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Government Support and Employment of Manufacturing SMEs*

Ali Recai Direkçi[1], Abdullah Tirgil[1]

ABSTRACT

Purpose: This study aims to examine how government incentives affect SME employment in Türkiye's manufacturing sector.

***Methodology*:** The dataset used in this study was derived from a survey conducted by a privately owned London-based company with the assistance of Türkiye's Ministry of Industry and Technology. Ordinary least squares and two-stage least squares regression techniques were used to analyze the relationship between government incentives and employment.

Findings: In the analysis, we found that between 2013 and 2016, jobs were created by Turkish manufacturing SMEs with the use of state assistance. Firm-level characteristics, including firms' age, capacity utilization rate, and innovative activities, were also found to have a substantial impact on SME employment.

Originality: Our study is the first to examine the impact of incentives on employment in manufacturing SMEs in Türkiye using a micro dataset administered to 10.063 manufacturing firms by the Ministry of Industry and Technology.

Keywords*:* Government Incentives, Employment, Manufacturing Industry, SMEs.

JEL Codes: H32, H81, J18, J21, O25.

Devlet Desteği ve İmalat Sanayii KOBİ'lerinin İstihdamı

ÖZET

Amaç: Bu çalışma, devlet teşviklerinin Türkiye imalat sektöründe KOBİ istihdamını nasıl etkilediğini incelemeyi amaçlamaktadır.

***Yöntem*:** Çalışmaya konu veri seti Türkiye Sanayi ve Teknoloji Bakanlığı'nın yardımıyla Londra merkezli özel bir şirket tarafından gerçekleştirilen bir anket araştırmasından edinilmiştir. Devlet teşvikleri ile istihdam arasındaki ilişkiyi analiz etmek için sıradan en küçük kareler ve iki aşamalı en küçük kareler regresyon teknikleri kullanılmıştır.

Bulgular: Çalışmada, 2013 ile 2016 yılları arasında Türk imalat KOBİ'leri tarafından devlet yardımı kullanılarak istihdam yaratıldığını bulunmuştur. Firmaların yaşı, kapasite kullanım oranı ve yenilikçi faaliyetleri gibi firma düzeyindeki özelliklerin de KOBİ istihdamı üzerinde önemli bir etkiye sahip olduğu bulunmuştur.

Özgünlük: Çalışmamız, T.C. Sanayi ve Teknoloji Bakanlığı tarafından 10.063 imalatçı firmaya uygulanan bir mikro veri setini kullanarak Türkiye'deki imalatçı KOBİ'lerde teşviklerin istihdam üzerindeki etkisini inceleyen ilk çalışmadır.

Anahtar Kelimeler*:* Devlet Destekleri, İstihdam, İmalat Sanayi, KOBİ'ler.

JEL Kodları: H32 H81 J18 J21 O25.

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[1] Ankara Yıldırım Beyazıt University, Faculty of Political Sciences, Department of Economics, Ankara, Türkiye

Corresponding Author: Ali Recai Direkçi, alidirekci@live.com

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1. INTRODUCTION

Analyzing the effect of incentives on employment is a topic that has attracted many researchers. The virtue of planning is to put resources into a cycle that helps individuals become involved and evolve. In this respect, successful planners have been praised by many great minds, as they might deserve more applause than philosophers (Cicero, 1999: 3). Today, to appraise planners' success in job creation, the main requirement is repetitive analyses of past policies.

The strong connection between creating jobs and being productive is crucial to society's progress (van Ark et al., 2004). Jobs are where people's abilities turn into economic value, boosting overall output and supporting growth. When the workforce is productive, it starts a cycle of continuous improvement, leading to long-lasting advantages. This interdependence is vital for economic health, emphasizing that jobs create wealth and encourage ongoing skill development and progress. In the complex process of societal development, the combination of jobs and productivity weaves a fabric that encompasses individual dreams and the prosperity of the whole nation.

In 2012, Türkiye's development objectives focused more on government funds' power to incentivize more employment. The Turkish government has designed various programs to incentivize Small and Medium Enterprises (SMEs) in the manufacturing industry. These programs include the Investment Incentive Program and Technology Development Zones Program (Kahraman et al., 2019). The Investment Incentive Program offers exemptions and tax reductions, social security premiums, and land allocation fees for SMEs that invest in specific regions and sectors. Meanwhile, the Technology Development Zones Program provides infrastructure, R&D support, and tax reductions for SMEs in designated technology zones. The government provides financial support through different programs, such as the credit guarantee fund and SME support and development programs. However, micro-enterprises find it challenging to benefit from these funds in Türkiye, whereas medium-sized enterprises can monitor legislation and credit incentive channels because of their advanced institutional structures (Erdin and Ozkaya, 2020).

Additionally, medium-sized enterprises employing 50-250 workers benefit from these loans in Türkiye, especially if they have an R&D infrastructure to design original products. Medium-sized enterprises in Türkiye can also provide counter guarantees for investment banks, which distribute funds to SMEs through low-interest, long-term investment loans. Moreover, the European Union's umbrella programs include support, grants, and loans for SMEs in Türkiye, which can further assist the manufacturing industry.

The Turkish government plays a significant role in promoting the growth and development of SMEs in the manufacturing industry. It offers various incentive mechanisms such as providing information and technology sources, establishing science parks, and directing financial support to innovative enterprises (Eceral and Köroğlu, 2015). However, the effectiveness of these incentives in promoting the growth and development of SMEs in the manufacturing industry has not been discussed explicitly in the literature. Incentives related to overall market conditions, government policies, and competition structure are essential in allocating resources and efforts to develop new knowledge. The industry in Türkiye is heavily regulated and protected, with public instruments used to support national interests and domestic firms. In the literature, the effectiveness of these incentives is explored in the case of the defense and aviation industry, where various institutions offer incentive mechanisms that firms exploit, leading to their growth and development. The defense and aviation industry invests heavily in research and development, which is essential for innovation and growth. The relationship between incentive exploitation levels and firm characteristics such as size, age, labor quality, innovative capacity, and performance needs to be evaluated to determine the effectiveness of incentive mechanisms in promoting the growth and development of SMEs in the manufacturing industry in Türkiye. Incentive and support mechanisms are crucial in ensuring the development and sustainability of the industry's growth and performance.

