

IBN HALDUN UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF ECONOMICS

PH.D. THESIS

**AN INVESTIGATION INTO THE EFFECTS OF
AGGLOMERATION ECONOMIES AND FIRM
FORMATION ON THE LABOR MARKET**

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ASSIST. PROF. ŞERİFE GENÇ İLERİ

ISTANBUL, 2024

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FORMATION ON THE LABOR MARKET**

by

MUHAMMAD MOIZ

**A thesis submitted to the School of Graduate Studies in partial
fulfilment of the requirements for the degree of Doctor of
Philosophy in Economics**

**THESIS SUPERVISOR
ASSIST. PROF. ŞERİFE GENÇ İLERİ**

ISTANBUL, 2024

APPROVAL PAGE

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the award of a Doctor of Economics.

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ÖZ

AGLOMERASYON EKONOMİLERİ VE FİRMA KURULUMUNUN İŞGÜCÜ PİYASASI ÜZERİNDEKİ ETKİLERİNE YÖNELİK BİR ARAŞTIRMA

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Bu tez üç bölümden oluşmaktadır. İlk bölüm, Türkiye'nin ekonomik tarihi, firma dinamikleri ve işgücü piyasası dinamiklerini incelemektedir. Bu bölüm, firma ve işgücü piyasası dinamiklerinin olgularını gözlemleyen, Türkiye'nin yıllar içindeki ilerlemesini ve mevcut piyasa görünümünü tanımlayan bir bölümdür. İkinci bölümde, işsizlik ve firma oluşumu arasındaki ilişki NUTS-II ve NUTS-III düzeylerinde incelenmektedir. Bu analiz, işsizliğin yeni firma oluşumu üzerinde anlamlı bir pozitif etkisi olduğunu göstermektedir. Firma oluşumunun ise işsizlik üzerindeki etkisi ile ilgili tersine ilişki analizi, NUTS-II düzeyinde belirgin olumlu etkiler göstermemektedir. Ancak, şehir düzeyinde 4 ve 5 yıllık gecikmelerle anlamlı bir negatif ilişki bulunmuştur. Üçüncü bölüm, Türkiye'deki ücretler üzerinde aglomerasyon ekonomilerinin etkisini şehir düzeyinde bir mikro veri seti kullanarak incelemektedir. Yığılma (aglomerasyon) ekonomileri uzmanlaşma, çeşitlilik (Shannon'ın entropisi), rekabet (Hirschman-Herfindahl Endeksi) ve yoğunluk (istihdam yoğunluğu) yoluyla ölçülmektedir. Zengin bir çalışan-işveren eşleşmeli veri seti aracılığıyla, yoğunluk ve çeşitlilik olmak üzere iki aglomerasyon dışsallığının Türkiye'de ücretler üzerinde olumlu bir etkisi olduğu bulunmuştur. Bu bulgular, bazı diğer gelişmekte olan ülkelerde bulunan sonuçlarla benzerlik göstermekte olup, gelişmiş ekonomilerde yapılan çalışmalarda bulunan sonuçlardan daha yüksektir.

Anahtar Kelimeler: Firma Oluşumu, İşsizlik, Maaş, Türkiye, Yığılma Ekonomileri.

ABSTRACT

AN INVESTIGATION INTO THE EFFECTS OF AGGLOMERATION ECONOMIES AND FIRM FORMATION ON THE LABOR MARKET

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This thesis contains three chapters, the first of which examines the economic history, firm dynamics, and labor market dynamics of Türkiye. This is a descriptive chapter that observes the facts of the firm and labor market dynamics, describing the progress Türkiye has made over the years and the current outlook of the market. In the second chapter, the relationship between unemployment and firm formation is examined on the NUTS-II and NUTS-III levels. In doing so, the results suggest that unemployment has a significant positive effect on new firm formation. The analysis concerning the converse relation, the impact of firm formation on unemployment, reveals no significant results at the NUTS-II level. However, a significant negative relationship is found at the city level with 4- and 5-year lags. The third chapter is an examination of agglomeration economies and their impact on wages in Türkiye using a micro dataset at the city level within Türkiye. Agglomeration economies are measured through specialization, diversity (Shannon's entropy), competition (Hirschman-Herfindahl Index), and density (employment density). Through a rich employee-employer matched dataset, it is found that two agglomeration externalities, namely density and diversity, have a positive effect on wages in Türkiye. However, these findings are similar to those found in some other developing countries, unlike those found in studies conducted on developed economies.

Keywords: Agglomeration Economies, Firm Formation, Türkiye, Unemployment, Wages.

DEDICATION

I dedicate this work to all those individuals that have helped me along my journey during my studies. It is difficult to pinpoint a single individual but rather everyone has contributed to this part of my life. The last six years have had their ups and downs, but I am proud to finally be reaching the finish line. My family has always been supportive of my studies, for which I am thankful. Finally, I would like to dedicate this work to my wife, Esma, who continued to motivate me, especially in the past year when things were quite stressful.



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LIST OF SYMBOLS AND ABBREVIATIONS

BRSA	Banking Regulatory and Supervisory Authority
DGMM	Directorate General Migration Management
EIS	Enterprise Information System
EU	European Union
ILO	International Labor Organization
IMF	International Monetary Fund
ISCO	International Standard Classification of Occupations
KOSGEB	Small and Medium Industry Development Organization
OAPEC	Organization of Arab Petroleum Exporting Countries
OECD	Organization for Economic Co-operation and Development
SGK	Social Security Institution
STB	Ministry of Science, Industry and Technology of Türkiye
TOBB	Union of Chambers and Commodity Exchanges of Türkiye
TPMK	Turkish Patent and Trademark Office
TÜBİTAK	Scientific and Technological Research Council of Türkiye
TUIK	Turkish Statistical Institute

CHAPTER I

INTRODUCTION

This dissertation focuses on the agglomeration economies of the Turkish labor market and the relationship between unemployment and firm formation. Türkiye is currently the 17th largest economy in the world (by GDP) and 11th largest (by PPP). It is one of the few emerging economies that have sustained high economic growth in the 21st century, leading to prosperity in the country in terms of income levels, infrastructure, and development. According to the World Bank (2024), the Turkish GDP expanded by more than 4.5% in 2023; however, the exports contracted while the imports grew. In addition, in the post-COVID period, Türkiye faced an ever-increasing depreciation of the Turkish Lira, which was matched by high inflation. Despite the economic struggles in recent years, the government continues to try different economic policies to sustain economic growth.

The second chapter is a descriptive study of the Turkish economy, including its economic history, firm dynamics, and labor market dynamics. This chapter serves as an informative chapter on the Turkish market by providing a brief overview of the economic history. The post-WWII economic history is of focus, briefly describing the economic policies adopted throughout the late 1900s as well as the reasons behind the rapid economic growth in the 21st century. The purpose is to get a brief overview and an economic background of Türkiye; it is in no way a comprehensive history and should not be taken as such. The second part of the chapter focuses on firm dynamics, which include the establishment, closures, and growth of firms in Türkiye. This section informs the reader about the details of the firms in Türkiye, their size, industry, geographical location, entry, exit, and growth. This serves as a brief background for the detailed study that is to follow in Chapter three about the impact of unemployment on firm formation and vice versa. The third part of the chapter focuses on the labor market dynamics, that is, the labor force participation, unemployment, and demographics of the labor force. This also serves as a brief background for the study

in Chapter four about agglomeration economies and wage differences. The chapter is essential in understanding the Turkish economy and the market operations. The chapter considers both the local and foreign populations residing in Türkiye, portraying a unique view of the market and its actors.

Firm formation is essential to the economy, leading to economic activity, employment opportunities, and competition in the existing market. The decision to establish a firm is influenced by a number of factors, many of which may be region-specific (Fritsch and Storey, 2014). Therefore, entrepreneurial activity will differentiate according to the place (Sternberg, 2009). The relationship between unemployment and firm formation has been studied with ambiguous results over time. The theory of income choice has been at the foundation of a number of studies that support the strand of literature that states unemployment will lead to entrepreneurship due to lower opportunity costs (Blau, 1987; Blanchflower and Meyer, 1994). On the other hand, unemployed individuals may not move towards firm formation due to a lack of resources (capital, entrepreneurial knowledge, etc.), hence leading to a lower degree of entrepreneurship (Lucas, 1978). The counter relationship has also been studied, where research has focused on ways in which new firms can create employment opportunities in the labor market, leading to a decrease in unemployment. Recent studies have focused on regional analysis, studying different European regions (O’Leary, 2022); regions within a country, in the case of Belgium (Carree and Dejardin, 2020), Korea (Sung and Kim, 2020), Iran (Cheratian et al., 2019), Poland (Wosiek, 2023), and others.

In light of previous studies, the current research on Türkiye analyzes the relationship between firm formation and unemployment from both perspectives. We test whether unemployment positively or negatively impacts firm formation and vice versa. We focus on the post-2008 financial crisis period and analyze the effects of unemployment and other control variables on firm formation at NUTS-II and NUTS-III regions of Türkiye. The study considers several determinants for entrepreneurial activity, such as GDP, urbanization, population density, patents, and education level. This provides us with a more comprehensive understanding of the relationship between the studied variables at the regional level. The study distinguishes itself from previous literature on Türkiye by utilizing a panel dataset that covers 81 Turkish cities and 26 second-

level regions over ten years (2009 to 2019). This study extends the literature on firm formation and unemployment in the context of a developing country. The analyses shed light on the Schumpeter and refugee effect at the regional(NUTS-II) and city (NUTS-III) levels. The study also adds to the literature by using control variables that act as determinants for firm formation and unemployment. Our results suggest that unemployment has a significant positive effect on new firm formation. The analysis concerning the converse relation, the impact of firm formation on unemployment, reveals no significant results at the NUTS-II level. However, a significant negative relationship is found at the city level with 4- and 5-year lags.

The fourth chapter focuses on agglomeration economies and their impact on wages. Cities are growing across the globe; people continue to flock to urban centers, which provide them with more opportunities. There are benefits to being closer, whether that be firms or people; being located near one another provides benefits known as agglomeration economies (Glaeser, 2010). These benefits can be observed from the firm's and people's perspectives. A firm being near other firms in the same industry (localization) can be beneficial through the sharing of infrastructure or a specialized labor pool (Bolter and Robey, 2020). These firms may also be able to negotiate better with suppliers, in addition to the suppliers being strategically located near them. The location of firms can also benefit by being located near firms from other industries through knowledge spillover effects and greater access to services outside their own industries. It may also be economical for firms to produce goods near the point of consumption (Glaeser and Kerr, 2009). In more populated cities, the production of consumer goods may be nearby within the city or in a nearby location. Agglomeration can also help to sustain infrastructure (Kline and Moretti, 2014). This may be a result of the high usage of infrastructure by people who essentially will pay taxes and pay for services where these earnings can be used to sustain public transportation, roads, etc. The labor pools in large cities are more extensive, providing a more diverse and specialized labor force (Backman and Kohlhase, 2013). The benefit is that firms can match with a labor force that fulfills their needs, and employees can match with a wide variety of firms. In addition, the agglomeration of industry leads to more job creation and employment opportunities (Kazekami, 2017).

Literature on agglomeration economies is vast in developed economies and has recently been more focused on developing economies. In the case of Türkiye, there is limited literature in the field, with most focused on the manufacturing sector (Alkay and Hewings, 2012; Falcıoğlu, 2011; Gezici et al., 2017; Kent, 2018) and some on regional performance (Akgüngör et al., 2012). More recently, Özgüzel (2023) has studied agglomeration economies at the regional level in Türkiye using an administrative dataset from 2008 to 2013. Different from the existing studies using Turkish data, the current study utilizes a rich data set with matched employer-employee data to investigate the agglomeration determinants in Türkiye. The individual-level firm and employee data is matched using the Enterprise Information System (EIS). This study investigates agglomeration economies and their effects on wages using a micro dataset at the city and district levels within Türkiye from 2014 to 2021. Agglomeration economies are measured through specialization, diversity (Shannon's entropy), competition (Hirschman-Herfindahl Index), and density (employment density). This study also contributes to the existing literature through the exploration of agglomeration externalities with the use of firm-level data. Furthermore, it adds to the literature on developing or emerging economies in the case of agglomeration and wage premiums.

In the panel results, we find that being a female has a significant negative impact on wages. The size of the firm is another important determinant, with employee wages increasing as the size of the firm increases. With regards to occupation, individual wages are significantly lower in occupations that require lower education. In terms of agglomeration determinants, the results show that density and diversity have a significant positive impact on wage premiums in Türkiye. However, competition is found to have a significant negative impact on wage differences. Employees in Türkiye benefit from being in cities with greater firm diversity instead of more concentrated industries. These results are similar to those found in the case of other emerging economies.

CHAPTER II

ECONOMIC HISTORY, FIRM DYNAMICS, AND LABOR MARKET DYNAMICS OF TÜRKİYE

2.1. Introduction

A brief overview of the economic history of Türkiye is important and valuable in understanding the way the business community operates within the country. Though there are many aspects to explore within the economic history of any country, we only briefly cover the post-WWII period. This was a time of internal focus by countries around the world since the world had suffered greatly during the war. Many countries adopted inward policies to foster domestic economic growth and protect themselves from the global economy. Low- and middle-income countries faced the tough task of building their industry to compete with those of the upper-income world. In order to do so, protectionist policies were adopted, and governments exerted their control over public companies. Privatization and free trade policies would later be adopted to improve competition among domestic firms and provide better commodities to consumers.

Türkiye struggled for many years in the post-WWII era due to economic policies, political instability, and a lack of economic discipline. We explore this with a brief overview of the economic conditions and policies over this 70-year period. In addition to studying economic history, it is imperative that firm and labor market dynamics be explored. The firm dynamics will provide us with an understanding of the firm openings, closing, growth, and other factors that are prevalent in the market. Meanwhile, labor market dynamics focus on aspects of the market such as labor force participation, employment and unemployment rates, demographic factors of the labor force, and job creation and destruction. All of these combined should provide the reader with an overview of the Turkish labor market.

2.2. Economic History

2.2.1. Economic Struggles of the 1950s and 1960s

In examining the economic history of Türkiye, the post-WWII era is important as the whole world was in rebuild mode. The post-war era brought about global change and development, pushing every country towards industrial development and economic growth. Türkiye's alignment with the West made it a favorable recipient of economic aid from the United States. Additionally, favorable weather conditions led to improved output and expansion in the agricultural sector (Okyar, 1979). However, the expanded benefits of the agricultural sector were short-lived, and the bad weather between 1953 and 1954 resulted in a 20% drop in agricultural output (Krueger, 1974). The agricultural downturn after 1954 led to a reduction in the GNP and further demanded support from the government, leading to increased inflation in the following years (Celasun and Rodrik, 1989). The increasing economic pressures would lead to the first agreement between the International Monetary Fund (IMF) and Türkiye in 1958, bringing about a stabilization program that would lead to Türkiye receiving \$359 million (U.S. Department of State). Türkiye would face further problems, both economic and political, leading to a military coup in 1960, the first of three that would take place in the following decades.

A new constitution was formed in 1961, highlighting the importance of socioeconomic policy and establishing the State Planning Organization, which would be a five-year economic development plan (Celasun and Rodrik, 1989; Krueger, 1974). Economic planning in the 1960s and early part of the 1970s was successful in that the GNP grew by over 6.5% annually, which was 2% higher than in the previous decade (Celasun and Rodrik, 1989). While the new plan had worked to some extent, Türkiye continued to face economic problems late into the 1960s, which ultimately led to another IMF stabilization program in 1970. The measures were similar to those adopted in 1958, with a devaluation of 65% and more liberalization (Yalpat, 1984). The GDP more than doubled from 1960 to 1970 and quadrupled in the next ten years until 1979 (see Figure 2.1).

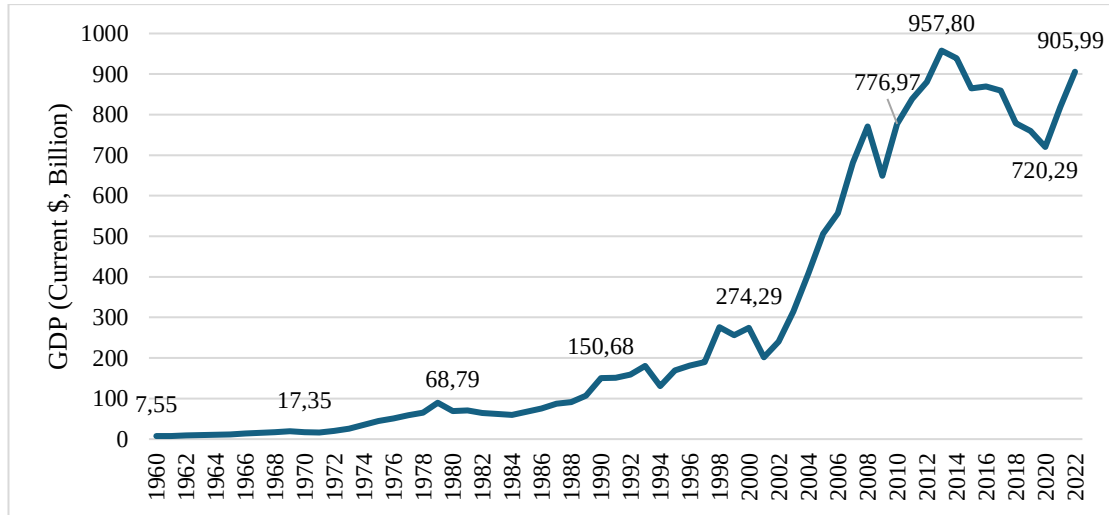


Figure 2.1. Türkiye GDP Historical Data, 1960-2022

Source(s): World Bank Databank (2023)

One aspect of the 1961 constitution that would help Türkiye in the coming years was the export of labor, particularly surplus labor. A bilateral agreement was signed between Türkiye and Germany in 1961 (İçduygu, 2012). Similarly, Türkiye signed labor agreements with Austria, Belgium, and Netherlands in 1964, France in 1964, and Australia and Sweden in 1967. In a 15-year period between 1961 and 1975, about 800,000 immigrants relocated to different European countries (İçduygu, 2012). Over 80% of these migrated to Germany, with France, the Netherlands, and Austria following in 2nd, 3rd, and 4th place respectively. In addition to immigrants going through the employment service, they began traveling to these countries independently or as dependents (Akgündüz, 2015). The immigration of Turkish workers to European countries benefitted the Turkish economy through remittances that increased over this period, leading to improved economic conditions in Türkiye. As a percentage of GDP, the remittances reached as high as 4% and remained between 2% and 3.5% during the 1980s after a dip in the late 1970s. Even with the steady rise in the GDP in the 1990s, the remittances continued to flow, remaining above 1.5% of GDP. This percentage has declined since the early 2000s; however, that is partially due to the exponential growth in the Turkish economy, moving from a \$200 billion economy in 2001 to over \$900 in just over ten years in 2013.

2.2.2. Economic Resurgence and Decline in the 1970s

In the early 1970s, economic growth was fueled by improved exports and increased remittances (due to immigration of labor), which helped increase the foreign exchange reserves to over \$2 billion by 1973 (Yalpat, 1984). Remittances combined with government investments resulted in high growth and domestic output in the 1970s. However, this growth was halted by the oil crisis of 1976 (Çeçen et al., 1994). From the 1960s to the 1970s, the Turkish economy had transformed drastically from an agriculture-intensive to an industry-intensive economy, where the agriculture sector accounted for 38.4% of total output in 1962 and reduced to 23.3% by 1977 (Çeçen et al., 1994). On the other hand, the total production of the industrial sector increased by nearly 10% over the same period. Likewise, the distribution of the labor force went through a similar transformation, where the labor force in the agriculture sector declined, whereas it rose in the manufacturing and service sectors. However, the unemployment rates remained relatively high due to slow growth in the manufacturing sector (compared with other European countries) and a rise in the total population growth. The rising population of the youth in Türkiye, which led to the availability of a higher labor force, was not met with the same growth in industrial sectors. It is important to note that the government of Türkiye had made significant investments in the 60s and 70s, a higher proportion of which was absorbed by the manufacturing, construction, transportation, and communication sectors while the education and health sectors lagged behind. One positive outcome during this period was the labor force's increased efficiency, where the total factor productivity increased at an annual average rate of over 2% in different subsectors within manufacturing. Moreover, the total factor productivity of the public sector was higher than that of the private sector (Krueger and Tuncer, 1980). This displays the importance of the public sector in the growth of the Turkish economy during the 60s and 70s, where their output increased at a higher rate and became more efficient over time.

While the economy improved in the early and mid-70s, a crisis was looming around the corner. The oil crises of the 1970s, which saw the Organization of Arab Petroleum Exporting Countries (OAPEC) impose an embargo on a number of countries in 1973, led to a substantial rise in global oil prices. The prices per barrel of oil increased nearly four-fold and would continue to remain high even after the embargo restrictions were

lifted. In addition to the oil prices creating havoc for the economy of Türkiye, exchange rates and public sector deficits (a surplus of \$534 million in 1973 declined to a deficit of \$3,431 million in 1977) also contributed to an economic crisis (Celasun and Rodrik, 1989).

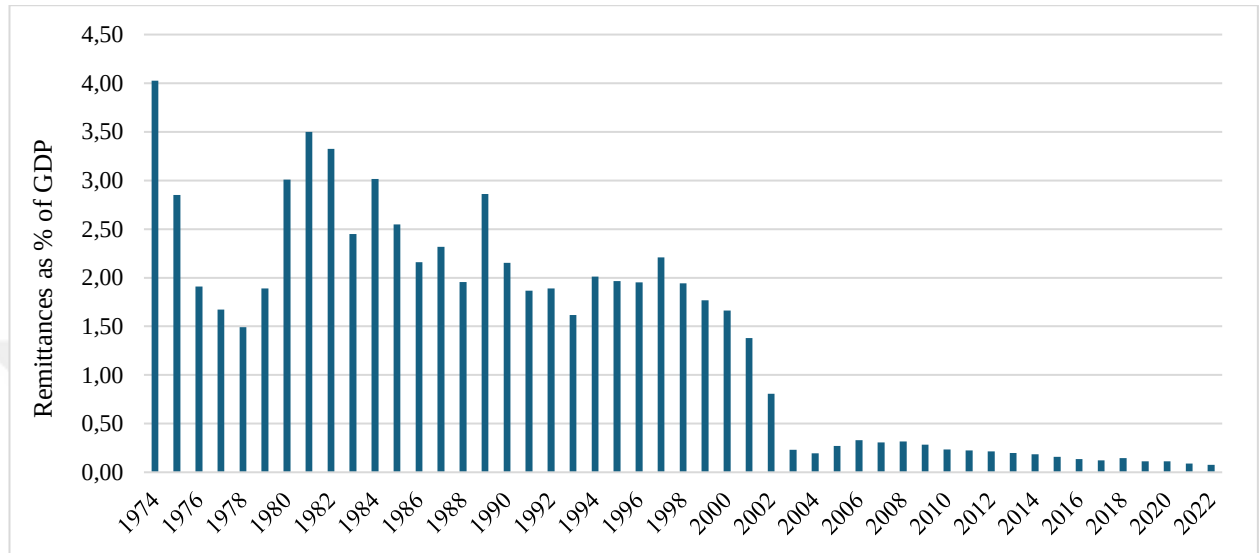


Figure 2.2. Personal Remittances Received as a % of GDP, 1972–2022

Source(s): The World Bank Databank (2023)

This would set the stage for a debt crisis to follow, which the government tried to manage in the following years. The government faced difficulties in making debt payments due to the reduced foreign reserves. Among developing countries, Türkiye's deficit in the percentage of GNP was more significant. While other countries were able to control and even decrease this deficit, for Türkiye, it continued to grow to 7.1% of GNP in 1977. Private sector borrowing protected by government policies was a key factor in driving the debt crisis in the late 1970s (Celasun and Rodrik, 1989). The government provided blanket protection against foreign exchange, motivating the private sector to continue borrowing to feed its funding.

The political situation of the 1970s was one of the critical factors in the economic problems faced by Türkiye. Political instability was a common theme throughout, as coalition governments were formed involving different parties. Several coalition governments were formed, leaving Türkiye with no central authority to take control and steer the economy and the economic policy.

2.2.3. Economic Reforms and Improvements in the 1980s

Drastic economic changes were brought in 1980 to mitigate the deteriorating economic situation within Türkiye. Inflation was at an all-time high and continued to increase into the early 1980s. Immediate changes were necessary to improve the economic situation that Türkiye found itself in when Suleyman Demirel became the Prime Minister of Türkiye in 1979. Turgut Özal and his team drew up economic reforms in early 1980. These included the devaluation of the Turkish Lira against the U.S. dollar (in eight years from 1979 to 1987, the Turkish Lira depreciated 50% in real terms (Baysan and Blitzer, 1990 In Ariclanı and Rodrik, 1990), price increases for SEE produced goods, and organizational changes in ministries responsible for economic policy (Krueger, 1995). The plan was set to liberalize the economy, leading to higher GDP growth and a decrease in inflation (Ertugrul and Selcuk, 2001). In the 1980s, the real GDP grew at 5.8% (1981 to 1988), making a good case for a booming economy. The focus had turned to an export-intensive economy, where the number of exports as a percentage of GDP grew rapidly from 5.16% in 1980 to 18.65% in 1988. A three-fold increase in just eight years. Import liberalization also started taking place; in 1984, the government created a list of commodities that could be imported with a license and others that could not (Ariclanı and Rodrik, 1990). This was a step towards import-friendly policies that had not been in effect prior to the 1980s due to the government's protectionist policies. There was still a lot of work to be done; though some commodities had been allowed to be imported, tariffs on them had been raised. This import liberalization would indeed come into effect in the 1990s, but the process had begun.

Export performance in the 1980s is perhaps the highlight of the economic policies of that time. The promotion of exports through export subsidies was adopted by the government at the time, leading to economic stability in the early 1980s (Boratav et al., 2001). The merchandise exports alone increased more than five-fold in ten years from 1979 to 1988 (\$2.3 billion to \$11.7 billion respectively). However, the late 1980s saw a slowing down in exports, which may partially be a result of the reduction in export subsidies and would eventually lead to these subsidies being imposed again (Arcilani and Rodrik, 1990). Türkiye would also benefit from the political hostilities between Iran and Iraq in the 1980s, as well as from the increase in its market within

the OECD countries. The government's attempt to feed the economy through domestic investment would be in vain. Arcilani and Rodrik (1990) explained that the political and economic environment was not conducive to investment and could not provide the expected benefits. This would also be the case for foreign investment, even though the amount of foreign direct investment and investors grew in the 1980s. Foreign investment would primarily go towards the financial sector, whereas the economic contribution of this sector at the time would be insignificant. Whether it be domestic or foreign investment, they would have benefitted from political stability, lower local currency depreciation, lower interest rates, and lower inflation.

2.2.4. Economic Liberalization in the 1990s

Similar to previous decades, Türkiye faced challenges in the 1990s, which resulted in mixed economic outcomes. There were positives in the shape of economic liberalization, trade liberalization, and growth, while at the same time, Türkiye would face crises, high inflation, and political instability. One of the factors that led to liberalization in the early 1990s was the increase in real wages, which had been suppressed in the past. In the manufacturing sector (the economy's most important sector at the time), wages increased by 90% within three years from 1988 to 1991 (Boratav et al., 2001). The industry was able to counter the rising wages with a slow-down in employment, hence continuing to perform and maintain a surplus.

As mentioned in the previous section, liberalization policies were adopted during the Özal governance. These policies aimed to reduce interference in the economy by the state and increase privatization of public (state) owned enterprises. It would also encourage foreign investors to enter the Turkish market in a bid to improve economic growth. Trade liberalization was another way in which Türkiye would open up to the global markets and improve its economic development. In the past, Türkiye had protected the domestic market through the implementation of high tariffs. However, in the 1990s, these tariffs were lowered to improve the accessibility of foreign products and push the local industry to improve their products. Türkiye also joined a Customs Union with the European Union in 1996, beginning a new trade era between the two partners. As part of the Customs Union, Türkiye would also align its trade policies and regulations with the EU, furthering the partner's economic integration. This also

expanded Türkiye's market to the EU, improving the already fruitful trade relationship between the two.

In addition to the Customs Union, Türkiye also sought to sign trade agreements with other countries in order to improve its exports and encourage foreign investment. The reduction of trade barriers would stimulate the local industry by improving export terms. Finally, Türkiye promoted both exports and foreign investment by improving regulations for foreign investors and improving the business environment. These efforts brought a positive change to the Turkish economy and also opened the country to the global economy, stimulating domestic growth and improving competitiveness.

An important outcome of the open economic environment was the introduction of regulatory bodies that would shape the future economy and provide much-needed confidence for foreign investors. A key institution formed due to the Customs Union that went into effect in 1996 was the Competition Board in Türkiye, a first in the country's history (Öniş, 2004). In addition, the involvement of the IMF in the Turkish economy would lead to the establishment of the Banking Regulatory and Supervisory Authority (BRSA). Being a part of the Customs Union and adhering to its regulations pushed Türkiye to establish regulatory bodies and adopt globally accepted standards. The European Union (EU), in particular, through accession terms for Türkiye, would be a motivator to improve its institutional framework, whether that be through improving its operational institutions or forming new institutions that would help regulate the economic environment.

2.2.5. Economic Growth and Stability Post-2000s

The turn of the century was unpleasant for the Turkish economy as it faced yet another crisis in 2001. Yet again, the country faced reforms and restructuring and sought the support of the IMF, where \$3 billion would be approved for Türkiye (IMF, 2001). It can be said that Türkiye needed the EU and the IMF to undertake reforms that would strengthen the country and its economic system (Öniş, 2009). In the aftermath of this crisis, the newly led Turkish government strengthened the Central Bank of Türkiye (CBRT) with banking reforms and improved financial management. One outcome of the banking reforms was the increased stability and confidence in the Turkish economy

from a foreign perspective. The BRSA, which was established in the late 1990s, became more effective through greater autonomy in the 2000s, which would lead to the banking system being more aligned with international norms (Tükel et al., 2006). The reforms also translated into an increase in foreign direct investment (FDI). This new phase of the economy was led by an improvement in the investment environment (Çanakçı, 2005). Investors turned to Türkiye due to the newly gained institutional security. The FDI to Türkiye rose to as large as \$22 billion in 2007, its highest point in history (see Figure 2.3). Since 2000, foreign investors have invested more than \$250 billion (current USD) in Türkiye. There have been some fluctuations in the amount of FDI, but it has remained high, with investors continuing to prefer Türkiye as the country continues to develop and improve over time. The lowest amount of FDI in the past 15 years was received in 2020 (COVID year); however, this number bounced right back up to over \$13 billion in 2021 and 2022. Türkiye, as an emerging economy, continues to reap benefits from the strong financial institutions, banking sector, and policies that favor economic growth.

