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An Anatomy of Productivity in Turkey in the AKP Era through a Political Economy Lens*

N. Nergiz Dincer[†] and Ayça Tekin-Koru[‡]

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Abstract

The main aim of the current paper is to investigate the productivity dynamics of Turkish economy between 2003-2015, 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 political economy of 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 underestimate the productivity improvements in the manufacturing sector and overestimate 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 had a negative contribution to aggregate productivity growth.

JEL Codes: *O47, D24, P16*

Keywords: Productivity, services, manufacturing, deindustrialization, AKP

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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 November 2002 and the demise of the highly fragmented and short-living coalition governments of the 1990s.

Regardless of the debate on the causes of the 2001-crisis, 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 (Akyüz and Boratav, 2003; Cizre and Yeldan, 2005; Van Rijckeghem and Üçer, 2005; Bakır and Öniş, 2010).

The AKP was successful in capitalizing upon these economic reforms in its first years; indeed, the annual 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 short-term foreign capital (Acemoğlu and Üçer, 2015).

Since then, the AKP continued its success in the ballot box; however, it was not able to reside over an inclusive and sustainable economic achievement. The years between 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 annual GDP growth has declined to 1.4 percent in the period of 2008-2010 but then rebounded to 7.1 percent in the 2011-2015 period (as a result of the basis effect).

Despite all this growth success, Turkey has not significantly changed its specialization in low-medium technologies and low labor cost production in the 2003-2015 period. Considering that one of the most important long-run economic objectives of a country is to achieve sustainable high growth rates, it is obvious that Turkey is in need of catching up in terms of technological sophistication and sustained productivity growth (Acemoğlu, 2008 and references therein).

In the light of these motives, 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 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). He 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 the Turkish economy where the deindustrialization of the country is dated back to the Customs Union Agreement with the EU in the December of 1995 (Boratav, 2016). In this paper, we explore the political economy of the deindustrialization process of Turkey as a complement to our productivity analysis.

The main results of our analysis in the current paper are as follows: (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 GFC with no improvements thereafter. However, the manufacturing sector’s productivity, which stayed stable during the GFC, 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 displayed 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 to the aggregate productivity growth in this sector. (v) As opposed to the manufacturing, in the services sector surviving firms had a negative contribution to aggregate productivity growth. Even though the productivity growth within the services firms was positive, it was 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 sectoral price indexes (as much granular as it can) throughout the study.

Table 1. Annualized Growth Rates for 2003-2015 Period (percent)

	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 are 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 values employing the producer price index (2003=100) from TurkStat data.

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.¹ 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.

¹ 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.

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 show 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 sectoral policy measures in Turkey. The finding that surviving firms in the manufacturing sector contributing positively to the productivity growth while those 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 seven sections. Section 2 offers a tour of the political landscape of the AKP relevant to this paper. We then continue with a detailed discussion of the nature of production under the AKP rule in Section 3 followed by our firm-level productivity analysis in Section 4. We first provide a description of the data and a brief discussion of the methodology and then we present our analysis of firm productivity in levels and in growth terms followed by the Melitz-Polanec (2015) decomposition of the productivity growth. In the light of results of our analysis, we provide a critical evaluation of the production structure in Turkey in Section 5. Finally, we conclude and discuss the policy implications of the current granular productivity analysis in Section 6.

2. An Aerial Tour of the AKP Policy Landscape

As a newly founded political party, the AKP came to power in Turkey in the 2002 parliamentary elections. An excellent historic evaluation of the context of this particular election is provided by Çarkoğlu (2007). Our objective in this section is to provide the necessary background in terms of the relevant AKP economic policies to put the developments in manufacturing and services sectors as well as firm productivity into perspective during the AKP rule in Turkey. We constrain our discussion to 2003-2015 period to be in line with the data used in this paper.

From a political economy standpoint, the main ingredient of the AKP's rise to center-stage in Turkey is the dual economic and political crises in November 2000

and February 2001 while following an exchange-rate based disinflation program overseen by the IMF. The cost of these severe crises was borne by the coalition partners of 1990s in terms of their obliteration from the political landscape. The winner of the circumstances was the young AKP, which was indeed a broad coalition of different layers of Turkish society in those days.

The era put under microscope in this paper is important in the sense that it represents the second phase of the neo-liberal restructuring of the Turkish economy. The first phase -based on the Washington Consensus- was introduced in 1980s and included massive yet premature strides of liberalization, deregulation and privatization. Without the necessary legal and institutional counterpart, this phase resulted in a fragile development pattern that heavily depended on short-term capital inflows (Bakır, 2009; Öniş, 2009). Mixed with clientelism deeply embedded in the Turkish financial system, the first phase was the perfect recipe for the makings of the three successive crises in 1994, 2000 and 2001. The second phase that evolved in a Post-Washington Consensus environment has coincided with the AKP rule and required moving beyond the obsession of short-term macroeconomic discipline with no regard to its societal costs. Essentially, the new type of conditionality in the second phase zeroed in on the regulatory role of state.

In what comes next, we examine the AKP rule in the Post-Washington consensus era by dividing it into three different periods: 2003-2006/2007, 2008-2010 and 2011-2015. These periods were carefully chosen to reflect the significant differences in policy measures taken and their economic outcomes.

2.1.Loyalty to Reforms (2003-2006/2007)

In the history of neo-liberal restructuring of the Turkish economy, there is no scarcity of political authorities that have been forced to implement a number of reforms in the aftermath of an economic crisis that inadvertently limited their range of movement. In other words, in the crisis times, political elites had to voluntarily limit their activities in terms of resource allocation in the country. In this context, the AKP government was no different. Their difference stemmed from standing behind most of the reform decisions taken by a previous government and the EU membership anchor, which in turn paved the way to give confidence to the international community in terms of the AKP's management of the economy.

The foundations of the economic reign of the AKP were built on the "Transition to Strong Economy Program" under the guidance of the IMF. This was a reform package which was brought into force in April 2001 and targeted fighting inflation under a floating exchange rate regime, a speedy and extensive restructuring of the banking sector, strengthening the balance of public finances, implementing incomes policy and establishing the legal framework for the structural measures that would ensure effective, flexible and transparent implementation of these policies.

In accordance with these targets, the AKP made a number of policy changes that might have directly affected the sectoral composition of economic activity and productivity in Turkey. In this context, a broad-brush view of the initial years of the AKP shows the following: (i) *There were improvements in the legal and regulatory infrastructure.* The Central Bank became independent. The Banking Law had a major overhaul. Some of the discretionary powers of the government were delegated to independent regulatory authorities such as the Banking Regulation and Supervision Agency. The Public Procurement Law was changed in an attempt to harmonize with the EU Acquis. (ii) *There were arrangements to strengthen public finances.* Many agricultural support mechanisms were eliminated and replaced with the Direct Incomes Support Program. Private sector was given a pivotal role in resource allocation and production through the proliferation of privatization. Indeed, compared to the 4.6 billion USD equivalent of privatization between 1985 and 1997, privatization receipts were around 8.2 billion USD in 2005 and 8.1 billion USD in 2006 (Yağcı, 2017). Furthermore, the social security reform of 2006 was a step towards reducing public debt by increasing the average pension contribution period from 7000 to 9000 days. The new system has also combined divergent practices in social security rights. (iii) *There were new incomes policy implementations.* Free market mechanisms were introduced to achieve step-by-step elimination of regulatory measures related to labor force and agriculture. A completely different set of measures were adapted to deal with “poverty” created by these eliminations such as in-kind and cash transfers by local governments (Yentürk, 2013).

In summary, the AKP was mostly loyal to the major objectives of the IMF Program in the first years of its reign. However, for this paper’s sake, it is important to take a detailed look at the changes in the industrial policy along with measures taken in regards to construction/real estate sectors.

Historically, the Turkish industrial policy was a blend of trade protection (until 1980 trade liberalization) and subsidies to private sector investments or exports (especially after post-1980 export-oriented growth period). Among the primary tools were export tax rebates, subsidized credits, cash grants for investments, investment deductions from corporate tax-base and other types of tax exemptions.

The initial approach of the AKP to industrial policy was regional prioritization. Through a new piece of legislation in 2004 (Law No.5084) newly created firms in the 36 priority provinces were offered allocation of Treasury land free of charge if they employ at least 10 workers for at least 5 years, 80 to 100 percent exemption from personal income taxes, exemption from social security contributions by employers, and a subsidy of 20 percent on the electricity bill. Later, with Law No.5350 passed in 2005, the number of priority provinces were increased to 49 and in order to benefit from the subsidies offered the newly established firms had to have at least 30 employees (Atiyas and Bakış, 2015).

The AKP has also initiated several programs in 2005 via the Scientific and Technological Research Council (TÜBİTAK) and Undersecretariat of Foreign Trade (DTM) to improve the international competitiveness of manufacturing firms through higher R&D and innovation. According to Atiyas and Bakış (2015) the program's spending has increased from 81 million USD in 2004 to 357 million USD in 2009 and the number of project applications has risen from 360 in 2004 to 1,500 in 2009. The R&D projects were supported in the areas of machinery and manufacturing technologies, electrical and electronics and information technologies, materials, metallurgical and chemical technologies, along with biotechnology, agriculture, environmental and food technologies (Tandoğan and Pamukçu, 2011).

