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Understanding Firm Dynamics And Job Creation In Turkey Using The Entrepreneur Information System Database

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Özet:

Bu çalışma 2006-2016 döneminde Girişimci Bilgi Sistemi'ni kullanarak şirket karakteristikleri ile net istihdam artışı arasındaki ilişkiyi incelemektedir. Kullanılan veri seti, daha önce benzer konuları inceleyen çalışmalarda kullanılan veri setlerine göre önemli avantajlara sahiptir.

Tanımlayıcı istatistikler, zaman içinde ortalama firma büyüklüğünün ve yaşının arttığını göstermektedir. İş hayatına başlayan şirketlerin sayısındaki artış örneklem sonuna doğru önemli ölçüde azalmakla beraber çıkış oranlarında tüm örneklem boyunca düzenli bir artış görülmektedir. Net istihdam artışı, ölçek geçiş matrisi, iş hayatına giriş ve iş hayatından çıkış oranlarıyla ilgili elde edilen bulgular, Türkiye'de yeni işlerin genç şirketler tarafından sağlandığı ile ilgili güçlü kanıtlar sunmaktadır. Yeni şirketler net yeni istihdamın yüzde 80'inden fazlasını sağlamaktadır. Örneğin, yeni şirketlerin örneklemden çıkarılması durumunda mikro ölçekli şirketlerin net istihdama katkısı negatife dönmektedir. Bu bulgular, ekonometrik analiz sonuçları ile de desteklenmektedir.

Ekonometrik analiz sonuçları ayrıca firma yaşı ve ortalamaya bağlanım etkisi kontrol edildiğinde firma ölçeğinin net istihdam üzerinde bir etkisi olmadığını göstermektedir. Yeni şirketler örneklemden çıkarıldığında firma ölçeği ve net istihdam büyümesi arasındaki ilişkinin pozitife dönmesi yeni şirketlerin istihdam sağlamadaki kritik rolünü bir kez daha vurgulamaktadır.

Abstract:

This paper analyzes the relationship between firm characteristics and job creation for Turkey using Entrepreneurship Information Dataset for the period between 2006 and 2016. Our dataset allows us both to refrain from the data limitations that previous studies suffer from.

We find that the average firm size and age increases as we move towards the end of the sample. The entry rates fall significantly to the end of the sample while we observe a steady increase in the exit rates. The empirical findings about net job creation, size transition matrix, entry and exit rates provide strong support for the importance of young firms in generating new jobs. More than 80 percent of the net new jobs have been created by the start-ups. In fact, once these start-ups are excluded, the contribution of micro-scale firms to net job creation becomes even negative. All of these findings are also supported by the regression results from a non-parametric regression model.

Regarding the impact of firm size on job creation, once we control for age and account for the regression-to-the-mean effect, firm size does not seem to be effective on job creation. In addition, once the youngest firms from different size groups are excluded, the relationship between firm size and employment growth turns out to be positive, which, once again, indicates the importance of start-ups in net job creation.

1. INTRODUCTION

The recent years have witnessed a growing interest in understanding the dynamics of job creation from the perspective of both developed and developing countries. There are several reasons for that. First, in an era of automation, where there is an increasing pace of labor-saving technologies being introduced into production processes, policymakers and academia are in search of new and effective policies to ensure job growth. Since a major fraction of the job growth is generated by the private sector, there has been a vast amount of studies that try to understand the links between firm characteristics and employment growth in a changing environment. Second, the recent methodologies and the new datasets have made it possible to revisit the issues about job creation and firm characteristics from a broader perspective that also included the developing countries. This paper is an attempt in this direction for its focus on the Turkish economy by employing a new and a rich dataset.

There is a dense literature that studies the impact of size and age dynamics on the employment growth trajectory of the firms. In particular, there has been an increasing number of studies which proposed answers for questions such as "Why do young enterprises grow more quickly than their older counterparts?" or "Why do small firms create and destruct more jobs?". In his seminal paper, Jovanovic (1982) offers an explanation within a learning model, where the firm expands quickly at first and then slows down its growth as it approaches its optimal size. While growth slows at later stages, we observe an increase in productivity as firms learn to utilize its resources more efficiently.[1] His framework implies a negative (positive) relationship between the age of the firms and its employment (productivity) growth. In addition, the uncertainties that surround young businesses over a number of dimensions including demand, costs and managerial ability lead new business to start small before expanding, which posits that smaller firms can generate higher employment as they get older. The empirical findings by Foster et al (2016), Drozd and Nasal (2012) provide support for this argument that young businesses are generally small and have the potential to generate higher employment growth.

