credit allocation and economic activity relationship. Thus, other methodologies might be used to check for the robustness of the results.

APPENDIX

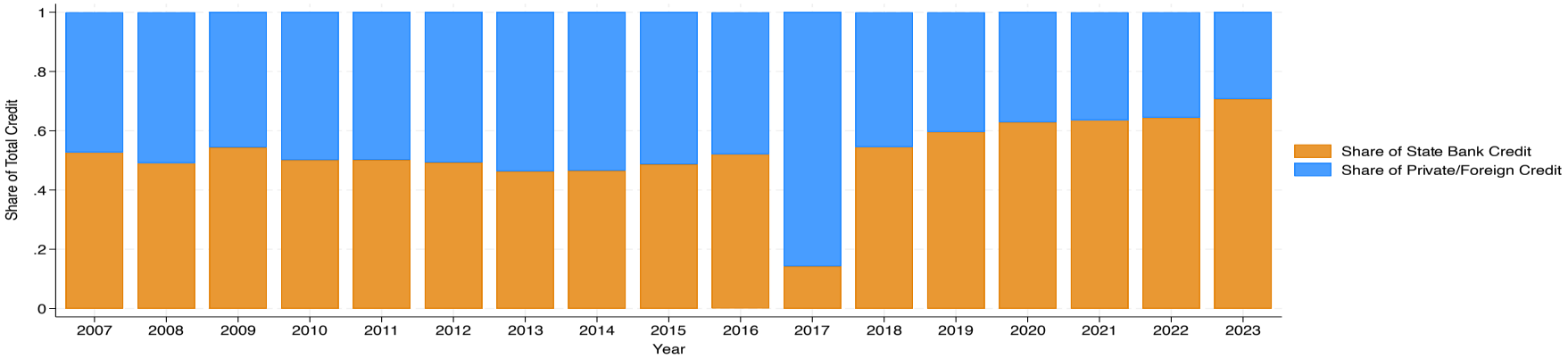

Figure A.1: Total Corporate Credits Granted by Commercial Banks by Ownership Types

Table A1: Non-tradable Sector Credit Allocation by State Banks and Provincial Non-tradable GDP Growth

	Dependent Variable: Provincial Non-tradable GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Non-tradable***	-0.258***	-0.027	0.055	0.261***	-0.338***	-0.115
	(0.04)	(0.046)	(0.046)	(0.048)	(0.063)	(0.072)
Lagged Non-tradable GDP	0.446***	0.471***	0.514***	0.426***	0.458***	0.45***
	(0.027)	(0.032)	(0.03)	(0.033)	(0.039)	(0.044)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2445	0.2001	0.2637	0.2226	0.197	0.1678
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A2: Non-tradable Sector Credit Allocation by State Banks, New Firms Entry and Provincial Non-tradable GDP Growth

	Dependent Variable: Provincial Non-tradable GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Non-tradable***	-0.281***	-0.011	0.036	0.21***	-0.323***	-0.109
	(0.041)	(0.047)	(0.046)	(0.049)	(0.06)	(0.071)
Firm Entry-to-Population	-24.11**	34.81***	58.05***	65.04***	101.07***	55.74**
	(9.75)	(11.29)	(13.92)	(16.20)	(19.63)	(22.75)
Lagged Non-tradable GDP	0.443***	0.49***	0.538***	0.444***	0.467***	0.443***
	(0.027)	(0.032)	(0.03)	(0.033)	(0.038)	(0.044)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2492	0.2086	0.2792	0.2395	0.2287	0.1766
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A3: Tradable Sector Credit Allocation by State Banks and Provincial Tradable GDP Growth

	Dependent Variable: Provincial Tradable GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Tradable***	-0.18***	0.155***	0.182***	0.059	-0.021	-0.158***
	(0.034)	(0.039)	(0.041)	(0.043)	(0.062)	(0.06)
Lagged Tradable GDP	0.401***	0.423***	0.38***	0.358***	0.341***	0.327***
	(0.029)	(0.032)	(0.032)	(0.035)	(0.038)	(0.038)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.1876	0.1692	0.1623	0.1353	0.1123	0.1212
Observations	1051	970	889	808	727	646