In the construction sector, one of the main policy changes during the first years of the AKP government was the complete overhaul of the urban development legislation. The government was offering a solution to the problem of housing provision by turning itself into a direct provider in the market (Ozdemir, 2011). Several amendments to the Mass Housing Law were made. The Mass Housing Administration (TOKI) was restructured and became one of the major players in the construction and real estate sectors in Turkey. In the overall, the AKP government has administered countrywide housing construction and urban regeneration projects via TOKI, the municipalities and a state-owned real estate investment company, Emlak Konut REIT (Erol, 2019).

Meanwhile, the abundance of global liquidity in early 2000s and the strengthening of public finance after the 2001 crisis reduced the lending opportunities of banks in Turkey to private sector and the government, respectively. This contraction caused the banks to turn their gaze onto the consumers, which was the beginning of an unprecedented consumer credit explosion particularly in the middle- and upper-income households given the relatively stable macroeconomic environment and low interest rates. Following these developments and conforming to its urban restructuring design, the AKP government moved to enact the Housing Finance Law (No.5582) in 2007 which made long-term fixed-rate borrowing possible for the first time in the country's history. Simultaneously, the Capital Markets Law, Law of Foreclosure, Consumer Protection Law, Financial Leasing Law, Mass Housing Law and tax laws were all changed to accommodate.

Notice that these policy shifts happened in an environment of global liquidity excess which was highly favorable for growth. All emerging countries benefited from the post-2000 global conditions, however, Turkey enjoyed a better run than many others given its restructured financial system and the social net created to protect the different classes of the society that were supposedly hurt by the reforms. Furthermore, the European Commission started Turkey's accession negotiations in 2005. Even though the relationship between the EU Block and Turkey has been nothing but rocky, the AKP government started taking large

strides in harmonizing the laws and regulations of the country with the EU Acquis. This was particularly important for the development of the institutional structure of the manufacturing sector in Turkey.

Even though Turkey had a great run in terms of growth performance (7.8 percent annually) in 2003-2006 period, two major macroeconomic problems relevant to the topic of this paper have not been resolved: high current account deficits and high unemployment rates.

2.2. Global Tremors (2008-2010)

While the to-do list of the IMF Program included commitments such as enacting of the Public Procurement Law in 2002 and the Social Security Law in 2005, by 2007 what was left to do did not include any major innovations and structural transformations. Therefore, although the IMF Program ended on paper in 2008, as a recipe for economic policy it effectively ended in 2006.

Concurrently, the GFC of 2008, fueled by a lack of oversight in financial markets followed by the subprime mortgage crisis in the US, has hard-hit the world (Bernanke, 2013). Turkey has felt the effects of the GFC most severely in the period between 2008 and 2009. So much so that, the Turkish economy contracted by 4.7 percent in 2009. The political cost for the AKP was a significant loss of votes in the next local elections. The policy response of the AKP government to this major contraction was to boost the demand by increasing government spending by one percent of the national income. These expenditures may not have been directed to the places where they would be the most productive, nevertheless they made the Turkish economy circumvent an even longer and deeper economic downturn during this period.

In terms of industrial policy design between 2008-2010, the government launched a new incentive system in 2009 that reintroduced the sectoral selectivity of the 1980s. What is more, the 2009 incentives regime was designed to differentiate across regions, sectors and size of investments. *First*, the provinces were classified with respect to their socio-economic development. *Next*, the priority sectors in these regions were identified according to the factor endowments of these regions. *Finally*, large scale investments over minimum specific thresholds in these specific sectors also became eligible for incentives. In sum, a much more complicated industrial incentives regime was put in place.

2.3. Surrender to Construction (2011-2015)

Turkey entered the 2011-2015 period with the lowest levels of interest rates in the world since the World War II. The country has used the cheap financial resources that became available in this period largely for infrastructure investments and financing of consumption. Due to an overvalued Turkish Lira and a low interest rate policy in this period along with a manufacturing sector that became more

import dependent by the day, relative prices deteriorated against manufacturing. This in turn has caused manufacturing to lose its appeal and increased the attractiveness of the services sectors such as construction. In other words, Turkey's excessive use of foreign financial resources has transformed the sectoral preferences of the country and made the construction the new engine of growth.

Not much has happened on the industrial policy front between 2011-2015. The incentives regime was changed one more time in 2012 (Law No.3305) to introduce the element of strategic investments. Eligible sectors were the ones with high import-dependency (imports account for more than 50 percent of domestic demand). Atiyas and Bakış (2015) present an informative summary of the new regime which divided Turkey into six regions, reduced the minimum investment thresholds for the large scale investment incentives and introduced the concept of priority investments in certain sectors. Furthermore, the package also provided incentives that promoted investments in organized industrial districts.

However, in the 2011-2015 period, there were a plethora of policy changes related to construction and real estate development. Among which a few deserve to be mentioned here. *Firstly*, the AKP's solution to the long-withstanding problem of "gecekondu" housing (illegal buildings on the outskirts of the cities started after the mass rural migrations in 1950s) was the concept of "urban transformation". As discussed in great detail in Erol (2019), the parliament passed the Urban Transformation Law (No. 6306) in 2012 to enable the countrywide implementation of urban regeneration projects. Under this law, urban transformation projects were delegated not only to TOKI but also to local governments and private-sector developers. *Secondly*, the AKP administration introduced an essential legislative reform (Law No. 6306 and Law No. 2644) in 2012 to be in line with the EU Acquis that substantially lessened foreign investment restrictions in property markets in Turkey. *Thirdly*, the government started taking counter-cyclical measures to boost housing demand. *Fourthly*, there were mega-projects in Istanbul, such as the third bridge, the third airport, Canal Istanbul and the city's financial center. *Finally*, the Public Procurement Law was changed a record 32 times from 2003 to 2014 that resulted in 135 article changes according to the formal response of the Parliament dated 14/08/2014 to a written question from the main opposition party. While the introduction of new methods to be in line with the EU Acquis such as dynamic procurement system and electronic exclusion were considered to be positive developments, increasing numbers of exceptions created with the changes in the Public Procurement Law spawned questions in terms of urban rents being transferred between different segments of the society.

In short, the AKP government massively subsidized and was directly involved in the construction industry, which might have given the wrong message to the manufacturers in terms of staying and expanding in their own sector and to potential foreign investors to stay away from manufacturing in Turkey.

The aerial tour of the policy landscape provided in this section shows that the second phase of the neo-liberal restructuring of the Turkish economy in the post-2001 crisis included elements of re-regulation and de-regulation (Çanakçı, 2005). The privilege was yet again bestowed upon the financial sector and there were no strong signs of shifting the focus to industrial production (Keyman and Koyuncu, 2005). Furthermore, the industrial policy, rather than being proactive, was reactive to the challenges of the new-genre of globalization started in 1990s. (Öniş and Şenses, 2007; Atiyas and Bakış, 2015).

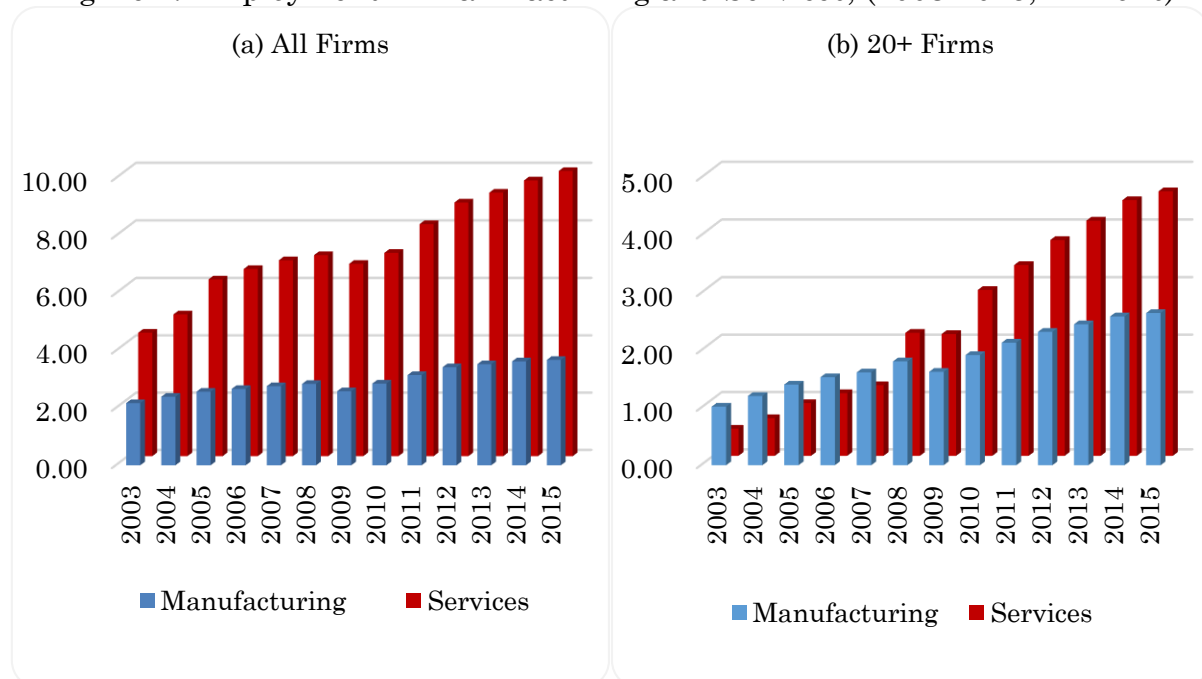
In this light, the following section first provides a broad-brush view of the major changes in the manufacturing and services sectors in the 2003-2015 period to offer a more concrete contextualization of the main shifts in the development strategy of Turkey. Then, it goes on to highlighting the importance of productivity growth for the development of the Turkish economy.