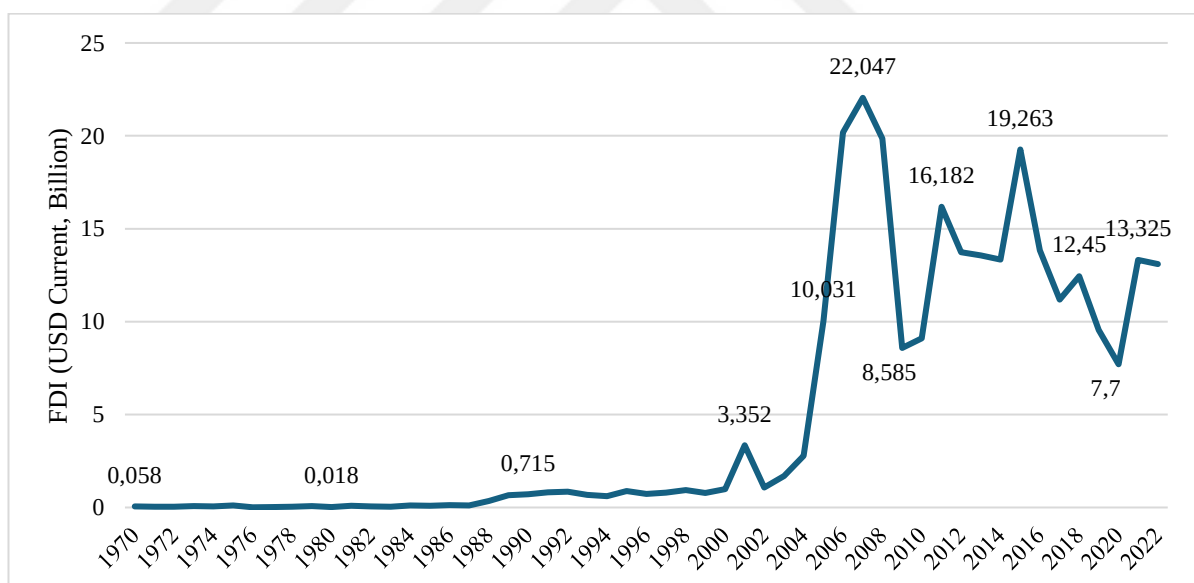


Figure 2.3. FDI to Türkiye From 1970-2022 (USD Current, Billion)

Source(s): The World Bank Databank (2024)

Stability brought about through the reforms and the implementation of the rule of law portrayed an image of Türkiye that it could and would protect investment partners. The following years would see Türkiye flourish with an average of over 5% GDP growth

for a number of years (from 2002 to 2010) and an improved foreign direct investment leading to domestic economic activity. Economic growth also paid favors to the citizens of the country. Türkiye's GDP per capita doubled in the same period, increasing from just over \$4,000 in 2000 to over \$10,000 in 2010. In addition, there was a boost in infrastructure development with significant projects that would position Türkiye as a transport hub. The road infrastructure was improved and expanded, making way for more efficient trade through road transportation. Coşar and Demir (2016) find that with the improvement of the domestic road structure in Türkiye in the 2000s, there was a decrease in transport costs, which led to increased trade between regions.

One of the problems that Türkiye faced as a result of the growth was that the economy grew more import-dependent. In the manufacturing sector, the dependency on imports has grown over time in Türkiye from 1987 to 2008 (Saygılı and Saygılı, 2011). Similarly, other sectors such as energy, machinery, electrical, medical, and chemical were the highest import-dependent sectors according to a study that covered the 2010-2014 period (Sönmez, 2015). Despite some drawbacks, Türkiye was able to grow quickly from 2000 to 2010, with fast economic growth. There were more major challenges awaiting the country in the next ten years, prior to the COVID-19 pandemic, that would shock the whole world.

Political uncertainty would define these ten years as the failed coup attempt in 2016 overshadowed all other matters. The subsequent policy decisions led to uncertainty for investors and businesses alike. In addition, the Turkish Lira faced increased devaluation arising from the external debt and the government's monetary policy. The devaluation of the Turkish Lira over time would lead to high inflation, which gripped the Turkish economy in the post-COVID time. The Turkish economy, much like other economies around the globe, contracted in 2020 as a result of the COVID-19 pandemic. After the pandemic, Türkiye has been facing high inflation, continued currency devaluation, and political instability. Türkiye's GDP has, to some extent, recovered from the contraction in 2020; however, the country continues to struggle with economic policies that have not been able to contain the high inflation.

In general, compared with developing countries, Türkiye's growth has fared above the average. However, it has lagged behind countries from East Europe and East Asia (Altug et al., 2008). Countries that had comparable per capita income levels to that of Türkiye in 1960 had shown better GDP growth rates, although the economy of Türkiye post-2000s has improved, leading to higher living standards and improved per capita income (better than many developing countries around the globe). Among the upper-middle-income (UMI) countries, Türkiye has performed at or above the average and has maintained itself quite well in the past few decades (see Figure 2.4). Currently, just four UMI countries are performing better than Türkiye, namely China, Russia, Malaysia, and Mexico.

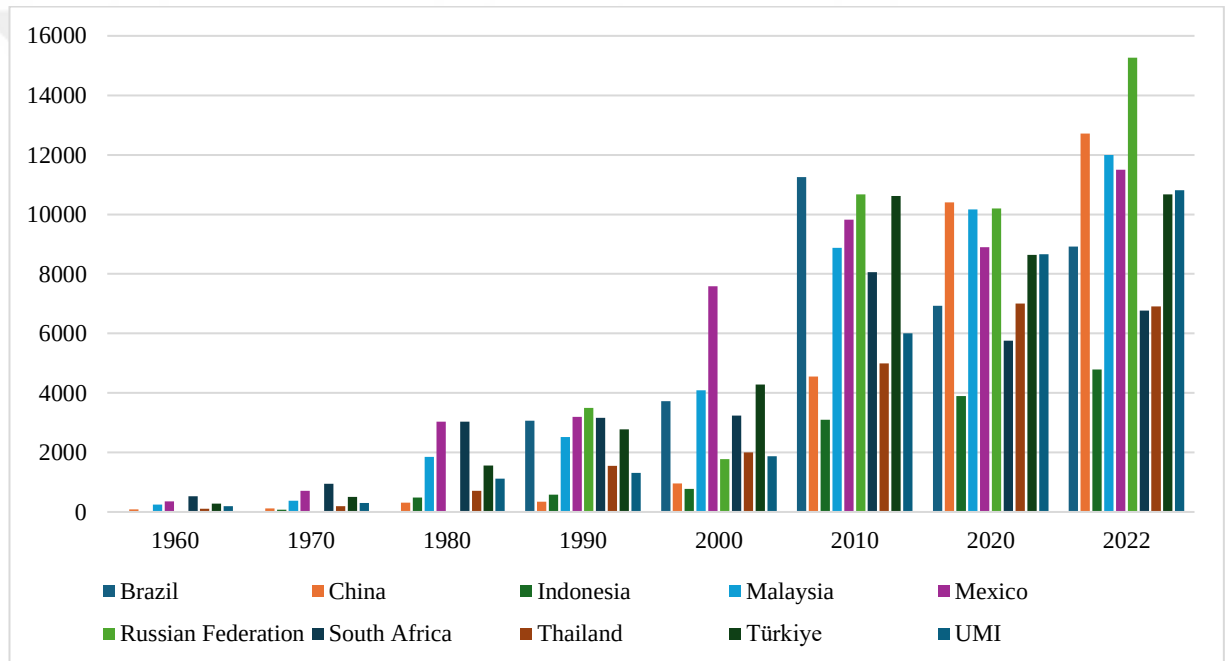


Figure 2.4. GDP Per Capita (Current USD) 1960 to 2022

Source(s): The World Bank Databank (2024)

Türkiye has experienced its highs and lows in the post-WWII era. Over the past 70 years, there have been many economic challenges and crises. However, Türkiye has improved its institutions and implemented reforms that have enhanced the overall business environment, leading to economic growth. In recent years, the economy's struggles have increased and been exacerbated by the COVID-19 pandemic. It will be necessary for Türkiye to continue implementing high standards among different government institutions and exercise discipline over its monetary and fiscal policies.

The economic challenges can be overcome through strong leadership and economic policy that favors the domestic industry and creates a conducive environment for competition and business.

2.3. Firm Dynamics

The term firm dynamics pertains to the characteristics of firms that change over time, including firm entry, exit, growth, etc. These dynamics can be traced back a century to Alfred Marshall (1920), who discussed firm entry, growth, and exit. Firms are established and grow over time; many may reach a certain level of maturity before giving way to younger rivals that enter the market with innovative ideas and improved production methods. Schumpeter (1942) emphasized the importance of innovation in a dynamic economy, terming it ‘creative destruction,’ a process by which markets are transformed by technology. Firms constantly try to improve and change their ways through new technologies and improved organizational structures. In the development of firm dynamics, Robert Gibrat (1931) proposed a model in which he stated that firm growth is independent of the firm size and that firms grow at a proportional rate no matter the size of the firm; this is known as Gibrat’s law. An example of such can be a 10% growth for firms, whereas for a medium-sized firm with 50 employees, this would translate to 5 additional employees, and a large employee with 5,000 employees would have this same growth translate into 500 additional employees. There has been plenty of literature on different models that may explain firm dynamics, statistical models (Simon and Bonni, 1958; Adelman, 1958), competitive equilibrium models (Lucas and Prescott, 1971), dynamic models (Smith, 1974), and equilibrium models (Jovanovic, 1982). These models have improved and enriched over time with additions from a number of researchers in the field of economics and firm dynamics. A discussion on the theory of firm dynamics is lengthy and requires an in-depth discussion, which is not the focus of this chapter. Instead, this chapter focuses on the firm demographics in Türkiye by exploring the data on established firms, new firm formation, firm formation by foreigners, and the development of the firms over time. This is not only examined on a national scale but also broken down by cities and industries.

2.3.1. An Overview of Enterprises in Türkiye

The number of enterprises in Türkiye has increased immensely over the years (see Figure 2.5). In 2006, over 1.9 million enterprises were operational in Türkiye, and this number has more than doubled to over 3.8 million in 2019. While the number of total enterprises has seen a decline in Türkiye since 2019, newly registered firms continue to increase. Looking over the data from 2006, one can observe a slight decrease is observed every few years. There are fluctuations yearly; however, the trendline shows that the number of enterprises has increased. The COVID-19 pandemic has had an adverse effect on firms across the globe, leading to a decline in sales and forcing many firms to cease operations. This can be directly observed by the data in Türkiye, where there has been a decrease of more than 400,000 enterprises in the two years following the pandemic. So, even though the number of newly registered firms is increasing, the overall operational firms have decreased.

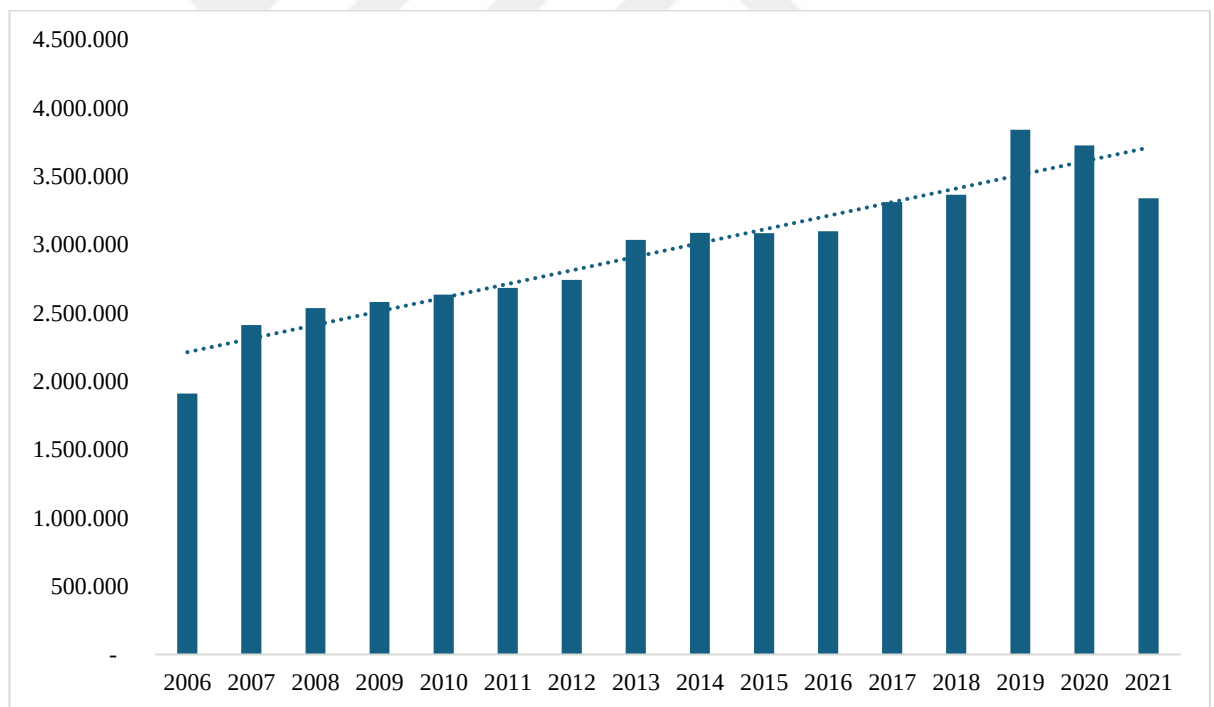


Figure 2.5. Number of Enterprises in Türkiye by Year (2006-2021)

Source(s): EIS (2023)

Thousands of firms are entering and exiting the market each year. Many firms may be established as a way to cope with unemployment (necessity entrepreneurship), while

others may be established to fulfill a market need. Whatever the reason, government policies that favor entrepreneurs can help improve new firm establishments and help economic growth. When examining firm size distribution, most of the firms across the globe are micro enterprises (less than ten employees). According to the Eurostat data used by Poschke (2018), across 12 European countries (including Spain, France, Netherlands, and Portugal, among others), micro-enterprises make up more than 93% of all enterprises. Schaper et al. (2009) find similar is the case in other developed countries such as Canada (~93% from 1983 to 2001), Australia (~80% from 1983 to 2002), and China (~87% from 1999 to 2003).

Table 2.1. Enterprises in Türkiye by Size (2006-2021)

Year	Micro Enterprise		Small Enterprise		Medium Enterprise		Above SME	
	#	Pct of Total	#	Pct of Total	#	Pct of Total	#	Pct of Total
2006	1,792,959	93.92%	98,729	5.17%	14,293	0.75%	2,951	0.15%
2007	2,289,413	94.95%	103,945	4.31%	14,721	0.61%	3,138	0.13%
2008	2,403,485	94.82%	112,070	4.42%	15,879	0.63%	3,274	0.13%
2009	2,453,978	95.10%	107,280	4.16%	15,989	0.62%	3,295	0.13%
2010	2,491,530	94.58%	120,681	4.58%	18,179	0.69%	3,788	0.14%
2011	2,520,984	93.98%	136,328	5.08%	20,885	0.78%	4,273	0.16%
2012	2,566,311	93.56%	148,903	5.43%	23,024	0.84%	4,707	0.17%
2013	2,850,940	93.92%	154,771	5.10%	24,795	0.82%	5,136	0.17%
2014	2,885,139	93.50%	167,871	5.44%	27,203	0.88%	5,436	0.18%
2015	2,867,751	92.95%	181,256	5.88%	30,087	0.98%	6,083	0.20%
2016	2,885,072	93.10%	177,483	5.73%	29,881	0.96%	6,303	0.20%
2017	3,071,144	92.73%	199,379	6.02%	34,104	1.03%	7,133	0.22%
2018	3,122,730	92.82%	196,357	5.84%	33,256	0.99%	7,160	0.21%
2019	3,606,035	93.86%	195,333	5.08%	31,975	0.83%	6,942	0.18%
2020	3,456,045	92.75%	223,533	6.00%	37,883	1.02%	8,408	0.23%
2021	3,020,234	90.42%	260,146	7.79%	48,117	1.44%	11,739	0.35%

Source(s): EIS (2023)

In the case of Türkiye, the number of micro-enterprises over the years has remained between 90% and 95% (see Table 2.1) of all enterprises. As the size of the enterprise increases, the proportion of those enterprises in the total decreases. Similar patterns are seen globally in both developed and developing countries. Micro and Small

Enterprises also make up the majority of the employment in many countries around the globe. According to ILO (El Achar, 2023), the share of employment by micro and small enterprises combined makes up more than 90% of employment in countries in different regions of Africa, as well as Central and Western Asia. In Türkiye, this proportion stands at 83%, and the share of employment in manufacturing of food products and wearing apparel by micro and small enterprises stood at 76% and 70%, respectively (ILO, 2023). The importance of MSEs is realized through their contribution to the labor market and economic development, and they are engines of economic growth.

In terms of sectors, wholesale and retail sectors have the highest proportion (almost 37%) of all the enterprises; however, this proportion has decreased by more than 4% since 2006. The professional, scientific, and technical sectors have seen the highest growth in this same period, while the construction sector has grown nearly 2%. Türkiye has developed immensely since the turn of the century, which is one of the reasons for the growth in the construction sector. The service sector has also grown as the economy has continued to develop, with services taking up the higher proportion of all the enterprises. The service sector accounts for 45% of employment in developing countries, while this number is around 75% for developed economies (Gill, 2021). The service sector also plays a vital role in developed economies, where two-thirds of the GDP can be associated with the service sector (Attiah, 2019). Employment trends in the US show the ever-growing service sector. In the last century, the proportion of employment in both agriculture and industry has declined (Rogerson et al., 2014). Different studies have found that a variety of service activities experience high growth (Loungani and Mishra, 2014; Gervais and Jensen, 2019). In the case of Africa, countries are also rapidly moving towards the service sector, and the share of employment in the service sector is increasing (Baccini et al., 2021). The manufacturing sector has been at the forefront of economic growth over the past century; however, the service sector has become just as important as it is, if not more important. Especially in developed economies, the service sector continues to grow in terms of its economic impact on market development and labor market demands. The developing economies have also increasingly moved towards the service sector to speed up economic development.

2.3.2. The Pandemic and Firm Formation in Türkiye

The effects of the COVID-19 pandemic on firms have been studied widely across the globe in the previous three years. The pandemic brought about a time of uncertainty, leading to a substantial decline in sales (Apedo-Amah et al., 2020; Ding, 2020; Fairlie & Fossen, 2021;) as consumers tried to predict and prepare themselves for difficult financial times. The largest sale drops were immediate as business closures began to occur, where the smallest offline businesses faced the largest loss in sales and continued to persist throughout the year 2020 (Bloom et al., 2021). The same was true for different industries, where specific sectors, such as accommodation, faced higher losses of as much as 91% due to mandatory lockdowns (Fairlie & Fossen, 2021). During the pandemic, companies that were more technologically advanced and digitized were able to perform better due to the increased consumption of the internet and increased online sales. At a time when smaller, unproductive firms were moving towards closure, technologically advanced companies were on the opposite side of the spectrum (Janzen and Radulescu, 2021; Muzi et al., 2023). In the face of the pandemic, many companies digitized very quickly to conform with the changes in the consumer behavior of online shopping (Kim, 2020). Firms were able to create successful business models by developing online platforms, making products and services more accessible to consumers from the comfort of their homes (Manolova et al., 2020). While the pandemic had an immediate negative impact on businesses, governments across the globe moved quickly to mitigate the negative effects by offering relief to firms through a number of different strategies. Some of these policies included debt finance support (restricting or rescheduling of payments, credit guarantees, or lending under favorable terms), employment support (wage subsidies or support for self-employed individuals), and tax relief programs. The policies adopted by the government generally conform to economic development (whether the country is low, medium, or high-income). High-income economies used tax relief and employment support policies, whereas low-income economies relied on debt financing (Cirera et al., 2021). From an economic perspective, low-income countries may not have the financial means to provide employment support programs such as direct income support; therefore, they rely on policies that would give tax breaks or financial restructuring. On the other hand, high-income economies have the financial strength to provide monetary transfers or wage subsidies. In Türkiye, the government

implemented a wage support program, increased salaries for healthcare employees, and provided monetary transfers to more than 2 million citizens.

Despite the COVID-19 pandemic, registration of new enterprises in Türkiye increased by over 20% compared to 2019. Upon examination of the monthly data, it is observed that new firm registrations dipped immediately following the mandated lockdown implemented in March 2020 (see Figure 2.6), and they continued to remain low for just two months (April and May) compared to 2018 and 2019. Besides those two months, the number of new registered firms was higher in 2020 than in 2019. In fact, the highest percentage difference in the number of new firms was in May (109% higher than in 2019) and showed high growth afterward throughout the rest of the year. A similar pattern has been observed in other countries, such as Brazil and Pakistan (Meunier et al., 2022). Figure 2.6 below shows the monthly firm registrations, showing a declining pattern in April and May across the years, though this decline is more profound in 2020. However, after those down months in 2020, the number of registered firms is relatively higher compared to other years (possibly making up for the two months in which there were strict COVID lockdown conditions). In general, the openings in later months follow a similar pattern to those of years prior (2018, 2019) and post (2021, 2022) COVID restrictions.

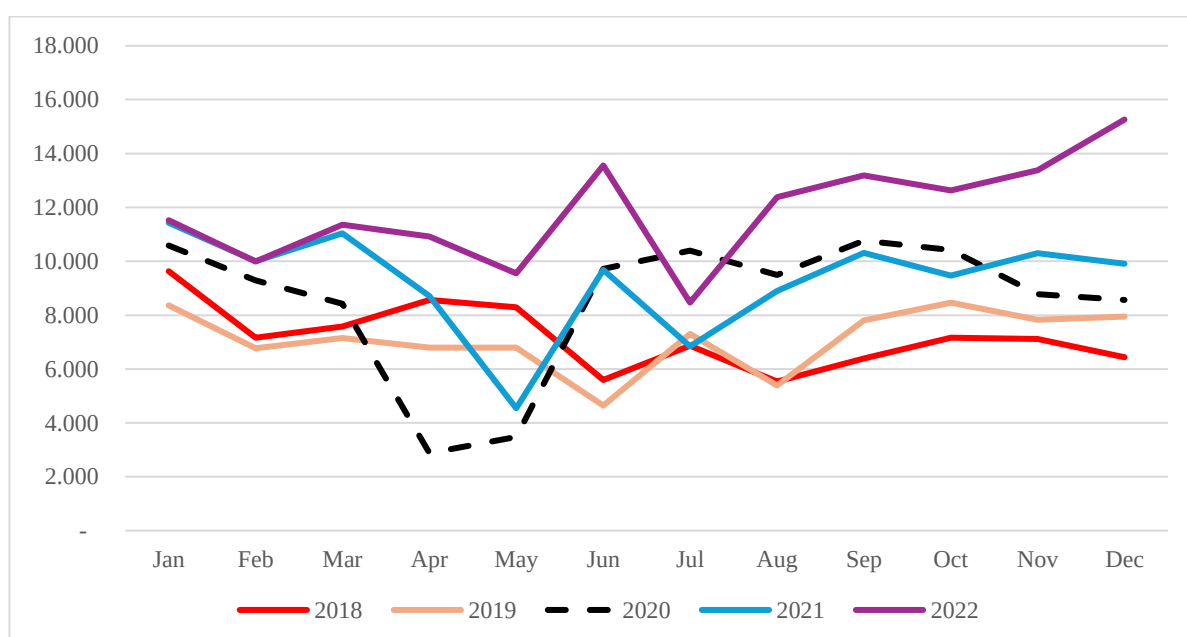


Figure 2.6. Newly Registered Firms in Türkiye by Month (2018-2023)
Source(s): TOBB (2023)

The COVID-19 pandemic has had a mixed effect on the registration of new enterprises in countries around the world. According to data from the World Bank Entrepreneurship Database, 58% of the economies around the globe experienced a decrease in the number of newly registered firms (Meunier et al., 2022). This is only 10% lower than the number of economies that experienced a decline in newly established firms during the financial crisis of 2008/2009 (68% in 2009). These are also the only two years from 2009 onwards when the number of economies with a decrease in new firms outnumbered those with an increase (Meunier et al., 2022). In the case of Türkiye, the number of newly established firms declined in both 2008 and 2009 until bouncing back the following year (See Appendix A, Table A.1 for the growth rates of newly established firms Since 2006).

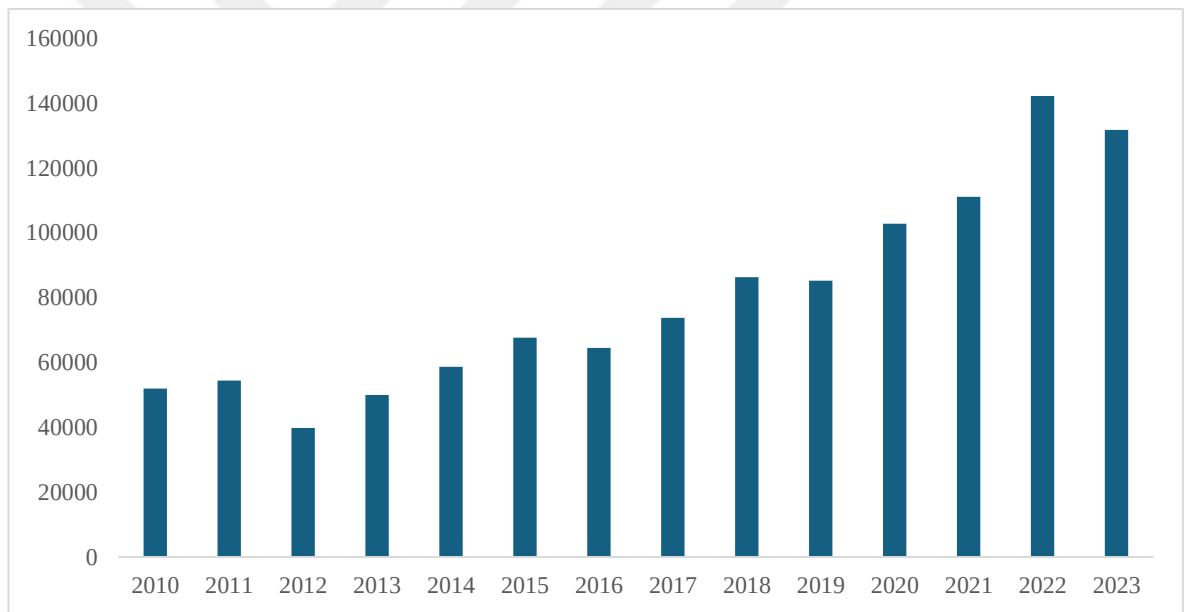


Figure 2.7. Number of Newly Registered Firms in Türkiye by Year (2010-2023)

Source(s): TOBB (2024)

Naturally, as the population of Türkiye has grown, the number of businesses also tends to increase since more individuals in the labor market means that more individuals also have self-employment to make financial gains (See Figure 2.7). However, compared to the labor force or the working-age population, the new business density has also grown from 1.18 in 2006 to 2.45 in 2022 (World Bank Entrepreneurship Database, 2024). The recent development in new firms may also be a result of the ease in

regulations and doing business within Türkiye. According to the World Bank Ease of Doing Business Rankings (World Bank DataBank, 2024), Türkiye improved from ranked 73 in the world in 2009 to 33 in 2019. Government policies have made it much easier and faster to open and operate a business through quick registration, faster acquisition of property, and improved services. In addition, the government has made it more friendly for foreign investors to be able to take advantage of the business environment within the country.

2.3.3. Business Formation in Türkiye by Foreigners

2.3.3.1. Brief Overview of Foreigners Residing in Türkiye

The number of foreigners residing in Türkiye has increased immensely over the last 15 years. This is a result of a combination of different policies to attract foreigners as well as the Syrian refugee crisis that resulted from the uprising in Syria in 2010-2011, part of a more significant Arab Spring uprising across a number of Middle East and North African (MENA) nations. In order to better understand how and why the number of foreigners has increased (equally leading to an increase in the number of foreign-owned businesses) in Türkiye, we must observe some of the policies that have contributed to this sharp rise in numbers.

The Syrian refugee crisis, which began in 2011, resulted in the displacement of millions of Syrians, a majority of whom fled to neighboring countries, including Egypt, Iraq, Jordan, Lebanon, and Türkiye. A smaller number fled to countries across the globe, including those in Europe, Canada, the United States, etc. While the refugees have made different countries their home, a majority of them have settled in Türkiye. According to the Presidency of Migration Management (PMM, 2024), currently, there are more than 3.1 million Syrians living under Temporary Protection Status (TPS) within Türkiye (See Figure 2.8).

