An Anatomy of Firm-Level Productivity in Turkey in the AKP Era

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Abstract

The main aim of the current paper is to investigate the productivity dynamics of Turkey during the *Adalet ve Kalkınma Partisi* (AKP) era to contribute to the ongoing discussions of long-term economic growth of the country, using a unique data set and firm-level granular productivity analysis. Furthermore, the deindustrialization of Turkey is scrutinized as a complement to the productivity analysis. Among a plethora of results, the following three are the most important ones in terms of their policy implications: (i) The aggregate productivity figures underestimated the productivity improvements in the manufacturing sector and overestimated the productivity losses in the services sector. (ii) The productivity growth of manufacturing sector in Turkey has been positive yet evolving towards medium-low tech manufacturing which displays the lowest productivity growth among all manufacturing sectors. (iii) While the surviving firms in the Turkish manufacturing sector have increased their own productivity in the AKP era, in the services sector surviving firms have a negative contribution to aggregate productivity growth.

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1. Introduction

The first two decades of the new millennium are laden with profound economic and political changes in Turkey. In the context of its modern history, the country has experienced one of its deepest economic crises in February 2001, which proved to be elemental in the subsequent rise of the Justice and Development Party (AKP, *Adalet ve Kalkınma Partisi*) to power in 2002 and the demise of the highly fragmented and short-living coalition governments of the 1990s.

Regardless of the debate on the causes of 2001-crisis[1], in its immediate aftermath the Turkish economy has undergone important economic reforms and rapid institutional improvements under the tutelage of the International Monetary Fund (IMF), which was also involved in the macro-management of the economy through an orthodox IMF program that imposed fiscal austerity and a contractionary monetary policy.

The AKP was successful in capitalizing upon these economic reforms in the years leading to the Global Financial Crisis of 2008; indeed, the economic growth in the 2003-2006 reached 7.8 percent, the highest since 1950s. Among other factors, the AKP owed this success mainly to its commitment to the goal of EU membership, since the EU was considered to be an external anchor for the implementation of a series of economic, political and institutional reforms (Öniş, 2012). Furthermore, these years also coincided with an abundant global liquidity environment that allowed Turkey to attract sizeable foreign capital (Acemoğlu and Üçer, 2015).

Since then, the AKP continued its success in the ballot box; however, it was not able to hold on to the same level of economic achievement[2]. The 2008-2010 was the period of a global recession that was erupted in the US and became an epidemic around the globe. Even though the AKP has effectively managed the public perception about the crisis, the GDP growth has declined to 1.4 percent in the period of 2008-2010 and rebounded to 6.6 percent in the 2011-2017 period. Over all the years the AKP was in office, Turkey has not significantly changed its specialization in low-medium technologies and low labor cost production and this is one of the main causes of the drop in the economic performance of the country.

As any other developing country, one of the most important long-run economic objectives of Turkey is to achieve a sustainable high growth rate. One of the prerequisites of attaining high economic growth is accomplishing sustained productivity growth (Acemoğlu, 2008 and references therein).

In the light of these discussions, the main aim of the current paper is to investigate the productivity dynamics of Turkey during the AKP era to contribute to the ongoing discussions of long-term economic growth of the country, using a unique data set and firm-level granular productivity analysis.

The data used in this paper originate from the Annual Industry and Services Statistics and the Foreign Trade Statistics Databases of Turkey. The Annual Industry and Services Statistics Database is based on a comprehensive survey of firms administered by Turkish Statistical Institute (TurkStat) whereas the Foreign Trade Statistics Database of

[1] See Akyüz and Boratav (2002), Cizre and Yeldan (2005), Rijckeghem and Üçer (2005), Celasun (2005), Öniş and and Bakır (2010), Acemoğlu and Üçer (2015)

[2] Since the general political economy discussions of the AKP period is out of the scope of this paper, the interested reader is referred to the works of Ziya Öniş and Daron Acemoğlu on this subject.

TurkStat is provided by the Ministry of Trade. The common time period covered by these two databases is the period 2003–2015.

At this point, it must be noted that there are heated debates on the issue that Turkey has entered into a spiral of premature deindustrialization during the AKP era both in the political and academic circles. Premature deindustrialization is defined as "*undergoing deindustrialization much earlier than the historical norms*" by Rodrik (2016, p3).

Rodrik (2016) argues that developing countries that open up to trade are hit by two shocks: (i) Countries without a strong comparative advantage in manufacturing become net importers in this sector, reversing gains from long-fought battles in import-substitution regimes. (ii) These countries import the deindustrialization of developed countries by being exposed to the downward push in the prevailing manufacturing prices in the world markets. Shafeaeddin (2005), Bogliaccini (2013) and Lopez (2017) are recent studies that link trade liberalization and deindustrialization in a number of developing countries. There are the same arguments for Turkish economy in which the deindustrialization of Turkey is dated back to the Customs Union Agreement with the EU in the December of 1995 (Boratav, 2016).

In this paper, we explore the deindustrialization of Turkey as a complement to our productivity analysis; however, due to the lack of firm-level data on a continuous and consistent basis starting from 1996, we work with the 2003-2015 period for which the data are available.

The main results of analysis in the current paper are: (i) Although labor productivity in manufacturing and services had similar movements in the first few years of the AKP administration (2003-2007), productivity of the services sector declined during the global financial crisis with no improvements thereafter. However, the manufacturing sector's productivity, which stayed stable during the global financial crisis, started to rise in the post-crisis period. (ii) The productivity growth of manufacturing sector in Turkey has been positive yet evolving towards medium-low tech manufacturing which displays the lowest productivity growth among all manufacturing sectors. (iii) Except Telecom and Health sectors, there have been productivity losses in all services sectors in the AKP era. (iv) Surviving firms in the Turkish manufacturing sector have increased their own productivity in the 2003-2015 period, nonetheless there were market share reallocations to the lower productivity firms in this time period that pulled down the contribution of surviving firms' productivity growth to the aggregate productivity growth in this sector. (v) As opposed to the manufacturing sector, in the services sector surviving firms have a negative contribution to aggregate productivity growth. Even though the productivity growth within the services firms is positive, it is not enough to offset the negative impact of market reallocations to less productive firms in this sector.

The contributions of this paper to the literature are twofold: Firstly, rather than working with sector aggregates to obtain the productivity figures, in this paper we calculate productivity at the level of the firm and then find aggregate productivity at the sectoral level through weighted averages. Moreover, we work with more granular price indexes throughout the study.

Table 1 is prepared to display the differences stemming from this methodological change. The first three columns are calculated using aggregate data whereas the values in the

last column come from the granular productivity analysis conducted in this paper.[3] When aggregate figures are used in the productivity calculations, Table 1 shows that –even though there are nuances between 1-19 employee firms and 20+ employee firms- in the overall there were significant productivity losses in both manufacturing and services sectors in Turkey in the AKP era. Although both employment and value-added in Turkey have grown in this period, the growth in employment was more than the growth in value added. The last column of Table 1 reports the granular productivity estimates produced in this paper for 20+ firms. Accordingly, while the productivity of manufacturing sector has increased by 1.3 percent annually over the period 2003-2015, that of services has declined by 2.5 percent annually in the same era. In other words, aggregate productivity figures underestimated the productivity improvements in the manufacturing sector and overestimated the productivity losses in the services sector.

The importance of these results originates from the fact that policy measures are often put in place by capitalizing on the aggregate analysis. However, in this paper we have shown that firms in manufacturing and services sectors are diversely different from each other in terms of employment and value added. In other words, in the existence of significant amounts of heterogeneity between manufacturing and services sector firms as in the case of Turkey, using aggregate productivity figures results in biased conclusions which leads to incorrect policy measures.

Secondly, the analysis of the survival dynamics of manufacturing and services firms in terms of productivity growth at the level of the firm during the AKP era gives important clues about the probable results of ongoing industrial policy measures in Turkey. The finding that surviving firms in the manufacturing sector contributing positively to the productivity growth while the surviving firms in the services sector pulling down the productivity of the entire services sector comes with important policy implications. Considering that the manufacturing sector exhibits sustained high levels of productivity against a backdrop of deindustrialization, industrial policy measures aiming at expanding the relative size of this sector in Turkey are necessary.

The paper is organized in eight sections. We start with the overall picture of the manufacturing and services sectors during the AKP era followed by a description of the data and a brief discussion of the methodology used. Then, we present our analysis of productivity in levels and in growth terms followed by the Melitz-Polanec decomposition of the productivity growth of manufacturing and services sectors in Turkey in 2003-2015. Finally, we discuss the policy implications of the current granular productivity analysis.

2. Overall Picture of the Manufacturing and Services Sectors

One of the most important facts in the economic history of developed countries is the sectoral shifts they witnessed during their development process. With the first and second industrial revolutions, these countries, which have made significant strides from

[3] The annualized value-added growth for the 2003-2015 period is 4.9 percent which is one percentage point lower than the annualized GDP growth for the same period according to TurkStat National Accounts data. This is due to the fact that agriculture and mining are not included in Table 1.

agriculture to manufacturing, have shifted from manufacturing to services within the last fifty years harboring the third and fourth industrial revolutions.

Turkey has also experienced important transitions between the main sectors of its economy in the last 100 years[4]. As seen in Figure 1, the share of agriculture decreased from 33 percent to 7 percent in the period spanning 1923 to 2016. The share of manufacturing could only reach 20 percent as of 2016, whereas the share of services has increased from 50 percent to 72 percent.

In the recent two decades, as Figure 1 shows, the share of agriculture in GDP stayed around 10 percent. The major structural change in this era is the decreasing share of manufacturing sector (deindustrialization) and the increasing share of services sector, which deserves a careful examination.

In the post-2002 period, value-added of both manufacturing and services sectors grew steadily almost every year (Figure 2). Overall, while the value-added of services sector was below that of manufacturing in the beginning of our sample (2003-2015), in the post-global financial crisis period this relation reversed and value-added of services sector surpassed that of manufacturing.

An even more striking feature of the post-2002 period was the divergent employment growth patterns in manufacturing and services sectors. This period was marked with strong job creation; indeed, Figure 3a suggests that the job growth in the services sector dwarfed that in the manufacturing sector.

In 2003, the services sector employment in firms with 20+ employees was about 0.5 million workers, the half of the manufacturing sector (Figure 3b). In 2008, employment in services sector has reached and passed that in manufacturing, nearly doubling it in 2015 at 5 million workers mark.

Evaluating Figures 3a and 3b together shows that a significant share of the job growth was realized in the services sector firms with 1-19 employees. The employment share of services enterprises in the non-agricultural businesses is 73 percent while the output share of these enterprises is only 52 percent, implying lower productivity in services sector compared to manufacturing.