3. Nature of Production under the AKP Rule

3.1. Developments in Manufacturing and Services Sectors

One of the striking features of the 2003-2015 period was the divergent employment growth patterns in manufacturing and services sectors. This period was marked with strong job creation; indeed, Figure 1a suggests that the job growth in the services sector dwarfed that in the manufacturing sector.

Figure 1. Employment in Manufacturing and Services, (2003-2015, millions)



Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database

In 2003, the services sector employment (in firms with 20+ employees) was about half a million workers, the half of the manufacturing sector (Figure 1b). 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 1a and 1b together shows that a significant share of 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 labor 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.

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.

Table 2. Employment and Population Growth Rates (percent)

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.

3.1.1. Manufacturing

Table 3 shows the manufacturing sector output shares of some selected OECD countries vis-à-vis Turkey 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 3) 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 4). 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.

3.1.2. 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 (Figure 2). 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 2). 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.

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

	Turkey	<i>Developed</i>				<i>Developing</i>	
		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

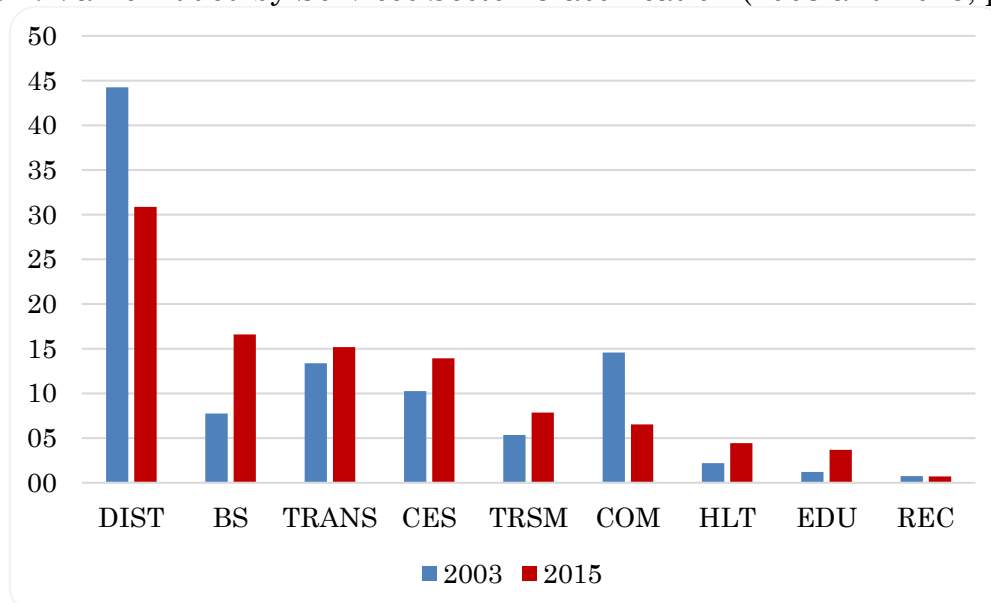
Source: OECD STAN Database.

Table 4. Aggregates of the Manufacturing Sector by Technology Classification (percent)

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: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database. Firms with 20+ employees were covered.

Figure 2. Value-Added by Services Sector Classification (2003 and 2015, percent)



Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database

Turkey has experienced a boom in the construction sector in 2000s. 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 2). 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 2). 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.

Table 5. Sectoral Output Composition of Services: Selected OECD Countries (2015, percent)

	Turkey	<i>Developed</i>				<i>Developing</i>	
		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.

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 as well.

Next, Table 5 shows the services sector output shares of some selected OECD countries vis-à-vis Turkey. As observed clearly, 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 5 and value-added share of 14 percent in Figure 2 (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 5, 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 mark.

3.2. Importance of Productivity Growth Objective

Turkey has been exposed to rampant populist cycles since 1950s that were initiated to establish broad electoral support. These cycles were endowed with constraints of short-term politics and clientelistic relations that allocated resources away from areas that were needed to improve competitiveness and income distribution in the country.

Populism is defined as “manipulating economic outcomes in ways that disproportionately benefit select groups and classes, whose strength and support the elite relies on to maintain its rule” (Öniş 2003, p.2). Similar to its predecessors the AKP government has become an actor in the endemic populist cycles of Turkey.

However, different from the earlier governments, an authoritarian exit in the form of a coup d'état was not observed in the case of the AKP owing to the new cultural context of neo-liberal globalization. The party was acutely aware of the perils of one-fits-all type of single-minded free-market capitalism prescribed by the Washington Consensus institutions and created its own brand of neo-populism that was also dubbed as social neo-liberalism by Öniş (2012). This new brand of neo-populism has involved formal and informal redistribution mechanisms that made a visible difference in the lives of the poor and the middle class in Turkey. In other words, the AKP has concocted its own recipe of populism to transcend the boundaries of class politics and that has resulted in the support of broad coalitions from the grassroots of the society. This new brand of populism has played a major role in the tectonic shifts across manufacturing and services sectors in Turkey, as detailed in the previous section and put the economy on a steady trajectory of deindustrialization.

As widely discussed in the economic growth literature nowadays (Rodrik 2016 and the multitudes of papers referencing it), early deindustrialization has harmful growth effects. *Firstly*, as a technologically dynamic sector, manufacturing exhibits labor productivity convergence unlike services. *Secondly*, manufacturing has the potential to absorb significant quantities of unskilled labor. *Finally*, manufacturing produces tradeables that makes it immune to the challenges posed by fluctuations in domestic demand of low/middle income classes.

Declines in manufacturing output may become inevitable for countries that have lower levels of technological progress in their manufacturing sectors even if they have productivity growth in manufacturing (Rodrik, 2016). What this implies is that, as a price-taker in world manufacturing markets, Turkey must sustain a productivity growth differential between manufacturing and non-manufacturing activities that is higher than the recent decline in relative prices of manufactures on world markets to experience growth through industrialization.

Therefore, ongoing deindustrialization and premature servicification of Turkish economy presented in the previous sections is not enough to critically assess the sustainable growth prospects of the country. With this in mind, in the remainder of the paper, we dissect the Turkish manufacturing and services sectors at the firm-level to gain a more comprehensive understanding of recent productivity dynamics.

4. Firm-Level Productivity Analysis

4.1. Data and Methodology

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. The common period covered by both databases is 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, turnover, 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 firms 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.

For the purposes of this paper, three different productivity measures⁵ are calculated but only labor productivity results are presented. The decision is made to avoid the data insufficiencies in the services sector, particularly in terms of capital stock. As well known, capital stock is one of the most important variables in the TFP estimations. The Annual Industry and Services database does not provide a capital stock indicator, which necessitates capital stock calculations

⁵ (i) Labor Productivity; (ii) Levinsohn-Petrin (2003); (iii) Akerberg, Caves & Frazer (2015) (ACF). The TFP choice was ACF calculated with value-added, energy as proxy. The reasons for this choice were as follows: (1) Majority of the literature is based on value-added estimates. (2) Since the functional form of the production function is Cobb-Douglas, elasticities added up to 1 more often with value-added when energy was used as a proxy variable. (3) Estimates based on output involved severe outliers. Capital stock was 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 were based in 2003 and provided by TurkStat. All productivity estimation results are available upon request.

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, our analysis will be carried on using labor productivity 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 , $\Delta\Phi^j = \Phi_2^j - \Phi_1^j$.

Labor productivity is used in logarithmic form to represent φ_{it}^j . Employment shares are used as weights, s_{it}^j for labor productivity.

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 method is indeed an extension of the one developed by Olley and Pakes (1996) by the contributions of both entry and exit to aggregate productivity changes. The advantage of this method compared to others (Griliches and Regev, 1995; and Foster, Haltiwanger and Krizan, 2001) is its success in removal of some of the biases such as the over-measurement of entry component and thus under-measurement of the contribution of surviving firms to the productivity growth.

In the MP decomposition, *survivor* is defined as a firm that is present in both $t=1$ and in $t=2$, *entrant* is a firm that is not present in $t=1$ but comes to existence in $t=2$ and *exiter* is a firm that is present in $t=1$ but does not appear in $t=2$. In the equations below, S represents survivor whereas E and X stand for entrant and exiter, respectively.