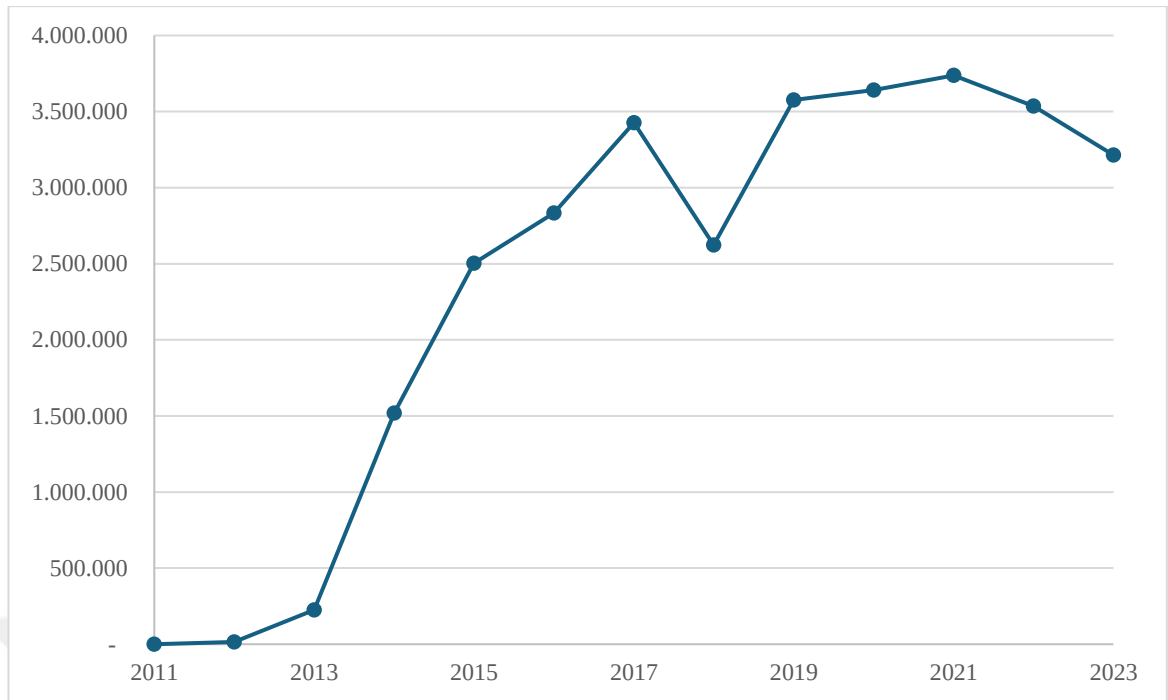


Figure 2.8. Syrians Registered Under the TPS in Türkiye Since 2011

Source(s): DGMM (2024)

The Syrian refugee crisis led to a large influx of the Syrian population into Türkiye, with most of them having the TPS status and others attaining short-term resident permits based either on education, business, or work. Alongside the Syrian influx, the foreign population also began to increase at a higher rate in the 2010s. This can be attributed to educational institutes targeting international students, increased business opportunities resulting from the influx of foreigners in Türkiye, government-led investment policies for foreigners, etc. The number of foreigners is more than ten times what they were in 2005. This number has increased consistently between 10% and 20% over the previous year, with the largest increase coming in 2016, when the number of foreigners almost doubled (93% increase) compared to 2015. The number of foreigners in Türkiye is still relatively on the lower end when compared with the total population (just over 2%). At the same time, combined with the Syrians under TPS, this rises to nearly 6%.

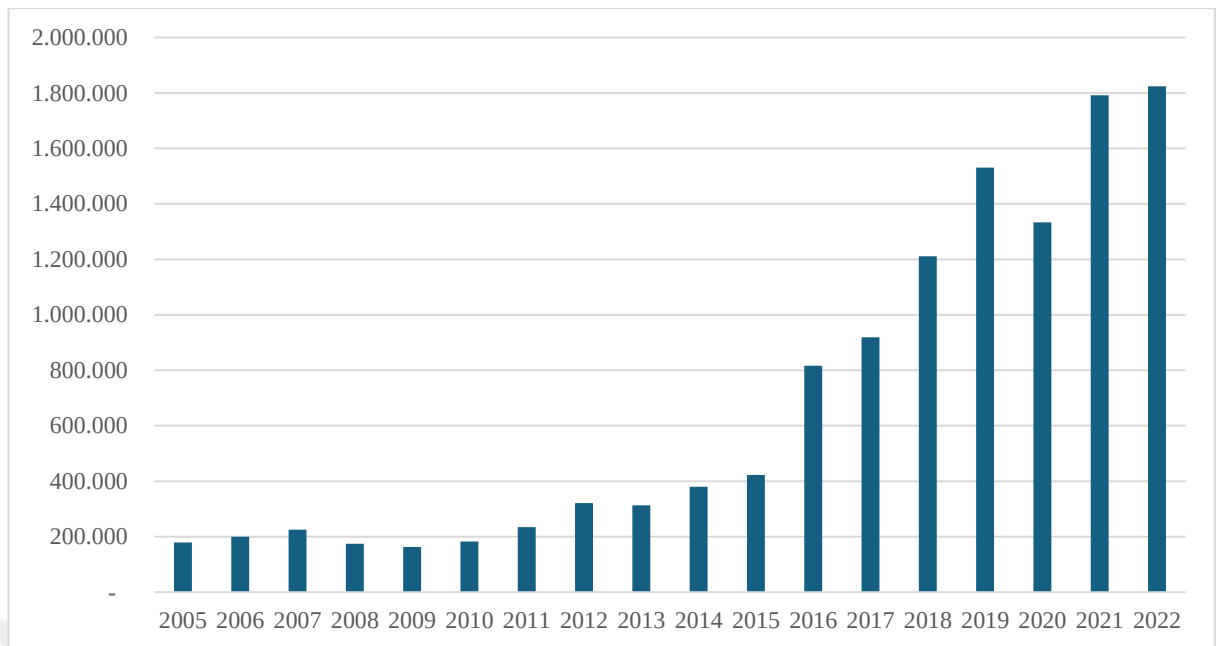


Figure 2.9. Foreigners with Residence Permit in Türkiye by Year (2005-2022)

Source(s): 2005 to 2015 data (DGMM) & 2016 to 2022 data (TUIK)

The Syrian crisis has not only been a catalyst for the rising number of Syrians in Türkiye but also, to some extent, given rise to the overall number of foreigners that have made Türkiye their home, whether that be for education, business, work, or otherwise (See Figure 2.9). People from the MENA region comprise Türkiye's most significant proportion of foreigners, with over 37% (675,784) of the total foreign population. Central Asia is the second region with the largest proportion of foreign population, 14% (255,369 people). Other notable populations include Afghanistan, with over 186,000 people in Türkiye, and Russia, with over 151,000 people (See Appendix A, Table A.2).

Istanbul hosts the highest number and proportion of foreign residents (naturally, that would be the case given that it is the economic hub of Türkiye and the largest city). Over the years, the proportion of foreigners in Istanbul has increased from 30.30% of the total foreign population in 2016 to 40.37% in 2022 (TUIK, 2023). Most of the foreign population in Türkiye is in highly populated Turkish cities, mostly residing in the central and western Türkiye. There is a higher number of Syrians in eastern Türkiye. However, this is not portrayed in Figure 2.10 since it shows the number of foreigners that reside in Türkiye with a residence permit.

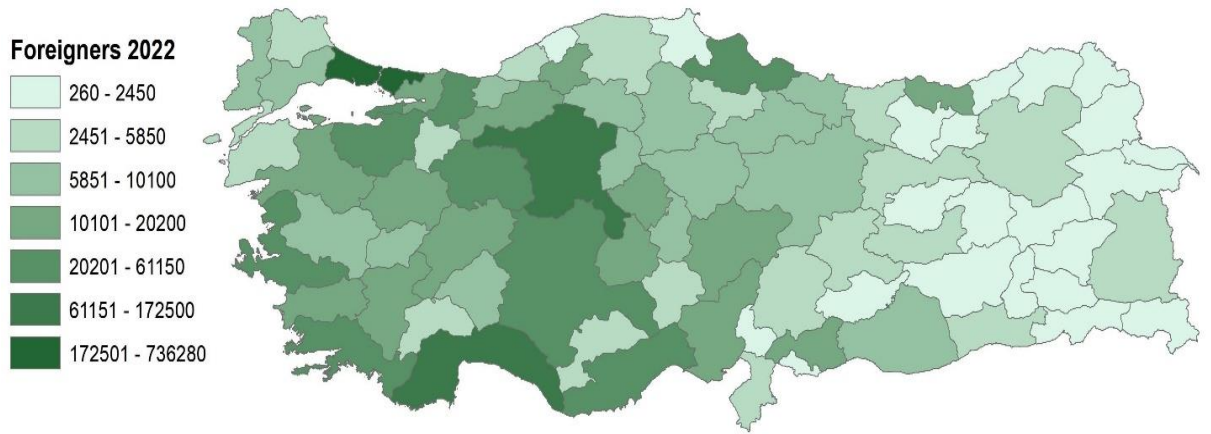


Figure 2.10. Number of Foreigners with a Residence Permit by City (2022)

Source(s): DGMM (2023), visualized by Author.

2.3.3.2. Firm Establishment with Foreign Partners

In the same period that the number of foreigners increased in Türkiye, the number of foreign-owned businesses also increased (See Figure 2.11). The number of newly established firms with foreign partners remained below 5,000 per annum up until the end of 2016. However, this figure increased by more than 60% in 2017 year over year and more than doubled the following year in 2018. The rise in foreign established firms coincides with the increasing number of foreigners in Türkiye, especially given the influx of Syrians in 2014. A lagged increase in the establishment of businesses is observed in the years following.

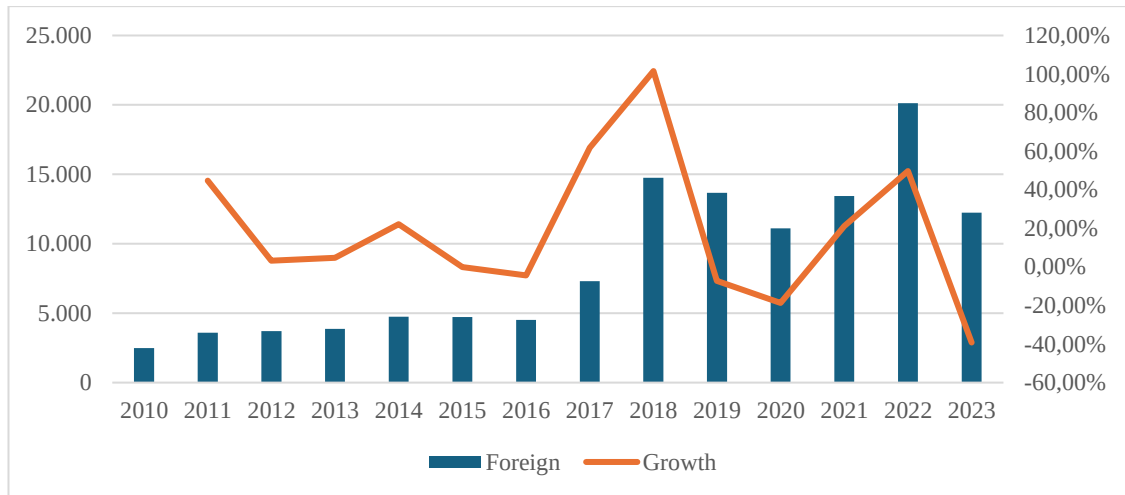


Figure 2.11. Newly Established Firms with Foreign Partners by Year (2010-2023)

Source(s): TOBB (2024)

The growth of foreign-owned businesses can also be observed by the growth of these businesses compared to all newly established firms in Türkiye (See Appendix A, Figure A.1). In 2010, only 4.6% of all the newly established businesses had foreign partners, whereas this percentage grew to 14.6% in 2018. Historically, the highest number of newly established businesses with foreign partners was formed in 2022, showing the resilience of foreign entrepreneurs in the post-COVID era. It must be noted that all businesses grew post-COVID; this may be due to a multitude of reasons. First, it is possible that people are having a more difficult time finding employment; hence, they opt for self-employment. Second, companies may be laying off workers due to slow sales during the COVID-19 pandemic, leading to an increase in unemployment and greater chances of unemployed individuals moving towards self-employment. As noted earlier, in the case of Türkiye, the slowdown of business establishment was temporary and only lasted a few months immediately after lockdown sanctions were imposed. However, when observing the year 2020, there was, in fact, growth in newly established firms in Türkiye by nearly 20% compared to 2019, which continued to grow in 2021 and 2022 and has only slowed down in 2023 but still far above 2019 (pre-COVID) and 2020 (COVID period).

Foreigners from the Middle East and North African (MENA) region have been at the forefront of firm establishments in Türkiye. Since 2014, foreigners from MENA

countries have established more than 20,000 firms in Türkiye. This rise in businesses owned by Arabic-speaking foreigners results from several factors. One, the Syrian influx has meant that there is a sizeable Arabic-speaking customer base to be served; two, similarities in culture between the MENA countries may lead individuals from these countries to invest in businesses in Türkiye; and last but not least, the availability of Arabic speaking staff due to the Syrian crisis. The wholesale and retail sectors comprise a large proportion of the foreign-owned firms (over 45%) over a 5-year combined period from 2017 to 2021 (Moiz and Turkec, 2023). This may result from low entry barriers and the low knowledge of the market required to open up a business in the sector. Foreign investors prefer the service sectors (accommodation and food services, administrative and support services, professional, scientific, and technical activities, and real estate services).

2.4. Labor Market Dynamics

The labor market is undoubtedly a significant component of the economy as it is intricately connected to capital, goods, and services. The labor market can be inspected through both macroeconomic and microeconomics lenses. On the macro level, this may relate to the unemployment rate, labor force participation, and labor productivity. On the micro level, components such as employee wages, number of work hours, and employee education or skills. In studying the labor market, the stylized facts about the market must be examined. In this section, the labor market dynamics of Türkiye are analyzed and described in their raw form. Three aspects are of interest: the labor force, unemployment, and the foreign workers in Türkiye. They are all examined through a demographic lens to show how these factors change among gender, age group, education level, and regional dispersion.

2.4.1. Labor Force Participation

The labor force datasets comprehensively capture the evolving demographic and educational profiles of workers over several decades, delineating shifts in age, gender, and academic qualifications. From trends indicating an aging and more experienced labor force to a tangible increase in higher education attainment, the data reflect broader societal changes. Specifically, age groups such as 35-54 and those over 55

have become more prominent in recent years, while younger cohorts like 15-19 have seen decreases, most probably due to extended education. The data also reveals a remarkable rise in skilled workers, with those holding high school, vocational, and especially college or university degrees growing exponentially, underscoring the increasing premium on education in today's labor market.

Among the emerging economies, Türkiye's labor force participation has lagged behind, remaining within a 46% to 57% range since 1991 (See Figure 2.12). Within that same period, the average among upper-middle-income countries has remained above 60%, and other countries of interest, such as Brazil, China, Indonesia, and Malaysia, have converged towards a similar labor participation rate of 65% yet Türkiye remains below 55%. One of the reasons behind these low labor force participation rates has been low female labor force participation, possibly due to females remaining as housewives and or the involvement of individuals in family-owned businesses as unpaid/unregistered workers (Korkmaz and Korkut, 2012; Önder, 2013). Despite the growth of the population and the number of individuals employed, employment participation has remained low (Kargi, 2014).

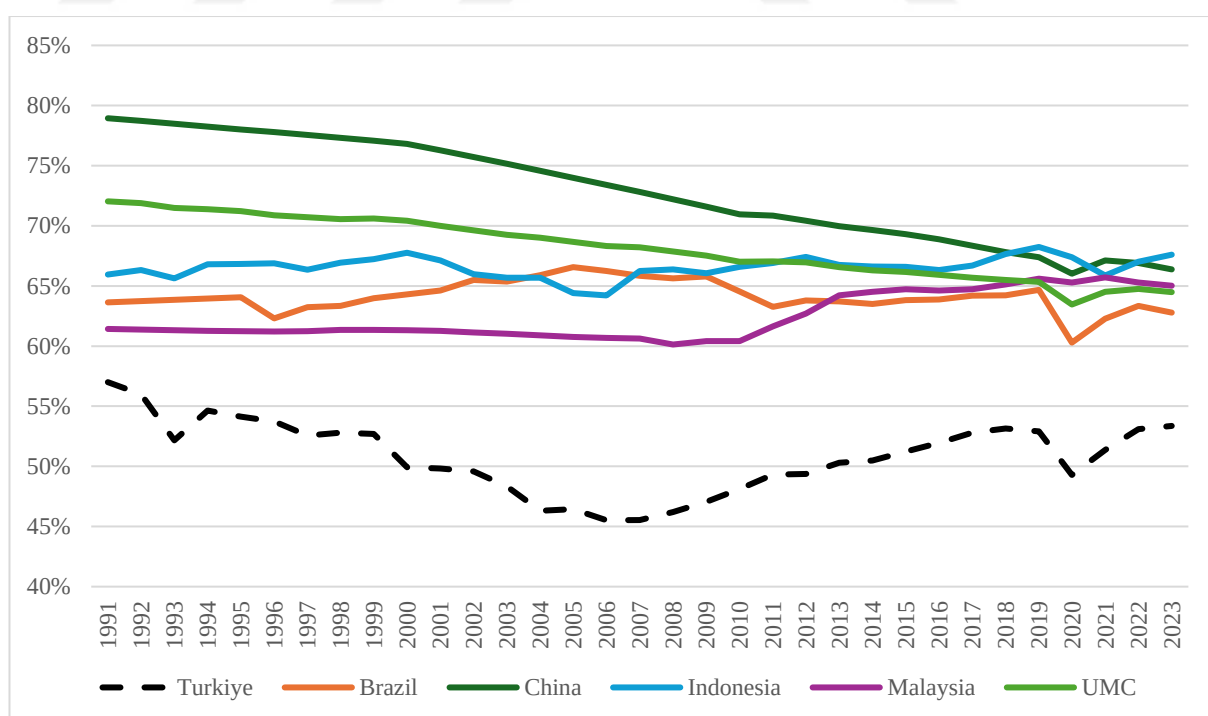


Figure 2.12. Labor Force Participation by Country (1991-2023)

Source(s): The World Bank Databank (2024)

The labor force has seen considerable growth over these years, but that may be attributed to the increasing population. In 1988, the labor force started at 19.4 million people, and by 2022, it had increased to 34.3 million, representing an overall growth of approximately 77% (See Figure 2.12). The average annual change in the labor force was approximately 1.7%, though this figure has fluctuated year-over-year. The mean labor force size over the 35-year period was around 25.23 million, indicating steady growth as the labor force size in 2022 was well above this average. This steady increase may be a result of increased population, business expansions, or new entrants (i.e., graduates and migrants) into the job market.

Despite the overall positive trend, the labor force data showcases periods of contraction within the 35-year span, with five noteworthy decreases occurring in 1993, 2000, 2003, 2004, and 2020. The most significant drop happened in 2004, with a 6.9% decline, possibly reflected in the aftermath of economic events such as market corrections or downturns. Similarly, the labor force reduction in 2000 by 3.4% could be associated with the dotcom bust and the national financial crisis. The year 2020 saw a 5.2% decrease, likely due to the global COVID-19 pandemic's impact on economies and workforces worldwide. Lesser declines were noted in 1993 and 2003, with 4.5% and 0.8% decreases, respectively, indicating potential minor economic disturbances or industry-specific challenges. These declines stand in contrast to the otherwise general upward trajectory of the labor force and highlight the sensitivity of employment levels to external economic pressures and significant global events.

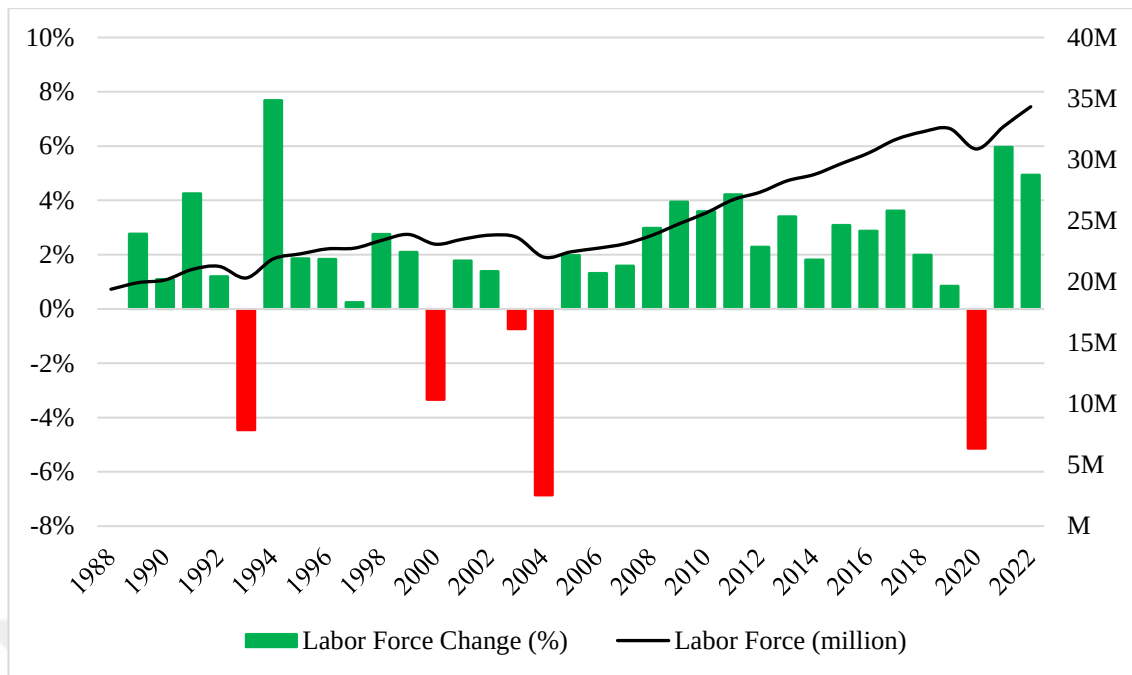


Figure 2.13. Labor Force and its Changes (1988-2022)

Source(s): TÜİK (2024)

Distinct variations in growth patterns can be observed when examining the labor force data across the past several decades (See Figure 2.13). During the late 80s to 90s (1988-1999), the labor force experienced robust expansion with an average annual growth of approximately 1.9%, culminating in a total growth of around 23.1%, reflecting a period of economic prosperity and globalization. In contrast, the 2000s (2000-2009) saw a noticeable slowdown, with an average annual increase of merely 0.4% and a total growth of 7.2%, likely due to economic downturns. The subsequent decade, the 2010s (2010-2019), marked a significant revival with the highest growth observed since the 80s and 90s, achieving an average yearly growth of about 2.8% and a total growth of approximately 26.9%. However, from 2020-2022, impacted by the COVID-19 pandemic, the labor force still managed an average growth of 1.9%, with a total increase of 11.2%, denoting a brisk recovery and reflecting resilience despite ongoing global challenges.

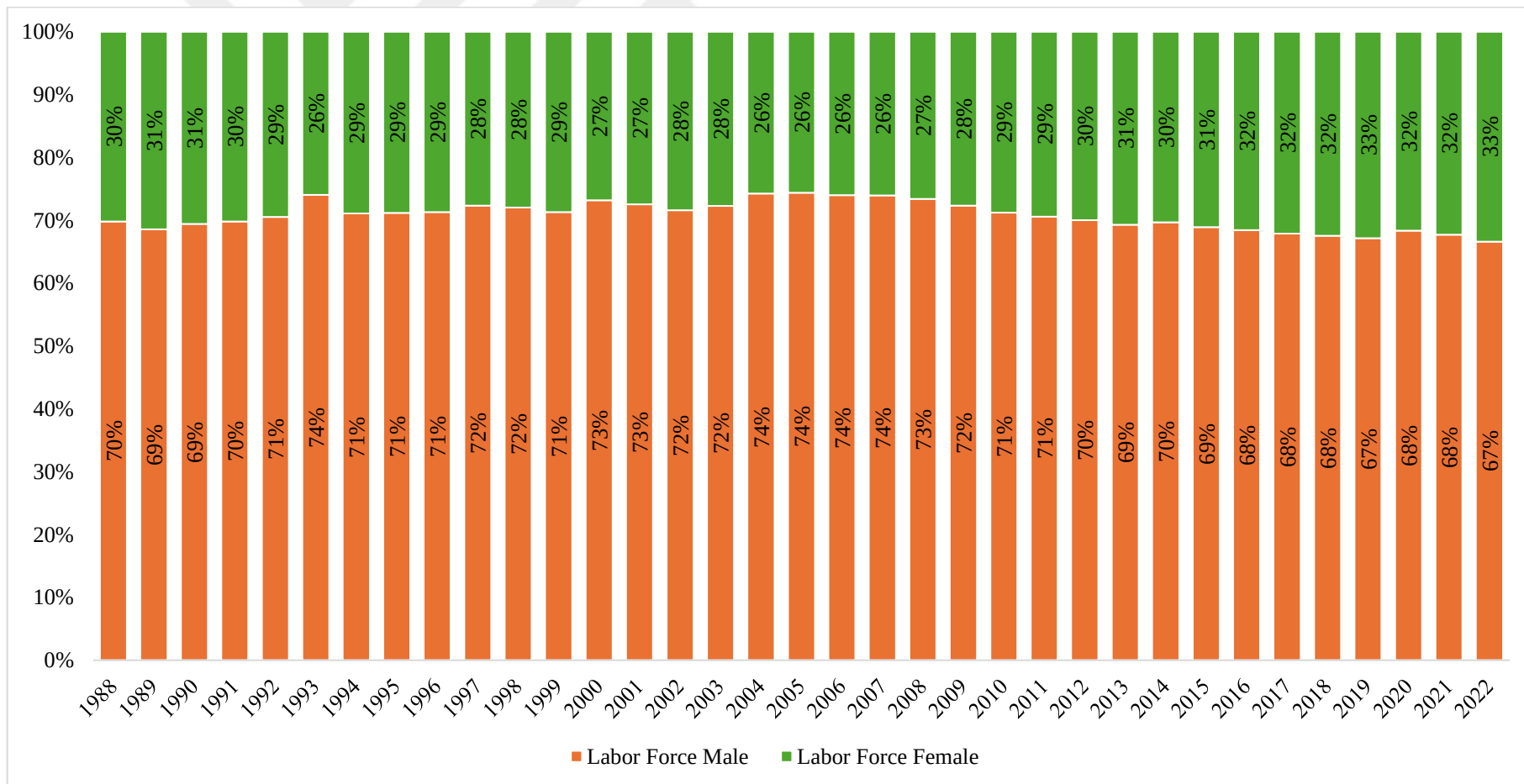


Figure 2.14. Labor Force by Gender (1988-2022)

Source(s): TÜİK (2024)

In the literature on the Turkish labor market, numerous studies attempt to explain the low labor participation rates among the female population (Uraz et al., 2010; İlkaracan, 2012; Göksel, 2013; Varol, 2017; Tunali et al., 2019). The female labor force has increased from 5.3 million to 11.5 million in the past 30 years. However, it has retained a smaller proportion of the overall labor force, with percentages fluctuating between 25.6% and 33.4% (See Figure 2.14). It should be noted that female labor market participation is considerably lower than that of a number of European countries (Uraz et al., 2010). One of the reasons behind the increased female labor market participation is improving education levels among females in Türkiye (Tunali et al., 2019). The desire for autonomy among females is seen as another determinant of increased participation (İlkaracan, 2012).

Meanwhile, marriage and an increase in the number of children have been found to have a negative impact on labor force participation among women in Türkiye (Varol, 2017). Among married women, those whose husbands are unemployed, underemployed, or recently unemployed are more likely to enter the labor market (Karaoglan and Okten, 2012). Naturally, this results from the need for survival; women are pushed into the labor market to survive. On the other hand, males have consistently constituted a significant majority of the labor force, with the percentage ranging from 66.6% to 74.4% over the years.

During the same period, the standard deviation in the percentages for each gender over the years is about 2.2%, indicating reasonably stable relative proportions of each gender within the labor force. Moreover, the mean labor force for females throughout the period is approximately 7.5 million, compared to a significantly higher mean of 17.8 million for males. This consistently higher participation rate of males in the labor force could be indicative of historical gender roles, societal norms, and possibly different rates of economic opportunities accorded to each gender. However, the data suggest a subtle but consistent shift over time, with male participation rates decreasing and female rates increasing. Specifically, the analysis projects a change in participation rates over a decade, with male participation decreasing by almost 0.9% and female participation rising by the same magnitude.

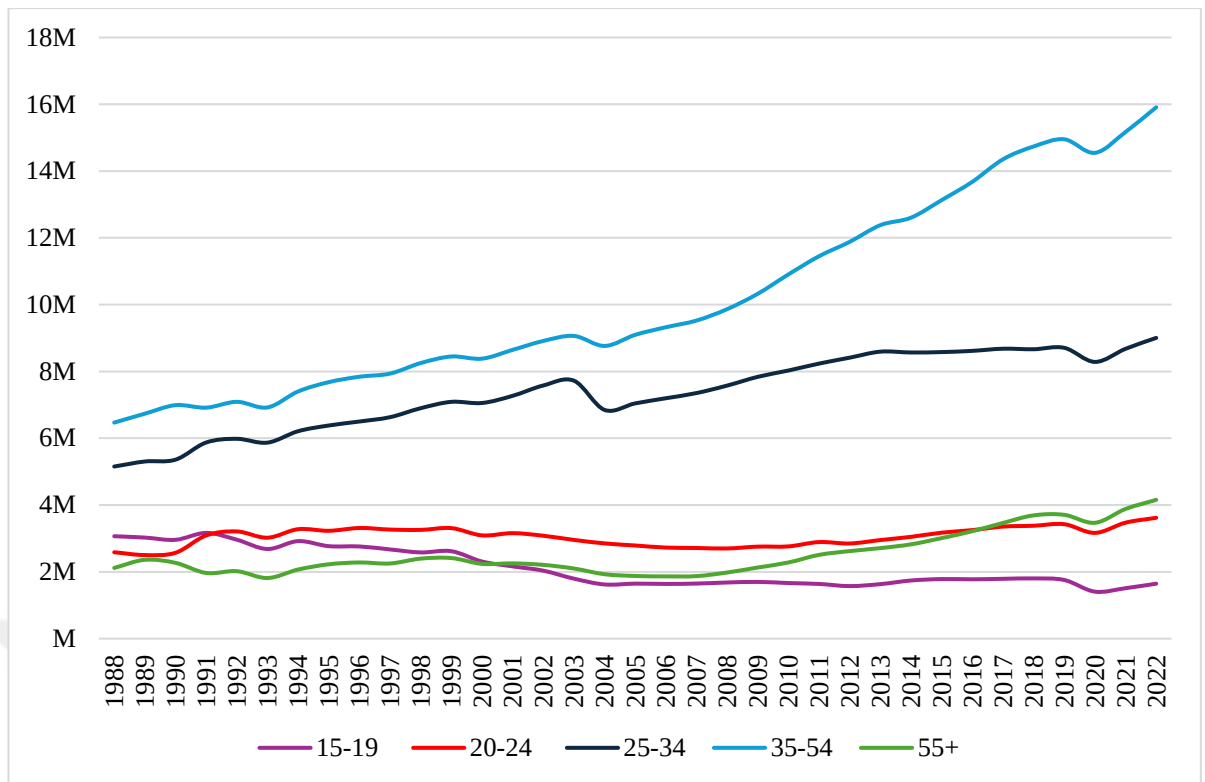


Figure 2.15. Labor Force by Age Group (1988-2022)

Source(s): TÜİK (2024)

Upon examining the labor force data by age group, it's clear that the labor market has undergone significant changes over the years. The data from 1988 shows that the labor force was heavily populated by younger age groups, with a notable 3 million individuals in the 15-19 bracket and 2.587 million in the 20-24 bracket. Over time, these figures have evolved, with the 2022 data revealing a reduction in the youngest cohort, now down to over 1.5 million, and an increase in the 20-24 group to over 3.5 million, potentially due to factors like higher education enrollment. The most substantial shifts are visible in the mature age groups; the 25-34 range has increased from slightly over 5 million to 9 million, and even more pronounced, the 35-54 range has nearly tripled from about 6.5 million to 16 million. These trends reflect not just an aging workforce but also a potential reflection of broader demographic and economic trends, such as longer life expectancy, changes in retirement age, and shifts in industrial or occupational structures.