Complementary to this picture, Table 2 reports the employment and population growth rates in the years 2005-2015. While the growth rate of non-institutional population was 1.8 percent in this time period, employment growth rates in agriculture, industry, construction and services were realized as 0.9 percent, 2.3 percent, 5.7 percent and 4.1 percent, respectively. Here, two observations are in order: (i) There was employment growth in all sectors with prevalent growth in construction and services; (ii) Employment growth in agriculture lacked behind the population growth pointing to either a shift of employment from this sector to the others or to the unemployed status.

[4] The sources and the consequences of the shift away from agriculture have been discussed in the literature extensively (Pamuk; 2008, Aydın; 2009 and the references therein). This shift was fueled mainly by two factors: (i) the agricultural policy transformation from "the 1950-1980 developmentalism" to "the post-1980s globalism" and (ii) the reluctance of political elites to implement comprehensive reforms that might result in large electoral losses. Consequently, the restructuring of Turkish agriculture that emerged in the wake of dominance of transnational agribusiness companies has unleashed a process of de-agrarianization in post-1980s. The resulting migration from rural to urban areas has brought employment shifts from agriculture not to manufacturing but to services sector.

In sum, the loud and clear message of this overall picture is that Turkey has recently been in a servicification trajectory without completing its industrialization.

Manufacturing

Table 3a shows the manufacturing sector output shares of some selected OECD countries and Turkey in comparison in 2015.

Chemicals/Plastics/Pharmaceuticals sector stands as the sector with the largest share of the manufacturing production in Turkey. The sector's share is similar to those in the other countries.

The sector with a very high share in production compared to those in the other countries is Textiles/Wearing/Leather. Among selected OECD countries, the share of the mentioned sector can reach only 5 percent while it is 15 percent in Turkey. The structure of Textiles/Wearing/Leather sector is labor-intensive and low value added.

The driving sector of Turkish exports has been the Automotive sector (under Transportation in Table 3a) in the post-2002 period. The share of the sector in production is 10 percent lower than the other OECD countries.

Technological decomposition of the manufacturing sector in Turkey suggests that the production structure with low technology has not changed during the sample period of this study (Table 3a). Indeed, there was a slight shift from low-technology production to medium-low technology during the sample period. Moreover, the production of the manufacturing products with high-technology, which was 5.1 percent in 2003, has decreased to 3.8 percent in 2015.

Services

In this section, the value-added composition of the Turkish services sector -covering firms with 20+ employees- is scrutinized followed by a comparative analysis of services output composition for the entire services sector in Turkey with some selected OECD countries.

When the value-added composition of the services sector firms with 20+ employees in Turkey is examined, it is observed that more than 50 percent of the sector is composed of the traditional services. Namely, in 2015, while 31 percent of the value-added in the services sector originated from distribution, transportation and construction constitute 15 and 14 percent, respectively.

The distribution services (DIST) accounted for the highest share in the value-added throughout 2003-2015 in Turkey (Figure 4). This is in line with the fact that in all countries, distribution services represent a large share of domestic value-added and employment. However, there was a sustained decline in the value-added share of distribution sector from 44 percent in 2003 to 30 percent in 2015 marking an intertemporal shift in the services sector value-added composition in Turkey. Considering that distribution sector provides an important link between manufacturers and consumers, the efficiency and productivity of this sector is vital in the sense that a poorly performing distribution sector can cause misallocation of resources that results in a multitude of economic costs.

Turkey has experienced a boom in the construction sector in 2000s as in many other emerging economies. This can also be observed as an increase in the value-added share of

construction and related engineering services (CES) in the entire services sector, from 10 percent in 2003 to 14 percent in 2015 (Figure 4). It is true that the construction sector has close ties with manufacturing and transportation sectors and a growing construction sector may signal growth in the other sectors. Moreover, this may also mean an increase in the demand for CES from the rest of the world encouraging services exports. However, the construction sector is also branded by low productivity and cyclical work conducted mainly by males. In a developing country like Turkey with very low levels of female labor force participation rate, the fact that one-seventh of services sector value-added is generated by the construction sector should be evaluated with a grain of salt.

Turkey changed its services sector value-added composition in favor of mainly business services (BS). Business services sector is a truly multidimensional sector that involves accountancy services, advertising services, architectural and engineering services, legal services and computer and related services. In Turkey, the share of business services value-added was 8 percent in 2003 but it passed the 10 percent mark in 2007 reaching almost 17 percent in 2015 (Figure 4). This increase is important for at least two reasons: (i) as one of the propellants of the knowledge-based economy, the sector is inherently labor-intensive and has the potential to create new jobs in the future; (ii) there is a globally growing need for technological progress and internet utilization which are essential factors that provide new ways of production and novel modes of supply.

The value-added share of communication services (COM) in the services sector of Turkey was cut in half from 2003 to 2015. This sector covers postal services, telecommunication services and audio-visual services. In line with the global trends, postal services in Turkey have undergone significant regulatory and technological transformations. Most importantly, owing to the recent digital revolution throughout the world, some of the traditional postal services became redundant in Turkey.

Next, Table 3b shows the services sector output shares of some selected OECD countries and Turkey in comparison. Turkey has the largest share in the construction and distribution/repair sector reaching almost 50 percent of services output. The same number hovers around 22 percent in the USA.

Construction sector which employs unskilled labor has an output share of 26 percent in Table 3b and value-added share of 14 percent in Figure 4 (20+ employees). This difference may stem from the low value-added of the sector coupled with the fact that many construction firms are small in size in Turkey. While the share of construction in services sector output in developed countries is around 10 percent, the same share has its highest value, 18 percent, in another emerging country, Poland. In other words, this international comparison confirms the above-mentioned disproportionate magnitude of the construction sector in Turkey.

The total share of education and healthcare services in Turkey in 2015 is only 5 percent. In all the other countries shown in Table 3b, this total has two-digits. These sectors are known to be the locomotives of long-term growth performance for any country. Therefore, low levels of output shares in education and health are worrisome for the long-term performance of Turkish economy.

Furthermore, in the framework of Industry 4.0, which is based on digital transformation in production, it is clear that IT and Professional/Science/Technical services will be the prerequisites for economic development. The output shares of these sectors in turkey in comparison to other OECD countries are very low, nearly at the half.

3. Data

The data used in this paper come from the Annual Industry and Services Statistics and the Foreign Trade Statistics Databases of Turkey. The Annual Industry and Services Statistics Database is based on a comprehensive survey of firms encompassing agriculture, manufacturing and services sectors administered by TurkStat whereas the Foreign Trade Statistics Database of TurkStat is based on customs declarations and provided by the Ministry of Trade. Both databases cover the period 2003–2015.

The Annual Industry and Services Statistics survey is composed of questions on employment, working hours, personnel costs, social security costs, expenses, income, inventories, turnovers, exports and imports of goods and services, depreciation, fixed capital investment, sales and many other firm-level variables. In addition, the distribution of capital as foreign, private, and government owned is included in the survey. The data regarding the extensive and intensive margin of services exports of the firm are provided by this database starting from 2006, whereas the data for foreign ownership start in 2008. The survey covers the universe of firms with over 20 employees in Turkey. In addition, a sample of firms with less than 20 employees is surveyed to compose the entire population of firms in Turkey.

The Foreign Trade Statistics Database includes goods flows, the reference period, commodity code, partner country, statistical value (export f.o.b./import c.i.f.), nature of transaction and type of payment. The classification used for compiling Turkey's foreign trade statistics is the Harmonized System (HS) 12-digit. The first 8-digits are international and the last 4-digits are national. The data regarding the extensive and intensive margin of goods exports is from the Foreign Trade Statistics Database and available for the entire sample period.

For the purposes of this paper, the two databases are merged to compose the universe of firms with 20+ employees in Turkey forming firm-year observations.

The sample of firms used is composed of manufacturing and services sectors (excluding finance – due to unavailability). Negative values of value-added, output, employment are dropped.

Various features of the TurkStat data used in this paper are presented in the Data Appendix.

4. Methodology

4.1. Productivity Estimation

In this paper, three different productivity measures are used[5]:

- Labor Productivity
    - Based on output and value-added
- Levinsohn-Petrin (2003) (LP)
    - Based on output and value-added
    - Proxy: Energy, Materials, Export Status

[5] All the productivity measures are available upon request.

- Ackerberg, Caves & Frazer (2015) (ACF)
    - Based on output and value-added
    - Proxy: Energy, Materials, Export Status

Throughout the paper, the TFP choice is ACF calculated with value-added, energy as proxy. The reasons for this choice are as follows: (i) Majority of the literature is based on value-added estimates. (ii) Since the functional form of the production function is Cobb-Douglas, elasticities add up to 1 more often with value-added when energy is used as a proxy variable. (iii) Estimates based on output involve severe outliers.

Capital stock is estimated by using the Perpetual Inventory Method. In the productivity calculations, in line with national accounts statistics provided by TurkStat, 2-digit PPI values were used for manufacturing sectors while 3 digit CPI values by spending categories were used for services sectors. Both PPI and CPI are based in 2003 and provided by TurkStat.

Due to the value-added choice in TFP, in the rest of the study labor productivity is measured as the ratio of value added to employment.

Following Melitz and Polanec (2015), aggregate productivity at time t as a share-weighted average of firm-productivity in sector j is defined as:

$$\Phi_t^j = \sum_t s_{it}^j \varphi_{it}^j$$

where the employment shares $s_{it}^j \geq 0$ sum to 1 and $j = \{Manuf, Serv\}$. In this study, the key variable of interest is the change in aggregate productivity over time (from t=1 to t=2) in sector j, $\Delta\Phi^j = \Phi_2^j - \Phi_1^j$.

Two productivity measures, labor productivity and TFP are used in logarithmic form to represent φ_{it}^j. Nominal value-added shares and employment shares are used as weights, s_{it}^j for TFP and labor productivity, respectively.

4.2. Productivity Decomposition

Melitz and Polanec (2015), henceforth MP, develop a productivity decomposition in order to account for the contributions of surviving, entering and exiting firms to aggregate productivity changes. The advantage of this method compared to other methods is its removal of some biases in the measurements of entry and exit contributions to aggregate productivity growth. These biases of other methods such as Griliches and Regev (1995) and Foster, Haltiwanger and Krizan (2001) include the over-measurement of entry component and thus under-measurement of the contribution of surviving firms to the productivity growth. Therefore, in this study, MP method is used.

In the MP model, survivor is defined as a firm that is present in both t and in t+1, entrant is a firm that is not present in t but comes to existence in t+1 and exiter is a firm that is present in t but does not appear in t+1. In the equations below, S represents survivor whereas E and X stand for entrant and exiter, respectively.