On the other hand, since most firms are born small, the effects of age and size on employment growth have often been confounded. Regarding the importance of age on employment growth, there is a general consensus. However, despite the studies including Neumark et al (2011), Criscuolo et al (2014), de Wit and de Kok (2014), the conclusion that small firms contribute

[1] Contrary to Jovanovic (1982), Burki and Terrell (1998) find that firms in developing countries face with productivity losses as they grow old, partly because they resist the emerging technologies leaving them with less productive equipment.

disproportionately to job creation has been challenged by several studies. Starting with Davis et al (1993), Haltiwanger and Krizan (1999), several studies point to an over-representation of small firms in job creation. Haltiwanger et al (2013) finds a weaker relationship between firm size and employment growth when we control for age. Moreover, if we take into account the regression-to-the-mean effect, which we discuss below in detail, the relationship between size of the firm and its job creation disappears. Eslava et al (2019) find that, large establishments grow even faster than small ones once we control for age.[2] Finally, Erhard (2017) questions the importance of how we measure employment growth. She discusses that size effect should not be overestimated just by focusing on the relative growth rates.

Another strand of the literature on the relationship between firm size and employment growth find that the two variables follow independent processes after firms achieve a certain level of size. Such a finding is consistent with Gibrat's Law, as mentioned in Sutton (1997), which claims that firm size and growth are not necessarily related. In fact, several empirical studies including Lotti et al (2003, 2009), Lawless (2014) and Daunfeldt and Elert (2013) find that firm size and employment growth become independent after firms achieve an efficient scale, which supports Gibrat's Law.

Size Classification Issues

In addition to the need to control for firm age in understanding the link between size and employment growth, the classification methodology for firm size emerges also as an important issue. Davis et al (1996) point to the "regression fallacy", where temporary fluctuations in size lead to biased estimates in favor of small firm job creation. To control for this regression-to-the-mean effect, Haltiwanger et al (2013) classify firm size with respect to both their employment at the base year, which is lagged employment for incumbent firms and first year employment for entrants, and their current year average size, which is the average of the current and the previous year employment. Their results differ to a significant extent depending on the choice of size class. Under current year average size classification, the higher growth that small businesses exhibit is driven mainly by the contribution of young businesses, which further casts doubt on the effect of firm size on employment growth.

On the other hand, Davidsson et (1998) states that the extent of the "regression fallacy" problem that Davis et al (1996) put forth is overestimated. They argue that, as long as the change in the employment comes from trend growth instead of temporary fluctuations, size classification should not matter. They also add that, in case of annual data, small number of size classes and

[2] Anyadike et al (2015) follow a different approach and control for the age by comparing the cohorts of firms born in the same year. They find that only a small proportion of the smallest firms play a role in explaining job growth differences.

large differences between job creation coming from different size of firms, the regression fallacy problem should not be an issue.

Advanced Economies vs. Developing Economies

Although the earlier studies have mostly focused on advanced economies, the recent data sets have made it possible for researchers to analyze the above issues for developing economies as well. Similar to the findings for advanced economies, Nichter and Goldmark (2009) find a robust relationship between young firms and employment growth for developing countries, which is supported also by several other studies that focus on Africa and Latin America, including Klepper and Richmond (2011) and Mead and Liedholm (1998).

Regarding the effect of firm size on employment, Li and Rama (2015) find that micro and small enterprises account for a greater share of both job creation and job destruction than acknowledged by conventional wisdom. They find that, it is small and medium size firms, more than young firms, which drive job creation even in high middle income countries. Based on enterprise surveys from 99 countries, Ayyagari et al (2011) find that size of the firm, not only the age, contributes to explaining growth. In a more recent study, using survey data over the period 2006-2010, which consists of 49370 firms in 104 countries, Ayyagari et al (2014) show that small firms generate most of the new jobs although they do not employ the largest number of people.

However, there are common caveats in cross section studies, especially with the enterprise surveys. These studies work with continuing firms and do not have the data for new firms and firm exits. However, as we show in this paper, the results may change to a significant extent if start-ups and exiting firms are ruled out. Finally, and importantly, enterprise surveys are at the establishment level, not the firm level, which makes it impossible to measure firm size accurately for multi-establishment firms.