The Turkish manufacturing industry comprises 382,974 SMEs, which account for almost 60% of the industry's total Employment (TurkStat, 2021). However, these SMEs generally produce low-value-added products, and the SME legend does not provide a sufficient economic contribution to Türkiye. In contrast, large-scale enterprises that produce high-value-added products are required for the development of regions and cities. Large enterprises (4,335) account for only 0.1% of the total enterprises but contribute 40% of Employment (TurkStat, 2021) and 73.1% to the value-added. The added value per person is $10,300 in medium-sized enterprises and $4,700 in large enterprises, while the added value per facility is $1,860,000 in medium-sized enterprises and $41,200 in large enterprises (Erdin and Özkaya, 2020). To ensure SMEs' survival in the long run, it is critical to understand the mediating effects of government incentives on their survival.

In this study, we contribute to the literature by assessing the perception of SMEs in the Turkish manufacturing industry. Previous research on the relationship between incentives and regional development has focused on developed countries. Studies on developing countries have generally

examined the impact of public support on overall employment in the economy. This study fills a gap in the literature by conducting a micro-level analysis of Turkish manufacturing SMEs. The study found that Turkish manufacturing SMEs are struggling but can still create jobs with the help of state support. Balancing inequalities among firms also seems to be far from being achieved. We conducted empirical analyses in the study to obtain a more detailed picture of the relationship between firms' employment and government incentives. The dataset used in the analyses was obtained from a survey of Turkish manufacturing SMEs. The study's sampling was made on 10,063 respondent firms based on their sectors and regions.

In addition to the variables derived from the survey study, we obtained variables from the database published by TurkStat to control for the effects of regional differences. We applied the Ordinary Least Squares (OLS) and Instrumental Variable (IV) approaches to analyze the relationship between variables. The OLS results showed a significantly positive relationship between general incentives and firms' employment. The IV approach found higher coefficients between these variables. The study's findings based on heterogenous effects revealed that SMEs with 1 to 19 employees employ more people when they benefit from incentives than those without incentives. Additional factors that were found to be significantly influential on SME employment are firm-level characteristics: the capacity utilization rate and innovation. The study's findings suggest that government incentives can positively impact SME employment, but other factors, such as firm-level characteristics, also play a role. The study's findings also suggest that the objective of balancing inequalities among firms is still a challenge.

The following is how the remaining portion of the article is organized: the second section explores the pertinent literature. The third chapter discusses the methodological approach taken for this investigation and presents the findings in the fourth part. In the final section, the conclusion and final thoughts are offered.

2. LITERATURE REVIEW

The literature on the effects of incentives on employment is vast. Whether in policy briefs or empirical analyses of industries, the academic consensus is that the effectiveness of incentives is uncertain (Patrick, 2014). However, it is important to note that certain structural factors found in studies of manufacturing SMEs contribute more to the national employment level (Voulgaris et al., 2005). In this section, empirical literature and recent discussions on the relationship between state support and firms' employment growth and level will be elaborated on.

Empirical studies on government incentives and employment changes differ in their theoretical frameworks and empirical strategies. Most studies assume that incentives have a lagged effect on employment, with a minimum of three years between the time of enrolment in an incentive program and the level of or change of Employment (Bartik, 2018: 18). As a result, government incentives variables in econometric models are either constructed periodically before the employment level variable (see for example Westhead and Birley 1995; Hoyt et al. 2008; Courseuil and Moura 2010; Jensen 2017) or the establishment-expansion decision of firms in the study sample is used to determine the time point of the variables (Faulk 2002; Gabe and Kraybill 2002; Fukanuma et al. 2006; Gamberoni et al. 2016).

Bartik (2018, p. 5) argues that economic development incentives are effective for at least 3 years, but no more than 20 years. He reasons that if a firm receives public funds to locate or relocate, it will eventually become clear that the decision was not in the firm's best interest if the incentive is not renewed. Therefore, one-time incentives are not a reliable way to reduce regional inequality.

Government incentives are often designed to create jobs, but they can also destroy jobs. The effectiveness of an incentive program depends on how it is structured and how it is implemented. Even unrealistic promises in political campaigns can reduce unemployment. Alt (1985) found that political interventions by newly elected and existing governments can positively affect the unemployment rate in the short term. However, he also found that this effect is only sustained if the government has a majority in parliament.

The success of government policies depends on how locals perceive them. Politicians and institutions need to gain the trust of the majority of society, not just a selected few. A study by Walker and Greenstreet (1991) found that favoring new manufacturing firms in sub-regions of Appalachia leads to intra-regional and intra-sectoral competition. This competition wastes resources that could be used to create jobs. Furthermore, regional imbalances deepen with the transfer of capital from one region to another. Therefore, governments should seek the trust of the majority of society when designing policies that are intended to create jobs.

In today's world, governments need to attract foreign investment to create jobs. A study by McAleese and McDonald (1978) found that there is no significant difference between the responsiveness of newly established domestic firms and foreign firms to government policies. They also found that government support for foreign manufacturing firms in Ireland has a significant positive impact on employment. McAleese and McDonald recommend that governments should carefully target their support to the right enterprises in order to maximize the benefits of foreign investment.

Some studies have examined the effectiveness of government policies and programs in targeting the best possible entities. Box et al. (1994) studied manufacturing entrepreneurs and found that firms owned by people with a strong desire for success and a keen awareness of their environment have more employment growth than those who lack these characteristics. They also found that government incentives have a significant positive impact on employment growth, but that these policies are not always targeted at the firms that are most likely to benefit from them. This is because government incentive programs are often designed to capture in-need firms, sectors, and regions. As a result, finding entrepreneurs with a strong desire for success in-need positions could be difficult, except for the early years of their startup.

Westhead and Birley (1995) studied the performance of firms in their starting years. They found that it is difficult to pick winners among new ventures, and that the relationship between employment growth and owner-manager characteristics is not profound. However, they did find that manufacturing firms that have been granted public funds tend to have more employment growth than services firms that raised finance through credits and loans from non-governmental institutions. They also found that startup size and the firm's sub-sector are significantly affecting firms' employment growth.

Gabe and Kraybill (2002) studied firms in their median age. They found that firms that expect to employ more people with government support for expansion tend to overestimate their future employment growth. Gabe and Kraybill state that firms do this to be eligible for incentives. The authors conclude that while incentives positively affect firms' announced employment growth, the actual growth is negatively correlated with government support.