MP defines aggregate productivity in each period by using the aggregate share and aggregate productivity of S, E and X firms as:

$$\Phi_1 = s_{S1}\Phi_{S1} + s_{X1}\Phi_{X1} = \Phi_{S1} + s_{X1}(\Phi_{X1} - \Phi_{S1})$$

$$\Phi_2 = s_{S2}\Phi_{S2} + s_{E2}\Phi_{E2} = \Phi_{S2} + s_{E2}(\Phi_{E2} - \Phi_{S2})$$

By using these equations, productivity change in terms of those components are derived and Olley-Peaks decomposition is applied to the contribution of the survivor firms:

$$\Delta\Phi = (\Phi_{S2} - \Phi_{S1}) + s_{E2}(\Phi_{E2} - \Phi_{S2}) + s_{X1}(\Phi_{S1} - \Phi_{X1})$$

$$= \Delta\overline{\varphi}_S + \Delta cov_S + s_{E2}(\Phi_{E2} - \Phi_{S2}) + s_{X1}(\Phi_{S1} - \Phi_{X1})$$

Here, the contribution of the surviving firms is decomposed into two components resulting in: a shift in the distribution of firm productivity and market share reallocations.

5. Productivity in Levels

Employment-share weighted labor productivity in manufacturing and services sectors in Turkey for the period 2003-2015 is presented in Figure 5 while firm-share weighted TFP in these sectors is illustrated in Figure 6.

Labor productivity in manufacturing and services had similar movements between 2003-2007 (Figure 5). Thereafter, there was a marked decline in the productivity of services sector until 2010. Productivity of the manufacturing sector; however, stayed stable during the global financial crisis. In the post-crisis period, while the manufacturing sector's productivity started to rise, there was no improvements in the services sector productivity.

It is obvious that the global financial crisis had adverse productivity effects on Turkish economy. As of 2015, more than 70 percent of the Turkish GDP was composed of services sector production, which is noticeably higher than that of medium-high income countries (55 percent). On the one hand, the significant decline in services sector productivity in Turkey magnifies the adverse effects of the crisis in the long-run. On the other hand, manufacturing sector productivity would have been higher if not for the crisis. Adding these two facts together, it is evident that the burden of the crisis on Turkey would be more than that was felt in the short run. As higher productivity translates into higher potential growth rates in the long run, both the composition of manufacturing and services production and the hit their productivity suffered during the crisis will undoubtedly decrease potential growth rate of the country.

Figure 6 displays a very similar productivity picture for manufacturing sector in terms of TFP. However, TFP in the services sector exhibits a very different pattern compared to labor productivity. The main reason is suspected to be the data insufficiencies in the services sector, particularly the capital stock.

Capital stock is one of the most important variables in TFP estimations. Annual Industry and Services database, the source of this study, does not provide a capital stock indicator, which necessitates capital stock calculations using Perpetual Inventory Method. As highlighted in Taymaz, Voyvoda and Yılmaz (2008), insufficiency of investment data and the lack of initial capital stock in the database result in consistency problems in calculated capital stock variables. This problem is aggravated in services sector capital stock

calculations. Therefore, in the rest of the study, analysis will be carried on using labor productivity variable.

Next, to provide a more granular analysis, labor productivity in manufacturing and services sectors will be dissected into different layers of firm size measured as employment, exporting status and foreign ownership status.

Employment Cut

In this paper, the size of a firm is defined in four categories: (i) small firms (20 to 50 employees), (ii) small-medium firms (50 to 100 employees), (iii) medium-large firms (100 to 250 employees), (iv) large firms (250+ employees). Note that micro-size firms (1 to 20 employees) are excluded in the dataset.

Figure 7 shows labor productivity of firms in different sizes in the manufacturing sector in Turkey. As shown in the Figure, all four lines move in a synchronized way throughout the sample period implying that the impact of business cycle does not change for different sized firms. However, there is a significant positive relation between firm size and the level of productivity in manufacturing sector. There is a big gap between large firms and SMEs (less than 250 employees).

Labor productivity of services sector firms in different sizes are displayed in Figures 8. In the services sector, the same conclusions can be made about the firm size and labor productivity as in the manufacturing sector.

Export Cut

Figure 9 shows labor productivity in manufacturing and services sectors for exporting and non-exporting firms. While blue lines indicate non-exporting firms, red lines are for exporting firms. Dashed lines represent manufacturing firms and solid lines are for services firms.

Figure 9 indicates that exporters are more productive in both sectors, in line with an extensive literature in international trade (See Bernard et al. 2007 and the reference therein). Productivity of exporters and non-exporters in the manufacturing sector of Turkey in the years 2003-2015 exhibit a similar pattern. On the other hand, productivity gap between services exporters and non-exporters widened in the post-crisis period.

When domestic firms in both sectors are examined, it is observed that services firms were more productive than manufacturing firms until the crisis. However, the relation is reversed following the crisis, which requires further investigation.

A striking result is the convergence of the labor productivity levels of manufacturing and services exporters in the sample period. In 2003, productivity of services exporters was much higher than that of manufacturing exporters. This gap has disappeared slowly by 2012 and thereafter the two series showed an upward movement together.

Foreign Share Cut

The foreign ownership status of a firm is defined in five categories in this report: (i) domestic, (ii) up to 10 percent foreign share, (iii) 10 to 50 percent foreign share, (iv) 50 to 100 percent foreign share, (v) foreign firm. Note that share of domestic firms in the data set is almost 97 percent.

Figures 10 and 11 show labor productivity of firms with different foreign ownership status in the manufacturing and services sectors in Turkey, respectively. Domestic firms in both sectors exhibit very low levels of productivity compared to firms with any type of foreign involvement. The gap is large in size showing the vital importance of foreign direct investment in increasing the level of productivity in Turkey.

A remarkable result in Figure 11 is that services firms with the least amount of foreign involvement have an outstanding performance in labor productivity over the years in the sample period. Considering that services sector firms are far from any type of institutional structure in Turkey, even the tiniest foreign involvement creates big difference for these firms in terms of productivity.

6. Productivity Growth

This section presents an extensive discussion of productivity growth in manufacturing and services sectors in Turkey for the period 2003-2015.

Table 5 shows the productivity growth of manufacturing and services sectors, respectively. The Table provides information on weighted and unweighted labor productivity.

Employment-weighted and unweighted labor productivity growth rates in manufacturing sector shown in Table 5 display similar growth rates for all time periods under concern. During 2003-2007 period, labor productivity growth was negative probably due to the change in regulations regarding the informality. In other words, there were waves of incentives given to the firms to reduce informality such as tax pardons and social security incentives. The outcome was a huge influx of employment both with the entrance of small informal firms and informal employees of medium to large firms to the system (see Table A2). During the global financial crisis years, 2008-2010 period, there were slight increases in labor productivity growth, indicating that the crisis did not heavily affect labor productivity in Turkey. After the global financial crisis, labor productivity increased more than 3.5 percent.

Table 5 shows that services sector productivity decreased in 2003-2007 period due to the same reason discussed above for the manufacturing sector. In the global financial crisis period of 2008-2010, productivity in the services sector displayed a significant decline of 9 percent. Moreover, since then, the sector has not recovered. This is in sharp contrast to manufacturing sector which seems to be the engine of productivity growth in the post-crisis years.

Considering the sheer size of services sector in the Turkish GDP, unless services sector increases its productivity, the country will not be able to experience sustainable high rates of productivity and hence growth. In other words, for Turkey to increase its potential growth rate, not only the manufacturing productivity but the overall productivity should rise. This is only possible by increasing the productivity of the services sector with policy measures that support such an objective.

The technology composition of the manufacturing sector in Turkey is not sophisticated. In the sample period, the change in the production technology in manufacturing has been from low to medium-low level of sophistication as seen in Table 6. However, in the same

period, the share of high technology production, which was already the lowest among the others, declined furthermore.

Productivity growth increases with level of technological sophistication in production as observed in Table 6. For the whole sample period, the only exception is the medium-low tech manufacturing which exhibited the lowest productivity growth in Turkey. Moreover, both value-added and exports of Turkey have increased in this technology sophistication class. In other words, the productivity growth of manufacturing sector in Turkey is increasing but it is evolving towards medium-low tech manufacturing which displays the lowest productivity growth among all manufacturing sectors.

Table 7 presents the productivity growth rates in the services sector for the 2003-2015 period. Except Telecom and Health sectors, there have been productivity losses in all services sectors in this time period.

Among services sectors, Telecom is the one with the highest productivity growth. The share of the communication sector in value-added declined from 14.57 percent in 2003 to 6.53 percent in 2015. Starting from 2000, there have been significant reforms taken place towards the liberalization of telecommunications sector in Turkey. Among these, the most important ones are the foundation of an independent regulatory authority, namely Telecommunications Authority; the ending of the monopoly power of Turk Telecom on voice services and fixed lines; the privatization of Turk Telecom and the liberalization of mobile telecommunications by the introduction of the structural reforms toward increasing activity in the communications. Consequently, the communications sector started enjoying high productivity increases in Turkey.

Health was the second among services sectors with the highest productivity increases for the period 2003-2015. The value-added share of health sector which was 2.19 percent in 2003, increased to 4.44 percent in 2015.

In Table 7 the sector with the lowest productivity growth is shown as transportation. The value-added share of this sector has showed an increase from 13.37 percent in 2003 to 15.18 percent in 2015.

The services sector with the second lowest productivity growth for the period 2003-2015 was Business Services. Firms in this sector provide support services to other firms, such as consultancy, office administration, and placement of personnel, security services, travel arrangement, cleaning, and waste disposal. Considering the fact that increasing the productivity of business services sector would boost the productivity in other sectors of Turkish economy, special attention should be given to this sector in order to increase its productivity.

7. Productivity Decomposition

In this section, the survival dynamics of Turkish firms in terms of productivity will be analyzed using the MP methodology.

Turkish firms exhibit a very high degree of churning in terms of entry and exit for the period 2003-2015 (Table 8). In particular, in the years 2005 and 2010 there was a huge degree of entry into the market. However, this is not based on economic fundamentals but rather a product of survey sampling adjustments. The exit rates, which ranged around

6.82-10.81 percent in the pre-crisis period, have increased to the range of 14.07-16.82 percent in the post-crisis years.

Tables 9 and 10 present the aggregate productivity decomposition of manufacturing and services sectors, in terms of yearly labor productivity, in the sample of 2003-2015, respectively. Accordingly, the employment weighted labor productivity has grown 16 percent in the manufacturing sector in the course of 13 years while it has declined 30 percent in the services sector.

The first rows of both Tables show the aggregate productivity decomposition for the entire period. The results suggest a negative contribution of entry to productivity change for the whole period both for manufacturing and services sectors as entrants have a lower aggregate productivity growth than surviving firms. The positive signs of the exiting firms in both sectors indicate that the least productive firms exit the market and this creates an upward pull in aggregate productivity growth. However, the contribution of exiting firms to productivity growth is lower in services sector indicating that low productivity firms remain in the market.