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A4: Tradable Sector Credit Allocation by State Banks, New Firms Entry and Provincial Tradable GDP Growth

	Dependent Variable: Provincial Tradable GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***State Bank Tradable***	-0.205***	0.144***	0.197***	0.089**	-0.01	-0.152**
	(0.034)	(0.039)	(0.041)	(0.044)	(0.063)	(0.061)
Firm Entry-to-Population	-61.18***	-42.34**	-71.72***	-84.2***	46.9	18.33
	(15.58)	(17.43)	(23.5)	(28.35)	(35.65)	(37.05)
Lagged Tradable GDP	0.384***	0.409***	0.361***	0.336***	0.35***	0.328***
	(0.029)	(0.032)	(0.033)	(0.035)	(0.039)	(0.038)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2003	0.1747	0.1719	0.1457	0.1147	0.1216
Observations	1051	970	889	808	727	646

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A5: Non-tradable Sector Credit Allocation and Provincial Non-tradable Sector GDP Growth

	Dependent Variable: Provincial Non-tradable GDP Growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	-0.001	-0.003	-0.1***	-0.197***	-0.264***	-0.145***
	(0.019)	(0.023)	(0.025)	(0.031)	(0.039)	(0.052)
Lagged Non-tradable GDP	0.437***	0.473***	0.53***	0.445***	0.409***	0.44***
	(0.027)	(0.032)	(0.03)	(0.033)	(0.038)	(0.044)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2113	0.1998	0.2763	0.2342	0.2166	0.1753
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A6: Non-tradable Sector Credit Allocation, New Firms Entry and Provincial Non-tradable Sector GDP Growth

	Dependent Variable: Provincial Non-tradable GDP Growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Non-tradable***	-0.015	0.042	-0.064**	-0.157***	-0.223***	-0.129**
	(0.022)	(0.026)	(0.028)	(0.033)	(0.04)	(0.052))
Firm Entry-to-Population	-13	45.33***	43.29***	50.73***	75.5***	49.03**
	(11.63)	(12.87)	(15.48)	(17.04)	(20.31)	(22.88)
Lagged Non-tradable GDP	0.436***	0.488***	0.542***	0.455***	0.421***	0.436***
	(0.027)	(0.032)	(0.03)	(0.033)	(0.038)	(0.044)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.2123	0.2108	0.2832	0.2434	0.233	0.182
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A7: Tradable Sector Credit Allocation and Provincial Tradable Sector GDP Growth

	Dependent Variable: Provincial Tradable GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Tradable***	0.026	0.133***	0.134***	-0.099**	0.268	-0.011
	(0.028)	(0.034)	(0.041)	(0.045)	(0.049)	(0.051)
Lagged Tradable GDP	0.405***	0.389***	0.367***	0.354***	0.336***	0.321***
	(0.03)	(0.031)	(0.033)	(0.035)	(0.038)	(0.038)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.1647	0.1682	0.153	0.1387	0.1123	0.1106
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A8: Tradable Sector Credit Allocation, New Firms Entry and Provincial Tradable Sector GDP Growth

	Dependent Variable: Provincial Tradable GDP Growth					
	$h = 0$	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
	(t-3,t)	(t-2,t+1)	(t-1,t+2)	(t,t+3)	(t+1,t+4)	(t+2,t+5)
Δ_3 ***Tradable***	-0.015	0.112***	0.114***	0.077*	0.045	0.00004
	(0.032)	(0.038)	(0.043)	(0.046)	(0.05)	(0.052))
Firm Entry-to-Population	-47.79***	-24.99	-38.50	-59.70**	54.39	36.46
	(17.74)	(19.22)	(24.67)	(28.30)	(36.35)	(37.37)
Lagged Tradable GDP	0.396***	0.383***	0.358***	0.343***	0.346***	0.322***
	(0.03)	(0.031)	(0.033)	(0.035)	(0.038)	(0.038)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
# Provinces	81	81	81	81	81	81
R-squared	0.1709	0.1698	0.1555	0.1439	0.1154	0.1121
Observations	1053	972	891	810	729	648

Notes: The standard errors are in parentheses and they are adjusted to account for heteroskedasticity. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

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