Voulgaris et al. (2005) studied the factors that affect manufacturing firms' employment growth in Greece between 1995 and 1999. They found that firms with 1-19 employees create more jobs than firms with 20 and more employees, and that the age of the firm is negatively correlated with employment growth. These findings are similar to those of other studies which analyze alike countries' markets.

Hoyt et al. (2008) found that regional differences affect the development of firms. They also found that incentives have a positive relationship with employment, but the effect varies from county to county. Border counties of Kentucky saw the most employment growth from incentives, while neighboring states saw an increase in employment from businesses attracted to Kentucky's public funds.

Incentives can also be used to alleviate disparities between people in the workforce with different conditions. For example, Lalive et al. (2009) found that Austria's policies to encourage firms to employ disabled workers led to an increase in the employment of disabled workers, but also a decrease in total employment. This is because the incentives displaced non-disabled workers.

Most studies of government support for firms only consider firms that receive support or those that do not. Courseil and Moura (2010) broke this mold by studying firms that were eligible for support but did not receive it. They found that firms that received support had more employment growth, while firms that were eligible but did not receive support had a negative trend in employment.

Patrick (2014) found that increasing public funds to help private entities negatively affects rural employment in the medium term. However, she also found that public support has a positive impact on urban county employment in the short term. Patrick suggests that public authorities should increase the restrictions on eligibility for government support. Other studies (Rolnick and Burstein, 1995: 8 Thomas, 2010: 161) support this recommendation.

Few studies have examined the effectiveness of employment incentives. Gamberoni et al. (2016) found that firms eligible for employment subsidies in Spain had 2% more employment growth in 2013. However, robustness tests and difference-in-discontinuities regressions failed to confirm a significant relationship between employment incentives and employment growth of SMEs. The authors are not skeptical about the long-term effects of the reform as more post-reform data become available.

Jensen (2017) argues that studies on the relationship between incentives and job creation are flawed if they do not control for other factors. He proposes using matching methods to compare firms that receive incentives with similar firms that do not. Jensen found that firms that received incentives were more likely to recommend the program to other firms, but he could not confirm that the program caused the employment growth. He concludes that firms that would have expanded their businesses anyway are more likely to apply for incentives, and he warns policymakers about the financial burden of these programs.

Partridge et al. (2020) conducted a more current analysis that takes into account a number of remedies to the issues mentioned by Jensen (2017). To examine the longer-term effects of incentives, they use Patrick's (2014) IEI as a variable in their research. They isolate the county fixed effects, employ Lewbel's (2012) instrumental variable approach, and develop a variable to simulate local demand shocks, also known as the Bartik instrument in the literature, to address potential endogeneity issues. Authors use the number of

new startups in a county as a measure of job growth. Their findings demonstrate that a decrease in the number of new companies is related to a shift in incentives. There is a clear inverse correlation between new startups and incentives, particularly in the manufacturing and export industries. They urge that the focus of future studies should be on the varied impacts of incentives. Furthermore, they argue that given that larger enterprises already predominate in the incentive market, researchers should concentrate on the long-term effects of incentives on SMEs when conveying their findings to policymakers.

A number of studies have found a positive correlation between government incentives and increased employment in Turkish manufacturing enterprises (Yavuz, 2010; Uğurlu, 2020). Tax incentives, grants, and subsidies have encouraged these businesses to expand and hire more workers. Despite the positive effects of public support, there are also challenges that need to be addressed. These include bureaucratic red tape, limited access to financing, and political instability. These challenges can hinder the full potential of public support programs. There is a paucity of studies that have explored the long-term sustainability of firms' employment resulting from public support (Yanıkkaya and Karaboğa, 2017). Understanding the durability of these initiatives is essential for policymakers. Regardless of the industry and sector, firms in Türkiye cite unfair competition from informal firms, high labor costs, and inadequately skilled workers as major challenges to doing business and creating jobs (Erdoğan and Carpio, 2019).

This study signifies a noteworthy exploration of the relationship between government support and employment in Türkiye's manufacturing sector. It diverges from existing research by centering on 2013-2016, providing a distinctive perspective on the immediate impact of the newly implemented incentive reform in 2012. Importantly, this research utilizes survey data for empirical analysis, distinguishing it from prior studies. Furthermore, we contribute to the academic conversation by extending and refining control variables. Mindful of the study's limitations, these methodological and contextual enhancements aim to deepen our understanding of the relationship between government interventions and employment outcomes in Türkiye.

3. DATA and METHODOLOGY

This study's data originates from a survey that was conducted in 2016. The survey involves 10 063 businesses. A commercial company working with the Turkish Ministry of Industry and Technology surveyed manufacturing businesses. The survey's questions are made to capture the general state of businesses' productivity levels and the variables influencing them. The sample was representative of regional, firm scale, and sectoral levels, with 24 subsectors in manufacturing (NACE Rev.2 Level 2), 26 regions by NUTS2 level, and two-scale groups (1-19 employees and 20+ employees). We consider firm sizes of 1-19 and 20+ in our study because the 10th Development Plan of Türkiye (2014-2018) used this classification for all projections to evaluate the efficiency of public policies. In addition, the survey we used aimed to conduct analyses at the regional, scale (1-19 employees and 20+ employees), and sector levels. Therefore, the representativeness of the sample at these levels was ensured. The population was divided into 1,248 strata using 24 manufacturing sectors (NACE Rev.2 Level 2), 26 regions according to the NUTS2 level classification, and two-scale groups of 1-19 and 20+ employees. Sampling was conducted at the level of these strata. The sample size was calculated at a 95% confidence level and a ±7.5% confidence interval. The number of firms surveyed and the population represented by these firms are given in Appendix A.

An overview of the traits of the companies in the study is provided in Table 1. Most of the companies in our dataset are SMEs. Additionally, 67.2 percent of the dataset's companies are younger. Almost one-third of the companies in our sample are based in the Marmara region, which includes Istanbul, the most populous city in Türkiye, as one might anticipate. The manufacturing of food goods dominates the industry in which businesses are engaged.