An important observation from Tables 9 and 10 is the very different contributions of surviving firms to the aggregate productivity growth in manufacturing and services sectors. In the manufacturing sector, surviving firms have very significant contribution (34 percent) to the aggregate productivity growth. The contribution of productivity growth within the firm over the years is 44 percent whereas the contribution of the market share reallocations across firms in the sector is -9 percent. In other words, surviving firms in the Turkish manufacturing sector have increased their own productivity in 2003-2015 period, nonetheless there were market share reallocations to the lower productivity firms in this time period that pulled down the contribution of surviving firms' productivity growth to the aggregate productivity growth in this sector.

As opposed to the manufacturing sector, in the services sector surviving firms have a negative contribution (-6 percent) to aggregate productivity growth. Indeed, this result is in line with the evolution of productivity in services sector in Turkey as discussed above. Even though the productivity growth within the firm is positive (10 percent), it is not enough to offset the negative impact of market allocation to less productive firms (-16 percent) in this sector. This is in sharp contrast to what we observe in manufacturing sector.

8. Concluding Remarks

8.1. Policy Implications

This last section is reserved for a brief discussion of the evolution of productivity in Turkey during the AKP era and the policy implications of the analysis explained in detail in the previous sections.

In the light of the results discussed in the previous three sections, the following is a list of policy implications followed by specific discussions for SMEs, trade and FDI.

First, to increase the overall productivity in Turkey, the sector that needs to be supported in terms of productivity enhancements is the services sector. Considering the sheer size of services sector in the Turkish GDP, unless services sector increases its productivity,

the country will not be able to experience sustainable high rates of productivity and hence growth. This is only possible by increasing the productivity of the services sector with policy measures that support such an objective.

Recall that, the major structural change during the sample period is the decreasing share of manufacturing sector (deindustrialization) and the increasing share of services sector. Considering that the manufacturing sector exhibits sustained high levels of productivity, industrial policy measures aiming at expanding the relative size of this sector in Turkey are necessary. The objectives of these measures should be lower levels of import dependency in production, a steady supply of qualified human capital to the sector through targeted education policies and selective incentives provided to the priority industries/firms.

Second, innovation capacity in manufacturing sector of Turkey should be developed using multi-faceted policy measures that promote better quality education and incentivize entrepreneurship. One such measure is designing and implementing an education system that cultivates problem-based learning which improves the critical-thinking and creativity of the human capital. Another measure would be supporting industry-university-entrepreneur cooperation by using incentives provided on the basis of ex-ante and ex-post impact assessment analyses.

Third, productivity gains in health sector have important implications for socially-inclusive growth in the long run. The subsidies given to this sector and trade incentives perhaps played a major role in this positive development. Therefore, similar support policies can be adapted to other services sectors that are afflicted by negative productivity growth rates. For example, transport sector with a high participation to services value-added exhibits the lowest productivity growth in the country. It is obvious that this will have negative growth implication if appropriate policy interventions are not adopted in the near future. Moreover, increasing the productivity of business services sector would boost the productivity in other sectors of Turkish economy, special attention should be given to this sector in order to increase its productivity.

In addition to these more general policy implications, some specific discussions will be provided regarding SMEs, trade and FDI.

SMEs

It is a fact that most of the services sector is composed of small and medium size enterprises (SMEs). It is also a fact that in Turkish economy over the years SMEs were over-subsidized as they had limited access to finance. In 2003-2015 period, a messy subsidy policy that was not based on solid productivity enhancement criteria created zombie firms particularly in the services sector of Turkey.

The resulting policy implication is that the subsidies given to SMEs in Turkey throughout the last decade have no significant effect on productivity levels of these firms. This is also evidenced in the literature that development improves the most if the resources are dedicated to the large firms due to large absorptive capacity of these firms (Jaud and Freund, 2015).

Therefore, the subsidy policy design of Turkey has to be revised to focus on productivity of the firms and the sectors. One method would be to direct the subsidies to large productive firms conditional on these firms extending support to SMEs in their value-

chain. This way, subsidies would be a mechanism to pull up the SME productivity with the help of large firms without creating a burden on them.

Trade

In line with the heterogeneous firm literature in international trade, exporters are more productive in both manufacturing and services sectors in Turkey. Although productivity of exporters and non-exporters in the manufacturing sector of Turkey exhibit a similar pattern during the sample period, the productivity gap between services exporters and non-exporters widened in the post-crisis period. The immediate policy implication is to support services exporting both in terms of new market penetration and increasing the market share of existing exporters in the international market.

More importantly, concrete measures should be taken to transform domestic service providers to services exporters to increase productivity of the entire sector. Considering the fact that majority of the services firms are small in size, policies to gather the services firms to cooperate for the purpose of exporting, namely clustering, should be enhanced and broadened.

FDI

Turkey is a country that is known to have potential for foreign direct investment due to its locational advantage and big market size. However, the country's FDI performance is much lower than its potential. Moreover, very different from the beginning of the sample period, currently, the half of the FDI inflows are in the real estate sector which has no contribution to the long-term growth of Turkey.

Based on the results of the paper showing that firms with foreign involvement are more productive than the purely domestic ones, the obvious implication is adopting policy measures to attract foreign direct investment particularly in the services sectors that have a major role in the growth of the country such as transportation and business services.

8.2. Consequences

Premature deindustrialization may have adverse growth consequences due to the fact that manufacturing is a technologically dynamic sector that produce tradeables and able to absorb large populations of unskilled labor. In other words, manufacturing contributes to productivity growth, provides employment to the migrants from the rural sector and overcomes the home market demand constraints through trade. Therefore, deindustrializing prematurely may have damaging growth consequences for a developing country.

As stated very clearly in Rodrik (2016, p28) "[t]he consequences are already visible in the developing world. In Latin America, as manufacturing has shrunk informality has grown and economy-wide productivity has suffered. In Africa, urban migrants are crowding into petty services instead of manufacturing, and despite growing Chinese investment there are as yet few signs of a significant resurgence in industry." Very similar patterns have been observable in the AKP era in Turkey as well. In other words, there has been a structural change in the output composition of Turkey, moving in the direction of low-productivity services and away from high-productivity manufacturing.

This picture implies the necessity of finding a new growth model for Turkey if the current trajectory of deindustrialization is allowed to continue. One venue is to implement a services-led growth policy. This requires a move towards services sectors that are highly productive and tradeable, such as information technology and finance. However, these types of services sectors require a skilled labor force and lack the potential to absorb the low-skilled workers released from agriculture and petty services. Another venue –the more traditional one- is to go back to the objective of industrialization and reap the benefits of a technologically dynamic sector which is branded as the engine of growth in the previous literature.

In conclusion, the road to moderate growth for Turkey passes from investing in high-productivity activities either in manufacturing or services and improved fundamentals in the form of better institutions, high quality human capital and knowledge accumulation.

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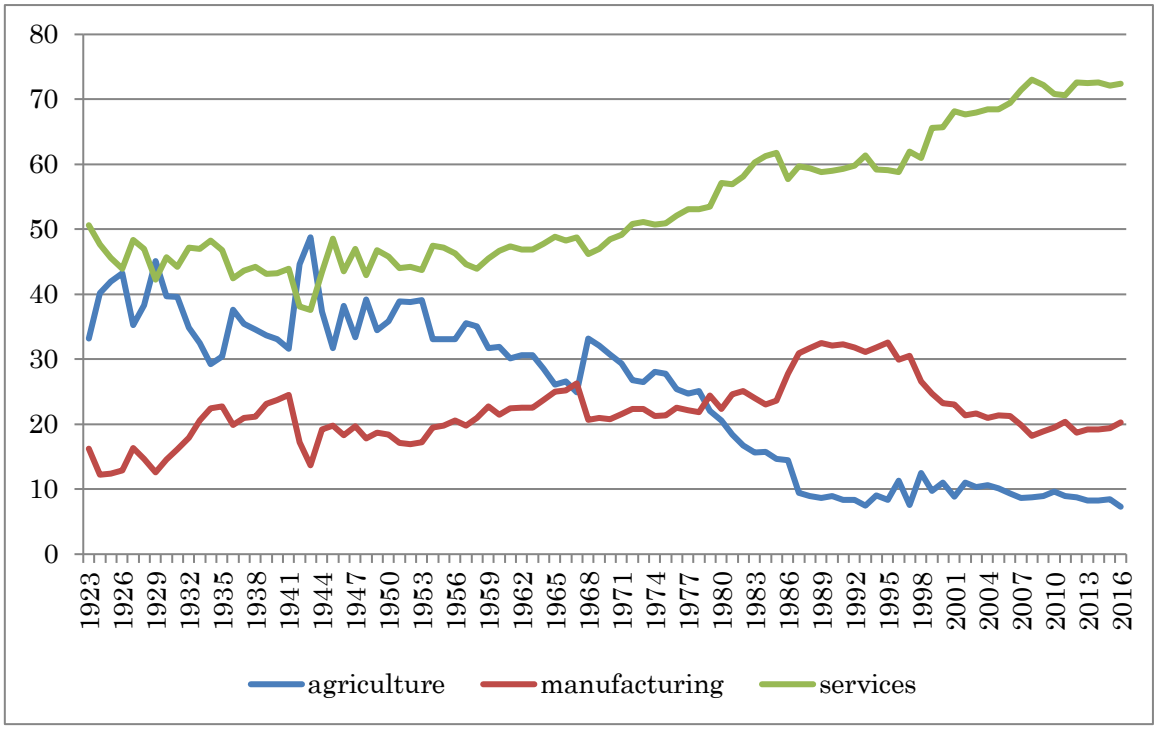
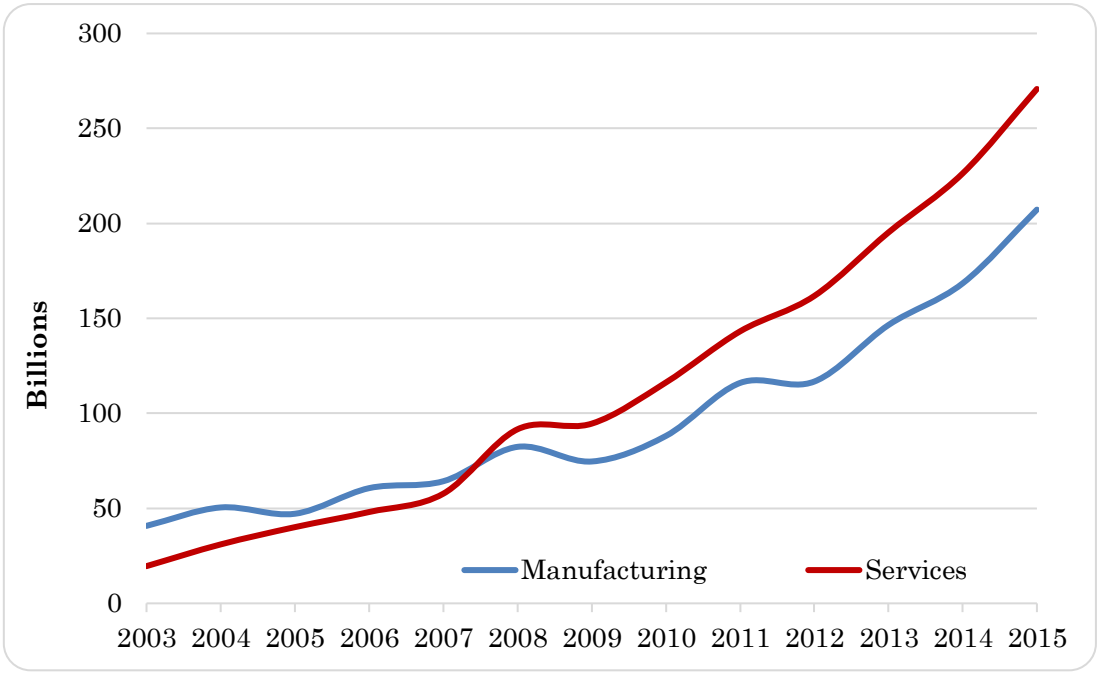
Figure 1. Share of the Sectors in GDP, 1923-2016



Note: Recent GDP series (in current prices) with base year 2009 were extended backwards by using the annual increases of the archived GDP (with old base years) of the CBRT website. Note that there are structural breaks in 2007, 1998, 1987, 1968 and 1948 due to the methodological change of GDP.