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

$$\begin{aligned}\Phi_1 &= s_{S1}\Phi_{S1} + s_{X1}\Phi_{X1} = \Phi_{S1} + s_{X1}(\Phi_{X1} - \Phi_{S1}) \\ \Phi_2 &= s_{S2}\Phi_{S2} + s_{E2}\Phi_{E2} = \Phi_{S2} + s_{E2}(\Phi_{E2} - \Phi_{S2})\end{aligned}$$

Then using these equations, productivity change $\Delta\Phi$ is obtained and the Olley-Pakes decomposition is applied separately to the contribution of the surviving firms:

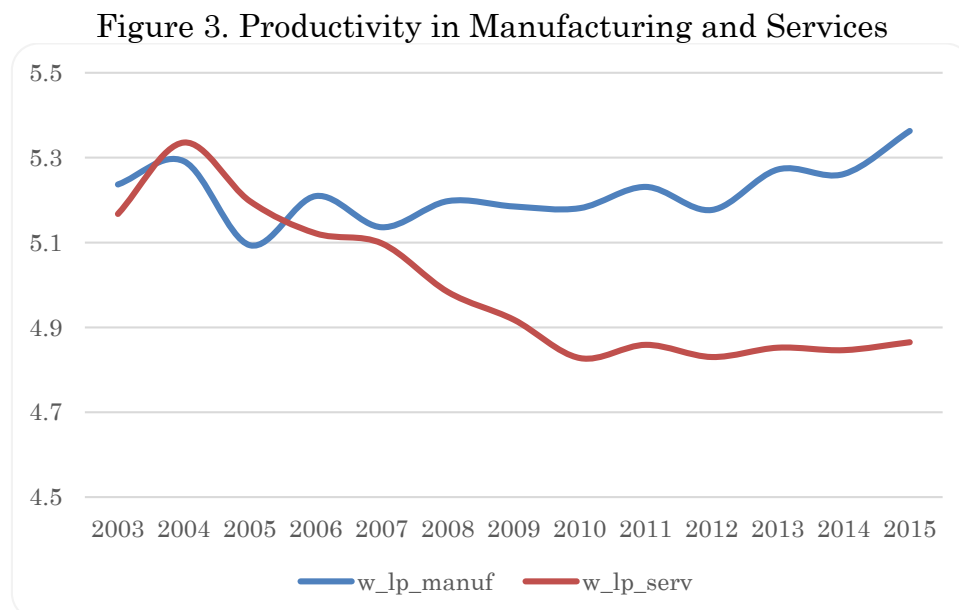
$$\begin{aligned}\Delta\Phi &= (\Phi_{S2} - \Phi_{S1}) + s_{E2}(\Phi_{E2} - \Phi_{S2}) + s_{X1}(\Phi_{S1} - \Phi_{X1}) \\ &= \Delta\bar{\varphi}_S + \Delta cov_S + s_{E2}(\Phi_{E2} - \Phi_{S2}) + s_{X1}(\Phi_{S1} - \Phi_{X1})\end{aligned}$$

The first line is a decomposition of the aggregate productivity change into components for survivors, entrants, and exiters. The second line applies the Olley-Pakes decomposition to the contribution of surviving firms to further separate it into two: one induced by a change in the distribution of firm productivity ($\Delta\bar{\varphi}_s$) and another induced by market share reallocations (Δcov_s). The first one is the productivity growth within the firm over time. The second one is the productivity shifts across the firms in a given time.

4.2. Productivity Levels

Employment-share weighted labor productivity in manufacturing and services sectors in Turkey for the period 2003-2015 is presented in Figure 3.

Labor productivity in manufacturing and services had similar movements between 2003-2007 (Figure 3). Thereafter, there was a marked decline in the productivity of services sector until 2010. Productivity of the manufacturing sector; however, stayed stable during the GFC. In the post-crisis period, while the manufacturing sector's productivity started to rise, there was no improvements in the services sector productivity.



Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database

It is obvious that the GFC 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 is 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.

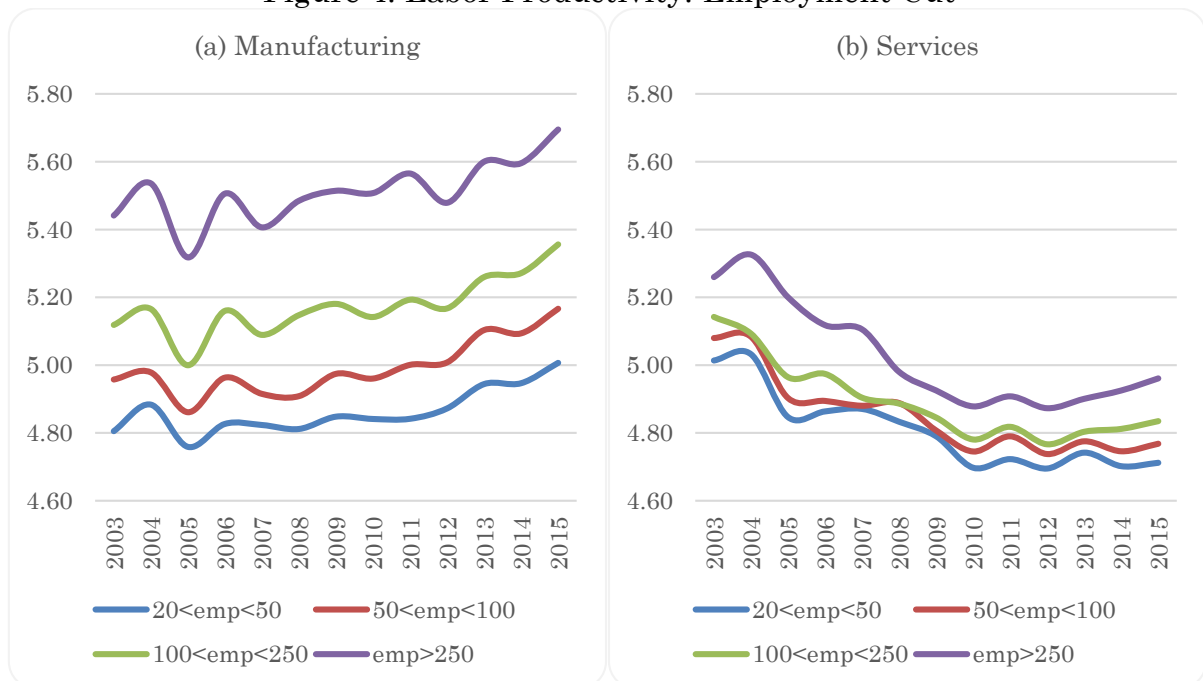
Next, to provide a more granular analysis, labor productivity in manufacturing and services sectors will be dissected into different layers of firm characteristics, i.e., employment, exporting status and foreign ownership status.

4.2.1. Employment Cut

In this paper, the size of a firm is defined in four categories: (i) small firms (20 to 49 employees), (ii) small-medium firms (50 to 99 employees), (iii) medium-large firms (100 to 249 employees), (iv) large firms (250+ employees). Note that micro-size firms (1 to 20 employees) are excluded in the dataset.

Figure 4a 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 the manufacturing sector. There is a big gap between large firms and SMEs (less than 250 employees).

Figure 4. Labor Productivity: Employment Cut



Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database

Labor productivity of services sector firms in different sizes are displayed in Figures 4b. In the services sector, the same conclusions can be made about the firm size and labor productivity as in the manufacturing sector.

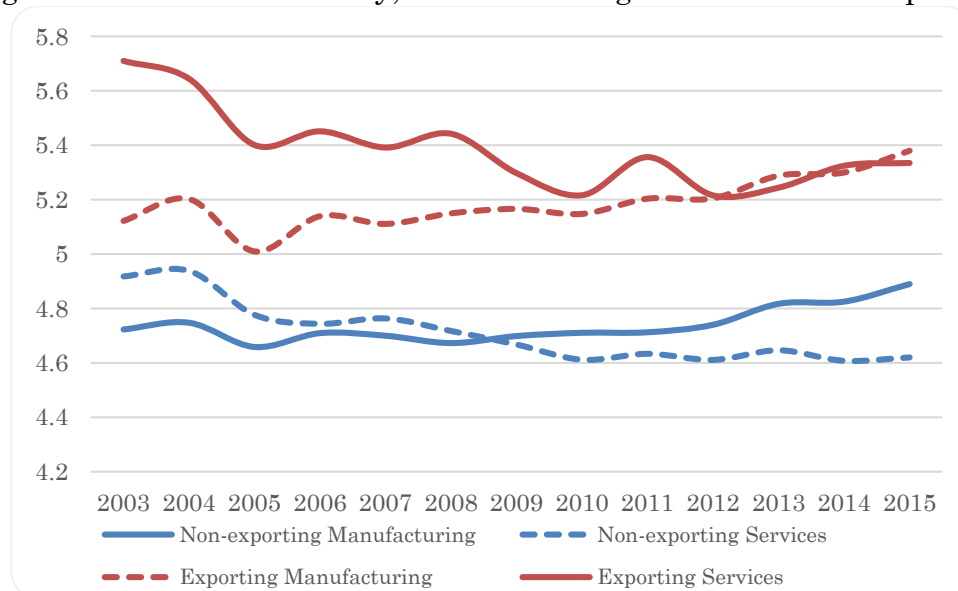
The important observation from Figure 4 is the difference between productivity levels in the manufacturing and services sectors and their movement over time. In almost all firm-sizes, manufacturing shows higher productivity than services. Furthermore, productivity of manufacturing firms demonstrates a secure positive trend in the 2003-2015 period while the same trend is negative in services firms independent of their size group.