Furthermore, it is observed from the sample that each region of Türkiye has a particular sector to which the government gives financial support attentively. For instance, 55 percent of SMEs operating in the textile manufacturing industry in Tekirdağ, Edirne, and Kırklareli have stated that they received incentives between 2013 and 2016. Finally, our data reveal that the Turkish government appears to be achieving its goal of assisting in pre-planned areas and industries. However, almost all 26 regions have a much lower percentage of the runner-up sector receiving public support than the leading industry. For instance, in the TRA1 region (Erzurum, Erzincan, and Bayburt), 50 percent of the enterprises producing clothing have received incentives, but just 23 out of 100 firms producing food goods have received incentives. This scenario might be seen as a targeted yet unfair distribution of public resources.

Table 1. Characteristics of firms in the survey

Characteristics	*Number*	*Percentage*
Size (Number of employees as of 2016)		
1-19 employees	6,724	66.8
20+ employees	3,339	33.2
Age (Number of years passed from the date of establishment)		
≤20 years	6,765	67.2
>20 years	3,298	32.8
Region (Regional location of the firm)		
Marmara Region	3,084	30.6
Central Anatolia Region	1,687	16.8
Aegean Region	1,343	13.3
Black Sea Region	1,213	12.1
Mediterranean Region	1,088	10.8
South-eastern Region	831	8.3
Eastern Region	817	8.1
Sector (Firm's sector in which has operations)		
Manufacture of food products	1,513	15.0
Manufacture of fabricated metal products	755	7.5
Manufacture of other non-metallic mineral products	675	6.7
Manufacture of textiles	610	6.1
Repair and installation of machinery and equipment	600	6.0
Manufacture of wearing apparel	590	5.9
Other sectors (18 sectors)	5,320	53.0

According to the theoretical and empirical literature (Gabe and Kraybill, 2002), our choice of variables is consistent. One distinction is that we increase the number of variables as much as our dataset permits rather than exactly copying the models of previous studies. We had to treat several survey questions that got no responses as being absent. We list our variables and their summary statistics in the table below.

Table 2. Definitions and summary statistics of variables

Variables	*Explanation*	*Obs.*	*Mean*	*SD*
Employment growth	Employment growth between 2013 and 2016	9,429	0.11	0.48
Employment level	Average employment between 2014, 2015, and 2016	9,429	44.73	146.26
Employment level in 2013	Employment level in 2013	9,429	42.76	142.32
Incentive	Dummy variable for receiving any government support between 2013 and 2016 (1 = at least once, 0 = never)	9,429	0.25	0.43
Firm age	Age of the firm	9,429	18.17	12
Capacity utilization rate	Categorical variable for capacity utilization rate for operations in 2015 (1 = %0-25, 2 = %26-50, 3 = %51-75, 4 =%76-100)	9,429	3	1.06
Export	Dummy variable for having export activities (1 = yes, 0 = no)	9,429	0.3	0.46
Innovation	Dummy variable for R&D and innovation activities (1 = yes there are, 0 = if there are no activities)	9,429	0.24	0.43
Technological sophistication level of machinery equipment	Categorical variable for level of sufficiency in machinery and equipment (1 = inadequate, 2 = neither inadequate nor adequate, 3 = adequate)	9,429	1.39	0.68
Utilization of Information technology	Categorical variable for utilization level of information technologies (1 = inadequate, 2 = neither inadequate nor adequate, 3 = adequate)	9,429	1.44	0.69
Firm size	Dummy variable for firm size (1 = 20 and more employees, 0 = 1 to 19 employees)	9,429	0.34	0.47
GDP per capita	The logarithm of the average gross domestic product per capita for years between 2013-2016 at a province level	9,429	9.38	0.4
Inflation	Average inflation rate between the years 2013-2016 on the province level	9,429	0.08	0.003

Our dependent variables are employment growth and employment level. For our analysis, we calculate employment growth between 2013 and 2016. For employment level, we average employment levels for 2014, 2015, and 2016 and take the natural logarithm of that value to use in our regression analysis. Over the study period, employment growth at businesses in our sample increased on average by 11%. While the average employment level is about 45 employees, the employment level in 2013 for firms was 43. The difference between the average employment growth rate and the increase in the number of people employed (approximately two employees) may imply that smaller firms may have had more growth rates proportionate to their size. Incentive, our key variable of interest, indicates that 25% of the firms in our sample received at least one government incentive between 2013 and 2016. The average age of firms in our sample is 18. Firms, on average, use between 51 and 75 percent of their total capacity, defined as the ratio of the total amount of production realized by the enterprise in a given period to the maximum amount of production that it can physically produce. Innovative activity is present in 24 out of 100 businesses. Generally speaking, the surveyed organizations do not believe their firms are well-established in using information technologies or machines. The initial employment level of companies, expressed as a natural logarithm, is added to the model along with other control variables where we regress $Incentive$ on employment level. We also include some macroeconomic variables at the province level to account for regional variations, which include the natural logarithm of average Gross Domestic Product (GDP) per capita between 2013 and 2016 and the average inflation rate between 2013 and 2016.

The ordinary least squares (OLS) approach is the first step in our empirical strategy for obtaining indicative estimates. At this phase, the goal is to determine whether government incentives are statistically significantly correlated to employment growth and the employment level of firms. As a result, we estimate the following model (Equation 1).

$$y_i = \gamma_0 + \delta Incentive_i + \theta X_i + \Omega Region_r + \beta Sector_s + \epsilon_i \quad (1)$$

where for the ith manufacturing SME in our dataset, y_i denotes two separate outcome variables, such as job growth from 2013 to 2016 and the average employment level between 2014 and 2016. $Incentive_i$ is an indicator variable taking the value of 1 if a firm received any government support at least once between 2013 and 2016 and zero otherwise. The key coefficients to be estimated are denoted by the symbol δ. γ_0 is a constant term. X_i include control variables such as firms' age, capacity utilization level, export and innovation activity levels, machinery and equipment level, information technology usage rate, size of SMEs, and the firm's employment level in 2013 (in the model where we use $Employment\ level_i$ as a dependent variable). Additionally, we include some macroeconomic variables such as province-level average GDP per capita and average inflation rate. $Region_r$ controls for regional fixed effects and $Sector_s$ controls for the sectoral fixed effects.

OLS estimates could result in biased estimations of our key independent variable, $Incentive_i$. The assumption that the independent variable is exogenous may not be met, which could lead to biased estimates (Koop, 2005: 215). To put it another way, the endogeneity problem with $Incentive_i$ may arise due to the fact that $Incentive_i$ is likely to be correlated with some unobservable factors in error term which might also have impact on employment growth or employment level (i.e., omitted variable bias). Another potential problem is the possibility that enterprises with more considerable employment growth or employment level would be the ones to gain from government incentives could cause reverse causality. Hence, the OLS estimator would be biased.