Figure 2. Value Added of Manufacturing and Services Sectors, 2003-2015



Source: Authors' own calculations using TurkStat data.

Figure 3a. Employment in Manufacturing and Services Sectors, 2003-2015

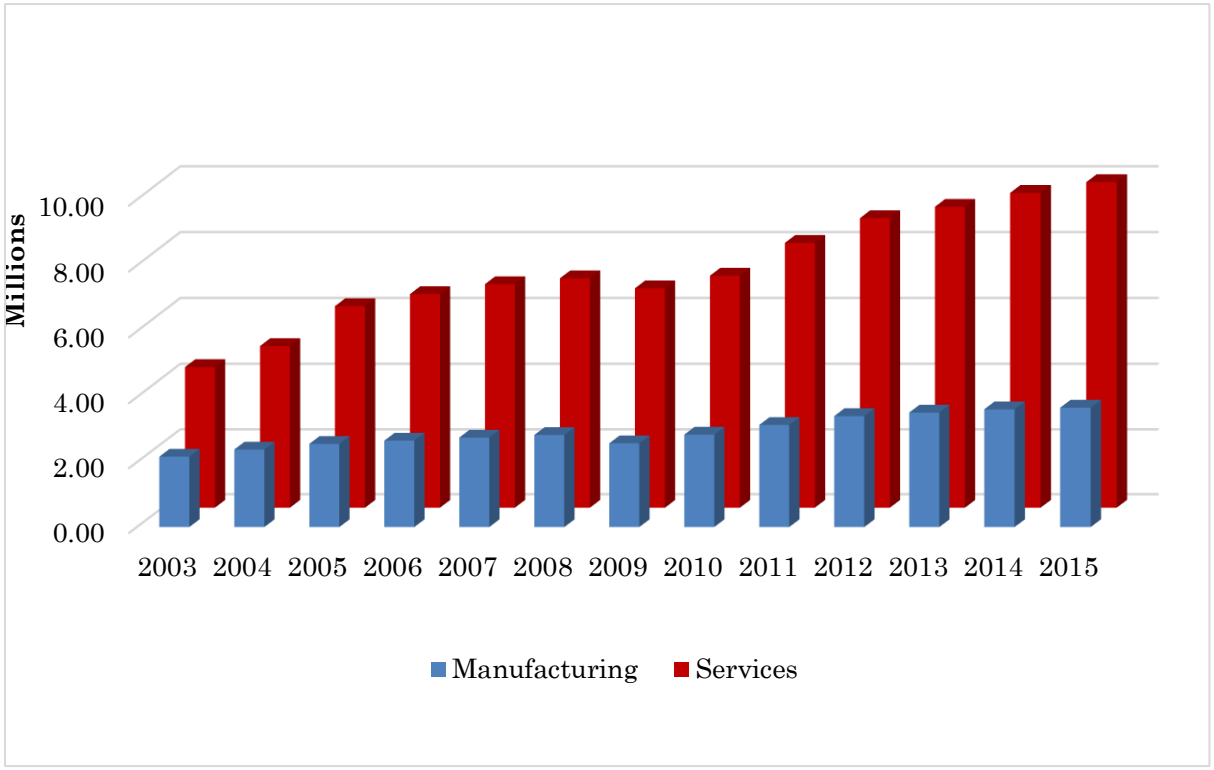
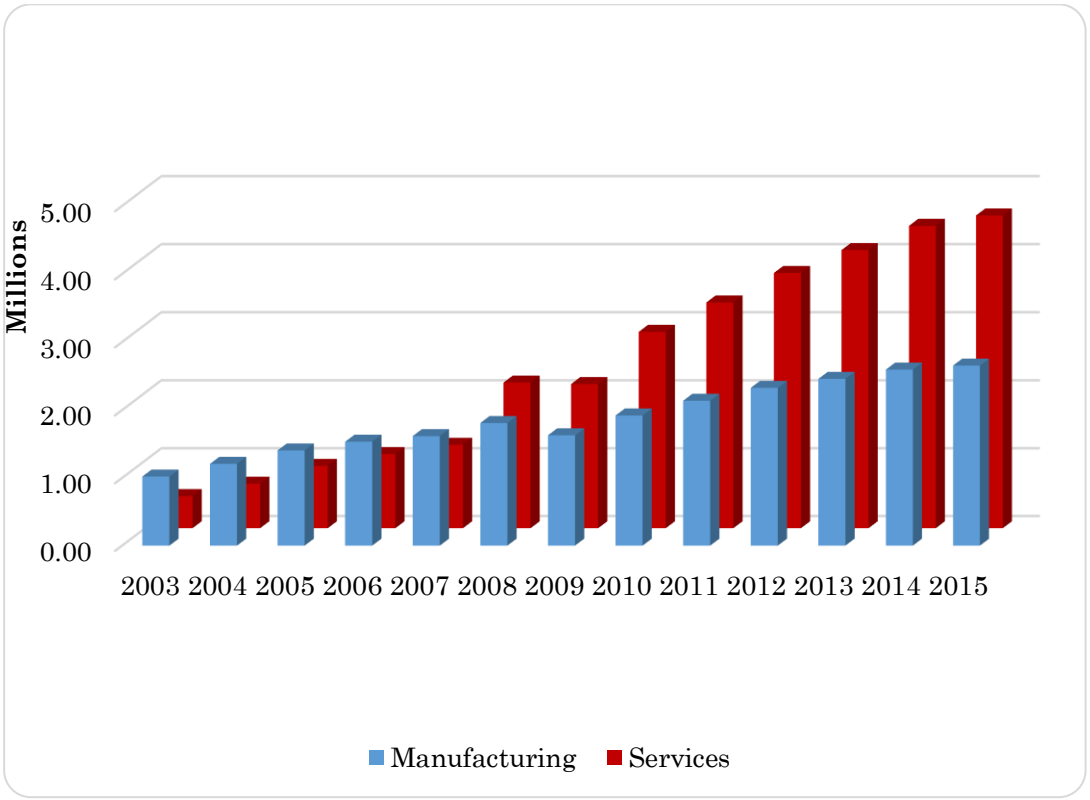
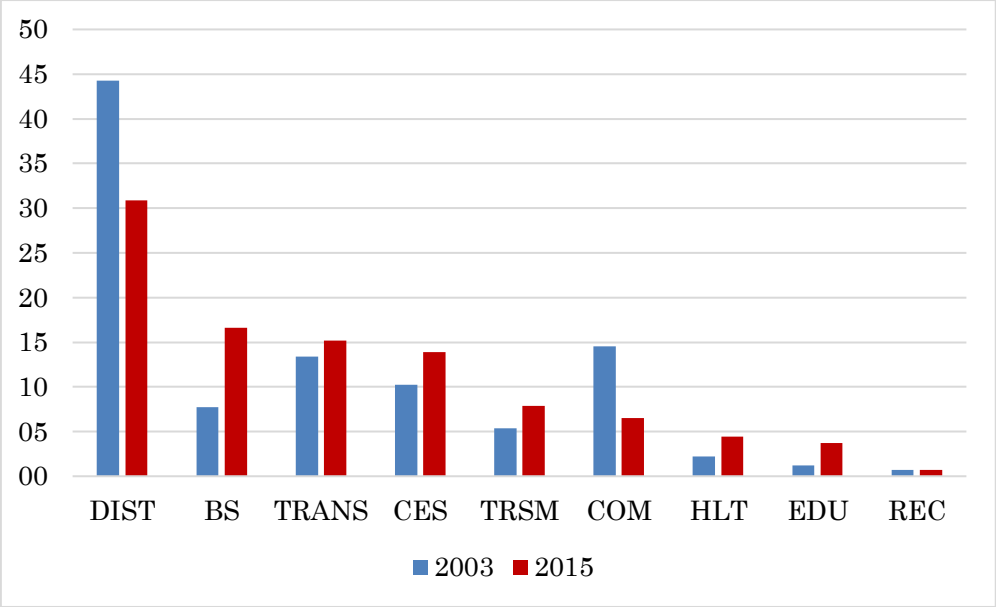


Figure 3b. Employment in Manufacturing and Services Sectors, 2003-2015
(firms with 20+ employees)



Source: Authors' own calculations using TurkStat data.

Figure 4. Value-Added by Services Sector Classification, 2003 and 2015



Source: Authors' own calculations using TurkStat data.