4.2.2. Export Cut

Figure 5 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 5 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.

Figure 5. Labor Productivity, Manufacturing and Services Comparison



Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database and Foreign Trade Statistics Database

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.

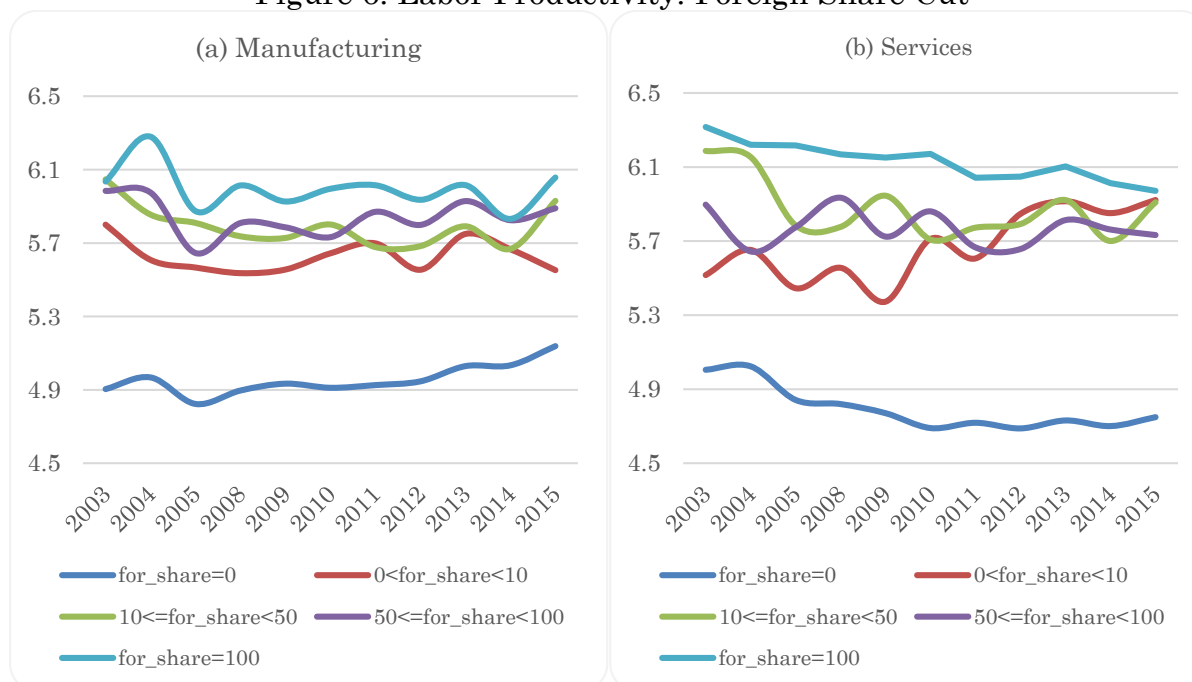
4.2.3. Foreign Share Cut

The foreign ownership status of a firm is defined in five categories in this paper: (i) domestic, (ii) up to 10 percent foreign share, (iii) 10 to 49 percent foreign share, (iv) 50 to 99 percent foreign share, (v) foreign firm. Note that share of domestic firms in the data set is almost 97 percent.

Figures 6a and 6b 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 6 is that both manufacturing and services firms experience an outstanding boost in labor productivity even with a minimal amount of foreign involvement. In other words, the productivity difference between manufacturing and services firms disappear when there is a foreign partner. Considering that services sector firms are far from any type of institutional structure in Turkey, even the tiniest foreign involvement creates a big difference for these firms in terms of productivity.

Figure 6. Labor Productivity: Foreign Share Cut



Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database

4.3. Productivity Growth and Its Components

4.3.1. Growth in Firm Productivity

Table 6 shows the productivity growth of manufacturing and services sectors, respectively. The Table provides information on weighted and unweighted labor productivity.

Table 6. Annualized Labor Productivity Growth Rates (percent)

Period	Manufacturing		Services	
	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

Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database

Employment-weighted and unweighted labor productivity growth rates in manufacturing sector shown in Table 6 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 GFC 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 GFC, labor productivity increased more than 3.5 percent.

Table 6 shows that services sector productivity decreased in 2003-2007 period due to the same reason discussed above for the manufacturing sector. In the GFC 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.

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

Productivity growth in the Turkish manufacturing sector increased with level of technological sophistication in production as observed in Table 7. 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 has been increasing but it was evolving towards medium-low tech manufacturing which displayed the lowest productivity growth among all manufacturing sectors.

Table 7. Manufacturing Productivity Growth, Tech Sophistication (percent)

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

Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database

Table 8 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.

Table 8. Services Sector Productivity Growth (percent)

Services Classification	Productivity Growth	Share in Value-Added	
	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

Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database

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 showing 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 8, the sector with the lowest productivity growth is shown as transportation. The value-added share of this sector has exhibited 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.

4.3.2. Decomposition of Productivity Growth

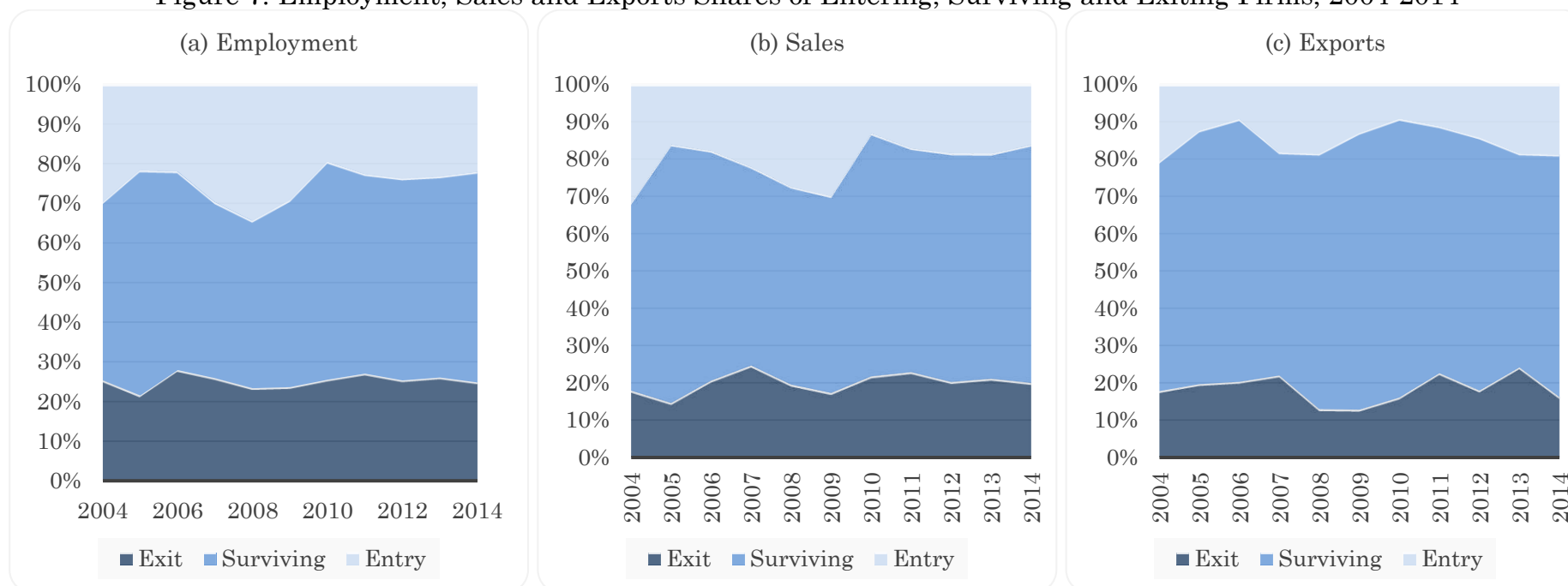
Turkish firms exhibit a very high degree of churning in terms of entry and exit for the period 2003-2015 (Table 9). In particular, in the years 2005 and 2010 there was a huge degree of entry into the market. However, this is not based on economic fundamentals but rather a product of survey sampling adjustments. 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.

Table 9. Entry, Exit, Survival in Firms (percent)

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

Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database. The row sums do not add up to 100 percent because 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 an exiter is a firm that is present in t but does not appear in t+1.

Figure 7. Employment, Sales and Exports Shares of Entering, Surviving and Exiting Firms, 2004-2014



Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database.