To account for the endogeneity problem, we use the instrumental variable (IV) method, where we identify a variable that is not directly connected with the dependent variable but is correlated with the variable that is thought to be endogenous, $Incentive_i$. When employing an instrumental variable, the primary concern is determining if any pathways other than those directly relevant via which the instrumental variable can influence the outcome variable (Angrist and Pischke, 2010). Simply put, we must ensure that no exogenous variables in the error term relate to our instruments and affect the degree of SME employment.

As our instrumental variable, we take advantage of the regional and sectoral average of the indicator variable, $Incentive_i$. The concept of "contextual effect" states that exogenous characteristics of the involved group shape individual acts justifies using our instrument (Manski, 1993). Equation 2 shows the first step of the 2SLS regression approach, from which we shall acquire fitted values. In order to obtain estimates using the IV regression approach, we will go back to our original linear regression (Equation 1) with these fitted values.

$$Incentive_i = \beta_0 + \beta_1 Incentive_{rs} + \beta_2 X_i + \ + \gamma_1 Sector_s + \vartheta Region_r + \epsilon_i \quad (2)$$

where $Incentive_{rs}$ is the average of the incentives at the regional and sector levels, and Equation 1 defines the other variables.

Our instrumental variable's rationale is heavily influenced by the concepts of contextual effect (Manski, 1993) and Currie and Gruber's (1996) "simulated eligibility" method. According to the contextual effect, any company in a given industry and location behaves similarly to its competitors in related clusters. The difference between the two ideas is that the peer effect assumes that businesses in the same league are inherently competing with one another, and as a result, their actions influence the movement space of other businesses. Regarding the idea of simulated eligibility, it is expected that firms in the same cluster, which we formed based on the geography and industry of the firm, will all have an equal chance of being eligible for incentives while holding firm-level attributes constant. Therefore, to simulate whether enterprises are eligible for government incentives, we must ensure that the control variables in the equation are adequate to account for firm-level peculiarities.

Our firm- and area-level metrics are sufficiently specific to rule out any relationship between the error term and government incentives. Additionally, area-based variations are employed as instruments for endogenous explanatory variables dependent on related regional variables being controlled and occurring in individual-level equations (Wooldridge, 2002).

4. FINDINGS

The present study was designed to assess the effect of government incentives on two outcome variables, including employment growth and average employment levels for manufacturing SMEs. We briefly report the findings from the first stage of the IV estimation before explaining our main findings. Our F-statistics are far higher than the suggested values, and our first-stage results are strong across different specifications.

Table 3 presents the results obtained from the preliminary analysis of receiving any government incentive for employment growth. The first column reports OLS coefficients, and the second column reports IV coefficients. This table is quite revealing in several ways. First, OLS results indicate a statistically significant positive correlation between incentives and employment growth. Second, IV coefficients are statistically significant and three times larger than OLS coefficients in magnitude. In other words, our OLS results are underestimated.

Further analysis shows that years spent in business have a detrimental effect on employment growth, which could be explained due to cost-cutting opportunities as a result of SMEs' experiences, which is known as passive firm learning (Jovanovic, 1982; Dunne et al., 1989; Gabe and Kraybill, 2003). If we now turn to the capacity utilization rate of firms, our findings show that enterprises operating at capacity levels over 75% see employment growth that was 4.2 percentage points higher than firms operating at capacity levels between 0 and 25%. What is surprising is that employment growth appears to be unaffected by the technological sophistication level of machinery equipment of firms. There seems to be a negative correlation between a sufficient level of information technology in a firm and employment growth; however, the precision is lower. Additionally, innovative SMEs experience employment growth of 5.1 percentage points higher than non-innovative SMEs.

Strong evidence of the correlation was found in the firm size, such that firms with 20 or more employees had 4.7 percentage points more employment growth than SMEs with 1-19 employees. A possible explanation for this might be that smaller firms may have limited resources, be more risk-averse, or have limited growth opportunities. However, it is also important to note that smaller firms are more likely to be innovative and entrepreneurial, and they are more likely to be located in new and growing industries. Because of this, smaller firms can create a disproportionate share of new jobs in the economy.

Overall, these results indicate that from 2013 to 2016, the job growth of SMEs was statistically significantly boosted by all forms of government encouragement. Additionally, SMEs' characteristics and the expansion of their employment are closely associated.

With the first set of findings, we examined how incentives affect the job-creation process. Unfortunately, using employment growth as a dependent variable necessitates including certain temporary employees in businesses. In other words, due to factors like the potential rehiring of former employees, we cannot be sure how many jobs are produced by simply looking at swings in the employment growth of organizations. People previously employed with public assistance before 2013 might have been rehired between 2013 and 2016. We must, in essence, consider the likelihood that public support may be misused.

The next section of the survey was concerned with the effect of government incentives on SMEs' average employment. Table 4 provides the OLS and IV results of receiving any incentive on firms' average employment in the first and second columns, respectively. OLS estimates indicate 4.4 percent more employment in firms that receive incentives than in organizations not offered incentives. Of interest here is the increase in the IV coefficient is more than doubled and takes on the value of 9.5 percent. This outcome could be explained by the fact that, between 2014 and 2016, Turkish manufacturing SMEs' employment levels were reliant on government subsidies.