Figure 5. Labor Productivity in Manufacturing and Services: Weighted

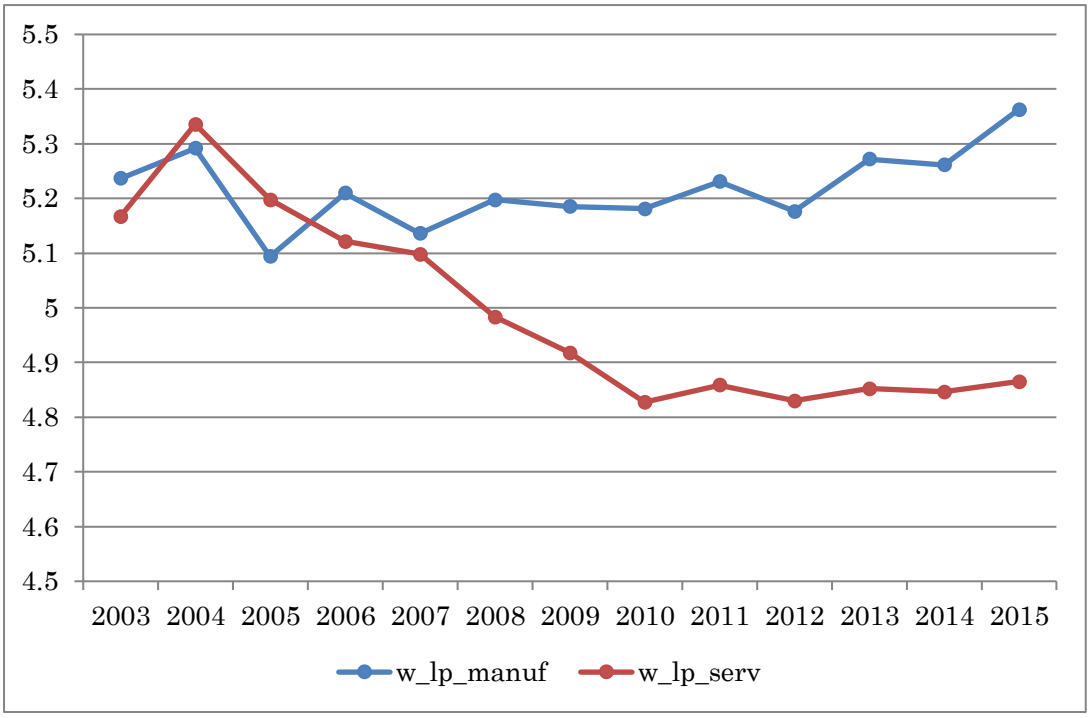


Figure 6. TFP in Manufacturing and Services: Weighted

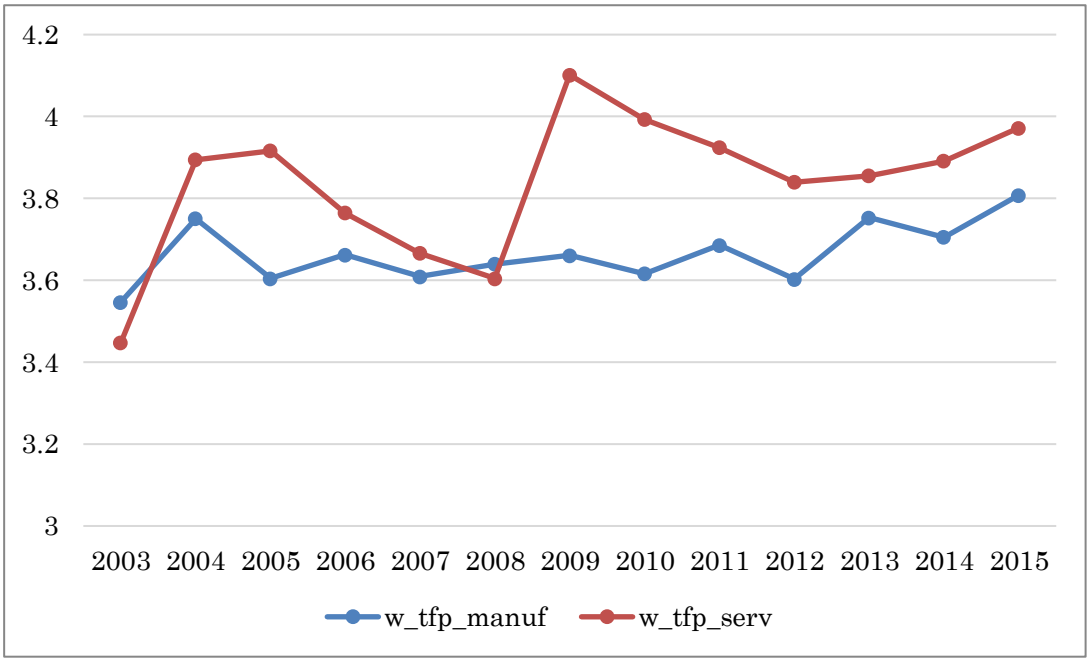


Figure 7. Labor Productivity in Manufacturing: Employment Cut

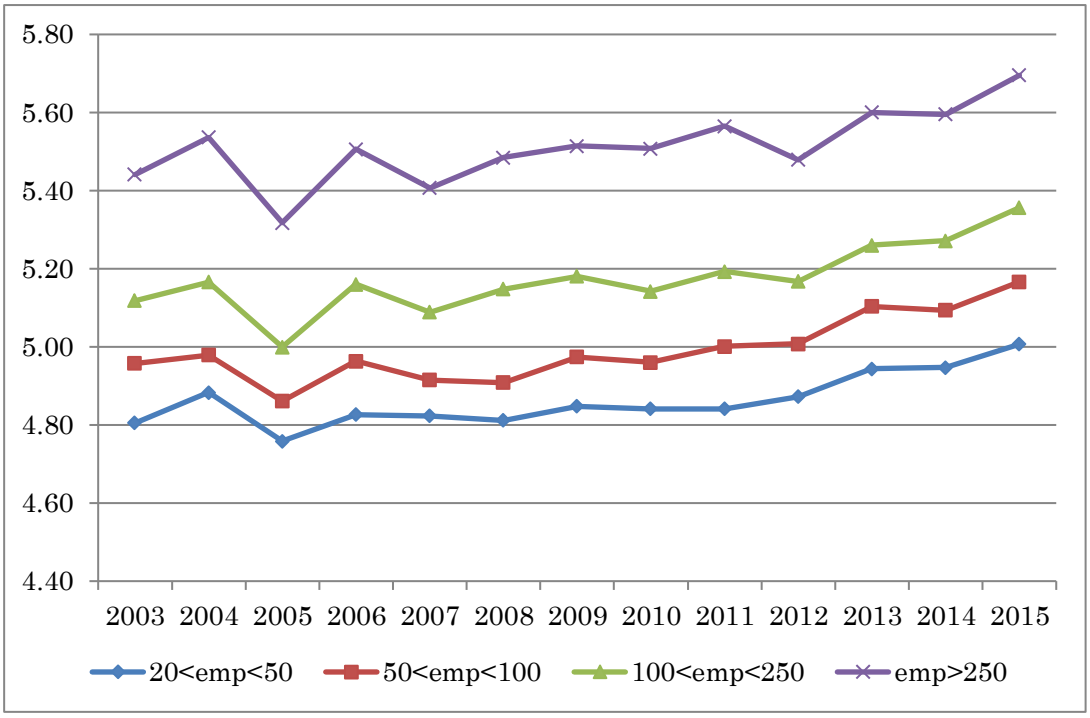


Figure 8. Labor Productivity in Services: Employment Cut

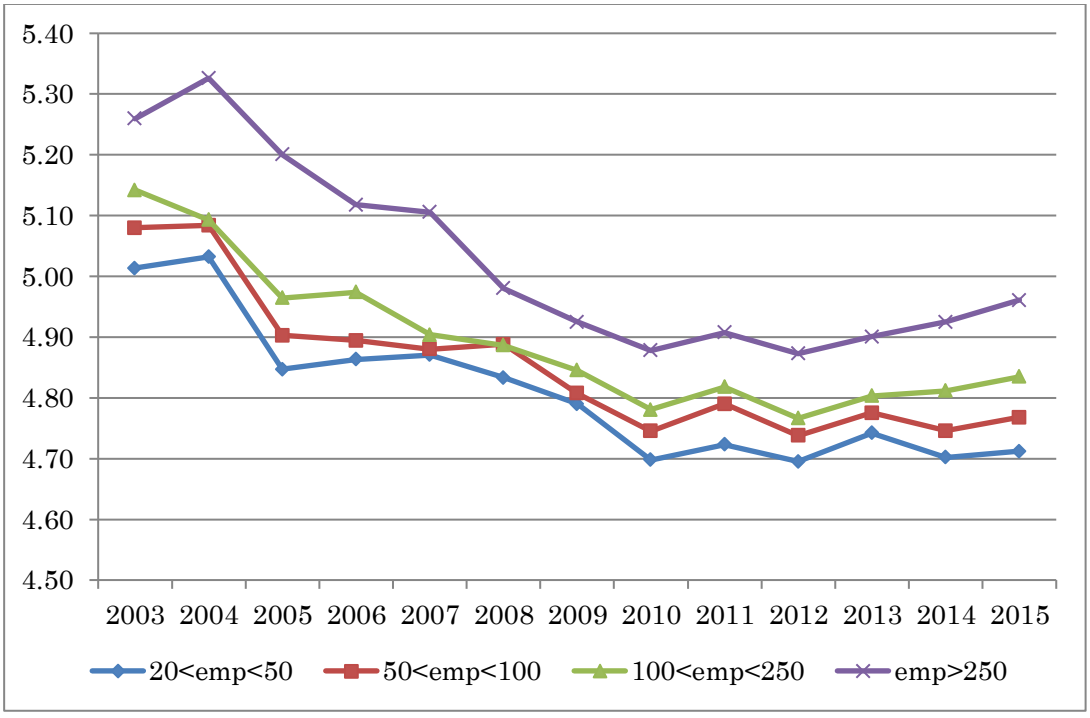


Figure 9. Labor Productivity, Manufacturing and Services Comparison

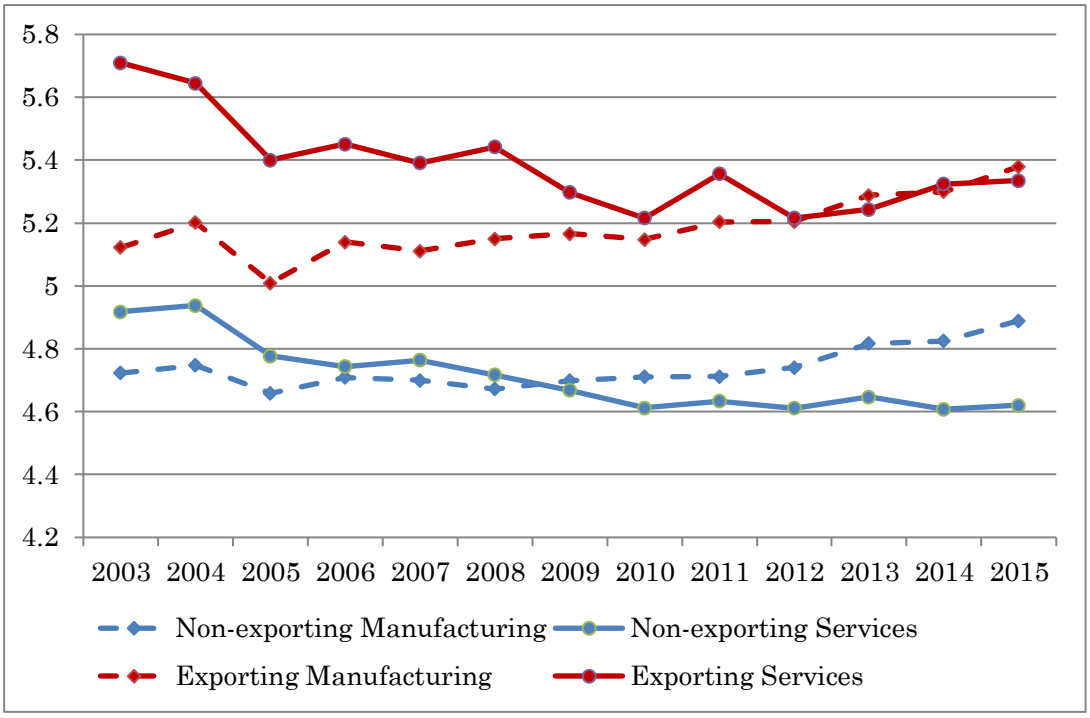


Figure 10. Labor Productivity in Manufacturing: Foreign Share Cut

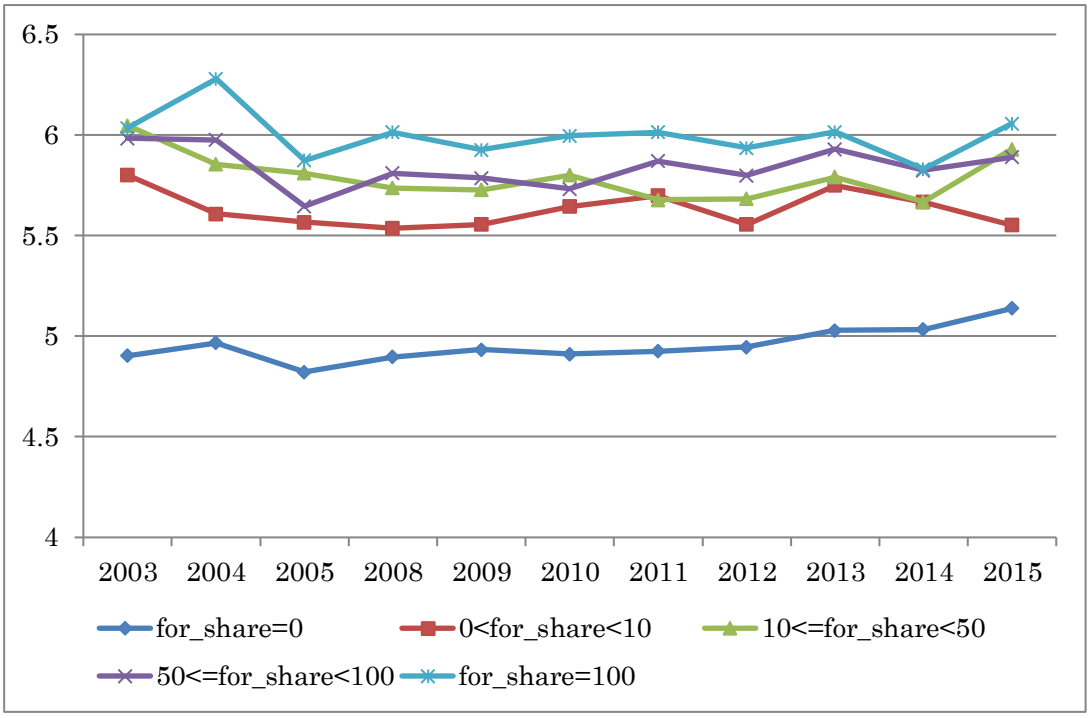


Figure 11. Labor Productivity in Services: Foreign Share Cut

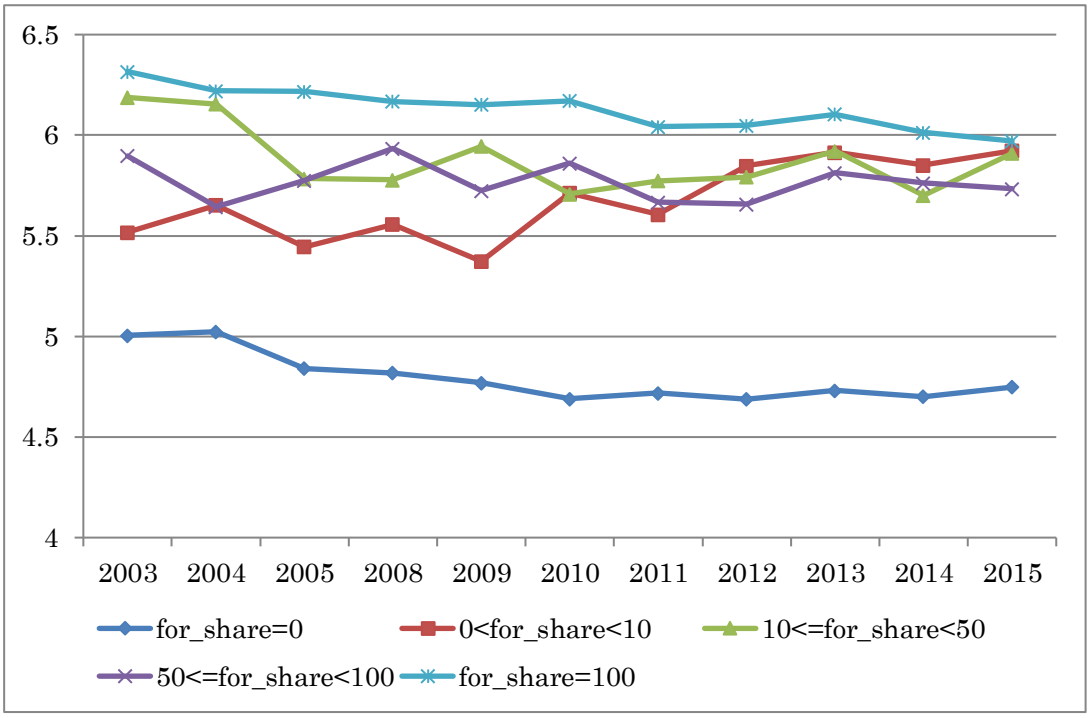


Table 1. Annualized Growth Rates for 2003-2015 Period

	L-Growth	VA-Growth	LP-Growth (aggregate)	LP-Growth (granular)
		Manufacturing + Services		
Total	8.1%	4.9%	-3.2%	
1-19	5.5%	-1.4%	-6.9%	
20+	9.4%	6.8%	-2.6%	
		Manufacturing		
Total	5.1%	4.2%	-0.9%	
1-19	3.6%	-0.5%	-4.1%	
20+	5.4%	4.6%	-0.8%	**1.3%**
		Services		
Total	9.8%	5.2%	-4.6%	
1-19	6.0%	-1.6%	-7.6%	
20+	12.7%	8.8%	-3.9%	**-2.5%**

Note: Calculations based on TurkStat Annual Manufacturing and Services Database. The first three columns are calculated using aggregate data whereas the values in the last column come from the granular productivity analysis conducted in this paper. VA growth is calculated by using real value employing the producer price index (2003=100) from TurkStat data.

Table 2. Employment and Population Growth Rates

Period	Agriculture	Industry	Construction	Services	Non-Institutional Population
2005-2006	-7.2%	2.9%	8.7%	4.8%	1.7%
2006-2007	-2.3%	0.9%	3.2%	3.1%	1.7%
2007-2008	1.6%	3.0%	0.6%	1.8%	1.6%
2008-2009	2.8%	-7.9%	5.3%	1.7%	1.8%
2009-2010	7.0%	10.4%	9.9%	3.3%	1.7%
2010-2011	6.5%	4.9%	17.1%	5.7%	2.0%
2011-2012	-2.1%	1.3%	2.2%	6.0%	2.1%
2012-2013	-1.8%	4.0%	2.9%	4.3%	1.6%