Figure 7 shows some economic magnitudes related to firms that enter, exit or survive in the market. The first panel of Figure 7 shows how employment is divided between these firm types. In the 2003-2015 period, half of the employment in 20+ firms in Turkey can be attributed to entering and exiting firms. This finding may have important implications on labor productivity growth. For all we know, the workers may be shifting from firm to firm or get unemployed and do not have a stable work environment to build strong skill sets. The second and third panels of Figure 7 show the shares of entering, exiting and surviving firms in sales and exports, respectively. Our knowledge from the trade theory informs us that exporting firms are more productive compared to domestic ones. Surviving firms do have the highest share in Turkish exports in Figure 7c, which can be considered as suggestive evidence that survival is linked to better productivity performance.

Table 10 displays the aggregate productivity growth decomposition of manufacturing and services sectors in the sample of 2003-2015. 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 results in Table 10 suggest a negative contribution of entry to productivity change 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 may still remain in the market.

Table 10. 2003-2015 Decomposition of Labor Productivity Growth (percent)

	Within	Reallocation	Surviving	Entry	Exit	$\Delta\Phi^j$
Manufacturing	0.44	-0.09	0.34	-0.41	0.22	0.16
Services	0.10	-0.16	-0.06	-0.30	0.06	-0.30

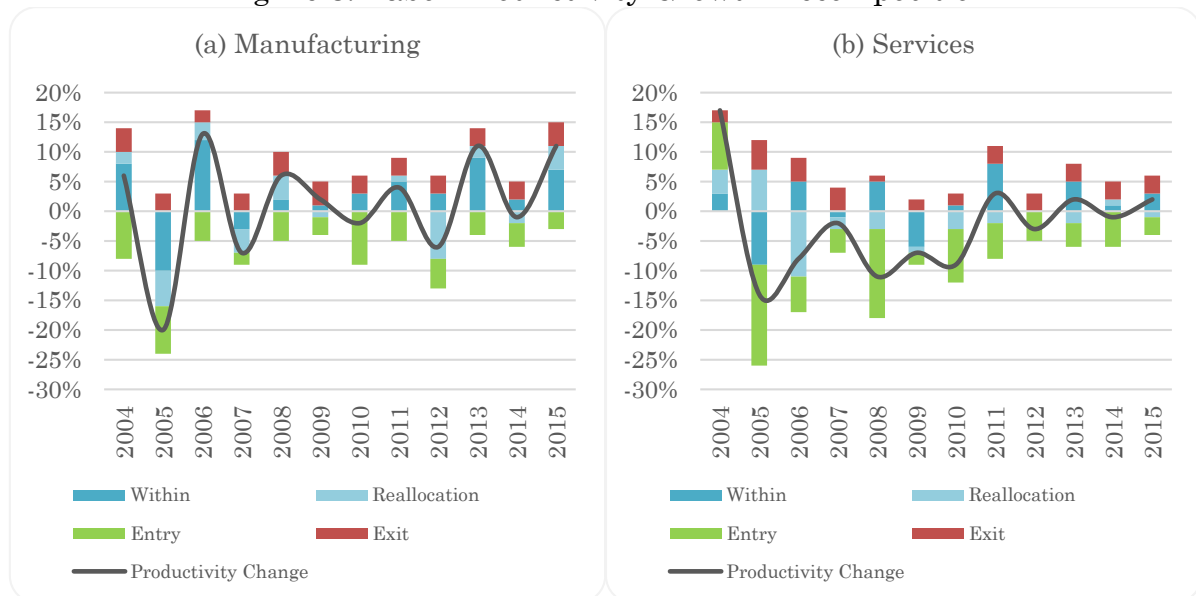
Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database.

An important observation from Table 10 is the very different contributions of surviving firms to the aggregate productivity growth in manufacturing and services sectors in Turkey. In the manufacturing sector, surviving firms had a very significant contribution (34 percent) to the aggregate productivity growth. The contribution of productivity growth within the firm over the years was 44 percent whereas the contribution of the market share reallocations across firms in the sector was -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 had a negative contribution (-6 percent) to aggregate productivity growth. Indeed, this result is in line with the evolution of productivity in services sector in this era in Turkey as discussed above. Even though the productivity growth within the firm was positive (10 percent), it was not enough to offset the negative impact of market reallocation to less productive firms (-16 percent) in this sector. This is in sharp contrast to what we observed in manufacturing sector.

Figure 8. Labor Productivity Growth Decomposition



Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database.

When we go one step further to examine this decomposition on a year to year basis as shown in Figure 8, we can identify the following: *Firstly*, in all the years illustrated in both panels of Figure 8 entry has a negative contribution to productivity growth while exit has the opposite, both in manufacturing and services sectors. Furthermore, when the gains from net entry are considered, it is seen that the positive effect of exit of less productive firms is not enough to offset the negative impact of new entrants on productivity growth. This is much more pronounced in the services sector. *Secondly*, the contribution of reallocation component in manufacturing is positive in most years while it is positive for services only for 3 years in the sample as seen in Figure 8. In other words, among the surviving firms market share was reallocated to less productive firms more often in the services sector in Turkey in the 2003-2015 period. *Thirdly*, the within-firm component contributes positively to productivity growth in most of the years in both manufacturing and services sectors. Evaluated together these three findings point to a conclusion that surviving firms in both sectors contribute

positively to productivity growth through their within-firm productivity enhancements, however, misallocation of resources created by a high degree of entry and exit not conducive to productivity improvements (net entry has a negative impact) and shifts of market shares to less productive firms among the surviving ones limit productivity performance particularly in the services sector.

5. A Critical Evaluation

Having presented the developments in manufacturing and services sectors in the 2003-2015 period and the results of our productivity analysis, in this section we attempt to provide an evaluation of our findings in the light of the AKP policy preferences.

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 have made significant strides from agriculture to manufacturing followed by a shift 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 years⁶. As seen in Figure 9, the share of agriculture decreased from 33 percent to 9 percent in the period spanning 1923 to 2015. The share of manufacturing increased from 16 percent to 19 percent in almost a century, whereas the share of services has increased from 50 percent to 72 percent.

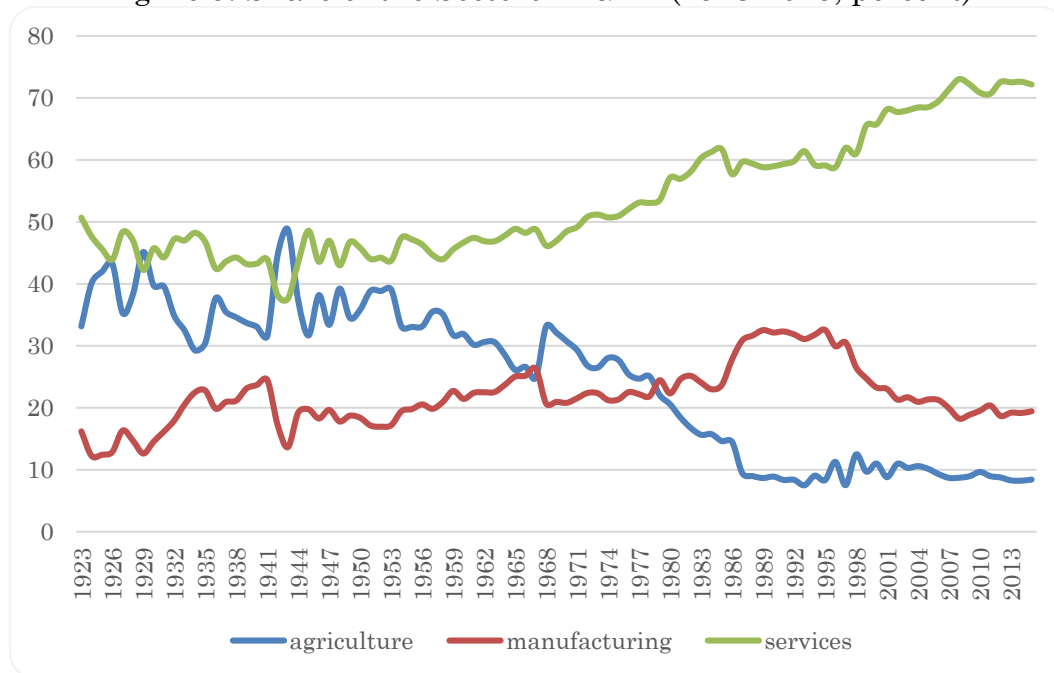
When we concentrate on post 2000s in Figure 9, we observe that the share of agriculture in GDP declined from 11 percent to 9 percent. The major structural change in this era is the decreasing share of manufacturing sector (from 23 percent to 19 percent) and the increasing share of services sector (66 percent to 72 percent). As much as the zeitgeist of the 2000s where many developing nations experienced successively increasing rates of servicification in their economies, this structural shift has its roots in the AKP policy practices.

One of the main reasons for the long political reign of the AKP in Turkey has its roots in the party's ability to build broad alliances that drew power from the grass-roots of the society. The AKP government was able to implement neo-populist policies that would appeal to both low-income and middle income groups. While a number of transfer policies enticed the low-income electorate, low interest rates and credit expansions have enabled the middle and upper-middle income

⁶ The sources and the consequences of the shift away from agriculture have been discussed in the literature extensively (Pamuk; 2008 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.

groups to realize their postponed expenditures due to unstable political and economic environment of 1990s. This, in turn, played a very important role in the victory of the AKP in the ballot-box, election after election. In other words, the AKP sought to realize growth by promoting non-manufacturing economic activities such as construction. And it worked. However, these policies had a supposedly uncalculated (by the government) large effect on the level and growth of productivity in manufacturing and services sectors.