Table 3. Regression results for the relationship between employment growth and receiving any government incentive

Variables	*(1) OLS*	*(2) IV*
Incentive	0.050***	0.134**
	(0.013)	(0.067)
Firm age	-0.003***	-0.003***
	(0.000)	(0.000)
Capacity utilization rate		
%0-25	Ref.	Ref.
%26-%50	-0.015	-0.016
	(0.019)	(0.019)
%51-%75	0.017	0.013
	(0.018)	(0.019)
>%75	0.043**	0.042**
	(0.018)	(0.017)
Technological sophistication level of machinery equipment		
Insufficient	Ref.	Ref.
Neither sufficient nor insufficient	-0.013	-0.016
	(0.021)	(0.021)
Sufficient	-0.018	-0.020
	(0.023)	(0.023)
Utilization of Information technology (computer, software, internet)		
Insufficient	Ref.	Ref.
Neither sufficient nor insufficient	-0.034	-0.036
	(0.023)	(0.023)
Sufficient	-0.041	-0.048*
	(0.025)	(0.025)
Export	-0.017	-0.030*
	(0.012)	(0.017)
Innovation	0.066***	0.051***
	(0.014)	(0.019)
Firm size	0.058***	0.047***
	(0.012)	(0.015)
Regional variables		
GDP per capita	0.068	0.072
	(0.044)	(0.045)
Inflation	-23.920**	-25.178**
	(10.483)	(10.628)
Sector fixed effects	Yes	Yes
Region fixed effects	Yes	Yes
First-stage regression results		0.800***
		(0.040)
First-stage F statistics		397.21
R-squared	0.032	0.027
N	9429	9429

Notes: The first row in Column 1 reports coefficients (robust standard errors in parenthesis) on incentive from estimating equation (1) by OLS, and the first row in Column 2 reports coefficients (robust standard errors in parenthesis) on incentive from estimating equation (1) by IV using average incentives at the region and sector levels as an instrument. Our dependent variable is the employment growth between 2013 and 2016, calculated as [(employment in 2016 - employment in 2013)/ employment in 2013]. All regressions control for sector fixed effects and region fixed effects as well as firm characteristics such as age, capacity utilization rates, technological sophistication level of machinery equipment, utilization of information technology, whether the firm exports or not, whether the firm carries out innovation activities, size, regional variables such as GDP per capita, and inflation rate. * p < .1, ** p < 0.05, *** p < 0.01.

Turning now to the firm characteristics on employment, there was a significant positive correlation between capacity utilization rate and employment. Businesses that operated at a capacity utilization level of above 75% had 5.5 percent more employees than those whose capacity utilization level was between 0 and 25%. A positive correlation was found between innovation and export operations and firms' employment. Further analysis showed that inflation has a significant unfavorable effect on employment. We controlled for the initial employment level of firms by including it as a covariate in the regression model, which was done to

remove the influence of the firm's employment level before 2013. The relationship between changes in employment and firm size has been the subject of much research (Wagner, 1992; Gabe and Kraybill, 2002). Larger firms are expected to have more significant employment change than smaller firms (Faulk, 2002). As one might expect, we found a positive relationship between a firm's initial and future employment levels with a highly significant coefficient.

In addition, we found a statistically significant positive relationship between GDP per capita and average employment level. Provinces with a high GDP per capita tend to have a high level of employment. To elaborate, GDP per capita is a measure of the average income of a province's residents, while employment is a measure of the number of people who are working in a city. A province with a high GDP per capita is likely to have a high level of employment because businesses are more likely to be located in cities with a high concentration of potential customers and workers. Incentives can also play a role in attracting businesses and jobs to cities. For example, a city that offers businesses tax breaks or other financial incentives is more likely to attract new businesses and create new jobs. The relationship between GDP per capita, employment, and incentives is complex. However, these factors all play a role in determining the development of SMEs.

In the final part of the analysis, we examined the heterogenous impact of incentives on employment growth for firms with 1-19 employees. Table 5 reports the OLS and IV estimates. We found that incentives had a significant impact on employment growth for small firms, which is expected, as smaller firms are more likely to expand and develop to compete with larger firms.[1]

Regarding firms' characteristics, we found that firms' capacity level (>%75) and innovativeness (less precisely estimated) positively correlated with employment growth. We also found that the age of the firms and the inflation rate at the city level were negatively correlated with employment growth for smaller firms, which means that when inflation is high, smaller firms are less likely to afford to hire new employees.

Inflation has been found to be a consistently negative factor in the employment growth and employment level of manufacturing SMEs in Türkiye, which is valid for SMEs of all sizes but is particularly pronounced for those with 1-19 employees. As the prices of goods and services rise, the number of people employed in manufacturing SMEs decreases. There could be three main reasons for this negative relationship between inflation and employment: Inflation can lead to higher unemployment. As businesses raise wages to attract and retain workers, their production costs increase, making it difficult for businesses to compete, and they may be forced to lay off workers to reduce costs. Employment can lead to higher inflation. When more people work, more money is circulating in the economy, leading to higher demand for goods and services, which can put upward pressure on prices. However, if businesses can increase production to meet the increased demand, inflation may not rise as much. Government policies can also affect inflation and employment. Governments can use monetary policy (such as interest rates) and fiscal policy (such as spending and taxes) to influence inflation and employment. For example, if the government raises interest rates, it can help slow the economy, leading to lower inflation and employment. The employment status of manufacturing SMEs in Türkiye may have been negatively affected by the government's disinflationary monetary and fiscal policies.

What emerges from the results reported here is that general government incentives seem to have considerably more of an impact on the employment status of enterprises. Regardless of the particular incentive offered, we emphasized that incentives significantly affect the employment levels of Türkiye's manufacturing SMEs.

[1] Results for firms with 20+ employees show no significant relationship and are available upon request.

Table 4. Regression results for the relationship between average employment and receiving any government incentive

Variables	*(1) OLS*	*(2) IV*
Incentive	0.044***	0.095***
	(0.006)	(0.034)
Employment level in 2013	0.944***	0.941***
	(0.003)	(0.004)
Firm age	0.001***	0.001***
	(0.000)	(0.000)
Capacity utilization rate		
%0-25	Ref.	Ref.
%26-%50	0.006	0.005
	(0.010)	(0.010)
%51-%75	0.040***	0.038***
	(0.010)	(0.010)
>%75	0.055***	0.055***
	(0.009)	(0.009)
Technological sophistication level of machinery equipment		
Insufficient	Ref.	Ref.
Neither sufficient nor insufficient	0.008	0.006
	(0.011)	(0.011)
Sufficient	0.005	0.005
	(0.011)	(0.011)
Utilization of Information technology (computer, software, internet)		
Insufficient	Ref.	Ref.
Neither sufficient nor insufficient	0.002	0.001
	(0.011)	(0.011)
Sufficient	0.014	0.011
	(0.011)	(0.011)
Export	0.021***	0.015**
	(0.006)	(0.007)
Innovation	0.049***	0.041***
	(0.007)	(0.009)
Firm size	0.118***	0.117***
	(0.007)	(0.008)
Regional variables		
GDP per capita	0.041*	0.044**
	(0.021)	(0.022)
Inflation	-14.531**	-15.362**
	(6.090)	(6.111)
Sector fixed effects	Yes	Yes
Region fixed effects	Yes	Yes
First-stage regression results		0.772***
		(0.040)
First-stage F statistics		375.20
R-squared	0.969	0.969
N	9429	9429