Analyzing the percentage growth of the labor force by age groups over the observed period reveals which demographics are expanding most rapidly. The 35-54 age group leads with an impressive growth of 136.2%, indicating a significant increase in the representation of experienced professionals within the labor market. Following closely, the 55+ age group also shows a substantial increase of 76.0%, reflecting trends of an aging workforce that continues to be active later in life, possibly due to a lack of retirement opportunities, as is the case in many developing countries. The 25-34 age group has grown by 69.8%, underpinning its role as a key contributor to workforce expansion as individuals establish and advance in their careers. Conversely, the 20-24 age group rose by 44.6%, showing moderate growth compared to older cohorts.

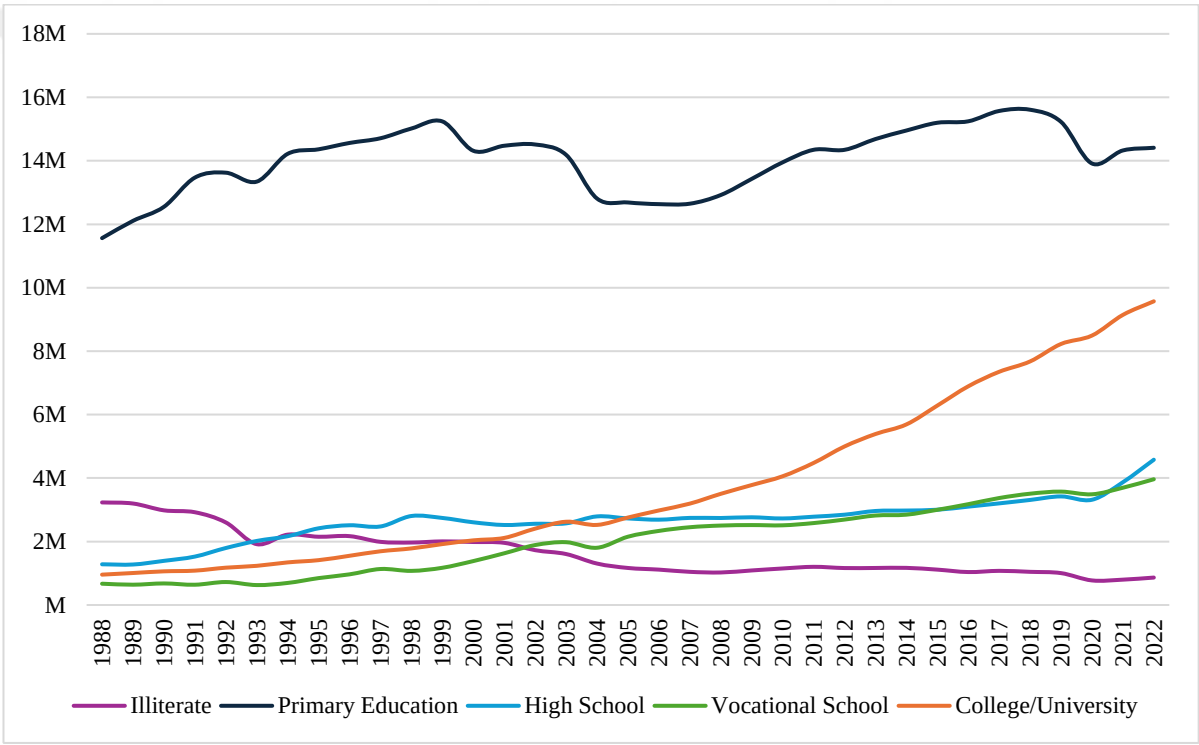


Figure 2.16. Labor Force by Education (1988–2022)

Source(s): TÜİK (2024)

Over the years, from 1988 to 2022, the labor force by education reveals substantial shifts in the educational attainment among workers. Those deemed illiterate experienced a dramatic decrease of 72.9% in their labor force numbers, while the group with rudimentary literacy but no formal schooling declined by 44.3%. Meanwhile, the labor force with primary education grew modestly by 19.0%.

However, the most significant changes are observed in higher educational tiers: the high school-educated labor force expanded by 258.9%, vocational school graduates saw an impressive growth of 519.2%, and the college or university-educated labor force witnessed the most noteworthy increase of 849.5%. These figures underscore a decisive trend towards higher education levels within the labor market, highlighting a shift toward a more educated and potentially skilled workforce over the studied period.

Since the year 2000, the college/university-educated labor force has exhibited steady growth. The average yearly percentage increase in labor force numbers for this category was 7.3% since 2000, compared to a slightly lower average increase of 6.8% during the 1990s. The changes in either decade reflect a continuous trend towards a more highly educated labor force, with certain years since 2000 standing out for their notable increases. For instance, the most significant jumps were observed in 2002, with a 13.8% increase from the previous year, and in 2012, with an 11.6% increase. Even though there was a slight decline of 3.8% in 2004, overall, the trend has been towards growth, peaking at over 9.5 million in 2022.

2.4.2. Unemployment

The provided unemployment data offers a multifaceted view of the labor market, segmenting unemployment trends by year, gender, age, education, and sector. It reveals that various demographic groups and education levels are impacted differently by economic cycles and shifts in the labor market. Key findings suggest significant variances in unemployment rates with respect to gender, highlighting a generally higher unemployment rate for males and indicating pivotal years where economic downturns led to marked spikes in joblessness. Age-wise, younger and older demographics face unique challenges, with the youngest often hit hardest due to their inexperience. In contrast, older individuals may struggle due to evolving industry requirements or nearing retirement. Education level analysis uncovers a complex picture where higher education does not always safeguard against unemployment. In some instances, individuals with college or university degrees may even experience more significant increases in joblessness. In general, unemployment among higher-educated individuals has been lower than that of lower-skilled groups. Likewise, in regions where the education level is higher, they are expected to face lower levels of

unemployment (Filiztekin, 2009; Duran, 2019). In the case of Türkiye, there may be regional spillover effects of unemployment rates. That is, the regions with higher unemployment rates also affect the unemployment rates of neighboring regions (Kantar and Aktaş, 2016; Güçlü, 2017).

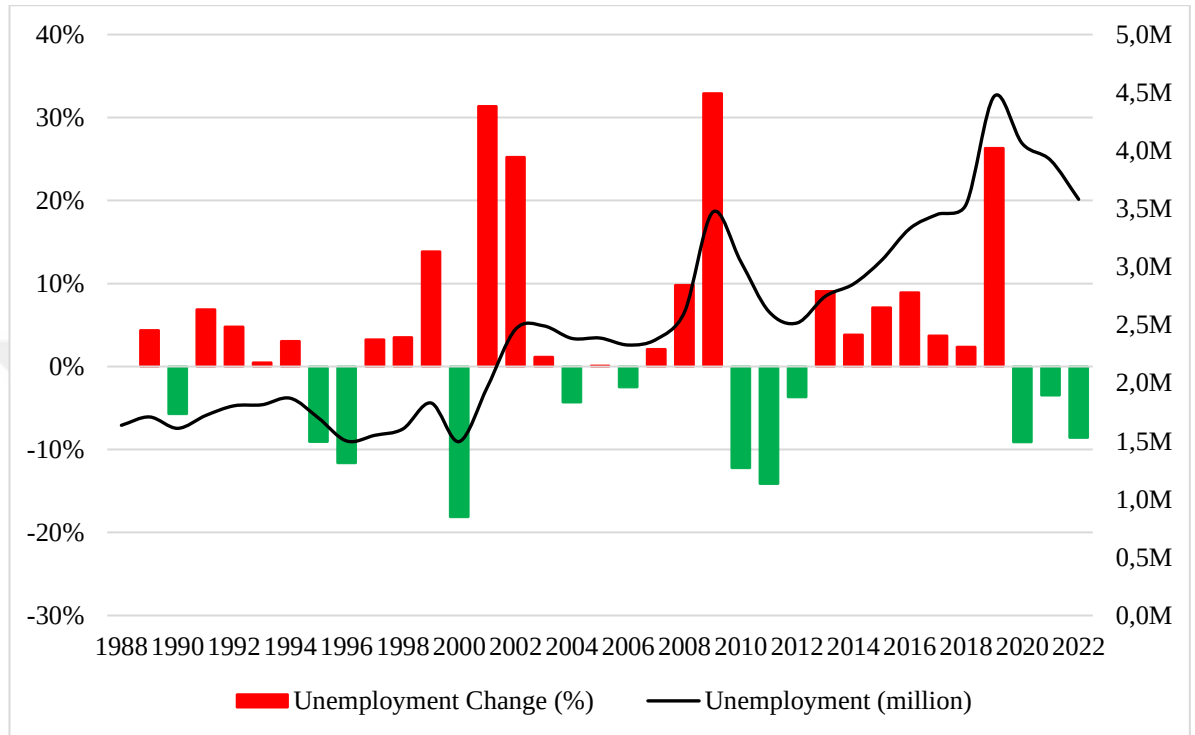


Figure 2.17. Number of Unemployed and Their Change (1988-2022)

Source(s): TÜİK (2024)

Over this period, the unemployment figures fluctuated, with a mean of about 2.5 million people unemployed annually. The year-to-year change in unemployment showed significant variability, with an average increase of approximately 3%. However, the range of change was quite broad, from a decline of about 18% to an increase of nearly 33%. The variability suggests periods of economic contraction and expansion impacting unemployment rates, with some years experiencing sharp increases in unemployment.

Chronologically, the labor market has faced unemployment dips at different times in the past 40 to 50 years. A significant rise in unemployment was 13.9% in 1999, affecting 1.8 million people (See Figure 2.17). This might be attributed to the national

economic crisis because of the political reflection. Moving forward to 2001, the aftermath of the dot-com bubble burst contributed to a steep increase of 31.4% in the unemployment rate, bringing the number of unemployed individuals to 1.9 million. The situation persisted into 2002, with unemployment increasing by 25.3%, impacting 2.5 million individuals. The most significant increase occurred in 2009, with a 32.9% surge in unemployment, correlating with 3.5 million people jobless during the global financial crisis. A decade later, in 2019, unemployment once again spiked, this time by 26.3%, with 4.5 million unemployed, possibly influenced by early repercussions of global trade disruptions, COVID-19, and other macroeconomic factors.



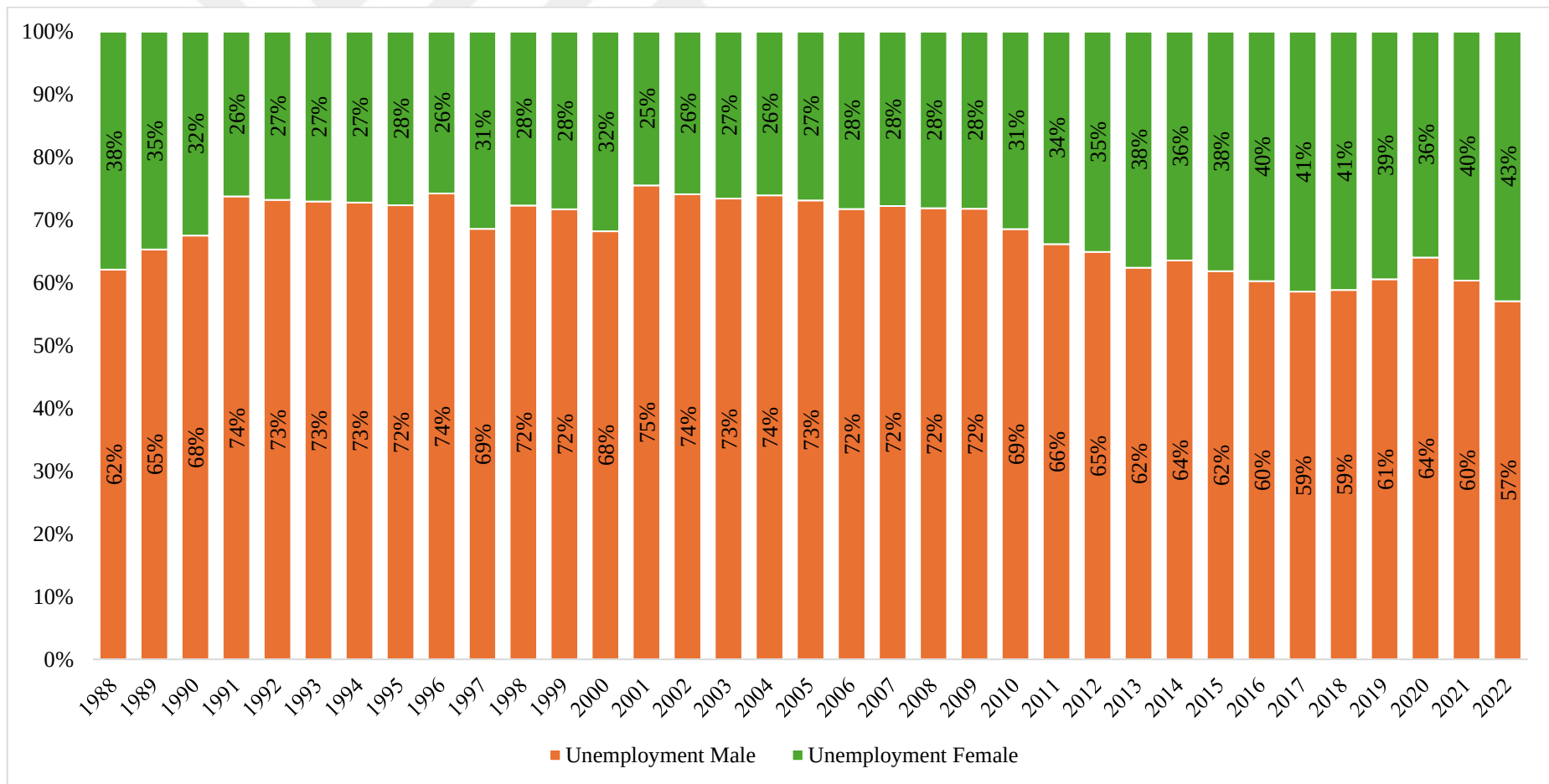


Figure 2.18. Unemployment by Gender (1988-2022)

Source(s): TÜİK (2024)

The analysis of gender shares in unemployment by year reveals that, on average, males constitute roughly 68% of total unemployment, while females account for about 32% (See Figure 2.18). These proportions indicate a persistent gender disparity in unemployment rates. Various factors, including demographics, gender-specific economic sectors, and changes in labor market participation, can potentially influence this disparity. For instance, more men may be employed in cyclically sensitive industries which are prone to greater volatility during economic downturns. On the other hand, the data also suggest that women, who historically had lower labor force participation rates, are less represented in unemployment statistics. As societal norms evolve and gender participation in the workforce becomes equal, these figures may continue to shift.

Male unemployment over the years has shown a varying trend, with an average yearly unemployment figure of around 1.6 million men. There has been an overall average change of roughly 2.8% in male unemployment from year to year. Notably, in 2001, there was a dramatic increase of approximately 33.7% in male unemployment, similar to the overall unemployment increase. In contrast, 2011 saw the most significant decrease in male unemployment at approximately -17.2%, which could be attributed to recovery from the global financial crisis that began in 2008.

Female unemployment over the years has exhibited fluctuations like those seen in male unemployment, with an average of roughly 0.8 million women being unemployed annually. The average change in female unemployment from year to year stands at about 3.4%. The year 2009 stands out with the greatest increase in female unemployment at an impressive 33.4%, likely correlated with the global financial crisis. These points highlight that female unemployment, while generally less than male unemployment, follows a parallel trend that is equally sensitive to the prevailing economic conditions. One thing to note is that the proportion of female unemployment is higher than that of their labor participation, indicating that unemployment among females is relatively higher than the male population.

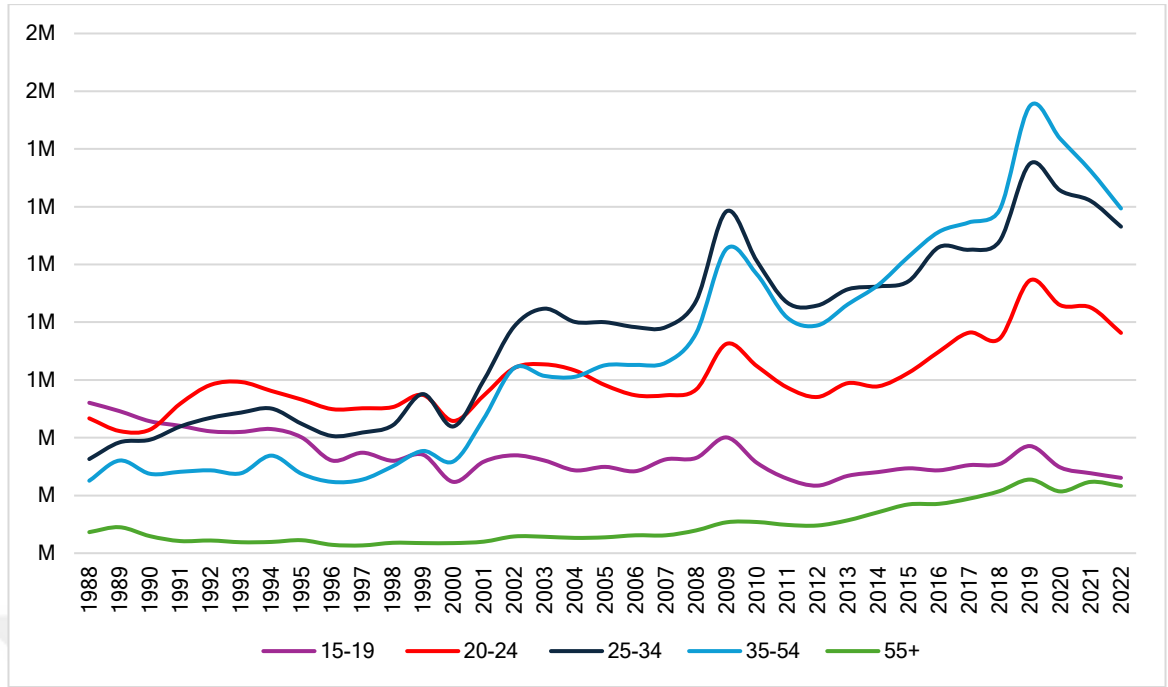


Figure 2.19. Unemployment by Age Group (1988-2022)

Source(s): TÜİK (2024)

Upon analyzing unemployment by age, it is evident that different age groups face varying levels of unemployment through the years, with vulnerability observed in the younger age brackets (See Figure 2.19). On average, the 15-19 age group has an unemployment figure of approximately 0.3 million, reflecting the challenges faced by new entrants to the job market. The prime working-age groups (20-54) generally face substantial unemployment as well, with the 25-34 group topping the figures at an average of around 0.766 million, indicative of the significant segment of young adults in transition within the job market. In contrast, the older age groups (55 and over) typically see lower unemployment levels, averaging around 0.098 million. This is a consequence of the higher job retention rates, a smaller labor force population in this age group due to retirement, or fewer older individuals seeking employment. It should be noted that unemployment among youth (age 20-24) in Türkiye is twice the average for unemployment of the same age group among OECD countries (Çelik and Lüküslü, 2018).

Analysis of the year-over-year percentage change in unemployment data by age groups reveals that the 35-54 age bracket exhibits the highest average yearly increase in

unemployment at approximately 5.8%. This age group, often considered to be at the peak of their careers, might not be typically associated with high unemployment volatility. The second highest average yearly increase in unemployment is in the 55+ bracket, with an average increase of approximately 5.2%. This trend points to the growing challenges faced by the older segment of the workforce.

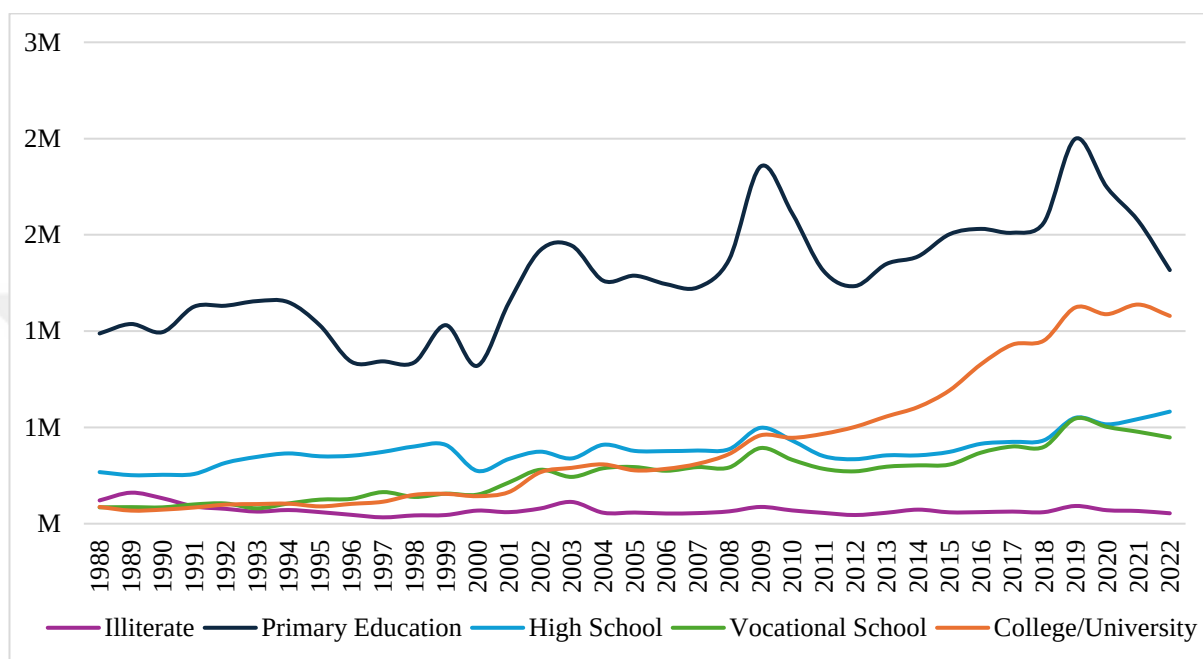


Figure 2.20. Unemployment by Education Level (1988-2022)

Source(s): TÜİK (2024)

Analyzing the unemployment by education data illustrates that those with primary education face the highest unemployment, with approximately 1.3 million unemployed annually. This could reflect the limited job prospects for individuals with only primary education in an increasingly demanding specialized skill market. On the other end of the educational spectrum, people with college or university education also experience significant unemployment, averaging around 0.414 million, which might highlight underemployment or mismatches between education and job market needs. Illiterate individuals have an average unemployment rate of about 0.07 million. At the same time, those who can read and write but did not graduate from school have an average unemployment rate of around 0.09 million. Meanwhile, the average unemployment is approximately 0.4 million for those with a high school diploma and 0.25 million for vocational school graduates.

When examining the year-over-year changes in unemployment levels across different educational categories, individuals with a College/University education show the highest average annual increase in unemployment, with a notable 8.6%. Closely following this, Vocational School graduates experience an average yearly increase in unemployment of 6.2%. These increases may illustrate the challenges higher-educated individuals face in a job market that's perhaps oversaturated or undergoing significant structural changes, where advanced qualifications don't necessarily guarantee job security. The trend for those with vocational education might depict the flux of demand in technical and trade sectors. Despite better qualifications, both these groups seem to face increasing difficulties in maintaining stable employment or finding new jobs, underscoring the complexity of the education-to-employment pipeline and the need for alignment between educational outcomes and labor market requirements. A recent study on higher education and unemployment in Türkiye finds that higher education is positively associated with unemployment (Algül, 2024). The study suggests that government policy should focus on middle-skilled rather than high-skilled workers. The supply of highly skilled workers is in excess, whereas the industry fails to accommodate highly educated individuals in Türkiye fully.

2.4.3. Foreigners in the Turkish Labor Market

Foreign workers had generally migrated to Türkiye for work in specific fields or as seasonal workers. Women in the past migrated to Türkiye to work as domestic workers (Akalin, 2010; Kümbetoğlu, 2005). Over time, foreign workers are turning to different sectors to support themselves. As the number of foreigners has increased in Türkiye over time, the same has been the case for foreign workers (See Figure 2.21). There were nearly 9,500 foreign workers in Türkiye in 2005, and this number grew by almost 50% to over 14,000 in 2010 (ÇSGB, 2011). As the influx of Syrians in Türkiye grew in the 2010s, the number of foreigners also increased, subsequently increasing the number of foreign workers. The number of foreign workers has only declined in 2 years, once in 2007 (likely a result of the global recession) and 2020 (a result of the COVID pandemic). Besides these two years, the number of foreign workers has grown every year, with over 200,000 registered in 2022, more than eight times the number 10 years prior in 2012.

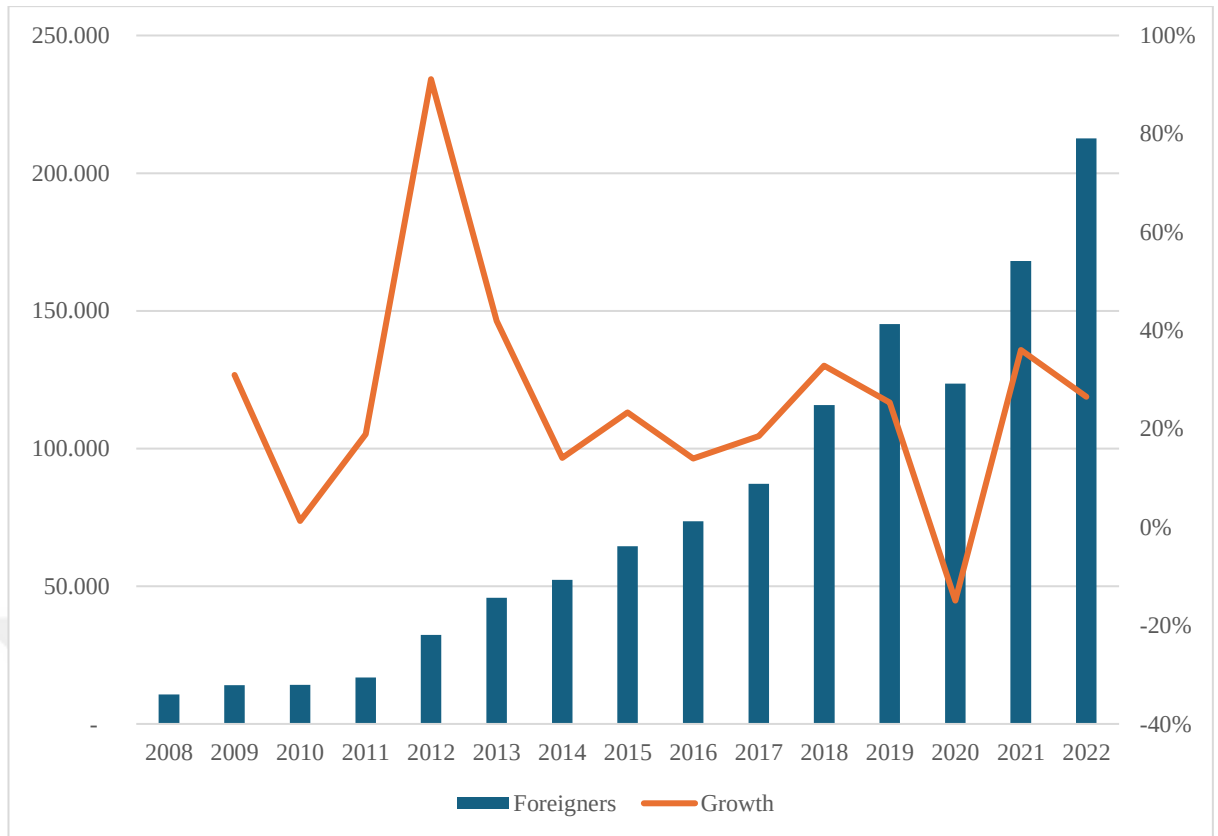


Figure 2.21. Foreign Workers in Türkiye (2008-2022)

Source(s): ÇSGB (2023)

More and more foreigners are choosing Türkiye as a destination country, making it their home for them and their families. The influx of Syrians has been a catalyst for the growing number of foreigners in the country, as can be observed through the exponential rise during the 2010s, especially after 2014. The educational status of foreign workers has changed over time; nearly 50% of the workers in 2012 had tertiary education or higher, with nearly 35% having bachelor's degrees. In 2022, the proportion of those with tertiary education or higher had decreased to a little below 25%, and the proportion of those with a bachelor's degree was just slightly above 18%. The textile and clothing industry has employed a higher proportion of migrant workers (Toksöz et al., 2012). This is also documented by Dedeoğlu (2011) in the case of Azerbaijani migrant workers in Istanbul. The construction and manufacturing sectors are also among the most preferred sectors by foreign workers, whether in formal or informal employment. According to the latest data (ÇSGB, 2023), in recent years,

foreign workers have increased in a variety of sectors such as health services, education, accommodation services, food services, and wholesale and retail.