2013-2014	5.1%	4.2%	8.2%	5.6%	2.5%
2014-2015	0.2%	0.3%	0.1%	5.0%	1.5%
2005-2015	**0.9%**	**2.3%**	**5.7%**	**4.1%**	**1.8%**

Note: Growth rates are calculated using data from TurkStat Labor Force Statistics, which is available after 2005 at the level of sectoral aggregates. The last row reports the annual growth rates for the entire period.

Table 3a. Sectoral Output Composition of Manufacturing: Selected OECD Countries (2015, percent)

		Developed				*Developing*	
	Turkey	USA	Germany	France	Korea	Hungary	Poland
Food/Beverages/Tobacco	16.75	15.93	10.10	21.19	6.84	11.48	20.09
Textiles/Wearing/Leather	15.18	1.51	1.31	2.12	4.78	1.56	2.45
Wood/Paper/Printing	4.72	6.33	4.53	4.92	2.49	3.52	7.73
Chemicals/Pharmaceuticals/Rubber	21.14	28.67	20.86	23.12	22.83	20.74	25.39
Metals (Basic+Fabrication)	16.36	10.38	12.49	10.48	13.98	7.60	12.14
Machinery and Equipment.	11.61	15.48	23.38	10.98	31.49	22.82	11.67
Transportation Vehicles	10.19	17.55	22.29	17.88	16.04	28.73	12.52
Furniture	4.05	4.16	5.04	9.31	1.55	3.56	7.63

Source: OECD STAN Database.

Table 3b. Sectoral Output Composition of Services: Selected OECD Countries (2015, percent)

		Developed				*Developing*	
	Turkey	USA	Germany	France	Korea	Hungary	Poland
Construction	26.51	7.4	9.77	11.15	14.20	10.56	18.13
Distribution/Repair	23.08	14.88	15.94	16.44	16.56	20.34	24.70
Transportation/Storage	16.66	6.11	10.70	7.84	9.92	13.13	13.21
Hotels/Restaurants	6.83	4.87	2.97	4.21	6.82	4.43	2.30
Publishing	0.94	6.82	2.16	2.17	1.86	2.24	1.67
Telecom	3.94	-	2.21	2.26	3.24	2.59	2.39
IT	1.40	3.02	4.20	3.28	3.67	3.42	2.49
Real Estate	1.12	15.75	13.49	12.60	9.70	11.03	7.77
Professional/Science/Tech	6.03	11.72	9.73	13.30	9.17	8.67	8.16
Administrative and Support	7.63	6.09	7.65	7.52	3.76	5.87	3.61
Education	1.56	6.89	5.47	5.35	7.56	5.68	5.43
Health	2.56	11.64	10.23	9.84	8.10	6.66	6.63
Art/Entertainment/Other	1.73	5.06	5.46	4.06	5.43	5.39	3.53

Source: OECD STAN Database.