Notes: The first row in Column 1 reports coefficients (robust standard errors in parenthesis) on incentive from estimating equation (1) by OLS, and the first row in Column 2 reports coefficients (robust standard errors in parenthesis) on incentive from estimating equation (1) by IV using average incentives at the region and sector levels as an instrument. Our dependent variable is the natural logarithm of the average employment calculated by averaging the firm's 2014, 2015, and 2016 employment levels. All regressions control for sector fixed effects and region fixed effects as well as firm characteristics such as age, capacity utilization rates, technological sophistication level of machinery equipment, utilization of information technology, whether the firm exports or not, whether the firm carries out innovation activities, size, firms employment level in 2013, regional variables such as GDP per capita, and inflation rate. * p < .1, ** p < .05, *** p < .01.

Table 5. Regression results for the relationship between employment growth and receiving any government incentive by firm size (1-19 employees)

Variables	*(1) OLS*	*(2) IV*
Incentive	0.069***	0.176**
	(0.020)	(0.090)
Firm age	-0.002***	-0.002***
	(0.001)	(0.001)
Capacity utilization rate		
%0-25	Ref.	Ref.
%26-%50	-0.005	-0.006
	(0.023)	(0.023)
%51-%75	0.029	0.028
	(0.022)	(0.022)
>%75	0.046**	0.046**
	(0.021)	(0.021)
Technological sophistication level of machinery equipment		
Insufficient	Ref.	Ref.
Neither sufficient nor insufficient	0.004	0.000
	(0.024)	(0.024)
Sufficient	-0.024	-0.029
	(0.025)	(0.025)
Utilization of Information technology (computer, software, internet)		
Insufficient	Ref.	Ref.
Neither sufficient nor insufficient	-0.036	-0.037*
	(0.022)	(0.022)
Sufficient	-0.029	-0.035
	(0.023)	(0.024)
Export	-0.014	-0.030
	(0.016)	(0.020)
Innovation	0.069***	0.049*
	(0.020)	(0.026)
Regional variables		
GDP per capita	0.069	0.069
	(0.049)	(0.049)
Inflation	-23.313**	-23.486**
	(11.106)	(11.233)
Sector fixed effects	Yes	Yes
Region fixed effects	Yes	Yes
First-stage regression results		0.740***
		(0.046)
First-stage F statistics		260.18
R-squared	0.034	0.027
N	6253	6253

Notes: The first row in Column 1 reports coefficients (robust standard errors in parenthesis) on incentive from estimating equation (1) by OLS, and the first row in Column 2 reports coefficients (robust standard errors in parenthesis) on incentive from estimating equation (1) by IV using average incentives at the region and sector levels as an instrument. Our dependent variable is the employment growth between 2013 and 2016, calculated as [(employment in 2016 - employment in 2013)/ employment in 2013]. All regressions control for sector fixed effects and region fixed effects as well as firm characteristics such as age, capacity utilization rates, technological sophistication level of machinery equipment, utilization of information technology, whether the firm exports or not, whether the firm carries out innovation activities, regional variables such as GDP per capita, and inflation rate. * p < .1, ** p < .05, *** p < .01.

5. CONCLUSION

This study sets out to establish whether government incentives have an impact on employment growth and the employment level of firms. As monetary policy instruments are restricted for direct state interventions, government support for businesses as a fiscal policy weapon is becoming increasingly crucial. In this regard, we looked at the success of incentives provided to Turkish manufacturing SMEs. Our data

demonstrate how strongly SMEs rely on incentives to grow and compete. Therefore, general incentives do aid in the expansion of SMEs.

The effectiveness of incentives is also significantly influenced by the firm's size in our sample. While businesses with 1 to 19 employees are keener to grow with public funds, businesses with 20 or more employees have less success with incentives. This result reflects those of Voulgaris et al. (2005), Faulk (2002), Gamberoni et al. (2016) who also found that smaller firms are more likely to participate in an incentive program hence create more jobs by the support than larger firms. Other factors strongly and positively connected with enterprises' employment level include firm-level characteristics like capacity level, exporting, innovation, and advancements in technology and machinery. Outcome for export is contrary to that of Partridge et al. (2020) who found negative relation. This fact compels us to advise Turkish officials to develop and carry out policies that support small businesses if they possess potential qualities.

Furthermore, regional disparities persist, with less-incentivized regions receiving higher incentives than those supposed to get most public funding. If research examines corporations' employment based on their factories instead of their headquarters, we predict that wealth dispersion between these locations could be shown to be more severe, which would be a fruitful area for further work.

The effects of public funds on firms' employment are complex and depend on a variety of factors, including the type of public funds, the size of the public funds, the way the public funds are used, and the economic environment. Some theories suggest that public funds can have a negative impact on employment, while others suggest that they can have a positive impact. Our study found a positive relationship between public funds and employment. This finding broadly supports the work of other studies in this area linking incentives with employment (Faulk, 2002; Voulgaris et al., 2005; Courseuil and Moura, 2010). These results provide further support for the hypothesis that public funds can positively impact employment, but the specific mechanisms through which this occurs are unclear. An implication of this finding is the possibility that public funds increased employment by subsidizing firms' costs, which can make it more profitable for firms to hire more workers. Alternatively, it is also possible that the multiplier effect played a role whereby public funds created jobs indirectly by stimulating economic activity. However, Yanıkkaya and Karaboğa (2017) suspected that the displacement effect could occur within the Turkish manufacturing sector, which might hamper job creation as the explanation for why they could not find any relationship between incentives and employment, which differs from the findings presented here.

Based on our findings, policymakers should adopt a targeted approach to government support for the Turkish manufacturing sector. Given the pronounced impact of incentives on small and medium-sized enterprises (SMEs), there is a pressing need to tailor policies to the specific needs of businesses with 1-19 employees. The observed variation in incentive effectiveness based on firm size underscores the importance of designing nuanced policies that cater to the unique characteristics of different segments within the manufacturing landscape. Policymakers are urged to bolster support for smaller firms as they demonstrate a greater propensity to generate employment through incentive programs. Furthermore, the study highlights the complex nature of the relationship between public funds and employment, warranting further research to elucidate the specific mechanisms through which these funds positively influence employment outcomes. Despite study limitations, our findings emphasize the need for policymakers to refine and optimize government incentives, ensuring they are both accessible and effective for the diverse array of manufacturing enterprises in Türkiye.