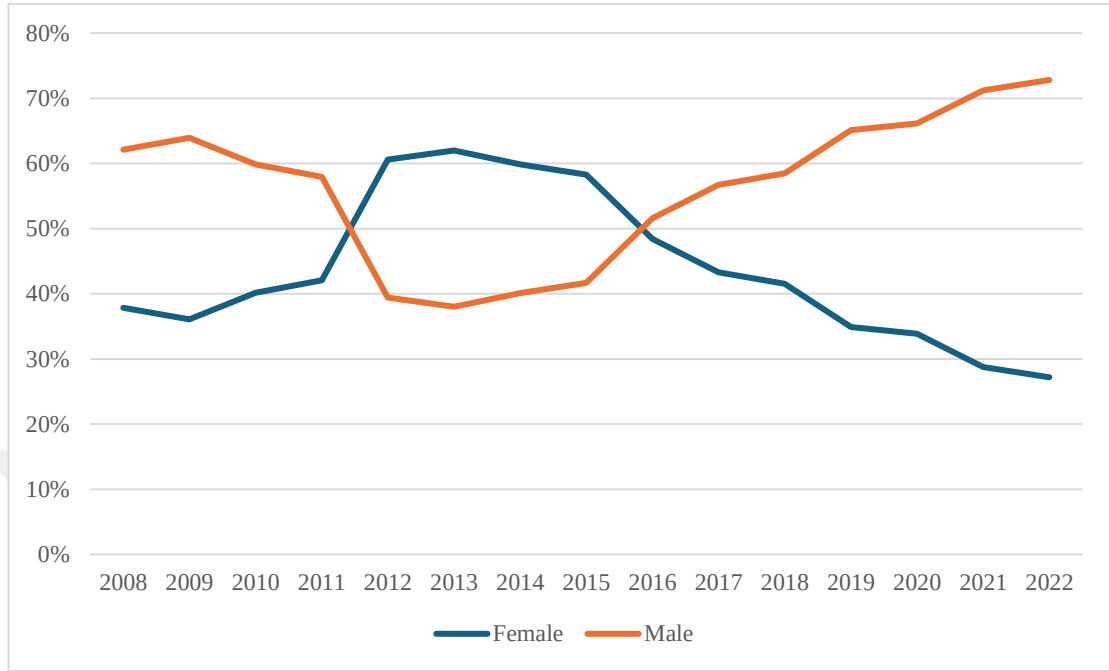


Figure 2.22. Foreign Workers by Gender (2008-2022)

Source(s): ÇSGB (2023)

The proportion of male and female (60% and 40% respectively) migrant workers remained relatively consistent from 2004 to 2011 (ÇSGB, 2011). However, since 2016, the divide in this proportion of gender has been increasing, with over 70% of the migrant workers being male in 2022 (See Figure 2.22). This is especially interesting since the proportion of females in the general population of foreigners in Türkiye has remained around 50% in the previous 15 to 20 years. One reason behind this might be that more foreign males are entering the labor market. Another reason may be that females are being employed in the informal labor market at a higher rate. The number of foreign workers continues to grow as Türkiye slowly changes from a transit state to a destination state in the eyes of many migrants. Most of the recent literature related to foreign workers in Türkiye has covered Syrian refugees (Del Carpio and Wagner, 2015; İçdugyu and Diker, 2017; Ceritoglu et al., 2017; Aksu et al., 2022; Demirci and Kırdar, 2023), however, research should also focus on all migrant workers, their

impact on the labor market, and their decision factors in making Türkiye their destination.

2.5. Summary

Türkiye has developed into one of the high-performing emerging economies. Initially, in the post-WWII era, the country struggled with political instability and economic policies that could not provide stability and growth. Over time, Türkiye implemented economic policies that brought growth and development, especially after 1990 the country opened up to trade with other countries. The Customs Union signed with the European Union pushed Türkiye to implement strong institutional reforms and improve its financial structure. The post-2000s brought high economic growth, export growth, and increased foreign direct investment, which would drive Türkiye's economy and improve living standards. In recent years, Türkiye has struggled with foreign debt financing, currency devaluation, and ever-rising inflation, but the country continues to grow.

Firm dynamics of Türkiye show the growth of firm establishment over the years, with an increasing firm entry rate and a consistent firm exit rate. Foreign firms have also increased as a result of the increasing number of foreigners in Türkiye, which is primarily due to the Syrian refugee crisis. The number of Syrians registered under temporary protection status is over 3 million, and the number of foreigners in the country is nearing 2 million. The increased number of foreigners has also led to a much higher number of foreigners in the labor market. The labor market dynamics of Türkiye show an increasing number of individuals in the labor market (mostly a result of the increased population over the years). Labor force participation, in general, has remained between 50% and 55% over the years. However, the labor force participation among females has increased. Unemployment, especially among youth, is much higher than that of other OECD nations. In addition, unemployment among individuals with higher education is higher contrary to what is observed in literature. This may possibly be a sign of a high supply of educated individuals and misalignment with the industry requirements. In future years, policymakers should focus on the alignment of skilled labor with the needs of the industry.

CHAPTER III

THE RELATIONSHIP BETWEEN FIRM FORMATION AND UNEMPLOYMENT: EVIDENCE FROM TÜRKİYE

3.1. Introduction

Businesses are a large part of the economy, especially small- and medium-sized establishments that account for the high number of employees and GDP. According to the World Bank, SMEs comprise about 90% of all businesses around the globe and over 50% of the employment (World Bank 2019). This figure is even more significant for developing economies; for example, in the case of Türkiye, 99.8% of all registered businesses are SMEs (TOBB, 2020). Given their close relation, labor market dynamics and firm formation move together, whether it be unemployment leading to firm formation or firm formation leading to employment and economic growth.

The relationship between unemployment and self-employment is well-documented in the literature, with mixed results. Likewise, the inverse relationship, that is, the effects of firm formation on the unemployment rates within a region, has also been the subject of several studies. While numerous studies provide evidence for a positive effect of firm formation on unemployment, other studies find these effects to be minimal and even non-significant.

Unemployment can lead to an increase in firm formation, which is named in the literature as the unemployment push, refugee, or desperation effect (Thurik et al., 2008). This is derived from the theory of income choice, which simply states that unemployed individuals move towards self-employment as the opportunity costs for firm formation decrease (Blau, 1987; Evans and Leighton, 1990; Blanchflower and Meyer, 1994). In addition, salaried positions may decrease as a result of unemployment; hence, individuals are pushed into self-employment in order to survive.

On the other hand, unemployment can also lead to a lower degree of firm formation. The unemployed may not have high enough human capital to sustain a firm, and/or they may not have the necessary endowments to establish their own business. Personal wealth is another determinant of self-employment, where unemployment may indicate a decreasing level of wealth and, therefore, lower self-employment (Johansson, 2000; Hurst and Lusardi, 2004; Van Stel and Suddle, 2007). Likewise, in the case of people who do not have collateral, it would be extremely difficult for them to obtain loans from a financial institution. The possession of collateral can play an important role in securing a loan and pursuing self-employment for unemployed individuals, mitigating the negative impacts of unemployment on new firm formation.

The opposite relationship also exists, whereby entrepreneurship can affect unemployment levels. Firm formation has a positive effect on the economic growth and performance of a region, which is referred to as the ‘Schumpeter effect’ in the literature (Van Stel et al. 2007). New firms hire employees, which in turn leads to a decrease in unemployment (Picot et al., 1998; Audretsch et al., 2001). However, this may not be immediate since new firms will hire employees when their performance and market demand increase; therefore, an expansion of their operations will lead to new hires. This effect may be observed in the years following the establishment of new firms; hence, it would be more pronounced in the medium term.

The objective of this paper is to shed light on the bilateral relationship between unemployment and firm formation using regional and city-level data for Türkiye. Türkiye is an interesting case in developing countries that offers the potential to unpack the important link between new firm formation and unemployment from a developing country perspective. Labor market dynamics and new firm formation have been at the center of just a handful of studies for the country, where many of them have used time series data at a national scale. Given the differences in the cities and regions of Türkiye, a more disaggregated level study has the potential to unveil a relationship based on better foundations.

Mixed evidence exists for both the Schumpeter effect and refugee effect in the firm formation and unemployment literature. This study contributes to the literature in several ways. First, it provides an in-depth analysis of the relationship between firm

formation and unemployment on two different regional levels. Second, the results provide insight into the lagged effects of firm formation and unemployment, showing how the relationship may develop on a medium- and long-term basis. The study distinguishes itself from the previous literature on Türkiye by utilizing a panel dataset that covers 81 Turkish cities and 26 NUTS-II level regions over ten years (2009 to 2019). Finally, it adds to the literature by analyzing an emerging economy case. Most of the literature studying this topic focuses on developed economies, while more attention has been turning to developing economies in recent years. Türkiye presents a unique case in that it is a developing economy that has grown quickly since the 2000s and continues its economic growth with a young population. This study extends the literature on firm formation and unemployment in the context of a developing country. The analyses shed light on both the Schumpeter and refugee effect at the regional (NUTS-II) level and city (NUTS-III) level. The study also adds to the literature by using control variables that act as determinants for both firm formation and unemployment.

To that end, we estimate a fixed-effects panel data model, and our results show that at the regional level, there is significant evidence for an unemployment push hypothesis complementing previous studies that provide evidence for a similar effect. Our city-level analysis reinforces our region-level findings on the unemployment push hypothesis. Moreover, we find a significant Schumpeterian effect at the city level, with 48- and 60-month lags, implying that new firm formation has the potential to reduce unemployment in the medium to long run.

The structure of our paper is as follows. In Section 2, we summarize the literature on new firm formation and unemployment/employment creation. Section 3 summarizes our methodology and data; Section 4 presents our results. In Section 5, we discuss our results and conclude the paper in Section 6.

3.2. Literature on New Firm Formation and Unemployment/Employment Creation

Numerous studies investigate the impact of unemployment on entrepreneurial activity. Wosiek (2023) analyzes this for various sectors in Poland. The results of this study show that an increase in unemployment leads to new firm formation. A similar result, that is, an unemployment rate leading to higher self-employment, is obtained for Croatia (Payne and Mervar, 2017), France (Aubry et al., 2015), Romania (Grigorescu et al., 2020), and the US (Cole, 2015). Likewise, da Fonseca (2022) shows that although unemployed individuals are twice as likely to start a business, they have a lower probability of making hires and a higher probability of exiting. Besides empirical findings on the positive impacts of unemployment on firm formation, some studies provide evidence for the reverse effect. Considering the positive impact of wealth and possession of collateral, some studies show that the lack of these among the unemployed leads to a negative relationship between unemployment and firm formation (Johansson, 2000; Hurst and Lusardi, 2004; Van Stel and Suddle, 2007). Homeownership was found to have a positive effect on self-employment as it serves as a proxy for wealth (Ritsilä and Tervo, 2002). In addition, unemployment may reduce self-employment due to other factors, such as stagnant economic growth (Audretsch, 1995; Audretsch et al., 2002). A slowing down of the economy would deter new entrants in the market because of a reduction in the demand for products and services. Moreover, the probability of revenue streams decreasing in the near future will further discourage new entrants who will be faced with lower revenues and higher chances of failure.

The literature also examines the opposite relationship, where new firm formation can affect unemployment levels. Many studies show the existence of this positive effect of firm formation on employment levels (negative effect on unemployment), namely the “Schumpeter effect.” Van Stel et al. (2007) use Japanese data and find that the Schumpeter effect, where entrepreneurship lowers unemployment, takes an 8-year lag to come into effect. Fritsch and Mueller (2004) find the same in the case of Germany, wherein they observe that new business formation has a positive effect on employment after the first five years (during which the relationship is negative). They show that a Schumpeter effect exists with a lag of 6 to 9 years, and the biggest impact occurs with

a 7- and 8-year lag. Thurik et al. (2008) refer to this as the 'Entrepreneurial' effect and test it for 23 OECD countries. They also provide evidence for a lagged negative relationship between self-employment and unemployment, where a 1% increase in self-employment leads to a 1.12% decrease in unemployment eight years later.

Job creation is another important aspect of firm formation and has been a subject of study in the literature. There is mixed evidence on whether firm formation leads to job creation. Van Stel and Storey (2004) find that in Great Britain, firm formation is associated with employment growth; however, at the same time, they find that is not the case in Scotland. Policy and implementation are important aspects of how firm formation may affect the labor market. Similarly, Ashcroft and Love (1996) also found there to be a positive relationship between new firm formation and net employment. Regional employment increases as a result of self-employment rates, which has been found to be the case for Sweden (Foelster, 2000) and Germany (Grotz and Brixy, 2002). In the case of Portugal, Baptista et al. (2008) find that there is a lagged positive effect of firm formation on employment and the indirect effects (greater competition, efficiency, innovation) are greater than direct effects.

In addition to the improvements in the labor market, entrepreneurial activity leads to improved economic growth (Acs and Armington, 2004; Van Stel et al., 2005). Furthermore, new firms may introduce new products or processes in the market that appeal to the changing demands of the customers. New and improved processes may also lead to more efficient production. As a result, other firms in the market are also forced to adapt to the changing environment, improving the competition in their respective industry. The effects of entrepreneurial activity may vary with the development level of an economy. Van Stel et al. (2005) find this type of activity to be more effective for highly developed economies. Likewise, Thurik et al. (2008) find the 'Entrepreneurial' effect to be higher in more developed nations. Inducing high-growth entrepreneurship would lead to higher benefits to the respective industry and economic growth. In this regard, the level of innovation through the number of patents issued may provide some insights into the effectiveness of innovation. It is predicted that higher innovation (patents) would lead to more entrepreneurial activity (formation of new firms).

Recent studies in the field have studied the aforementioned effects that link new firm establishment and unemployment at a regional level. Economic performance may be a significant determinant in the direction of this relationship, as O’Leary (2022) found for different European regions. Their results highlight that higher-performing regions show a more positive relationship, whereas the inverse is shown in lower-performing regions. Carree and Dejardin (2020) find an unemployment push effect in their study of different regions within Belgium; this is especially the case in industries with low entry barriers. Individuals may be more willing to move towards firm formation due to the perceived low startup capital that accompanies industries with low entry barriers. The results of Wosiek (2023) also support a positive relationship whereby unemployment results in enterprise births within the service sector in the case of different European countries. The unemployment push hypothesis is also confirmed in the case of Korea, where higher unemployment is observed to lead to an increase in startups, particularly for small businesses (Sung and Kim, 2020). A common pattern found across these studies is that there exists a higher number of startups in the service sector, particularly those businesses that have low entry barriers. Another study by Pisá-Bó et al. (2021) investigates the impact of spatial and temporal variations in Spain and some economic indicators, including unemployment, on entrepreneurship. They divided the sample into three subperiods containing the crisis and non-crisis years and found that unemployment was an important driver of entrepreneurial activity during crisis years. Goschin et al. (2021) conducted a similar study in Romania. The results from their dynamic spatial panel model reveal that economic crises are important drivers of new firm formation. They also found that in the long run, higher unemployment results in more new firm establishments through the “push effect.” Edobor and Marshall (2021) analyzed a similar case using MSA-level data for the US. Their ultimate goal is to measure the impact of disasters on new firm formation. Their results suggest no significant impact of these negative events on new firm formation, but they report a significant negative impact of unemployment on the establishment of new firms.

These studies have focused on developed economies, whereas studies on developing economies still lag and present an opportunity to enrich this literature. For the case of Türkiye, the literature on regional dynamics of firm formation can be traced back to early studies by Kaya and Ucdogruk (2002), who analyzed the dynamics of entry and

exit in the Turkish manufacturing industry. Gaygisiz and Koksall (2003) study firm formation using both a cross-section and panel data approach for the manufacturing industry, where they find that population density is an important indicator of firm formation, and Günalp and Cilasun (2006) unfold an important role for the real interest rate in firm formation in the manufacturing sector.

Only a few studies have shed a spotlight on the relationship between new firm formation and unemployment in Türkiye. Karahasan (2015) finds that an east-west duality exists where the western regions are seen to be more developed compared to their eastern counterparts. This correlates with the unequal distribution of new firm shares across Türkiye, following the same pattern as those regions' economic performance and environment. In addition, it may be correlated with the business cycles, where a higher amount of firm formation is observed during expansions and relatively lower levels of firm formation during contractions. Unveiling these relationships can assist policymakers in devising city-level and regional economic and development policies that may improve the conditions of the labor market and further lead to economic development.

Kum and Karacaoğlu (2012) offer another study on Türkiye, which finds that an increase in unemployment leads to a decrease in self-employment in the country. They note that a lack of entrepreneurial knowledge and support from the government may be hindering the chances of entrepreneurship in the country. In addition, people may be risk averse and opt to keep their savings in banks where they can benefit from the interest returns instead of taking higher risks through investment. Ozerkek and Dogruel (2015) point to an inverse relationship, where changes in the self-employment rate have a negative effect on unemployment in subsequent periods. Similarly, Apaydin (2018) also found the same relationship using the ARDL model in Türkiye, where a one percent increase in self-employment leads to a two percent decrease in unemployment. Demirdag and Eraydin (2021) recently studied government policies as a determinant of entrepreneurship in the country. Their findings show that government policies lead to higher entrepreneurship rates in regions where there is existing high startup activity but not in those regions with low entrepreneurship rates. This highlights the importance of regional development in determining the effects of government policies when it comes to firm formation.

Regional disparities are noted in Karahasan (2015), which documents the differences between the eastern and western parts of Türkiye. The study indicates that firm formation in the service industry is increasing in various regions of north, central, and southeastern Türkiye with a drastic fall in firm formation in manufacturing and trade; however, that does not disrupt the east-west duality, and the eastern region continues to lag behind. These regional disparities in new firm establishment are explained by regional differences in various factors, such as local demand, provincial business cycles, human capital development, and financial availabilities. Knowledge of these relationships can assist policymakers in devising city-level and regional economic and development policies that may improve the conditions of the labor market and further lead to economic development.

3.3. Methodology and Data

3.3.1. Data

This study used several sources of data. The data used are from the 2009–2019 period. The Turkish Statistical Institute (TUIK) provides a wide variety of data on city-level and economic region (NUTS-III and NUTS-II, respectively) levels. For firm establishment data, our source is the Union of Chambers and Commodity Exchanges of Türkiye (TOBB). TOBB provides detailed NUTS-III (city-level) and NUTS-II (regional) data on the establishment and closure of firms across Türkiye. The data used in this study are collected on an annual basis, providing 260 observations for the 10-year period on the NUTS-II regional level. A list of all the variables can be found in Table 3.1, and their descriptive statistics are in Table 3.2.

Table 3.1. List of Variables

Variable	Notation	Definition	Sources	Period
Dependent Variable				
Net Firm Formation	FirmRate	New Net Firms Formed per 1000 Labor Force	TOBB	2010–2019
Firm Entrants	EntRate	New Firms Established per 1000 Labor Force	TOBB	2010–2019
Firm Exits	ExitRate	Firms Exited per 1000 Labor Force	TOBB	2010–2019
Independent Variables				
Unemployment	Unemploy	Unemployment Rate (% of Labor Force)	TUIK	2009–2019
Labor Force	LF	Labor Force (Age 15 and up)	TUIK	2009–2019
GDP Per Capita	GDPCapita	GDP per Capita (TL, constant 2009)	TUIK	2009–2019
Patents	Patent	Approved Patents by numbers per 1000 Labor Force	TPMK	2009–2019
Population	PopDen	Population Density (# of inhabitants per sq. km)	TUIK	2009–2019
Urbanization	Urban	Population living in Urban areas within city limits	TUIK	2009–2019
Net Migration Rate	NetMig	Net Migration between regions (# of inhabitants entered minus # of inhabitants exited)	TUIK	2009–2019
High School Education	HSEdu	Number of people with High School or Equivalent Education (as a percentage of total population of area)	TUIK	2009–2019
Higher Education	HigherEdu	Number of people with university degree or higher (as a percentage of total population of area)	TUIK	2009–2019

Table 3.2. Descriptive Statistics of Variables at NUTS-II Level

Variable	Observations	Mean	Std. dev.	Min	Max
Net Firm Rate	260	1.19524	0.733402	0.146809	4.285651
Firm Entry Rate	260	1.518204	0.885455	0.318066	5.279316
Firm Exit Rate	260	0.322964	0.229062	0.03794	1.528773
Net Firm Rate (Eco Approach)	260	10.6024	5.664764	1.185593	31.70771
Firm Entry Rate (Eco Approach)	260	13.40471	6.440355	3.592346	39.40718
Firm Exit Rate (Eco Approach)	260	2.802314	1.536786	.4855211	10.11756
Unemployment Rate	260	.1009846	.4532516	.034	.309
Labor Force	260	13.68484	0.61707	12.54611	15.72327
GDP per Capita	260	10.00832	0.514404	8.749098	11.37047
Population Density	260	4.534069	.9140959	3.258096	8.002025
Urbanization Rate	260	.8130304	.1575268	.4662	1
Net Migration Rate	260	-1.230411	9.488787	-29.41066	58.49405
Patent Rate	260	0.027546	0.035483	0	0.21935
High School Education	260	0.211913	0.034973	0.132266	0.286355
Higher Education	260	0.127327	0.042524	0.040111	0.278856

* Net firm, firm entry, and firm exit rate data are collected from TOBB, and calculated by authors. Patent rates are collected from TPMK and calculated by authors. Net migration rate is calculated by authors.

- Unemployment Rate:

The unemployment rate used in this paper is calculated with the total number of unemployed and the labor force in each region ($U_{it} = Total\ Unemployed_{it} / Labor\ Force_{it}$). TUIK provides unemployment rate data, which is used in this paper.

- Firm Establishment Rates:

The firm entry/exit rate can be calculated through two methods: the firm approach and the ecological approach (Armington and Acs 2002). The firm approach, also termed the labor market approach (Audretsch and Fritsch 1994), states that the firm establishment rate be calculated as the number of firms entering/exiting relative to the labor force, whereas the ecological approach is calculated by the number of firms entering/exiting relative to the number of total established firms. The ecological

approach can show relatively greater differences in the entry/exit rate since it is based on the number of business establishments in the region (Armington and Acs 2002).

This study makes use of both approaches, allowing the authors and readers to make a comparison between the results produced by each. Though results are presented for both approaches, the labor market approach is considered more appropriate; hence, the entry and exit rate table (see Table 3.3) and graphics (see Figure 3.1; 3.2) use the labor market approach. The entry and exit rate table for the ecological approach can be found in Appendix B (Table 7.3).

- Labor Market Approach

$$\begin{aligned}
 \text{Net Firm Formation} &= \frac{\text{Number of Firms Established}_{i,t} - \text{Number of Firms Closed}_{i,t}}{\text{Labor Force}_{i,t} (1000)} \\
 \text{Firm Entry Rate} &= \frac{\text{Number of Firms Established}_{i,t}}{\text{Labor Force}_{i,t} (1000)} \\
 \text{Firm Exit Rate} &= \frac{\text{Number of Firms Closed}_{i,t}}{\text{Labor Force}_{i,t} (1000)}
 \end{aligned}$$

- Ecological Approach

$$\begin{aligned}
 \text{Net Firm Formation} &= \frac{\text{Number of Firms Established}_{i,t} - \text{Number of Firms Closed}_{i,t}}{\text{Number of Existing Businesses}_{i,t-1}} \\
 \text{Firm Entry Rate} &= \frac{\text{Number of Firms Established}_{i,t}}{\text{Number of Existing Businesses}_{i,t-1}} \\
 \text{Firm Exit Rate} &= \frac{\text{Number of Firms Closed}_{i,t}}{\text{Number of Existing Businesses}_{i,t-1}}
 \end{aligned}$$

**Table 3.3. NUTS-II Unemployment and Firm Statistics-Annual Average
From 2010-2019**

Region	Code	Labor Participation	Unemployment	Entry Rate	Exit Rate
Adana	TR62	50.44%	11.55%	4.16	1.19
Agri	TRA2	52.73%	6.91%	1.11	0.24
Ankara	TR51	50.81%	11.09%	1.04	0.28
Antalya	TR61	56.81%	12.25%	2.16	0.56
Aydin	TR32	55.24%	7.90%	1.42	0.38
Balikesir	TR22	48.10%	6.20%	0.90	0.21
Bursa	TR41	50.09%	8.53%	1.96	0.38
Erzurum	TRA1	49.83%	6.89%	1.59	0.29
Gaziantep	TRC1	44.89%	12.13%	3.51	0.73
Hatay	TR63	47.01%	13.81%	1.60	0.35
Istanbul	TR10	53.56%	12.70%	2.37	0.43
Izmir	TR31	59.78%	14.67%	1.84	0.37
Kastamonu	TR82	54.67%	6.12%	1.36	0.22
Kayseri	TR72	48.76%	10.95%	1.20	0.33
Kirikkale	TR71	49.37%	9.80%	1.44	0.34
Kocaeli	TR42	54.08%	11.05%	0.68	0.20
Konya	TR52	50.08%	6.40%	0.69	0.21
Malatya	TRB1	49.85%	7.78%	0.90	0.21
Manisa	TR33	52.71%	5.77%	0.79	0.19
Mardin	TRC3	37.90%	22.72%	0.80	0.25
Samsun	TR83	51.69%	6.57%	0.54	0.09
Sanliurfa	TRC2	40.66%	15.45%	1.08	0.22
Tekirdag	TR21	57.03%	8.27%	0.92	0.17
Trabzon	TR90	54.84%	6.17%	2.05	0.25
Van	TRB2	46.84%	14.26%	1.64	0.17
Zonguldak	TR81	53.03%	7.79%	1.72	0.15

*Authors calculation: The entry and exit rates were calculated using the labor market approach.

A variation in entry and exit rates across the region is observed, with some outliers having much higher or lower entry/exit rates than the average. Observing the annual entry rates, with an exception for a dip in 2012, they have been increasing since 2010 across Türkiye, while the exit rates have remained consistent for the most part over this period (see Figure 3.1). In addition, we observe that the entry rates have increased over the years among regions, but the disparity has also increased between the regions. While the difference between the highest and lowest in 2010 firm formation rate was 3.212, it rose to 4.619 in 2019, which implies that between-region variation is rising. This observation is also confirmed by the rising standard deviation and variance, thus suggesting that there is more variation in firm formation rate across Türkiye than in the past (see Table 3.4). Another observation is that the firm exit rates have decreased over the years, signaling better sustainability for firms in the market. Provided that there is a rise in the number of new firms, it would also naturally give a rise in employment opportunities and economic growth.

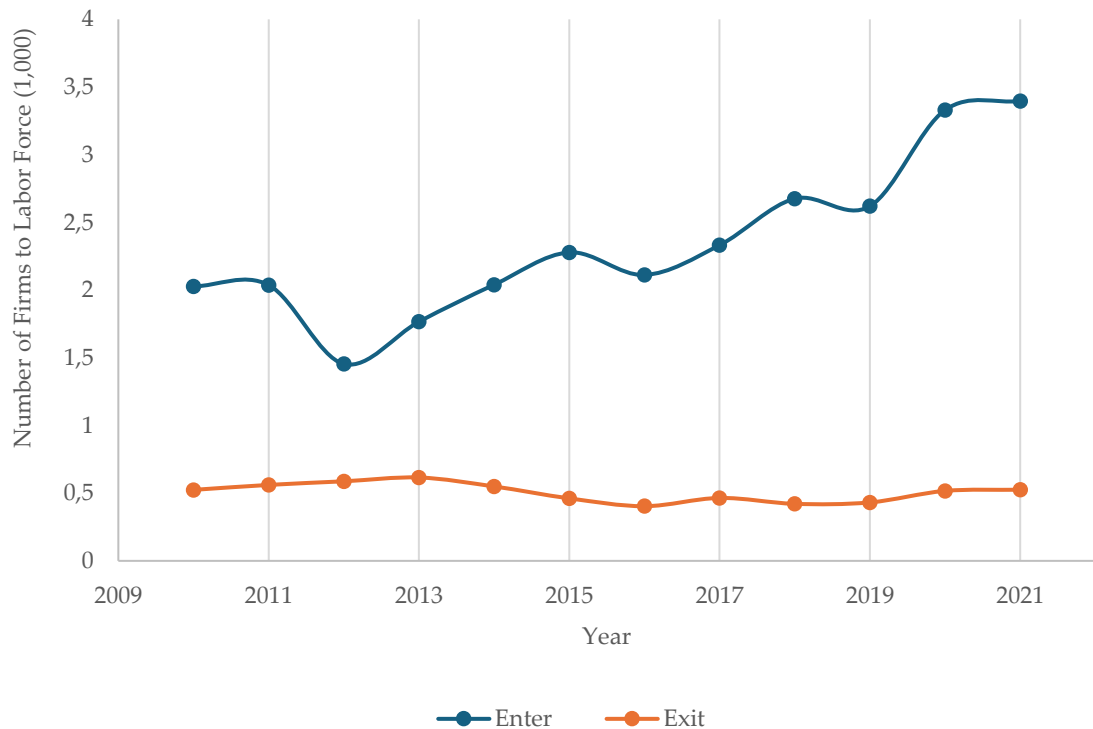


Figure 3.1. Annual Firm Entry and Exit Rate in Türkiye From 2010-2021

Source(s): Author's Calculation using data from TOBB

**Table 3.4. Firm Entry and Exit Rate Descriptive Statistics
Over the Studied Period**

	Min	Max	Mean	SD	Variance
Firm Formation Rate (2010)	0.708	3.920	1.552	0.764	0.584
Firm Formation Rate (2014)	0.380	4.008	1.423	0.847	0.717
Firm Formation Rate (2019)	0.660	5.279	1.753	1.087	1.181
Firm Exit Rate (2010)	0.107	1.320	0.333	0.261	0.068
Firm Exit Rate (2014)	0.099	1.206	0.363	0.228	0.052
Firm Exit Rate (2019)	0.070	0.994	0.270	0.186	0.035

On the other hand, unemployment disparities across regions should also be noted as the average annual unemployment for the studied period varies considerably, with 5.77% being the lowest in Manisa (West side of Türkiye) and 22.72% being the highest in Mardin (Southeast of Türkiye). Overall, this trend can be observed across western regions and east and southeastern regions. In Türkiye, these disparities are more pronounced due to development differences between the East and West, and this development gap is reflected in the unemployment rates (Filiztekin 2009). The regional disparities can be explained by the differences in various factors such as the labor market participation rates, the share of the young population, the share of agriculture in the overall economic activities of the region, and education attainment (Orhan and Gülel 2016). Income disparities also impact the individuals, where higher per capita income in urban settings attracts skilled and unskilled workers, therefore leading to increased internal migration among the regions. Regions that lag economically have low productivity and value-added economic activities, lower employment rates, and high population growth when compared to other regions (Karaalp-Orhan 2020). Among others, these factors are responsible for the disparity that is observed in the unemployment rates of Türkiye, as shown in Figure 3.2 (annual average unemployment rate between 2010 and 2019). While we hypothesize that higher unemployment should lead to higher firm formation rates, this may also vary due to other factors, such as education, which have a positive effect on new firm formation. It is also observed in the previous literature that eastern and southeastern regions lag in education levels (Lynn et al. 2015), which may explain why their new firm formation rates are also lower.