Figure 9. Share of the Sectors in GDP (1923-2015, percent)



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.

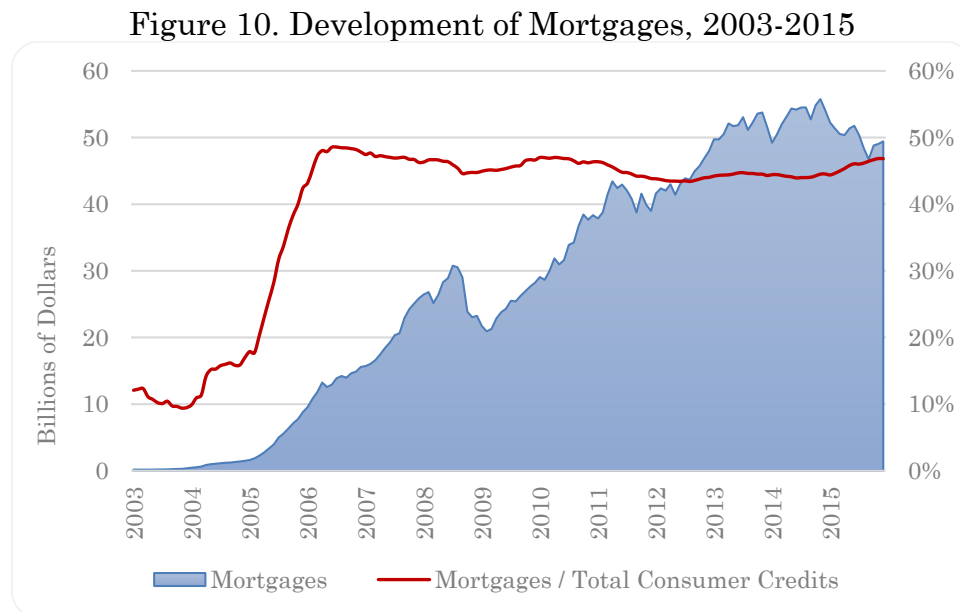
In what follows, we present three major changes that occurred during the AKP reign and had an important part in the sector share shifts and firm productivity dynamics in Turkey in 2003-2015 period.

5.1. Deteriorated Credit Structure

Credit structure in Turkey had deteriorated to the detriment of the manufacturing sector. Recall from Section 2 that the abundance of global liquidity in early 2000s and the strengthening of public finance after the 2001 crisis reduced the domestic lending opportunities of banks in Turkey to private sector as well as to the government and resulted in an unparalleled consumer credit eruption, particularly the mortgages. It is not hard to see that household savings that could have been used to finance new investments by the manufacturers went to mortgages that financed residential construction which does not contribute to productive capacity. Furthermore, when the interest rates on new housing loans

in Turkey are scrutinized, it is seen that there was a major decline from 25.2 percent in 2004 to 9.7 percent in 2013 (Erol, 2019). As a result, total residential mortgage debt has surged from 361.6 million USD in 2003 to 49.4 billion USD in 2015, demonstrating an astonishing increase of 13,662 percent (Figure 10).

Even under these circumstances, Turkish manufacturing experienced positive growth in its labor productivity as shown in Section 5, which might have been much higher if manufacturing were a policy priority.



Note: Authors' own calculation using Turkey Banks Association (TBB) data.

5.2. Crowding-Out of Manufacturing

The obvious policy preference of the AKP government in favor of construction sector in 2003-2015 period (as detailed in Section 2) caused the crowding-out of manufacturing activities through an almost doubling of the size of construction from 4.6 percent in 2003 to 8.2 percent of GDP in 2015. More importantly though, the construction sector has metamorphosed in this time period.

The construction sector is classified under three main headings in NACE: (i) Construction of buildings (development of building projects, construction of residential and non-residential buildings); (ii) Civil engineering construction (constructions of roads, railways, bridges, tunnels and utility projects) and (iii) Specialized construction activities (demolition, site preparation, electrical, plumbing, sewerage activities etc.)

Tables 11 and 12 show the evolution of the construction sector in terms of sector composition and growth of components in 2003-2015 period. The share of construction of buildings increased from 50.3 percent in 2003 to 57.2 percent in 2015 with even higher values in-between years. This sector also includes airport and hospital construction projects, which were carried out mostly through public-

private partnership programs during the AKP era. Furthermore, while the share of civil engineering construction (undertaken mostly through the public-sector and have a significant part in the infrastructure) stayed relatively stable around 25 percent, that of specialized construction activities (mostly labor intensive) declined from 25.4 percent in 2003 to 16.1 percent in 2015 (Table 11).

Table 11. Production Shares in the Total (percent)

NACE	Construction	2003	2007	2011	2015
41	Construction of buildings	50.3	61.7	58.1	57.2
42	Civil engineering construction	24.3	22.7	25.5	26.7
43	Specialized construction activities	25.4	15.6	16.5	16.1

Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database.

Table 12. Annualized Growth in Real Production (percent)

NACE	Construction	2003-2007	2008-2010	2011-2015
41	Construction of buildings	32.1	7.5	17.2
42	Civil engineering construction	23.4	12.3	15.5
43	Specialized construction activities	11.1	10.3	16.9

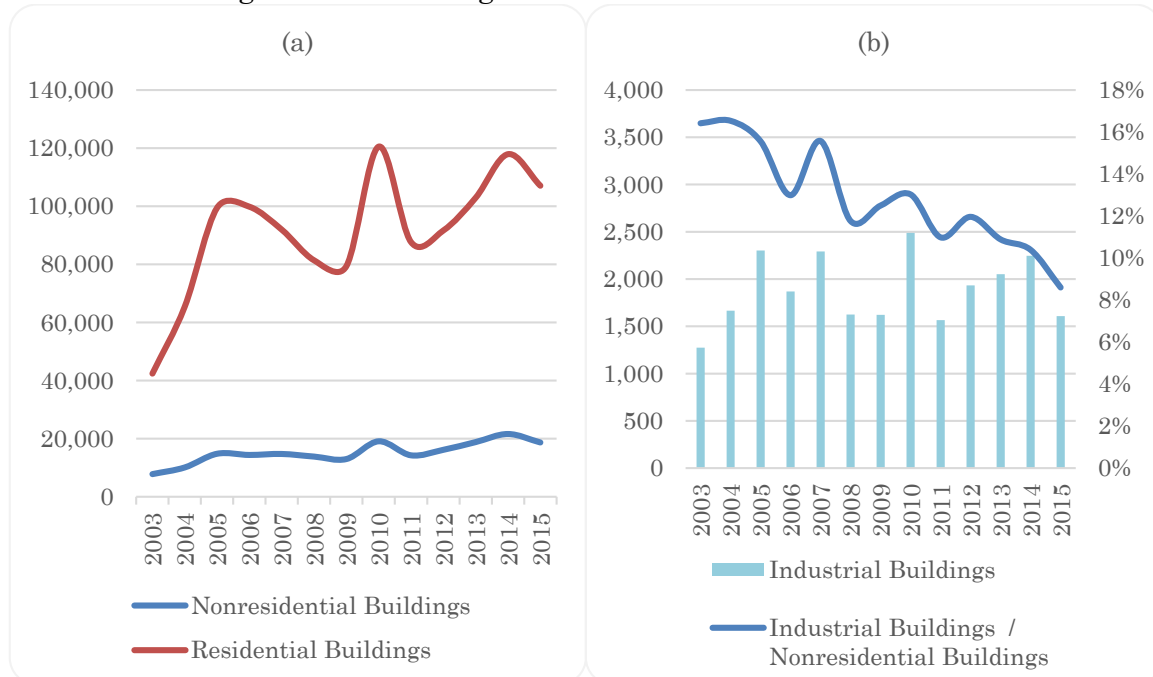
Note: Authors' own calculation using TurkStat's Annual Industry and Services Statistics Database.

All sub-sectors have grown from 2003 to 2015, however, the highest growth rates were observed in construction of buildings (32.1 percent) and civil engineering construction (23.4 percent) in 2003-2007 period (Table 12). Notice that even in the GFC years of 2008-2010 the construction sector continued to grow at record rates ranging from 7.5 to 12.3 percent.

In sum, the sector was dominated by construction of buildings and it grew at record pace in 2003-2015. Figure 11 gives information about the building permits granted during the reign of AKP government in this period. As shown in panel (a) both non-residential and residential building permits were on rise, however, the growth of residential buildings was at a much faster pace.

More relevantly, panel (b) shows a further breakdown for the industrial building permits. The number of permits showed a volatile pattern in 2003-2015 period. What is most surprising here is the halving of the share of industrial building permits in non-residential buildings from 16 percent to 8 percent. This, in our opinion is one of the most glaring indicators of the ongoing deindustrialization in Turkey in the AKP era.