Table 4. Aggregates of the Manufacturing Sector by Technology Classification

Technology Classification	**2003**			**2015**		
	Firm	Value Added	Exports	Firm	Value Added	Exports
Low	60.8	43.4	33.7	52.3	37.0	31.8
Medium-Low	22.9	26.7	21.7	28.3	31.8	26.1
Medium-High	14.8	24.8	43.3	18.2	27.4	40.7
High	1.6	5.1	1.3	1.2	3.8	1.4

Note: Firms with 20+ employees were covered.
Source: Calculations based on TurkStat Annual Manufacturing and Services database.

Table 5. Annualized Labor Productivity Growth Rates

	Manufacturing		Services	
Period	Unweighted	Weighted	Unweighted	Weighted
2003-2007	-0.55	-2.52	-4.59	-1.74
2008-2010	1.81	1.50	-5.49	-9.01
2011-2015	3.87	3.64	0.87	0.75

Table 6. Manufacturing Productivity Growth, Technology Sophistication

Technology Classification	2003-2015	2003		2015	
	Productivity Growth	Value Added	Export	Value Added	Export
Low	1.15	43.39	33.74	37.04	31.82
Medium-Low	0.53	26.70	21.68	31.78	26.05
Medium-High	2.80	24.82	43.25	27.39	40.71
High	5.82	5.10	1.33	3.79	1.42

Table 7. Services Sector Productivity Growth

	Productivity Growth	Share in Value-Added	
Services Classification	2003-2015	2003	2015
Business Services	-4.30	7.74	16.59
Construction	-1.82	10.26	13.93
Telecom	3.99	14.57	6.53
W&R	-2.29	44.25	30.87
Education	-0.20	1.21	3.69
Health	2.23	2.19	4.44
Other	-1.75	0.33	0.21
Art/Recreation	-0.44	0.74	0.71
Transportation	-4.83	13.37	15.18
Travel	-1.15	5.34	7.86

Table 8. Entry, Exit, Surviving Firm Percentages

Year	Entry	Exit	Surviving
2004	26.41	8.29	61.10
2005	41.22	6.82	57.40
2006	19.85	9.12	78.72
2007	9.81	10.81	88.70
2008	33.69	7.30	64.97
2009	10.86	16.32	87.72
2010	43.90	8.97	54.97
2011	26.57	14.49	72.35
2012	24.42	14.07	74.46
2013	20.05	16.61	78.74
2014	23.58	15.59	75.26
2015	18.37	16.82	80.47

Table 9. Yearly Decomposition of Labor Productivity Growth in Manufacturing

year	within	reallocation	surviving	entry	exit	$\Delta\Phi^j$
2003-2015	**0.44**	**-0.09**	**0.34**	**-0.41**	**0.22**	**0.16**
2003-2004	0.08	0.02	0.10	-0.08	0.04	0.06
2004-2005	-0.10	-0.06	-0.16	-0.08	0.03	-0.20
2005-2006	0.12	0.03	0.15	-0.05	0.02	0.13
2006-2007	-0.03	-0.04	-0.07	-0.02	0.03	-0.07
2007-2008	0.02	0.04	0.06	-0.05	0.04	0.06
2008-2009	0.01	-0.01	0.00	-0.03	0.04	0.02
2009-2010	0.03	0.00	0.03	-0.09	0.03	-0.02
2010-2011	0.05	0.01	0.07	-0.05	0.03	0.04
2011-2012	0.03	-0.08	-0.05	-0.05	0.03	-0.06
2012-2013	0.09	0.02	0.11	-0.04	0.03	0.11
2013-2014	0.02	-0.02	0.00	-0.04	0.03	-0.01
2014-2015	0.07	0.04	0.10	-0.03	0.04	0.11

Table 10. Yearly Decomposition of Labor Productivity Growth in Services Sector

year	within	reallocation	surviving	entry	exit	$\Delta\Phi^j$
2003-2015	**0.10**	**-0.16**	**-0.06**	**-0.30**	**0.06**	**-0.30**
2003-2004	0.03	0.04	0.07	0.08	0.02	0.17
2004-2005	-0.09	0.07	-0.02	-0.17	0.05	-0.14
2005-2006	0.05	-0.11	-0.05	-0.06	0.04	-0.08
2006-2007	-0.01	-0.02	-0.02	-0.04	0.04	-0.02
2007-2008	0.05	-0.03	0.02	-0.15	0.01	-0.11
2008-2009	-0.06	-0.01	-0.07	-0.02	0.02	-0.07
2009-2010	0.01	-0.03	-0.02	-0.09	0.02	-0.09
2010-2011	0.08	-0.02	0.07	-0.06	0.03	0.03
2011-2012	0.00	0.00	-0.01	-0.05	0.03	-0.03
2012-2013	0.05	-0.02	0.03	-0.04	0.03	0.02
2013-2014	0.01	0.01	0.02	-0.06	0.03	-0.01
2014-2015	0.03	-0.01	0.02	-0.03	0.03	0.02

Data Appendix

Table A1 shows the nature of the firms covered in the sample. Although firms with 20+ employees compose only 3 percent of the firm population in Turkey, their sales, output and value added shares are 77 percent, 82 percent and 85 percent, respectively.

Table A1. Nature of the Firms Covered in the Sample (2015)

By firm size	*Percentages*	
	1-19	20+
#Firms	97	3
Sales	23	77
Output	18	82
Value Added	15	85

Table A2 provides information about the distribution of manufacturing and services firms on an annual basis. The number of firms with 20+ employees in these sectors has gone up from 15,528 to 74,853 from 2003 to 2015. In these 13 years, the share of manufacturing firms has declined from 61 percent to 34 percent, implying the ongoing de-industrialization process in Turkey in the last decade. Note that there are significant increases in the number of firms in 2005 and 2010 which is not based on economic fundamentals but survey-related adjustments.

Table A2. Annual Distribution of Manufacturing and Services Firms

Year	# obs	# obs-manuf	# obs-serv
2003	15,528	9,392	6,136
2004	17,002	10,509	6,493
2005	23,168	13,030	10,138
2006	26,014	14,492	11,522
2007	25,768	14,220	11,548
2008	35,125	16,287	18,838
2009	33,309	15,089	18,220
2010	51,359	19,815	31,544
2011	58,478	22,059	36,419
2012	65,336	24,031	41,305
2013	67,756	24,743	43,013
2014	73,678	25,858	47,820
2015	74,853	25,766	49,087
Total	*567,374*	*235,291*	*332,083*

The data exhibit a very high degree of churning of firms as shown in Table A3. More than one-fifth of the firms appear only once in the sample. The share of firms that survive for the entire sample is only 4 percent of all the firms while it decreases to less than 2 percent for the services sector. A more striking finding is that less than 50 percent of the firms have 4+ years of life-span within the sample. This severe degree of dynamism for a country

in the size of Turkey may have particularly important consequences in terms of productivity and efficiency of production in the country.

Table A3. Survival Dynamics in the Sample, 2003-2015

#Years a Firm Appears in the Sample	Manufacturing (%)	Services (%)	All (%)
1	19.85	26.92	22.50
2	15.01	18.86	17.16
3	11.17	12.83	12.21
4	9.42	9.90	9.83
5	8.15	8.08	8.48
6	8.66	8.63	9.27
7	3.31	2.66	2.92
8	4.38	4.64	4.85
9	2.38	1.37	1.84
10	3.23	1.56	2.30
11	4.18	1.68	2.79
12	3.07	0.95	1.80
13	7.17	1.84	4.05

Table A4 shows the distribution of firms with 20+ employees in terms of their employment. Large firms compose only 6 percent of the sample. The rest are small and medium size enterprises (SMEs). Since the SMEs constitute a huge share of the sample, the level and growth of SME productivity would drive the overall productivity growth in Turkey.

Table A4. Distribution of Firms According to Employment, 2003-2015

Employment Cut	# observations	percentage
20<emp<=50	325,510	58
50<emp<=100	103,028	18
100<emp<=250	70,701	13
250<emp	35,623	6
Total	*561,861*	*100*

The sectoral distribution of the Turkish manufacturing sector is given in Table A5. Textiles & Apparel has the lion-share of manufacturing at 35 percent for the 2003-2015 period. It is followed by Basic & Fabricated Metals; Food, Beverages & Tobacco; and Chemicals, Rubber & Plastic sectors at 15 percent, 12 percent and 11 percent, respectively.

Manufacturing sectors are also classified by technological sophistication in Table A6. An overwhelming majority of Turkish manufacturing sector operates with low and medium-low technology. Only 1 percent of the manufacturing sector is classified as high technology.

Table A5. Sectoral Distribution of Manufacturing, 2003-2015

Industry Classification	# observations	percentage
Food, Beverages & Tobacco	24,007	12
Textiles and Apparel	69,124	35
Leather	5,919	3
Chemicals, Rubber & Plastic	20,713	11
Basic & Fabricated Metal	28,617	15
Machinery	16,808	9
Transport Equipment	10,470	5
Furniture	10,983	6
Computer, Electronics & Electrical Equip.	10,388	5

Table A6. Technological Distribution of Manufacturing, 2003-2015

Technology Classification	# observations	percentage
Low	127,693	54
Medium-Low	62,934	27
Medium-High	41,502	18
High	3,162	1

In Table A7, sectoral distribution of services sector is presented. In the TurkStat sample spanning 2003-2015 period, DIST (wholesale and retail trade) sector has the highest frequency of observations amounting up to 35 percent of the services sector. It is followed by CES and BS at 20 percent and 14 percent, respectively. TRSM has a 12 percent share in services sector firms.

Table 7A. Sectoral Distribution of Services, 2003-2015

WTO Classification	# observations	percentage
BS	47,615	14
CES	65,822	20
COM	2,719	1
DIST	115,653	35
EDU	15,231	5
HLT	15,036	5
OTH	2,302	1
REC	2,053	1
TRANS	27,174	8
TRSM	38,477	12

Services sector classification follows WTO as Communication (COM), Transportation (TRANS), Construction and Engineering Services (CES), Business Services (BS), Health (HLTH), Education (EDU), Distribution (DIST), Tourism (TRSM), Recreational Activities (REC), and Other Services (OTH) to provide a general frame of productivity and other features of services sectors in Turkey. Finance sector is not covered under Annual Industry and Services Survey.

Table A8 reports the export status of firms in the sample. This includes both goods and services exports. While 33 percent of firms with 20+ employees engage in exporting, 67

percent remain as domestic firms. Table A9 presents foreign share status. Almost 97 percent of Turkish firms are domestic.

Table A8. Export Status of Firms, 2003-2015

Exports Cut	# observations	percentage
Domestic	380,688	67
Exporter	186,686	33
Total	*567,374*	*100*

Table A9. Foreign Share Status of Firms, 2003-2015

Foreign Share	# observations	percentage
Domestic	497,943	96.7
0<shr<10	942	0.2
10<=shr<50	2503	0.5
50<=shr<100	6187	1.2
Foreign	7209	1.4