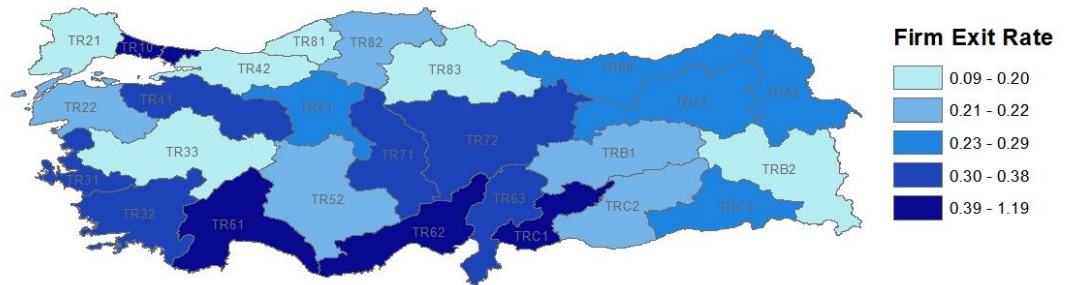
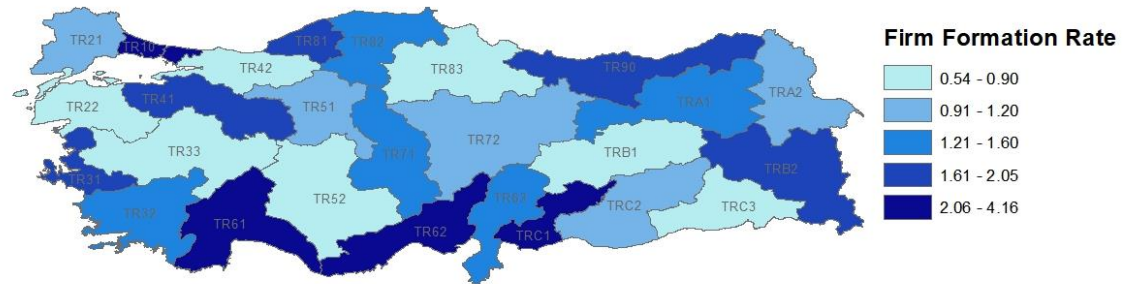
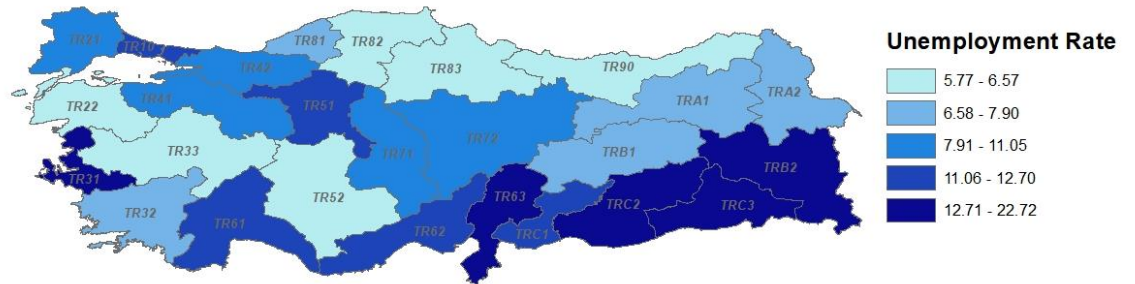


Figure 3.2. Average Annual Unemployment, Firm Formation, and Firm Exit Rates From 2010-2019

Source(s): Author's own creation.

In addition, the increase in the number of immigrants, notably the Syrian refugees, may be causing increased unemployment in regions near the Syrian border. Previous studies have found there to be negative effects of the Syrian population on unskilled/low-skilled natives in Türkiye who compete with Syrian refugees (Del Carpio and Wagner 2015; Ceritoglu et al. 2017). It has also been documented that native businesses are growing in refugee-host areas. However, this growth is in the informal economy and is leading to a displacement of native workers (Altındağ et al. 2020). Overall, the unemployment rates in the southeast may have further increased since 2013–2014 due to the influx of refugees in this region. That is not to say that the region had much lower unemployment prior to the Syrian refugee influx, but rather, it helps to explain why there may be a further rise in unemployment in this specific region.

3.3.2. Empirical Model (Regional NUTS-II Analysis)

$$F_{i,t} = U_{i,t-1} + Z_{i,t-1} + \varepsilon_{i,t} \quad (3.1)$$

In Equation (3.1), we assume that all firms are established by individuals who reside within the region. The model is set up to check for the effects of unemployment ($U_{i,t-1}$) on net firm formation ($F_{i,t}$). In addition to unemployment, we also include other control variables ($Z_{i,t-1}$), which may affect firm formation. We utilize the previous year's data on unemployment as well as other explanatory variables because of the possible lagged impact of these variables on the number of new firms established. There are two possible reasons for this lagged relation: the first is that unemployed individuals will most probably try to find a new job within a short period of being unemployed; second, it may take them several months to make the decision for firm formation, and again, may take them some time to bring that decision to fruition. Therefore, T–1 is used for the explanatory variables; hence, their data observation period begins in 2009. In Equations (3.2) and (3.3), we replace the dependent variable from net firm formation to firms entered/established ($E_{i,t}$) and firms exited/closed ($X_{i,t}$), respectively.

$$E_{i,t} = U_{i,t-1} + Z_{i,t-1} + \varepsilon_{i,t} \quad (3.2)$$

$$X_{i,t} = U_{i,t-1} + Z_{i,t-1} + \varepsilon_{i,t} \quad (3.3)$$

In Equation (3.4), we include the labor force as another explanatory variable because there is a possibility that all individuals in the labor market (whether employed or unemployed) may start up a business (Santarselli et al. 2009).

$$F_{i,t} = L_{i,t-1} + U_{i,t-1} + Z_{i,t-1} + \varepsilon_{i,t} \quad (3.4)$$

3.3.3. Empirical Model (City-Level NUTS-III Analysis)

The base form of the model is used to test the refugee effects on the city level. The same has been utilized for NUTS-II analysis (Equation 3.1); however, control variables are not used in this model. This model is set up to understand the effects of unemployment ($U_{i,t}$) on net firm formation ($F_{i,t}$).

$$F_{i,t} = U_{i,t} + \varepsilon_{i,t} \quad (3.5)$$

Likewise, the opposite relationship is tested to observe for the Schumpeter effect. An important distinction between the NUTS-II and NUTS-III analyses is that 6-month lags are used in the latter to observe the lagged effects of unemployment and firm formation. The availability of monthly data allows the authors to observe these lags, which are otherwise not tested in the NUTS-II analysis.

$$U_{i,t} = F_{i,t} + \varepsilon_{i,t} \quad (3.6)$$

The analysis is further enriched by utilizing data on vacancies and labor market matching. In using the vacancies and matching data, we can test whether a relationship exists between new firms and vacancies ($V_{i,t}$) in the market, as well as job matches ($M_{i,t}$).

$$V_{i,t} = F_{i,t} + \varepsilon_{i,t} \quad (3.7)$$

$$M_{i,t} = F_{i,t} + \varepsilon_{i,t} \quad (3.8)$$

These analyses will further inform us on the effectiveness of firm formation and how it affects the labor market mechanisms. In the data gathered, vacancies are defined as the requests for workers made on behalf of the businesses to the Turkish Employment

Agency (İŞKUR). Job matches are defined as the placement of job seekers through İŞKUR.

3.4. Results

We utilized a balanced panel dataset in conducting our analyses, whereby unit root tests were performed on the dependent variables and showed that the data were stationary (see Table 5). The complete list of variables with unit root test results can be found in Appendix B. In the literature, there is a debate about whether the unit root should be tested in the case of panel data. The reliability of the tests in the case of a small value of T may be in question as there exists a risk of declaring a short panel nonstationary while the longer panel may be stationary (Karlsson and Lothgren 2000 in Baltagi, 2005). The results from these unit root analyses show that the panel is stationary at level; hence, we can continue using it in our further analyses (results from the panel unit root tests for all variables can be found in Appendix B, Table 7.4). The Hausman test was performed in order to find the better model fit between fixed and random effects, the results of which led to the usage of the fixed-effects model for this study (see Appendix B, Table 7.5 for results).

Table 3.5. Results of Panel Unit Root Tests for the Dependent Variables

	Panel Unit Root Test			
	LLC	<i>p</i> -Value	Breitung	<i>p</i> -Value
Net Firm Formation	−3.7316	0.0001	−3.3822	0.0000
Firm Entry	−4.1083	0.0000	−3.5185	0.0002
Firm Exit	−2.0145	0.0220	−4.0499	0.0000
Net Firm Formation (Ecological Approach)	−3.4776	0.0003	−3.6976	0.0001
Firm Entry (Ecological Approach)	−4.5162	0.0000	−3.9296	0.0000
Firm Exit (Ecological Approach)	−3.6476	0.0001	−4.6995	0.0000

As a first check, we plot the new firm establishment rate against the lagged unemployment rate. Figure 3.3 shows the relationship between the net new firms and the unemployment rate for the observed period and regions. A positive relationship

between the two variables exists: as unemployment increases, the number of firms established also increases. The overall pattern, represented by the linear prediction line, is an increasing pattern over the space of increasing unemployment.

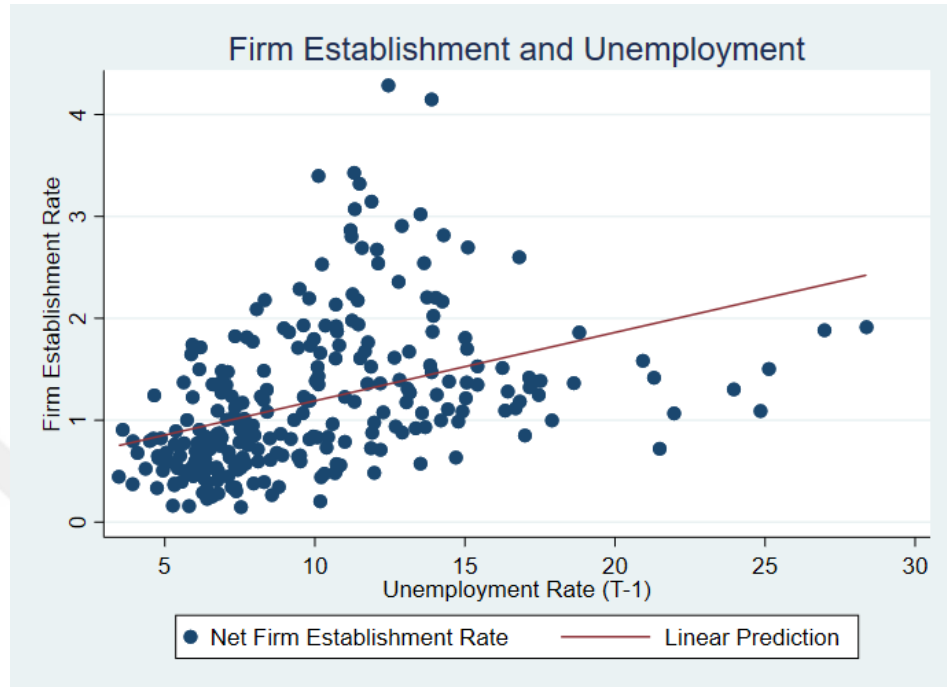


Figure 3.3. Scatter Plot Graph Between Net Firm Establishment Rate and Unemployment Rate (t-1)

Tables 3.6 and 3.7 show the results of the models presented in the previous section. The results for both the labor market approach and ecological approach are summarized. The model is calculated with robust standard errors to account for any heteroskedasticity that may be present. The unemployment rate has a significant positive effect on net firm formation. Given that the unemployment rate is in log form, the results can be interpreted as a 1% increase in unemployment would lead to a 0.00273 unit increase in net firm formation rate (see equation 3.4 results). Both the labor market approach and ecological approach give the same results, though the ecological approach results are more significant and higher in numbers. These results are similar to what has been found in previous studies in the case of France (Aubry et al. 2015), Iran (Cheratian et al. 2020), Poland (Wosiek et al. 2022), and Belgium (Carree and Dejardin 2020), among other research in the literature. The ecological approach results in relatively higher birth and exit rates since they are calculated by

the number of establishments (firms) rather than the number of employees (labor market approach). When compared to the labor market approach, the ecological approach may show higher results, as our results confirm, due to the entry and exit rates being relatively higher. This is an expected result as the ecological approach relies on all companies as a measure of new firm formation, whereas the labor approach relies on the labor force. GDP per capita has a significant negative effect on net firm formation in our analysis; that is, a 1% rise in the GDP per capita would lead to a 0.00872 unit decline in net firm formation (see equation 3.4 results). This result is somehow surprising. One explanation is that with higher wages, people face a higher opportunity cost in switching to their own business. An individual earning more money would be unwilling to take on the risk of failure from a new business and hence settle for their job. Therefore, an increase in the GDP per capita may lead to a decline in new firm formation¹. Population density also has a significant positive effect on new firm formation, as found in the ecological approach. This is also expected as a higher population within a region needs to be catered for by a higher number of shops, services, and other businesses.

Table 3.6. Results of NUTS-II Region Using the Fixed-Effects Model and Labor Market Approach

	(3.1)	(3.1)	(3.2)	(3.3)	(3.4)	(3.1)
	Net Firm Rate	Net Firms Rate Robust SEs	Entry Rate Robust SEs	Exit Rate Robust SEs	Net Firms Rate Robust SEs	Net Firms Rate GMM
L.Net Firms Rate						0.460***
						(0.028)
Log (Unemployment Rate)	0.236***	0.236*	0.177*	-0.058**	0.264**	0.208***
	(0.088)	(0.119)	(0.100)	(0.024)	(0.112)	(0.032)

¹ A counter argument is that a higher GDP per capita implies a higher purchasing power for individuals, which may motivate people to startup businesses. To examine that channel, we should check the consumer expenditure data and see if they raise the net firm formation.

Table 3.6. (cont.)

Log (Labor Force)					-1.249***	
					(0.381)	
Log (GDP per capita)	-1.076***	-1.076***	-0.780**	0.296***	-0.886**	-0.361**
	(0.294)	(0.354)	(0.344)	(0.068)	(0.333)	(0.177)
Log (Population Density)	1.063	1.063	1.026	-0.037	2.901**	0.194***
	(0.925)	(1.435)	(1.374)	(0.196)	(1.218)	(0.034)
Urbanization	-0.142	-0.142	0.018	0.160**	-0.214	0.285*
	(0.273)	(0.409)	(0.396)	(0.059)	(0.303)	(0.155)
Net Migration	-0.004	-0.004	-0.004	0.000	-0.007**	-0.003***
	(0.003)	(0.003)	(0.003)	(0.000)	(0.003)	(0.001)
Patent Rate	5.068***	5.068**	4.174**	-0.894**	4.979**	5.203***
	(1.620)	(2.193)	(1.908)	(0.383)	(2.141)	(0.675)
High School Education	9.630***	9.630***	8.305***	-1.325**	8.209**	-7.357***
	(3.164)	(3.109)	(2.880)	(0.596)	(2.978)	(0.465)
Higher Education	14.860** *	14.860***	9.891*	-4.969***	14.355***	12.693***
	(3.578)	(4.985)	(4.814)	(0.983)	(4.564)	(2.382)
Constant	3.608	3.608	1.846	-1.761*	2.375	0.460***
	(4.560)	(7.853)	(7.648)	(1.019)	(6.841)	(0.028)
Observations	260	260	260	260	260	234
R-squared	0.460	0.460	0.377	0.540	0.498	

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Urbanization and net migration do not have any significant effects despite the theoretical prediction that urbanization would have a positive effect while net migration would have a negative effect on net firm formation. The significant positive effects of the patent rate show that technology plays a positive role in firm formation. Hence, governments should focus on assisting firms with technological transformation. In addition, research and development spending should be increased

to improve innovation across the regions². Education also has a significant positive effect on the formation of new firms. Given that education data used is a percentage, the interpretation of the results would be that a 1% rise in higher education would lead to a 14.76 unit increase in net firm formation. Higher education displays a significant impact. This finding is in line with the literature, which implies that more highly educated individuals have more developed entrepreneurial skills. A 2019 GEM report on entrepreneurship in Türkiye shows that 11.81% of entrepreneurs between the ages of 18 and 64 have educational levels below high school, 14.21% have high school education, and 17.44% have higher education (Karadeniz 2019, p. 30). This also adds to the explanation that more educated individuals are more likely to become entrepreneurs.

In addition to net firm formation, we also checked for the effects of new entries and exits of firms from the market. In the case of new firm entry, the effects are similar to net firm formation, though smaller in magnitude, whereas there is a significant negative effect of unemployment on the firm exit rate. This could be due to market conditions in which, as the unemployment rate rises, firms may downsize to cut costs and stay afloat. Overall, the results support the strand of literature that documents the positive effects of unemployment on the net establishment of new businesses. GMM analysis was performed to add to the robustness of the findings. The GMM results show findings similar to those found using the fixed effects model (see Tables 3.6 and 3.7). The Arellano-Bond test for autocorrelation and Sargan test for overidentification were also carried out and showed that the tested model is fit for the data and the results are reliable (see table in Appendix B, p. 113).

² The research and development spending for each region was also considered as a variable; however, due to a lack of data, it was omitted. While we have utilized data since 2009, the R&D data at the NUTS-II level is only available from the year 2018 onwards.

Table 3.7. Results of NUTS-II Region Using the Fixed-Effects Model and Ecological Approach

	Net Firms Rate	Net Firms Rate Robust SEs	Entry Rate Robust SEs	Exit Rate Robust SEs	Net Firms Rate Robust SEs	Net Firms Rate GMM
L.Net Firms Rate						0.440***
						(0.0143)
Log (Unemployment Rate)	2.606***	2.606***	2.284***	-0.322*	2.717***	3.023***
	(0.700)	(0.870)	(0.721)	(0.180)	(0.885)	(0.633)
Log (Labor Force)					-4.884	
					(2.868)	
Log (GDP per capita)	-8.976***	-8.976***	-7.111**	1.865***	-8.236***	-4.302***
	(2.346)	(2.778)	(2.677)	(0.493)	(2.827)	(1.168)
Log (Population Density)	14.990**	14.990	16.321*	1.331	22.180**	0.582
	(7.367)	(9.864)	(8.974)	(1.540)	(10.229)	(0.449)
Urbanization	-1.642	-1.642	-0.923	0.719	-1.922	2.134***
	(2.174)	(2.243)	(1.939)	(0.452)	(1.992)	(0.796)
Net Migration	-0.043*	-0.043*	-0.047**	-0.005	-0.052**	-0.0203***
	(0.024)	(0.021)	(0.018)	(0.004)	(0.022)	(0.00694)
Patent Rate	43.815***	43.815**	39.417**	-4.397	43.469**	40.99***
	(12.909)	(16.478)	(14.817)	(2.859)	(16.523)	(7.412)
High School Education	61.721**	61.721**	43.834*	-17.887***	56.165**	-90.65***
	(25.211)	(24.056)	(21.821)	(4.907)	(25.601)	(10.14)
Higher Education	139.109***	139.109***	110.667***	-28.442***	137.136***	146.4***
	(28.509)	(38.916)	(36.589)	(6.490)	(38.367)	(13.55)
Constant	6.901	6.901	-8.547	-15.448**	2.077	50.68***
	(36.333)	(52.896)	(49.861)	(7.286)	(51.761)	(10.10)
Observations	260	260	260	260	260	234
R-squared	0.567	0.567	0.546	0.388	0.575	

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.4.1. City-Level Results

This study investigates the relationship between entrepreneurship and unemployment using monthly and city-level data. The Turkish Employment Agency provides city-level monthly data on various labor market indicators, such as the number of people registered as unemployed, the number of new vacancies opened, and the number of people who are matched with jobs in the labor market. The monthly unemployment covers the period 2009–2017³ with a total of 8,748 observations. The vacancies and matching data are from 2009 to 2018, a 10-year period with 9,720 observations for 81 cities in Türkiye. The natural log was taken for the dataset. These labor market dynamics can further help us to understand how firm formation may affect unemployment and vice versa. Additionally, the effects of firm formation on matching and vacancies are also observed. The descriptive statistics of the variables used in the city-level analysis are presented in Table 3.8.

Table 3.8. Descriptive Statistics of City-Level Data From 2009-2018

Variable	Observations	Mean	Std. dev.	Min	Max
Net Firms	9,720	2.445941	1.493576	0	8.002694
Firm Entry	9,720	2.772208	1.409498	0	8.255049
Firm Exit	9,720	1.294806	1.292183	0	7.218177
Unemployment	8,748	7.120807	1.094751	3.713572	11.31197
Vacancies	9,720	5.99413	1.694825	0	11.4339
Matching	9,720	5.326965	1.689312	0	10.97102

Note: Monthly unemployment data from ISKUR was only available until the end of 2017.

This study utilized a balanced panel dataset to conduct the analyses. Unit root tests are conducted as a first check. The results of these tests are provided in Table 3.9, which reveals that the data do not have a unit root and are stationary at different levels. Hence, the analysis uses a fixed-effects model to investigate the relationship between firm formation and various labor market indicators.

³ The data on registered unemployed each month are not shared by the Turkish Employment Agency starting in 2018.

Table 3.9. Unit Root Test Results Using Levin-Lin-Chu (LLC), Breitung, and Harris-Tzavalis Methods

	LLC	<i>p</i> -Value	Breitung	<i>p</i> -Value	Harris-Tzavalis	<i>p</i> -Value
Firm Entry	-24.9215 ***	0.000	-38.2234 ***	0.000	0.3277 ***	0.000
Net Firm Formation	-27.4591 ***	0.000	-33.9428 ***	0.000	0.3609 ***	0.000
Unemployment	-14.095 ***	0.000	-21.6713 ***	0.000	0.6575 ***	0.000
Matching	-22.5148 ***	0.000	-15.0071 ***	0.000	0.5884 ***	0.000
Vacancies	-18.7109 ***	0.000	-8.9225 ***	0.000	0.7218 ***	0.000

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The first step is to examine the relationship between firm formation and unemployment. As mentioned before, the literature provides evidence in both directions for this relation, namely the Schumpeter effect and the Refugee effect. In the city-level analysis, some additional lagged variables are used. The use of further lags is plausible in monthly data because the frequency of the effects can be delayed. Moreover, since this dataset has a large number of observations, lags can be applied and still provide meaningful results.

3.4.1.1. Refugee Effect

City-level results support the regional level; that is, unemployment has a positive effect on net firm formation. As unemployment increases, firm formation also increases, giving rise to new businesses and new employment opportunities. The refugee effect is found to be strongest after 2 and 3 years, which was tested using a 6-month lag for the first year and a 12-month lag afterward up to 5 years.

3.4.1.2. Schumpeter Effect

The Schumpeter effect was not significant at the regional level. The city-level analysis results point out a positive and significant Schumpeter effect (see Table 3.10). The decline in coefficients implies that the long-run effects exceed those of the short-run. A point to note is that in the 4th and 5th years, this study finds a negative and significant relationship, showing that as time passes, new firm formation does lead to a decrease

in unemployment. Hence, it is concluded that, in the long run, new firms can help to reduce unemployment and have a positive effect on the labor market.

Table 3.10. Fixed-Effects Regression Results for City-Level Analysis

	Net Firm (3.5)	Unemployment (3.6)
At Level (no lags)	0.0793 ***	0.0549 ***
	−0.0129	−0.00892
6-month lag	0.248 ***	0.0202 **
	−0.013	−0.00908
12-month lag	0.266 ***	0.0000796
	−0.0129	−0.00924
24-month lag	0.364 ***	0.0358 ***
	−0.0151	−0.00917
36-month lag	0.343 ***	0.000117
	−0.0172	−0.00912
48-month lag	0.140 ***	−0.0683 ***
	−0.0172	−0.00924
60-month lag	0.187 ***	−0.124 ***
	−0.0174	−0.0106
Observations	8,748	8,748

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.4.1.3. Employment Analysis

Storey (1985) finds that manufacturing firms are generally 8 to 9 years old when they reach peak employment. Therefore, the lag structure may be an important factor when studying this relationship, given that some effects will be realized in the medium to long run. Our overall results are in line with Apaydin (2018), who also investigated Turkish firms, though, in their study, they only found evidence for the Schumpeter effect and not the refugee effect. Employment analysis was conducted using vacancy data to explore the impact of new firm formation. Findings in this study suggest that there is a significant positive relationship between firm formation and vacancies at level and with a 6-month lag (see Table 3.11). However, with further lags, the relationship is not significant. Though it was expected to be positive in the long run, the evidence does not support that hypothesis.

Table 3.11. Fixed-Effects Regression Results for Employment Analysis

	Vacancies (3.7)	Matching (3.8)
At Level (no lags)	0.166 ***	0.112 ***
	−0.0171	−0.0179
6-month lag	0.0629 ***	0.0456 ***
	−0.0162	−0.0172
12-month lag	0.0233	0.0375 **
	−0.0149	−0.0163
24-month lag	−0.0117	−0.0274 *
	−0.0129	−0.0152
36-month lag	−0.0228	0.023
	−0.0121	−0.0154
48-month lag	0.0153	0.0713 ***
	−0.0117	−0.016
60-month lag	0.00244	−0.0197
	−0.0124	−0.0174
Observations	9720	9720

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

New firms can be an important source of job openings, creating opportunities for the local labor market. Employment growth as a result of new firms is established in the literature in the case of different countries, Spain (Arauzo Carod et al. 2008), the US (Acs and Mueller 2008), and Portugal (Baptista et al. 2008), among many others. In the literature, there are different effects of firm formation on employment. One is an immediate effect on job creation; the second is the displacement of existing jobs; and the third refers to the long-term effects that may result from increased competition (Baptista and Preto 2011). These effects may differ in magnitude and timing given the different regions and economic makeup of the countries. This study investigates whether a relationship exists between firm formation and the number of monthly employment matches in the labor market. The results imply a positive relationship between firm formation and matching in the first year, though the strength of the relationship decreases with further lags.

3.5. Discussion

The existing literature on firm formation and unemployment provides evidence for mixed results. Although studies focusing on developed economies are more abundant, there is also rising interest in studying the same question for developing economies over the past 15 to 20 years. To better understand this relationship, this study utilizes a NUTS-II- and NUTS-III-level analysis using data on Türkiye that incorporate various variables that may affect firm formation or unemployment.

On the NUTS-II level, we find evidence for an unemployment push hypothesis complementing different studies that have found the same in the past (Aubry et al. 2015; Carree and Dejardin 2020; Wosiek 2023). We also find that education plays an important role in firm formation, adding to the strand of the literature, which states that higher levels of education lead to higher entrepreneurship (Jiménez et al., 2015). Similarly, the unemployment push or refugee effect is also found through the city-level analysis. This study used lagged data, which determined that the effects increase with time, reaching the highest point in year 3. This confirms our hypothesis that higher unemployment would lead to higher firm formation.

The Schumpeter effect, entrepreneurship leading to lower unemployment, is found to be significant at the city level with 48- and 60-month lags. New firm formation may reduce unemployment in the medium to long run. Differently from previous studies, vacancies and employee matching were used as dependent variables to observe whether they are impacted by firm formation. The firm formation positively affects vacancies in the short run (6- and 12-month lags), which is also in line with the past literature on employment growth resulting from new firm establishments (Baptista et al. 2008). In the long run, we do find evidence for our hypothesis of the presence of the Schumpeter effect; however, we do not find this in the short or medium run.

This study has several implications. First, new firms and entrepreneurial activity should be prioritized within government policies. The focus should be on small- and medium-sized enterprises which create employment opportunities. Entrepreneurial training and education may also motivate individuals to move towards new firms. Second, there can be a greater focus on regions that have lower education levels since

education plays an important role in firm formation. Currently, there are education disparities among different regions within Türkiye; therefore, the focus should be turned towards creating an equal playing field through improvements across regions. This may be attained through regional policies that focus on and prioritize regions that currently lag behind.

3.6. Conclusion

This study examines the relationship between firm formation and unemployment at the NUTS-II level in Türkiye. We investigate how new firm formation affects unemployment and vice versa using a 10-year dataset for the country covering the period 2010–2019. In addition, the paper tests the relationship on the NUTS-III level, albeit with slightly different data than has been used traditionally in the literature. Instead of using total unemployment, we utilize monthly newly registered unemployed individuals, and we do the same for vacancies and labor market matching statistics. The results show that unemployment does lead to an increase in firm formation in Türkiye on the regional level, which is complemented by the results from the city-level analysis.

This study adds to the literature on the *Refugee* and *Schumpeter* effects within the field of firm formation and unemployment. It also provides insights into the lagged effects of this relationship. Lastly, it contributes to the literature on emerging economies in this field. Ideally, microdata would be preferred to better understand the relationship between the studied variables. However, due to data limitations, the current study utilizes NUTS-II and NUTS-III data. In future studies, sectoral analysis should also be considered because firm formation in different sectors can affect the labor markets differently. Sectoral growth may also be an important aspect of future studies. The impact of the concentration of different firms (firm density) and firm diversity on labor markets is an interesting avenue for future research. Furthermore, given the rapid rise in the number of immigrants in Türkiye, the effects of foreign firm formation are an important question to analyze.

From a policy perspective, there are various implications. First, policies should focus on supporting new firms since they provide employment opportunities. In addition, the

government should formulate policies that decrease the disparities among regions within Türkiye. There is an active lower degree of firm formation in southeastern Türkiye, which is possibly rooted in lower educational levels, fewer employment opportunities, and slower economic growth. Therefore, policies should try to improve the economic situation of cities where there is slower economic growth and lower education levels since these are significant factors in firm formation.



CHAPTER IV

AGGLOMERATION ECONOMIES AND WAGE DIFFERENCES: EVIDENCE FROM TÜRKİYE

4.1. Introduction

The concentration of humans has increased greatly over the past few decades, and mass migration from rural to urban areas continues to rise. Recent data shows that 55% of the world's population lived in urban areas in 2018, and this number is projected to increase to 68% by 2050 (United Nations, 2018). Urbanization has also given rise to megacities.⁴ There are more than 30 mega cities in the world today, and they continue to expand. People generally migrate to cities for better opportunities which can range from education or work to improved facilities and resources. As a result, the concentration of people and economic activity go hand in hand. This concentration can provide great benefits to firms in terms of availability of skilled workers, proximity to suppliers, proximity to customers, exchange of information and ideas, and others. Employees in the region also benefit through greater opportunities, bargaining power, lower switching costs, and learning from others.