The issue of employment incentives is intriguing and could be usefully explored in further research. Furthermore, we do not have panel data to examine the effects of incentives over a more extended period. Notwithstanding these limitations, the study suggests continued efforts are needed to make government incentives more accessible to firms with 1-19 employees.

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Author Contributions
Ali Recai Direkçi: Literature Review, Data Curation, Analysis, Writing-original draft *Abdullah Tirgil*: Conceptualization, Methodology, Data Curation, Analysis, Modelling, Writing-review and editing

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It was declared by the authors that the tools and methods used in the study do not require the permission of the Ethics Committee.

Ethical Statement
It was declared by the authors that scientific and ethical principles have been followed in this study and all the sources used have been properly cited.

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APPENDIX

Table A1. Number of firms in the sample and population by firm size, subsector, and region

	Number of Firms Participated in the Survey	*%*	*Total Number of Firms Represented by the Sample*	*%*
By Size				
1-19 Employees	6 724	66,82	189 222	87,29
20+ Employees	3 339	33,18	27 552	12,71
Total	10 063	100	216 774	100
By Subsector				
10 - Manufacture of food products	1 513	15,04	34 857	16,08
11 - Manufacture of beverages	175	1,74	455	0,21
12 - Manufacture of tobacco products	2	0,02	11	0,01
13 - Manufacture of textiles	610	6,06	14 589	6,73
14 - Manufacture of wearing apparel	590	5,86	26 381	12,17
15 - Manufacture of leather and related products	446	4,43	5 441	2,51
16 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	447	4,44	8 823	4,07
17 - Manufacture of paper and paper products	230	2,29	1 778	0,82
18 - Printing and reproduction of recorded media	358	3,56	7 262	3,35
19 - Manufacture of coke and refined petroleum products	100	0,99	212	0,10
20 - Manufacture of chemicals and chemical products	281	2,79	3 447	1,59
21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations	108	1,07	217	0,10
22 - Manufacture of rubber and plastic products	580	5,76	10 470	4,83
23 - Manufacture of other non-metallic mineral products	675	6,71	11 359	5,24
24 - Manufacture of basic metals	391	3,89	6 135	2,83
25 - Manufacture of fabricated metal products, except machinery and equipment	755	7,50	29 460	13,59
26 - Manufacture of computer, electronic and optical products	213	2,12	1 279	0,59
27 - Manufacture of electrical equipment	283	2,81	4 205	1,94
28 - Manufacture of machinery and equipment (not elsewhere classified)	421	4,18	7 435	3,43
29 - Manufacture of motor vehicles, trailers and semi-trailers	279	2,77	2 905	1,34
30 - Manufacture of other transport equipment	189	1,88	694	0,32
31 - Manufacture of furniture	539	5.,6	16 497	7,61
32 - Manufacture of furniture	278	2,76	4 986	2,30
33 - Repair and installation of machinery and equipment	600	5,96	17 906	8,26
Total	10 063	100	216 802	100
By Region				
TR10-İstanbul	1 476	14,67	77 909	35,94
TR21-Tekirdağ, Edirne, Kırklareli	364	3,62	4 422	2,04
TR22-Balıkesir, Çanakkale	305	3,03	4 032	1,86
TR31-İzmir	611	6,07	15 001	6,92
TR32-Aydın, Denizli, Muğla	362	3,60	8 888	4,10
TR33-Manisa, Afyonkarahisar, Kütahya, Uşak	370	3,68	7 154	3,30
TR41-Bursa, Eskişehir, Bilecik	612	6,08	15 759	7,27
TR42-Kocaeli, Sakarya, Düzce, Bolu, Yalova	520	5,17	10 752	4,96
TR51-Ankara	531	5,28	14 459	6,67
TR52-Konya, Karaman	363	3,61	6 547	3,02
TR61-Antalya, Isparta, Burdur	335	3,33	5 918	2,73
TR62-Adana, Mersin	417	4,14	7 479	3,45

Table A1. (*Continued*)

	Number of Firms Participated in the Survey	*%*	*Total Number of Firms Represented by the Sample*	*%*
By Region				
TR63-Hatay, Kahramanmaraş, Osmaniye	336	3,34	4 596	2,12
TR71-Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir	281	2,79	2 298	1,06
TR72-Kayseri, Sivas, Yozgat	363	3,61	5 029	2,32
TR81-Zonguldak, Karabük, Bartın	252	2,50	1 929	0,89
TR82-Kastamonu, Çankırı, Sinop	240	2,38	1 279	0,59
TR83-Samsun, Tokat, Çorum, Amasya	333	3,31	4 726	2,18
TR90-Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane	333	3,31	4 661	2,15
TRA1-Erzurum, Erzincan, Bayburt	222	2,21	1 127	0,52
TRA2-Ağrı, Kars, Iğdır, Ardahan	147	1,46	477	0,22
TRB1-Malatya, Elazığ, Bingöl, Tunceli	264	2,62	2 276	1,05
TRB2-Van, Muş, Bitlis, Hakkâri	195	1,94	759	0,35
TRC1-Gaziantep, Adıyaman, Kilis	378	3,76	6 698	3,09
TRC2-Şanlıurfa, Diyarbakır	239	2,38	1 929	0,89
TRC3-Mardin, Batman, Şırnak, Siirt	214	2,13	694	0,32
Total	10 063	100	216 796	100

The Ministry of Industry and Technology, Directorate General of Productivity, prepared and implemented the Productivity Strategy and Action Plan for 2015-2018 (Çoban et al., 2018). The document aimed to develop specific policies and instruments to improve productivity at the regional, scale, and sectoral levels (which is also included in the 10th Development Plan) (Republic of Türkiye Ministry of Development, 2014). However, the lack of data and findings on the causes of productivity problems at these levels hindered the achievement of this goal. The first action under the document was to create a Türkiye Regional and Sectoral Productivity Development Map, which would provide data and findings on the levels of differentiation and concentration of productivity problems in industrial sectors and regions.