Figure 11. Building Permits Issued in 2003-2015



Note: Authors' own calculation using TurkStat's Building Permits Statistics Database.

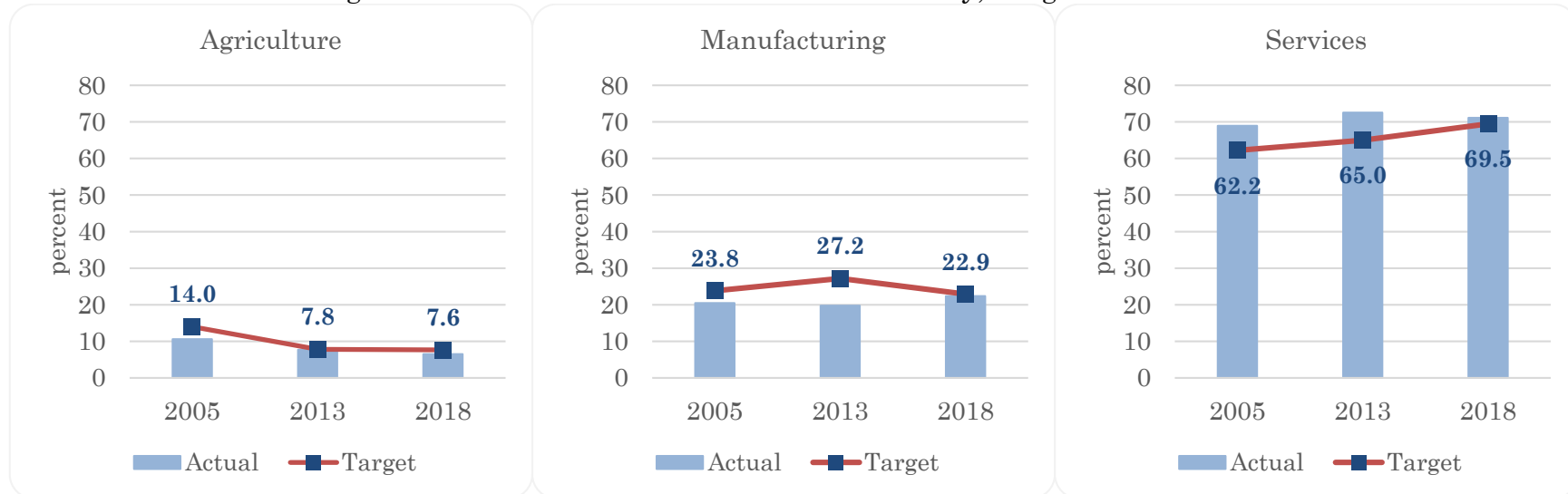
5.3. Weaknesses of Industrial Policy Design

The industrial policy measures that were taken during the AKP era suffered from a plethora of deficiencies that not only hampered the potential productivity growth but also handicapped the advancement of the technological sophistication of manufacturing.

These deficiencies are lined up in Atiyas and Bakış (2015) as follows: (i) The incentives policy of 2000s did not have a sectoral selectivity until 2009. (ii) The incentives regime was volatile in the sense that important components were changed very frequently that contributed to the unpredictability of the industrial policy. (iii) All incentives granted were published in the Official Gazette, however, transparency in terms of process was a problem. Most incentives were determined by the AKP Cabinet without much justification or public consultation. (iv) There was a lack of coordination. Evidently, there have been various programs for the same purpose with few links between them. (v) There were almost no impact evaluations of the granted incentives.

All of these are contributing factors to the findings of this paper. Most relatedly, we found that in 2003-2015 period the productivity growth of manufacturing sector in Turkey has been positive yet evolving towards medium-low tech manufacturing which displayed the lowest productivity growth among all manufacturing sectors. Furthermore, surviving firms in the Turkish manufacturing 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 to the

Figure 12. The Shares of Main Economic Activity, Targeted and Actual



Note: The actual values are obtained from TurkStat National Income Statistics. The target values are from the 8th, 9th and 10th Development Plans of Turkey.

aggregate productivity growth in this sector. Finally, as opposed to the manufacturing, in the services sector surviving firms had a negative contribution to aggregate productivity growth. Even though the productivity growth within the services firms was positive, it was not enough to offset the negative impact of market reallocations to less productive firms in this sector.

To sum up, in the post-2002 period, manufacturing has lost its quality as a fast-growing, locomotive sector in Turkey. The policy texts of the AKP era that were excellently analyzed Taymaz and Voyvoda (2015) were acutely aware of dependence on imports, backwardness in technological sophistication, deindustrialization and break-up of backward/forward linkages in the country's production structure. However, as shown in Figure 12, all three development plans of Turkey implemented in the 2003-2015 period undershot their manufacturing sector objectives while overshooting the services sector ones. This picture can be considered as the score card of the AKP in terms of its policy implementation in regards to the productive structure of the Turkish economy.

6. Concluding Discussion and Policy Implications

Industrialization contributing to economic growth is an irrefutable fact of the modern times. This is due to manufacturing's ability to absorb low-skilled workers released from agriculture or petty services and due its potential to deliver relatively greater productivity growth in the long run. The unhalted growth in the developing world since the mid-1990s, however, has not been driven by this traditional mechanism. It was rather a product of capital inflows or commodity booms that begs the question of how sustainable this growth will prove to be in the near future.

Propelled by this motivation, in this paper we investigated the productivity dynamics of Turkish economy 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. Furthermore, we scrutinized the deindustrialization of Turkey as a complement to our 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 underestimate the productivity improvements in the manufacturing sector and overestimate 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 had a negative contribution to aggregate productivity growth.

At this point, let us note that the level of institutionalization in sectors such as construction and services in general is much lower than in manufacturing activities. This may create significant opportunities for politicians to mobilize economic resources, particularly the ones for financing infrastructure investments through public procurement such as urban transformation projects based on state-municipal-private sector cooperation. The main problem with such maneuvers is that some of the foreign financial resources brokered by the private sector in these cases may quickly become excluded from parliamentary control through institutions (such as TOKİ in the Turkish case) whose status is not very clear. And this in turn can cause a crowding-out effect on the manufacturing production. Turkey seems to have walked this path in the 2003-2015 period as laid out in this paper.

Furthermore, all the while the Turkish economy was deindustrializing, it was also subject to serious import competition. Rather than a much needed boost in the domestic production of imported intermediates, each day new genres of imported products were added to the production lines of the Turkish manufacturers. One culprit behind this failure was the inability of the manufacturers to muster the financial resources necessary for investing in efficient methods to produce imported intermediates domestically. These resources were long shifted to construction and other services sectors. Overall, in the AKP era, the growth policy was engineered in favor of services sectors which were not subject to much international competition for a long time. Consumption expenditures based on credit expansions coupled with infrastructure expenditures of the public sector have been among the most important sources of growth in the 2003-2015 period in Turkey. Meanwhile, the Turkish manufacturing sector was still much better than its services counterpart in terms of productivity growth but it fell short of developing additional productive capacity to update its technological sophistication during this period.

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 the light of this paper's findings and our evaluation presented in the previous sections, we believe it is important to point out the policy implications while concluding the paper.

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 this 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 AKP era that is analyzed in this paper is the decreasing share of manufacturing sector (deindustrialization) and the increasing share of services sector (servicification). 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 carefully chosen priority industries/firms.

Second, innovation capacity in the manufacturing sector of Turkey should be developed using multi-faceted policy measures that promote a 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 government incentives mechanisms based on 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 were 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, next, some specific discussions are 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 have been heavily subsidized as they had limited access to finance. In 2003-2015 period, a messy incentives policy that was not based on solid productivity enhancement criteria may have helped create zombie firms (insolvent borrowers, Caballero et al, 2008) particularly in the services sector of Turkey.

The resulting policy implication is that the incentives 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 incentives 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 incentives to large productive firms, conditional on these firms extending support to SMEs in their value-chain. This way, incentives 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 exhibited 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 cluster the services firms to cooperate for the purpose of exporting 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 were more productive than the purely domestic ones, the obvious implication is adopting policy measures to attract foreign direct investment particularly in the services sectors.

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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)

<i>By firm size</i>	<i>Percentages</i>	
	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
<i>Total</i>	<i>567,374</i>	<i>235,291</i>	<i>332,083</i>

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. Less than 50 percent of the firms have 4+ years of life-span within the sample.

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

#Years a Firm Appears in the Sample	Manufacturing (percent)	Services (percent)	All (percent)
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 firm-year observations 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).

Table A4. Distribution of Firm-Year Observations 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
<i>Total</i>	<i>561,861</i>	<i>100</i>

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	
	(firm-year)	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 Sophistication of Manufacturing, 2003-2015

Technology Classification	# observations	
	(firm-year)	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 A7. Sectoral Distribution of Services, 2003-2015

WTO Classification	# observations	
	(firm-year)	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 (firm-year)	percentage
Domestic	380,688	67
Exporter	186,686	33
<i>Total</i>	<i>567,374</i>	<i>100</i>

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

Foreign Share	# observations (firm-year)	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