The concentration of firms in cities, whether large or small, influences productivity and wages within the region. However, the concentration of the type of industries or the skill level of the workers can affect the benefits of agglomeration. Agglomeration economies can differ with respect to region and time and may show more distinct effects in one region than in another. While worker and firm characteristics are important factors in the determination of total factor productivity and wages, agglomeration externalities also play a significant role. Furthermore, the goals of the firms and workers are different. While a firm aims to maximize profits, a worker maximizes its utility. Workers may also be quick to relocate, reacting to market

⁴ The UN defines megacity as a city with more than 10 million inhabitants.

conditions. Therefore, it becomes essential that agglomeration effects be studied and empirically sought out.

Policymakers need to realize the impact of agglomeration economies as they are responsible for deciding whether to focus on larger or smaller cities. It would be equally important to understand the productivity or wage differences arising from an increase in density, specialization, and diversity, among other factors. How does the number of workers per square kilometer affect the wage premiums in the region? Does a higher level of specialization (concentration of employment in a few industries) or diversity (employment spread over a number of industries) have a greater impact on productivity? Moreover, is competition good or bad for productivity or wage growth? These are all important questions that policymakers can ask. A better understanding of agglomeration economies can help form economic policies that provide answers to these questions and more. From a policy perspective, it becomes essential to know which factors besides the firm and worker characteristics account for the change in productivity and wages. Once learned, economic policies can be formed that take into account different agglomeration externalities and how they apply to firms and workers within a specific region. The importance of agglomeration can only be understood after having empirical evidence of different factors that determine productivity at a regional level. It may also be more beneficial to study at the micro-level as differences may arise among micro-regions, whether these be cities, districts, or metropolitan areas.

4.2. Literature Review

Agglomeration economies have been a topic of study for more than a century. Marshall (1890) is considered as one of the earliest works in the field with three main categories of agglomeration including labor market interactions, firm linkages, and knowledge spillovers. The micro-foundations of agglomeration economies can be better described by three sources of agglomeration, as stated by Duranton and Puga (2004): sharing, matching, and learning.⁵ Sharing is based on the concept of indivisible goods, where everyone would benefit from sharing a good that can be resourced jointly. Sharing can be achieved by producing non-tradeable goods in a single city (Abdel-Rahman, 1990)

⁵ Duranton and Puga (2004) provide an overview of the micro foundations of agglomeration economies.

or by several sectors operating within a city, leading to economies of scale (Abdel-Rahman, 1994). Diversity can play an important role in agglomeration, creating a positive effect on productivity and wages.

On the other hand, specialization can also have its own benefits. When studied at a micro level, specialized workers can achieve higher productivity as they gain more experience in their work and become more efficient. Similarly, companies can also be specialized in their production processes. Labor pooling is another factor that can be considered under sharing, that is the sharing of the labor force within the region. The firms can benefit from a larger labor pool by having the ability to lay off workers at a time of a negative market shock, whereas employees prefer denser markets to minimize their risks of possible unemployment that may result from shocks. In this way, both the firms and employees prefer to agglomerate in certain regions.

A related concept is urbanization economies, which refer to externalities that arise due to the characteristics of the location, such as the density of firms clustered within a region (Cohen and Paul, 2008). These economies are more pronounced in regions that are closest to economic activity. The proximity of firms plays an important role in determining the effects of agglomeration in urbanization, where closeness can lead to cost benefits that arise from various industries established in the same region. Therefore, distance between firms may lead to a decline in agglomeration effects (Audretsch and Feldman, 2004; Van Soest et al., 2006). These cost benefits may be a result of firms using various services that are common among them, such as legal services, logistics, marketing, etc. Hence, the concentration of the city (region) in terms of employment is an important factor when discussing urbanization economies. In other words, one would observe the concentration of different industries (employment) within a region rather than being concerned with the specialization of the region.

Differences in wage premiums may also be heterogeneous across regions, where inland cities show negative effects of city size on wages in the long run as compared to coastal cities, having a positive long-run effect (Chen et al., 2021). These differences may be attributed to the development of firms in the different regions, where firms in the later stages of development will experience a positive effect of city size on wages

in the long run. The development of the city can also be a factor in these heterogeneous wage premiums across regions, and improved infrastructure should provide more positive outcomes. The results may also differ with respect to industries; Barufi (2015) finds that high and low-tech firms gain more advantages from the urban scale along with the service industry in Brazil. In the case of Egypt, service firms are found to benefit more from diversification, while manufacturing firms benefit more from specialization (Badr et al., 2019). Evidence of agglomeration economies is also found in Colombia, where Garcia (2019) found a positive effect of employment density on wage premiums. The differences are more profound in the informal sector than the formal sector, where the informal sector has a higher effect on productivity than the formal sector. In Indonesia, urban density is found to have a positive agglomeration effect on individual wages in addition to the significant positive effects of specialization (Ridhwan, 2021). Given the recent findings from various studies in developing economies that showcase the positive effect of density on wage premiums, it is hypothesized that in the case of Türkiye, we would observe the same.

The geographical location of firms depends on these factors, among others, when deciding where they will locate, whether they are in an industrially specialized region where they seek the benefits of localization economies or a more diverse region where they can take advantage of urbanization economies. Location strategies are more likely to consider a combination of both localization and urbanization, given that benefits can be gained from both. Lavoratori and Castellani (2021) find that urbanization economies operate at a more macro level (city) and localization economies at a micro level (within neighborhoods). They go on to state that the benefits of urbanization economies can be reaped at the city level as they are large enough to provide interaction between industries and other economic activities. At the city level, it is predicted that as city size increases (in terms of population), the wage premiums would also increase in the case of Türkiye. This study compares Mincerian wage equation results at two levels (city and district level) to add to this strand of the literature. The agglomeration determinants are measured at the city level only and add to the strand of literature on agglomeration determinants at the city level.

Localization Economies, on the other hand, refer to externalities arising from the characteristics of the industry in a specific location, such as specialization (Combes

and Gobillon, 2015). The benefits of localization economies are gained by firms in the same industry (Baldwin et al., 2008). Since the efficiencies of localization are gained by firms in close proximity, these benefits tend to decrease as firms move further away (Rosenthal and Strange, 2003). Localization economies can be enhanced through easier communication, specialization, and economies of scale that may arise from the concentration of particular industries (Enright, 1995). To this effect, Jofre-Monseny et al. (2014) find that localization economies are prevalent in industries that require more industry-specific skills benefiting from a specialized pool of workers. Desmet and Fafchamps (2005), in the case of the US, found that localization economies are of more importance than urbanization economies when assessing employment growth in non-service sectors. Andersson and Larsson (2022) make an important contribution to this literature in terms of specialization, finding that the concentration of both firms and similar occupations within a region makes fertile ground for wage premiums within cities. In an attempt to test this relationship within Türkiye, this study utilizes employee occupational data to measure its impact on wages.

Despite the vast amount of research on agglomeration economics in developed countries, there are also studies analyzing the same question in the context of developing countries. Pan et al. (2016) use Chinese data and find that city size plays an important role in the wage premium of workers in China. The literature provides mixed evidence on the impacts of diversity on wages in developing countries. While some lend support to the positive effect of diversity effect (Barufi, 2015; Torres-Gutiérrez et al., 2019), others display a negative diversity effect (Ridhwan, 2021; Prasertsoong & Puttanapong, 2022). Different methodologies utilized to measure diversity or other agglomeration variables can be one reason for the difference in the results. This is evident in the study by Barufi (2015), in which a number of different methods are used to measure agglomeration economies and observe how the results may vary. In the case of diversity measured by either the Herfindahl Index or Shannon's Entropy, Barufi (2015) finds a positive diversity effect in Brazil; however, when using the share of 5 biggest sectors as an indicator of diversity, a negative effect of diversity is observed. This study contributes to the literature on diversity by testing Shannon's Entropy to measure the effects of wages.

In terms of Türkiye, there are a limited number of studies, and most of them focus only on the manufacturing sector. Alkay and Hewings (2012) studied the manufacturing

sector in Istanbul using three different geographical areas, namely the European side, the Asian side, and the Istanbul Metropolitan Area level. They find that urbanization economies can be explained through density, market area potential, and labor market potential. Their results also show that labor market pooling is in effect within their study area, and raw materials play an important role in agglomeration at the geographical level; however, they do not find any evidence of knowledge spillover. Since they studied the manufacturing sector in Istanbul, the results cannot be generalized to a wider geographical area of Türkiye due to the status of Istanbul as an economic hub. Istanbul is the largest city and has the most economic activity of any city in Türkiye by a large margin. However, these results may explain how agglomeration operates within large cities where there is a high population and high firm density within proximity.

Kent (2018) uses a similar strategy to Alkay and Hewings (2010), utilizing the Ellison and Glaeser (1997) index to study the concentration of the manufacturing sector in Türkiye. While this study captures a wider region (the whole of Türkiye), it is limited to the NUTS-2 level, creating a geographical restriction. The study finds that there is a higher concentration in low-tech and medium-tech firms. Their findings concur with the literature demonstrating that low-tech firms tend to agglomerate more, similar to what Devereux et al. (2004) found in the case of the UK. Özgüzel (2023) conducted a more comprehensive and recent study that analyzes the effects of agglomeration in Türkiye at the NUTS-III level using an administrative dataset from 2008 to 2013. The study utilized a dataset provided by the Social Security Administration of Türkiye, where the data was aggregated at the NUTS-III level and respective sectors. Like other studies, Özgüzel (2023) finds a positive effect of density on labor productivity, whereas no effects of sorting are found.

Different from the existing studies using Turkish data, the current study utilizes a rich dataset with matched employer-employee to investigate the agglomeration determinants in Türkiye. This study also contributes to the existing literature through the exploration of agglomeration externalities with the use of firm-level data. Furthermore, it adds to the literature on developing or emerging economies in the case of agglomeration and wage premiums.

4.3. Methodology

4.3.1. Data

The primary data (administrative data on employees and firms) used in this study is made available through the Enterprise Information System (EIS) provided by the Ministry of Science, Industry and Technology (STB). EIS is a comprehensive database of enterprise, plant, and employee data that covers all registered firms and employees that are registered with the Social Security Institution (SGK). Furthermore, there is detailed financial data (balance sheet) for firms across Türkiye. It also has trade (import and export) data for all countries and Türkiye, as well as data on firm support programs initiated by different institutions such as the Science Ministry (TÜBİTAK), Small and Medium Industry Development Organization (KOSGEB), and others. EIS provides data from 2006 onwards and has been available to researchers and other institutions since 2016. The data can be matched across datasets to gain meaningful insights.

In this study, the individual employee data is matched with the firm-level administrative data for analysis. The authors are able to incorporate employee locational data at the city and district levels by using a matched dataset of firms and employees. Data available over the time frame since 2006 provides us with all registered employees with SGK, making the dataset high in observations. In our dataset, which has a cross-section of 2009 and panels from 2014-2019, there are more than 7 million observations in 2009 and more than 11 million annual observations each year from 2014 onwards. Firm data is also vast, and more than 10 million observations have been recorded over the study period.

Both district-level and city-level datasets are used in this analysis. The city-level dataset consists of 81 Turkish cities over a 6-year period, and the district-level dataset consists of 957 districts across Türkiye over the same period. The employee data provided includes the employee's age, gender, daily wages, and occupation. The firm data available includes firm size, number of employees, location (city and district), wages paid to employees, 4-digit NACE classification, establishment year, whether

the firm is operational, the technology level (only among manufacturing firms), and detailed balance sheet data. Balance sheet data is not used in this study.

4.3.2. Variables

Wage – The monthly and daily wage data is available for all employees by quarter. We use the daily wages because monthly wages can vary depending on the number of working days. Using the daily wage level would provide more accurate results and has been used in literature. The year-end daily wage data is used; therefore, only the individuals employed in the last quarter of each year are a part of the dataset.

- Age – The age of employees is an indicator of their work experience and, therefore, their wages. Age and age squared are widely used in labor economics literature.
- Gender – This captures the wage differences among males and females.
- Occupation – Education is used in much of the literature to measure wage differences; however, education data is not available in the EIS database. We use data on occupations as a proxy for education, which was available after 2013. Besides serving as a proxy for education, this variable also gives us an idea of how wages differ with respect to an individual's occupation. Nine occupational categories are used in this dataset.

Table 4.1. ISCO Occupations Matched with ISCED-97 Levels of Education

Occupation	Skill Level	ISCED-97 Levels of Education
Managers	4	Second stage of tertiary education (leading to an advanced research qualification)
		First stage of tertiary education, 1st degree (medium duration)
	3	First stage of tertiary education (short or medium duration)

Table 4.1. (cont.)

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Professionals	4	Second stage of tertiary education (leading to an advanced research qualification)
		First stage of tertiary education, 1st degree (medium duration)
Technicians and Associate Professionals	3	First stage of tertiary education (short or medium duration)
Clerical Support Workers	2	Post-secondary, non-tertiary education
		Upper secondary level of education
		Lower secondary level of education
Services and Sales Workers		
Skilled Agricultural, Forestry and Fishery Workers		
Craft and Related Trades Workers		
Plant and Machine Operators and Assemblers		
Elementary Occupations	1	Primary level of education

Source(s): International Standard Classification of Occupations (ISCO-08 Vol. 1, ILO, 2012)

The International Labor Organization (ILO) has also matched some of these occupations with their education levels. However, it does not mean that those education levels are the only consideration that may go into these occupations, and the skills required for each individual position may differ according to the responsibilities. For example, a manager in the manufacturing sector may require a different skill set than a manager in the service industry; however, both will attain some level of education. The ISCED-97 levels of education are defined for occupations that are used to measure the skill within these occupations. Identifying education levels with their respective occupations provides us with an idea of how we can treat them in our assessment without an employee's education.

Firm Size – The firm size is defined by the number of employees and the amount of annual revenue generated by the firm. The size of the firm can influence the wages because it is expected that bigger firms will provide higher wages. This can be a result

of higher profits and productivity in larger firms, leading to better incentives for employees.

Table 4.2. Firm Size by Number of Employees and Net Sales

Firm Size	# of Employees	Net Sales or Balance Statement (TL)
Micro	0-9	$\leq 3,000,000$
Small	10-49	$\leq 25,000,000$
Medium	50-249	$\leq 125,000,000$
>SME	250 or more	$> 125,000,000$

Fixed effects are applied through the use of year, region, firm size, and sector dummies. The sector dummy is based on NACE Rev. 2 (Eurostat, 2008) categorization of industries, where 19 sectors are identified and used as a part of this study.

The current research uses a 6-year dataset covering the 2014-2019 period because the employee occupational data is unavailable before 2014. We also present results for a cross-section from 2009 and 2021 to analyze and compare the pre and post-pandemic periods.

4.3.3. Empirical Model

This study follows an empirical strategy proposed by Combes et al. (2008) and later used by Groot et al. (2014) in their study of micro-data from the Netherlands and further applied in the context of Indonesia (Ridhwan, 2021) and Thailand (Prasertsoong and Puttanapong, 2022). A two-stage analysis is conducted to check for the effects of various agglomeration factors on wage premiums. The first step uses a Mincerian wage regression to analyze the wage differences. These wage differences can be a result of various employee characteristics such as age, education level, gender, and occupation. In addition to employee characteristics, wage differences may also occur due to regional characteristics such as infrastructure, resources, and agglomeration effects.

$$\log(w_{it}) = \beta_0 + \beta_1 Age_{it} + \beta_2 Age_{it}^2 + \beta_3 Female_{it} + \beta_4 D_{it}^{Occ} + \beta_5 D_{it}^{Firm} + \beta_6 D_{it}^{Region} + \beta_7 D_{it}^{Sector} + \beta_8 D_{it}^{Year} + \varepsilon_{it} \quad (4.1)$$

There are employee characteristics, which include age, age squared, and gender. Various dummy variables are used, D_{it}^{Occ} represents the occupation dummy, D_{it}^{Firm} represents the firm-size dummy, D_{it}^{Region} represents the regional dummy, D_{it}^{Sector} represents the sector dummy and D_{it}^{Year} represents the time dummy.

- Specialization

$$Spec_{jr} = \frac{E_{jr}}{E_r} \quad (4.2)$$

Specialization is the share of employment in a specific industry compared to the total employment in the region (here, the subscript j represents sector, r represents region). The higher the specialization index, the more concentrated an area is in terms of industry. This indicator shows the concentration of an industry within a region. A higher specialization could mean benefits for the industry because a concentration of companies can result in the placement of suppliers in the same region. In addition, more potential employees may be attracted to the region.

- Diversity

$$Div_r = - \sum_j \left(\frac{E_{jr}}{E_r} \times \ln \frac{E_{jr}}{E_r} \right) \quad (4.3)$$

Shannon's entropy is used to capture the diversity of a region. Diversity indicates the number of different industries that are operating within a region. A high value means the region is diversified, whereas a low value indicates that the region has a high concentration of a few industries. This indicator can help us understand whether the region is more diversified, more specialized, or not. Diversity could benefit the region through greater spillover results and the availability of a diverse workforce to cater to the needs of the different industries.

The highest levels of diversity are observed in two southern cities, in the far east and in central Türkiye (see Figure 4.1). Cities close to Istanbul are more specialized and host a smaller number of industries. In Central Türkiye, there is also lower diversity, and this trend continues as we move further east with the exception of a few cities such as Ankara, Sivas, Elazığ, Hakkari, and Van. In 2019, more diversification of industries was observed in the Southeastern cities of Türkiye, namely Şanlıurfa, Diyarbakir, and Elazig. The overall diversity across Türkiye has also increased over this period, as seen in the increase in diversity levels.

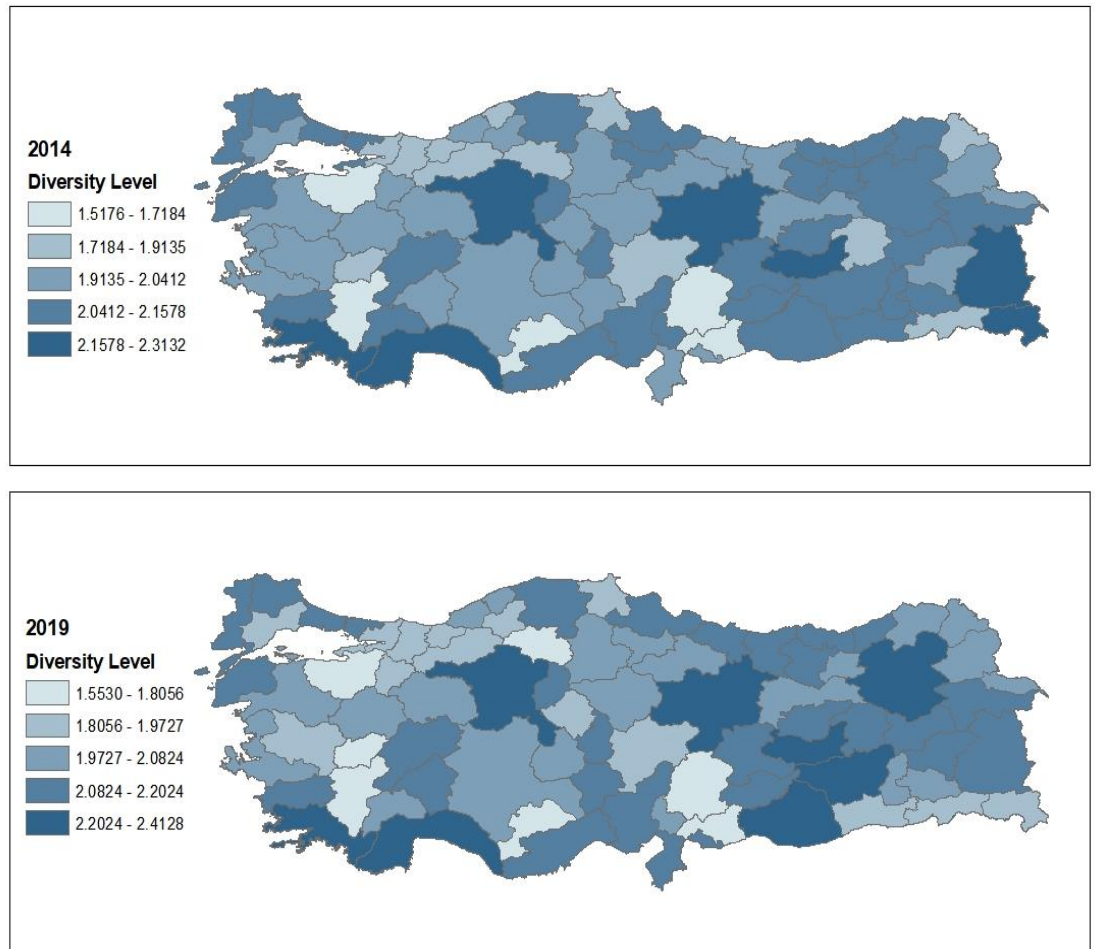


Figure 4.1. Comparison of Diversity From 2014 and 2019

Source(s): Author's own calculation and creation.

- Competition

$$Comp_{jr} = 1 - \sum_f \left(\frac{E_{fjr}}{E_{jr}} \right)^2 \quad (4.4)$$

The Hirschman-Herfindahl Index is used to measure the competition among firms within a region (here, the subscript f represents a single firm). This is another important agglomeration indicator as it shows whether the regional employment is concentrated among a few firms or spread out. This can be interpreted as a low value indicating lower competition (regional employment concentrated among a small number of firms) and a value closer to one indicating intense competition (regional employment spread out over a large number of firms).

There is high competition among firms in Western Türkiye, and it decreases as one moves across the region toward the East, though there are a few exceptions, as seen in Figure 4.2. The competition is becoming fiercer as one moves over time, which may also be linked to the increase in the number of firms that are established across Türkiye. The overall competition has more or less remained similar; however, the concentration in the Western provinces has increased while the industries in Eastern cities are becoming less competitive.

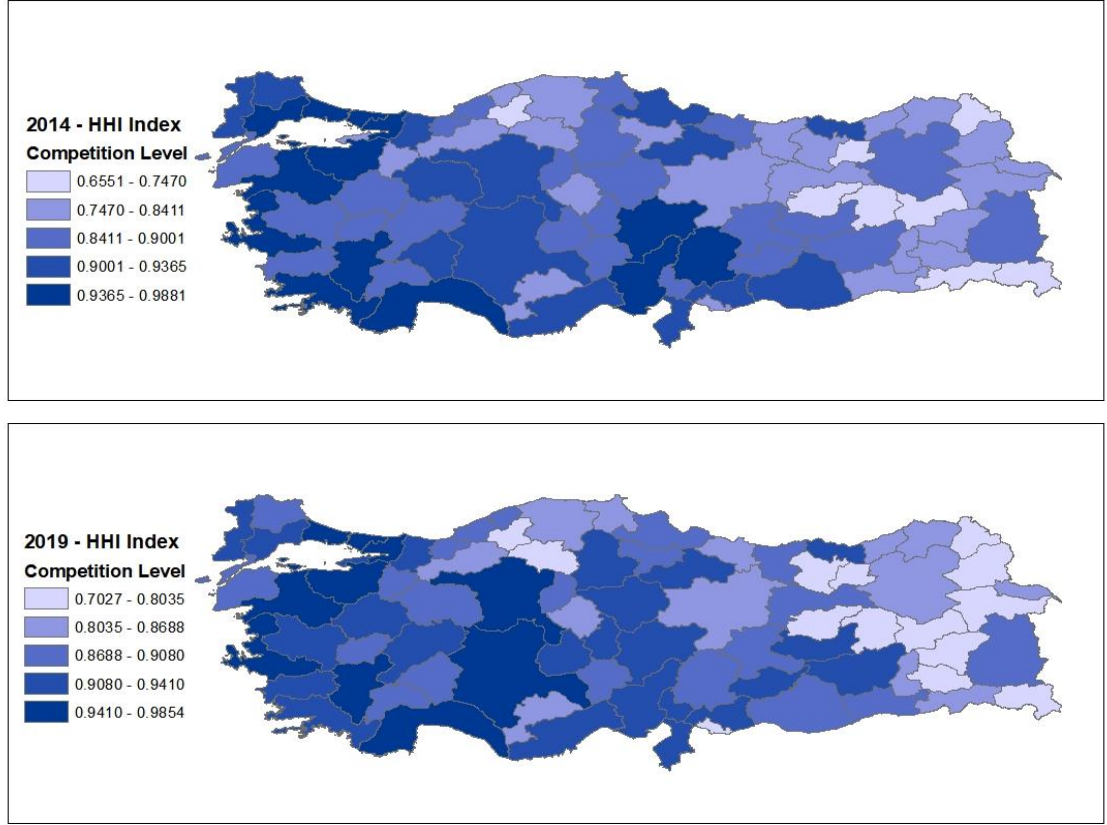


Figure 4.2. Comparison of Competition Between 2014 and 2019

Source(s): Author's own calculation and creation.

- Density

$$Den_r = \ln\left(\frac{E_r}{Area_r}\right) \quad (4.5)$$

Employment density is used to capture the effects of urbanization. It should be noted that we use employment density and not population density because we want to check for the concentration of employment in different regions. A high employment density means there is higher urbanization due to the concentration of people.

Employment density is an important factor in wage differences, as demonstrated in the literature on agglomeration. The three biggest cities of Türkiye show the highest employment density, as expected. The employment density in the Eastern cities continues to decline, possibly showing migration from these cities into larger Western cities, which host a larger number of industries. The overall density levels have risen

over time, but Eastern cities continue to have a lower number of employees when compared to Western cities.

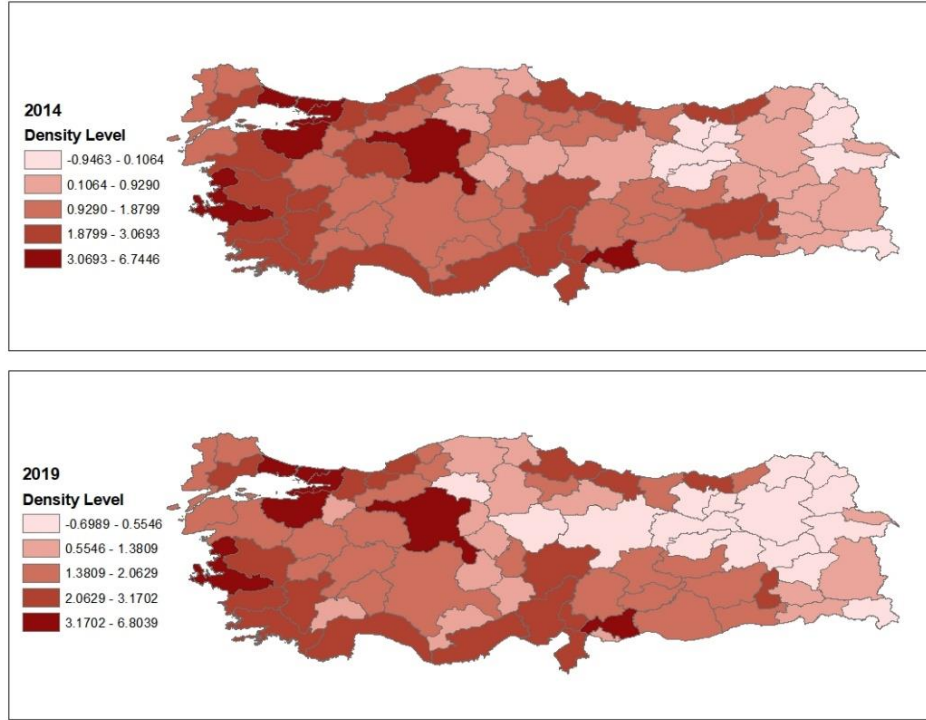


Figure 4.3. Comparison of Density Between 2014 and 2019

Source(s): Author's own calculation and creation.

➤ Two-stage Regression:

A two-stage regression is utilized to estimate the difference in wages that are not explained by the employee characteristics. In the first stage, the mincer-equation is estimated with an interaction dummy term for the sector, region, and year.

i. First Stage

$$\log(w_{it}) = \beta_0 + \beta_1 Age_{it} + \beta_2 Age_{it}^2 + \beta_3 Female_{it} + \beta_4 D_{it}^{occ} + \sum_j \sum_r \sum_t \varphi_{jrt} D_{it}^j D_{it}^r D_{it}^t + \varepsilon_{it} \quad (4.6)$$

The interaction term (φ_{jrt}) will take the coefficient of the particular industry within a region at time t . Here D_{it}^j represents the sector dummy, D_{it}^r represents the region dummy and D_{it}^t

represents the year dummy. These coefficients estimate the differences that are occurring in each industry and region over time. The interaction term accounts for those residuals in explaining wages that are not explained by the variables included within the model.

ii. *Second Stage*

$$\begin{aligned} \varphi_{jrt} = & \alpha + \beta_1 Spec_{jrt} + \beta_2 Div_{rt} + \beta_3 Comp_{jrt} + \beta_4 Den_{rt} \\ & + \beta_5 Area_{rt} + \beta_6 D_{rt}^j + \beta_7 D_{rt}^t + \varepsilon_{jrt} \end{aligned} \quad (4.7)$$

In the second stage of the regression, we regress the different agglomeration determinants estimated earlier on the interaction term coefficients. φ_{jrt} is the interaction term that is estimated in the first stage of regression, $\beta_1 Spec_{jrt}$ represents specialization for each region and sector, $\beta_2 Div_{rt}$ represents diversity measured by Shannon's entropy, $\beta_3 Comp_{jrt}$ represent competition measured using the Hirschman-Herfindahl index, $\beta_4 Den_{rt}$ represents employee density and $\beta_5 Area_{rt}$ represents the log of the region's area. In addition, sector and time dummy variables are used to check for their fixed effects.

The standard errors are clustered at the regional level to obtain robust standard errors. This is in line with the approach used by Groot et al. (2014) in their study of the Netherlands microdata. Some results shown below have these regional clustered standard errors where specified.

4.4. Results and Discussion

Cross-section results for the years 2009 and 2021 are presented in Table 4.3. The firm size dummy results are also displayed because they can explain wage differences since larger firms may be more productive and pay higher wages. Taking micro-enterprises as a point of reference, we observe higher wages as the firm size increases. The difference is more than double at each level between small and medium enterprises and between medium enterprises and above SMEs. Individuals looking to earn higher wages should aim for larger firms where they can expect better compensation.

**Table 4.3. District-Level Cross-Section Results for the
Mincerian Regression From 2009-2021**

		2009	2014	2019	2021
		(1)	(2)	(3)	(4)
Variables		Log(w)	Log(w)	Log(w)	Log(w)
Age		0.0420***	0.0368***	0.0338***	0.0376***
		(0.000116)	(7.64e-05)	(7.25e-05)	(7.24e-05)
Age squared		-0.000491***	-0.000436***	-0.000382***	-0.000424***
		(1.64e-06)	(1.06e-06)	(9.92e-07)	(9.85e-07)
Female		-0.0224***	-0.0953***	-0.0960***	-0.106***
		(0.000382)	(0.000268)	(0.000238)	(0.000235)
Small Enterprise		0.119***	0.120***	0.0976***	0.113***
		(0.000444)	(0.000325)	(0.000307)	(0.000330)
Medium Enterprise		0.299***	0.272***	0.234***	0.262***
		(0.000493)	(0.000351)	(0.000331)	(0.000347)
>SMEs		0.539***	0.473***	0.431***	0.489***
		(0.000480)	(0.000345)	(0.000315)	(0.000328)
Constant		2.383***	3.036***	3.889***	4.149***
		(0.00200)	(0.00135)	(0.00129)	(0.00130)
Observations		7,522,589	11,444,253	11,501,701	14,059,330
R-squared		0.325	0.431	0.448	0.404
Occupation Dummy		No	Yes	Yes	Yes
Industry Dummy		Yes	Yes	Yes	Yes
Region Dummy		Yes	Yes	Yes	Yes
Firm Size Dummy		Yes	Yes	Yes	Yes

*Micro-enterprises are taken as a reference point for the Firm size dummy.
Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Here, 2009 results are included to get an idea of the relationship between wages and independent variables across time; 2009 to 2021 gives us a large window to observe the variables. However, not having occupational data is a large limitation of the 2009 dataset. This can be observed by the rise in R-squared when an occupation dummy is added in the years 2014 onwards. One noticeable result is the jump in the coefficient for female employees from 2009 to 2014. According to the model, there was far less wage inequality between the genders in 2009. However, that coefficient remains fairly consistent from 2014 to 2021; therefore, we can postulate that the results in 2009 may

be affected by the lack of occupational or educational data (see Table 4.4). It was hypothesized that district-level effects may provide a better understanding of the wage equation, but the results show minor differences between the city and district-level regressions for most variables since one is a more macro representation of another. It may be important to study cities where there are concentrated districts in proximity and the opposite. As a check of the robustness of the wage data, these regressions were also tested with the adjusted wages to account for the increase in inflation over the studied period (see Appendix C, Table 7.6). The results found with normalized wages are identical to those found here. Therefore, we continue to use the unadjusted wage data in the rest of the analysis.

**Table 4.4. City-Level Cross-Section Results
for the Mincerian Regression From 2009-2021**

	2009	2014	2019	2021
	(1)	(2)	(3)	(4)
Variables	Log(w)	Log(w)	Log(w)	Log(w)
Age	0.0436*** (0.000118)	0.0377*** (7.77e-05)	0.0348*** (7.39e-05)	0.0388*** (7.38e-05)
Age squared	-0.000512*** (1.67e-06)	-0.000449*** (1.08e-06)	-0.000396*** (1.01e-06)	-0.000439*** (1.00e-06)
Female	-0.0241*** (0.000389)	-0.100*** (0.000272)	-0.100*** (0.000242)	-0.109*** (0.000239)
Small Enterprise	0.124*** (0.000451)	0.124*** (0.000330)	0.100*** (0.000312)	0.117*** (0.000335)
Medium Enterprise	0.307*** (0.000495)	0.284*** (0.000352)	0.241*** (0.000333)	0.270*** (0.000351)
>SMEs	0.572*** (0.000472)	0.502*** (0.000339)	0.454*** (0.000308)	0.512*** (0.000323)
Constant	2.344*** (0.00204)	3.010*** (0.00137)	3.863*** (0.00131)	4.119*** (0.00132)
Observations	7,522,590	11,444,253	11,501,701	14,059,331
R-squared	0.295	0.411	0.425	0.380
Occupation Dummy	No	Yes	Yes	Yes

Table 4.4. (cont.)

Industry Dummy	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes
Firm Size Dummy	Yes	Yes	Yes	Yes

*Micro-enterprises are taken as a reference point for the Firm size dummy.
Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The panel results show a lower coefficient for the female workers and continue to decrease as we add more years to the dataset. As observed in the cross-section results, the district results are slightly lower than the city results. The panel results on both the district and city levels are tested with standard errors and then clustered standard errors (clustering at district and city levels, respectively). The coefficients for the variables show slight changes between the two different regressions (SE and clustered SE), with the errors increasing quite a bit when regional clustering is applied. The standard errors are larger at the city level; as the geographical size increases, the errors tend to increase. Cameron and Miller (2015) suggest clustering at the highest level (i.e., broader level), which in this case is city level. However, it is useful to see the results for standard errors on both district and city levels. In both cases, the results are significant and only change very slightly.

Considering the highest occupation category (Managers) as the reference point, it is found that as one moves down the list, the wages decrease. This is expected as, on average, one would expect higher wages since higher job positions are generally associated with higher experience and education (see Table 4.5). One interesting finding is that there are large wage differentials between occupations as one moves up the professional ladder, i.e., the difference between professionals and associate professionals. Among less skilled workers, the differences between occupations are similar, not changing significantly between occupations.

**Table 4.5. District and City-Level Panel Results
for the Mincer Regression From 2014-2019**

Year	Panel 2014-2019		Panel 2014-2019 w/Clustered SE	
	District	City	District	City
Variables	Log(w)	Log(w)	Log(w)	Log(w)
Age	0.0359***	0.0364***	0.0360***	0.0366***
	(2.70e-05)	(2.74e-05)	(0.00175)	(0.00479)
Age squared	- 0.000413***	- 0.000421** *	- 0.000416** *	- 0.000424** *
	(3.60e-07)	(3.65e-07)	(2.05e-05)	(5.63e-05)
Female	-0.0852***	-0.0894***	-0.0838***	-0.0880***
	(0.000106)	(0.000108)	(0.00428)	(0.00447)
Small Enterprise	0.111***	0.115***	0.110***	0.114***
	(0.000135)	(0.000137)	(0.00592)	(0.0181)
Medium Enterprise	0.251***	0.262***	0.251***	0.262***
	(0.000144)	(0.000145)	(0.00931)	(0.0321)
>SMEs	0.440***	0.469***	0.441***	0.470***
	(0.000140)	(0.000137)	(0.0123)	(0.0290)
Professionals	-0.102***	-0.103***	-0.100***	-0.102***
	(0.000318)	(0.000323)	(0.0100)	(0.0101)
Technicians and Associate Professionals	-0.271***	-0.279***	-0.271***	-0.279***
	(0.000314)	(0.000319)	(0.0148)	(0.0220)
Clerical Support Workers	-0.318***	-0.326***	-0.319***	-0.326***
	(0.000319)	(0.000324)	(0.0135)	(0.0311)
Services and Sales Workers	-0.439***	-0.451***	-0.438***	-0.450***
	(0.000298)	(0.000302)	(0.0190)	(0.0431)
Skilled Agricultural, Forestry and Fishery Workers	-0.469***	-0.482***	-0.468***	-0.481***
	(0.000685)	(0.000695)	(0.0208)	(0.0405)

Table 4.5. (cont.)

Craft and Related Trades Workers	-0.457***	-0.474***	-0.457***	-0.474***
	(0.000302)	(0.000307)	(0.0173)	(0.0501)
Plant and Machine Operators, and Assemblers	-0.453***	-0.475***	-0.454***	-0.475***
	(0.000306)	(0.000310)	(0.0162)	(0.0492)
Elementary Occupations	-0.476***	-0.491***	-0.475***	-0.490***
	(0.000295)	(0.000300)	(0.0176)	(0.0500)
Constant	3.808***	3.799***	3.805***	3.686***
	(0.000573)	(0.000582)	(0.0284)	(0.0747)
Observations	73,628,279	73,628,279	73,265,359	73,265,359
R-squared	0.516	0.500	0.516	0.481
Occupation Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes
Firm Size Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes

Micro-enterprises are taken as a reference point for the firm size dummy, and managers are taken as a reference point for the occupation dummy.

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The employee characteristics (age, gender, occupation) utilized in this model alongside the industry, region, firm size, and year dummies provide a good idea of how the wages of individuals are determined in Türkiye. The firm size is indicative of the types of wages an employee can expect; as the firms grow larger, they compensate workers better. A higher number of employees may also lead to more spillover effects as different departments come together to work towards common goals. While employee characteristics and firm size provide an important insight into wage differences, there is a large proportion of wages that are not explained by the employee characteristics.

In order to explain those differences, the current study uses the two-stage regression model proposed by Groot et al. (2014), which is further utilized by many other studies, especially when studying the case of emerging economies. The two-stage regression

is explained in a previous section, and the second-stage equation is estimated to get the following results, which are presented in Table 4.6.

**Table 4.6. Explaining Regional Wage Differences not Explained
by Employee Characteristics**

Variables	2014-2019	2014-2019	2014-2019	2014-2019	2014-2019	2014-2019 Clustered SE
Specialization	0.00492 (0.0652)		-0.0625 (0.0620)			-0.0625 (0.120)
HHI Index	-0.155*** (0.0139)		-0.132*** (0.0133)			-0.132*** (0.0420)
Diversity	0.769*** (0.0724)		0.844*** (0.0690)			0.844*** (0.190)
Density	0.0534*** (0.00162)		0.0527*** (0.00154)			0.0527*** (0.00501)
Log Area	0.0390*** (0.00294)		0.0379*** (0.00279)			0.0379*** (0.00790)
Constant	-0.382*** (0.0273)		-0.395*** (0.0260)			-0.395*** (0.0771)
Observations	8,802		8,802			8,802
R-squared	0.422		0.478			0.478
Industry Dummy	Yes		Yes			Yes
Year Dummy	No		Yes			Yes

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results found in this study are similar to those that have been found in previous studies (here cite some papers). A significant positive effect of density is observed with and without fixed-year effects, 5.27% and 5.34%, respectively. That is, the doubling of employment density in the region would have a positive effect on wages to the extent of over 5%. The effects of land area are also significant in this study, having a 3.79% effect on wages, which shows that both the density and land area are closer in importance. Additionally, a positive significant effect is found for diversity and area.

Competition, however, as observed from the results, has a significant negative effect on the overall wages. The negative effects of competition may be offset by the positive effects of diversity, where knowledge spillovers between industries lead to improved results in agglomeration economies. The results show no significant effect of specialization; similar results have been found in other studies on developing countries, i.e., in the case of Brazil (Barufi et al., 2016) and Thailand (Prasertsoon and Puttanapong, 2022).

These findings are similar to those of other emerging economies such as Indonesia Ridhwan (2021), Ecuador (Torres-Gutiérrez et al., 2019), China, India, and Brazil (Chauvin et al., 2017), Brazil (Silva and Azzoni, 2021), and Colombia (Duranton, 2015). These studies all provide support for the positive effect of density on wage differences. For example, using Indonesian data, Ridhwan (2021) estimates a density effect of 6% compared to the current study's 5% estimate. The results are also comparable to those of Torres-Gutiérrez et al. (2019), where density is defined as employment with respect to an area in Ecuador. Yet these estimates remain lower than those found for other developing countries where density has been defined as population density Prasertsoon and Puttanapong (2022).

In this study's results, diversity is observed to have the largest effect on wages in Türkiye. Therefore, in the case of Türkiye, employees' wages benefit the most in more industrially diverse cities where there is a large variety of industries instead of a concentration of specific industries. Similar to density, literature in developing economies also finds mixed results for diversity. Ridhwan (2021) finds a significant negative effect between 3% and 7% (depending on their model specifications) in the case of Indonesia. On the other hand, Barufi (2015) explains that the negative or positive sign for diversity may be due to the way it is measured. Measuring diversity in three different ways, they find a positive effect when using Shannon entropy and a negative effect when using the share of 5 largest sectors as a proxy for diversity. This could also be a result of the sectors of study; therefore, the results must be interpreted with care. In the case of Türkiye, the current study finds a significant positive effect of diversity where Shannon's entropy has been utilized to measure diversity.

4.5. Conclusion

This study is the first to use individual-level worker and firm data to measure agglomeration externalities in Türkiye. This study used a novel dataset over a 6-year period and found that employment density plays an important role in wage premiums across Turkish cities. Furthermore, diversity is found to have a significant positive effect on wages, whereas competition is found to have a significant negative effect. This study contributes to the literature on agglomeration economies in developing countries by providing important evidence for Türkiye.

In the case of Türkiye, it was found that agglomeration has a positive effect on wage premiums both through the increasing of density (number of employees within a region) or diversity (the number of different firms and industries within a region). The results also reveal a significant negative effect of competition on wage premiums. However, that should be interpreted with caution since competition was measured among different industries and not within industry among firms. We also found that employees gain higher wages as they improve their occupations, which explains how education affects the ability of workers to earn wages. The strong relationship found between density, diversity, and labor wages shows the importance of urbanization in developing economies.

Türkiye is an emerging country with both a growing population and economy. As cities grow rapidly across Türkiye and other developing countries, the importance of agglomeration and its effects on labor wages will augment. This study sets out to contribute to this literature with microdata from Türkiye, which will further the debate on agglomeration externalities and bring about more studies in developing countries along with Türkiye.

This study, like all others, has limitations and should be interpreted with those in mind. Though we show the effects of agglomeration economies on wage premiums across Türkiye, we cannot be certain they are causal. However, as found in a plethora of literature, agglomeration externalities do exist and have evidence in both developed and developing countries. In such studies, instrumental variables (IVs) have been used in the past, especially the use of historical population data to show that cities have been

growing as a historical phenomenon and not due to the benefit of higher wage premiums. However, we do not apply any IVs in this study, though we plan to utilize them in the future to further our work on this topic within Türkiye. Future studies may also study specific sectors across Türkiye (in addition to the Manufacturing sector, which has garnered attention in the past). In addition, migration and wage premiums shall also be of interest in future studies.



CHAPTER V

CONCLUSION

Türkiye is a rapidly growing emerging economy with a young population. The country's geographical location also makes it a country of interest for many around the globe; it sits in the center of Asia and Europe, serving as a connection between the two great continents. The economic structure and markets are an important aspect of any economy, with firms and employees taking center stage. This dissertation is an effort to improve our understanding of the Turkish labor market and firm dynamics. It provides evidence on different aspects of the market through studies on the firm establishment, unemployment, agglomeration economies, and wage premiums.

In the study on firm establishment and unemployment, we show that there are disparities across regions in terms of firm establishment, firm closure, and unemployment. Firm establishment rates are highest in western and southern Türkiye, while the unemployment rates are highest in the southeastern and eastern regions. It is found that unemployment has a significant positive effect on net firm formation. In addition, the patent rate (used as a proxy for technology) and higher education significantly positively affect net firm establishment. These are the results found on the NUTS-II level using annual data. On the city level, using monthly data from the Turkish employment agency, the results support those found at the regional level. The most significant results are found with 2- and 3-year lags; that is, unemployment may lead to firm establishment more in the medium run. One reason for this may be the lack of opportunities in the labor market, creating a push effect toward firm formation.

The studies conducted, and the results found within the scope of this dissertation have significant implications for policymakers. The results from the firm formation and unemployment study can be used to shape policies related to the entrepreneurial environment. Policymakers should focus on supporting small businesses in their growth so they can create more employment opportunities and contribute to economic

growth. Institutions that support unemployed individuals towards self-employment can also be beneficial. Entrepreneurial education and training can also be an alternative to preparing individuals for entrepreneurship. Business incubators can also be useful in supporting new entrepreneurs, especially those who bring innovative ideas to the market. The results from the study of agglomeration economies show the importance of firm diversity within cities. More than density (the concentration of firms), firms belonging to different industries have a greater effect on wage premiums. Policymakers should focus on industrial diversification in larger cities as well as smaller cities; this will benefit the firms with knowledge spillover effects and contribute to employee wage premiums. In addition, more educational opportunities should be provided so individuals can improve themselves and contribute to the economy.

There are a number of future avenues that can be undertaken to make further strides in literature. In unemployment and firm formation literature, a sectoral study can be undertaken to observe how this relationship takes shape in different industries. In addition, foreign-owned businesses can be observed in terms of employment opportunities created and their effects on the labor market.

In agglomeration economies, there are many studies that can be conducted in the case of Türkiye, especially utilizing the EIS dataset. The EIS dataset provides individual-level data for employees (wage, occupation, employment industry, and employment city); this data may be used to track employees across the years to measure how experience in larger cities affects their wage premiums. In tracking the employees, we can also observe how the movement of workers between cities affects their employment opportunities and wage premiums. Furthermore, a sectoral analysis can be conducted. We can also further analyze the cities and their city centers; this could be of importance for smaller cities that have concentrated city centers. How do agglomeration determinants perform in this setting? The EIS database is a very useful resource and can be utilized for numerous studies. It is suggested that this resource be used to further study the Turkish economy and how various actors perform in the market.

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APPENDIXES

APPENDIX A

Table A.1. Newly Registered Firms and Growth by Year (2006-2023)

Year	Number of Newly Registered Firms	Growth compared to previous year
2006	53,757	
2007	56,900	5.85%
2008	51,060	-10.26%
2009	46,449	-9.03%
2010	51,971	11.89%
2011	54,442	4.75%
2012	39,764	-26.96%
2013	49,943	25.60%
2014	58,715	17.56%
2015	67,622	15.17%
2016	64,481	-4.64%
2017	73,783	14.43%
2018	86,349	17.03%
2019	85,263	-1.26%
2020	102,794	20.56%
2021	111,125	8.10%
2022	142,214	27.98%
2023	131,730	-7.37%

Source(s): 2006 to 2009 data is from the World Bank Entrepreneurship Database (2024) and 2010 to 2023 data is from TOBB (2024).

Table A.2. Foreigners in Türkiye by Nationality (2022)

Country	Male	Female	Total
Iraq	140,973	134,332	275,305
Afghanistan	109,123	77,037	186,160
Russian Federation	75,060	75,989	151,049
Iran	56,827	60,199	117,026
Turkmenistan	59,037	57,410	116,447
Germany	54,532	55,921	110,453
Syria	51,385	47,975	99,360
Azerbaijan	31,558	37,326	68,884
Uzbekistan	18,691	43,063	61,754
Ukraine	13,977	36,380	50,357
Kazakhstan	18,845	26,685	45,530
Egypt	18,618	14,422	33,040
Palestine	15,523	10,755	26,278
Kyrgyzstan	7,122	17,363	24,485
Jordan	13,068	9,665	22,733
Libya	12,365	9,312	21,677
Austria	11,525	9,786	21,311
Somalia	10,544	10,362	20,906
Yemen	11,757	7,342	19,099
Morocco	3,953	14,529	18,482
United Kingdom	8,777	8,416	17,193
China	9,538	7,342	16,880
Bulgaria	7,347	9,265	16,612
Pakistan	10,549	5,956	16,505
Other	131,430	134,880	266,310
Total	902,124	921,712	1,823,836

Note: Foreigners belonging to countries with 15,000 or higher residents in Türkiye are listed in this table. Overall, foreigners from more than 80 countries are currently residing in Türkiye.

Source(s): TÜİK (2024)

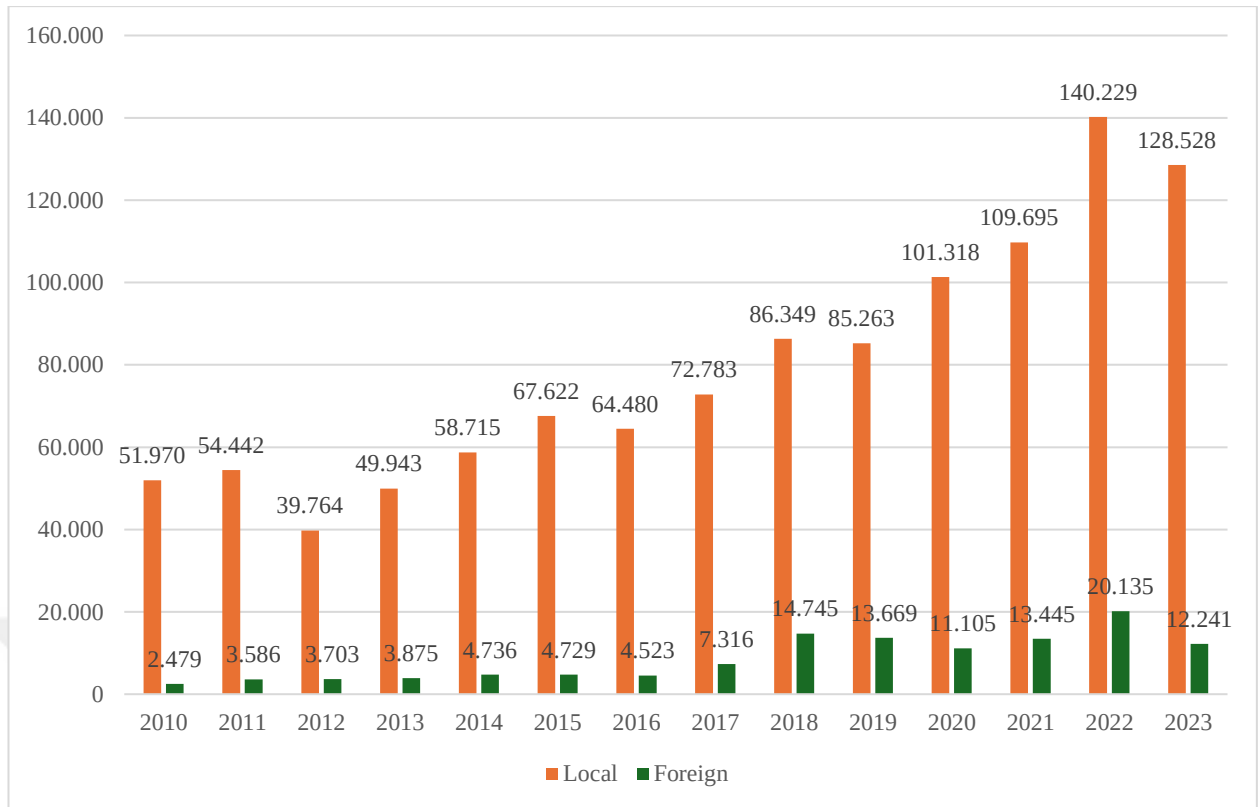


Figure A.1. Newly Established Firms in Türkiye with Local and Foreign Partners by Year (2010-2023)

Source(s): TOBB (2024)

APPENDIX B

Table B.1. NUTS-II Firm Entry and Exit Rate Average for 2010-2019 According to the Ecological Approach Per 1000 Firms

Region	Code	Entry Rate	Exit Rate
Adana	TR62	16.64	3.21
Agri	TRA2	7.30	1.21
Ankara	TR51	28.68	5.73
Antalya	TR61	17.38	3.16
Aydin	TR32	10.49	2.81
Balikesir	TR22	7.72	2.10
Bursa	TR41	17.14	3.30
Erzurum	TRA1	8.32	2.65
Gaziantep	TRC1	17.13	1.96
Hatay	TR63	12.21	2.01
Istanbul	TR10	30.12	8.29
Izmir	TR31	18.08	4.60
Kastamonu	TR82	7.06	2.23
Kayseri	TR72	13.55	3.24
Kirikkale	TR71	10.71	3.04
Kocaeli	TR42	15.36	2.85
Konya	TR52	13.02	2.84
Malatya	TRB1	11.00	2.36
Manisa	TR33	8.04	1.91
Mardin	TRC3	18.86	1.68
Samsun	TR83	8.53	1.95
Sanliurfa	TRC2	16.33	1.67
Tekirdağ	TR21	10.27	2.17
Trabzon	TR90	7.60	1.88
Van	TRB2	11.60	2.33
Zonguldak	TR81	6.74	2.03

* In the calculation of the entry and exit rate, we need total established firms $t-1$, and therefore, the average is 9 years, and $t-1$ is equal to 2010 and onwards. The rate is calculated per 1000 established firms.

As expected, the rate is much higher when compared to the labor market approach because the denominator for the ecological approach (number of established firms per 1000) is much smaller than that for the labor market approach (labor force per 1000).

**Table B.2. Results for Unit Root Test for All Variables
Used at the NUTS-II Level**

	LLC	<i>p</i> -Value
Net Firm Formation	−3.5095	0.0002
Firm Entry	−4.1083	0.0000
Firm Exit	−2.0145	0.0220
Net Firm Formation (Ecological Approach)	−3.4776	0.0003
Firm Entry (Ecological Approach)	−4.5162	0.0000
Firm Exit (Ecological Approach)	−3.6476	0.0001
Unemployment Rate	−16.2775	0.0000
Labor Force	−4.0952	0.0000
GDP per capita	3.496	0.9998
Population Density	−5.8898	0.0000
Urbanization	−4.3556	0.0000
Net Migration	−3.641	0.0001
Patent Rate	−4.824	0.0000
High School Education	11.7304	1.0000
Higher Education	−10.9512	0.0000

Given that there was a small T value in this study (10 time periods) and the unit root tests show nonstationary GDP per capita, the authors examined studies that had been specifically conducted on the unit root testing of GDP or GDP per capita. There are mixed results in the literature, with some studies finding the GDP data for various countries to be stationary (Hegwood and Papell 2007; Chang et al. 2008; Murthy and Anoruo 2009; Chang 2011; Chang et al. 2014), whereas other studies find there be a unit root across various countries studied (Chang et al. 2006; Guloglu and İvrendi 2010; Çınar 2015). In the case of Türkiye, the GDP per capita data was found to be stationary using the ADF unit root test (Ozturk and Kalyoncu, 2007). Although Zeren and İşlek (2019) find that a unit root does exist in the GDP per capita data for D8 countries, including Türkiye, they use a BCIPS panel unit root test. There is yet a debate about whether unit root should be tested on data where the T is small since the

unit root test can give inaccurate results. In addition, in this study, the N (26) is much greater than T (10), and therefore, it may not be appropriate to test for unit root, though the results are shown in the body and appendix of the paper.

Table B.3. Hausman Test Results to Decide Whether to Use Random Effects or Fixed Effects

	Coefficients			
	(b)	(B)	(b-B)	$\sqrt{\text{diag}(V_b - V_B)}$
	fe	re	Difference	Std. err.
Unemployment Rate	0.2427587	0.4031754	-0.1604166	0.041485
GDP Per Capita	-1.064694	-0.4587345	-0.605959	0.2288104
Population Density	1.019697	0.2222758	0.797421	0.9243385
Urbanization	-0.0012686	0.0016915	-0.0029602	0.001102
Net Migration	-0.0045125	-0.0029208	-0.0015918	0.0005281
Patent Rate	5.125259	5.572583	-0.4473243	0.9470923
High School Education	9.612212	0.0554659	9.556747	2.445507
Higher Education	14.75648	11.3589	3.39758	2.680975

b = Consistent under H0 and Ha

B = Inconsistent under Ha, efficient under H0

Test of H0: Difference in coefficients not systematic

$$\chi^2(8) = (b-B)'[(V_b - V_B)^{-1}](b-B) = 27.64$$

$$\text{Prob} > \chi^2 = 0.0005$$

($V_b - V_B$ is not positive definite)

The Hausman test shows that the fixed-effects model is appropriate for the dataset used in this article.

➤ GMM – Post estimation tests

• Labor Market Approach

Arellano–Bond test for zero autocorrelation in first-differenced errors

H0: No autocorrelation

Table B.4. Arellano-Bond Test Results I

Order	z	Prob > z
1	-3.2587	0.0011
2	-1.6321	0.1027

At order 1, the p-value is less than 0.05; this means that we cannot reject the null hypothesis of no autocorrelation. However, at order 2, we do reject the null hypothesis as the p-value is greater than 0.05. This satisfies the conditions for Arellano-Bond assumptions.

Sargan test of overidentifying restrictions

H0: Overidentifying restrictions are valid

$$\chi^2(43) = 23.27854$$

$$\text{Prob} > \chi^2 = 0.9939$$

Since the p-value is over 0.05, we can reject the null hypothesis for the overidentification of instruments.

- **Ecological Approach**

Arellano-Bond test for zero autocorrelation in first-differenced errors

H0: No autocorrelation

Table B.5. Arellano-Bond Test Results II

Order	z	Prob > z
1	-3.6171	0.0003
2	-1.4593	0.1445

Sargan test of overidentifying restrictions

H0: Overidentifying restrictions are valid

$$\chi^2(43) = 24.09014$$

$$\text{Prob} > \chi^2 = 0.9912$$

Since the p-value is over 0.05, we can reject the null hypothesis for the overidentification of instruments.

APPENDIX C

**Table C.1. City-Level Cross-Section Results for the Mincerian Regression
Adjusted Wages for Inflation (Using CPI)**

	2014	2019	2021
Variables	Ln(w)	Ln(w)	Ln(w)
Age	0.0378*** (0.00617)	0.0348*** (0.00552)	0.0391*** (0.00688)
Age squared	-0.000450*** (8.15e-05)	-0.000397*** (6.66e-05)	-0.000444*** (8.51e-05)
Female	-0.100*** (0.00484)	-0.100*** (0.00431)	-0.109*** (0.00512)
Small Enterprise	0.124*** (0.0186)	0.100*** (0.0155)	0.116*** (0.0143)
Medium Enterprise	0.284*** (0.0333)	0.241*** (0.0259)	0.270*** (0.0252)
>SMEs	0.502*** (0.0263)	0.454*** (0.0235)	0.512*** (0.0254)
Constant	2.930*** (0.129)	3.750*** (0.122)	3.805*** (0.147)
Observations	11,442,890	11,500,453	13,991,816
R-squared	0.411	0.425	0.380
Occupation Dummy	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes
Firm Size Dummy	Yes	Yes	Yes

*CPI data used here is collected from TUIK (2024).

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results found here are nearly identical to those found without using the adjusted wages. These results have similar coefficients for the different variables and are significant. This is an indicator that it is not necessary to use adjusted wages in this study, as the results do not change. Therefore, we can continue to use the unadjusted wage data that we have for the rest of the study.

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