Several studies that compare the firm and employment dynamics between developing countries and the United States draw attention to the slower employment growth for the former in an average business cycle. Eslava et al (2019) stress the importance of slower employment growth over the life cycle of the average business. While the post entry growth in the United States is driven mostly by an up or out dynamic, there is a high likelihood of long-run survival for small, unproductive plants in Colombia. The absence of a high-growth entrepreneurship environment leads to slower employment growth. Hsieh and Klenow (2014) find a similar result, which is lower employment growth over an average business cycle for Mexico and India compared to the United States. They attribute this divergence to lower investments by Indian and Mexican plants in process efficiency, quality, and in accessing markets at home and abroad.

The Turkish Economy and Contribution of This Paper

The above mentioned discussion have very important implications also for the Turkish economy. The credit led growth strategy, which has been the driving factor behind the high economic growth came to a halt and Turkey has entered into a period of low economic growth with high unemployment. Turkey's young demographic profile and the distortion in the labor market created by the influx of refugees make job creation the top priority for the Turkish policymakers.

Despite its importance, there has been only a limited number of studies that have analyzed the links between firm dynamics and job creation in Turkey, primarily because of the absence of an enterprise-level data set, which would not suffer from the data limitations that we discussed above. However, two recent papers seem to handle this issue by using two different data sets. Atiyas et al (2017) have used the Business Registers (BR) data set, put together by the Turkish Statistical Institute to analyze firm characteristics and employment dynamics for 2005-2012. Their results are in the same direction with Haltiwanger et al (2013): Once they control for both the age of the firm and the regression-to-the-mean effect, the role of firm size on job growth becomes negligible. On the other hand, after controlling for firm size, younger firms are found to create more jobs than their older counterparts. These findings are consistent with the literature. They also report a rightward shift in the age and the size of the firms. That is, although half of the net job creation has been generated by micro scale firms with (1-2 employees), the distribution of employment has moved from these small and young firms to larger and older firms as we move towards the end of the sample period. Finally, their results show that although the new entrants are mostly the very small firms, almost half of these very small new entrants and also the very small existing firms die within five years.

Although Atiyas et al (2017) is an important contribution to understand the link between firm dynamics and job growth, the Business Registers data set they use has important drawbacks. This dataset does not include any information other than the sector of activity, year of establishment and number of employees. Therefore, it does not permit to link the analysis on employment dynamics with productivity or any other measure of firm performance. It can be linked with AISS which includes a much richer set of variables and is a census of large firms but a small sample of firms with less than 20 employees.

This paper uses data from Entrepreneur Information System (EIS), administered by the Ministry of Industry and Technology, to provide new evidence on the employment dynamics of Turkish firms that are in the Business Register and that also have their balance sheet and income statement data. These firms constitute around 30-35% of all enterprises in Turkey but account for more than 90% of the total employment. This sample of firms are expected to be less prone to

informal economic activity and hence provide us with more reliable data. Moreover, due to the existence of more detailed information, EIS data permits further analysis, such as productivity estimations, on these firms. By comparing our findings on employment dynamics of this special subset of Turkish firms with the findings of Atiyas et al (2017) on all firms, we will be able to comment on the potential of the EIS data for further use.

Polat and Taşkıran (2018) is, to the best of our knowledge, the only study which analyzes the link between firm dynamics and job growth for the period 2006-2015 using the Entrepreneur Information System (EIS). Using EIS, Polat and Taşkıran (2018) find that small and young firms contribute disproportionately to net job growth. Their findings do not change once they restrict their analysis to continuing firms only. However, their study does not control for the possible "regression fallacy" problem. Although earlier studies such as Davidsson et al (1998) mention that the "regression fallacy" problem that stems from the choice of size class methodology should not matter, especially when we have a small number of size classes, the more recent papers including Haltiwanger et al (2013) provides strong empirical evidence for the existence of "regression fallacy" problem. Therefore, the strong relationship that is reported by Polat and Taşkıran may be contaminated by a strong regression-to-the-mean effect.

This study takes the above discussion and the empirical findings about developing countries as its starting point and contributes to the literature by analyzing the links between firm dynamics and job growth in Turkey by using the EIS data set within the estimation framework that is introduced by Haltiwanger et al (2013). Our data set also covers a wider range, 2006-2016, which allows us to capture the variations on a firm-level basis for a broader time period. By doing so, we will improve over the existing studies by

i) Using a detailed data set, which will not have the data limitations that previous studies suffer from
ii) Analyzing the relationship between firm dynamics and job growth for a broader time span
iii) Adopting the estimation and the size class methodology of Haltiwanger et al (2013) to have a broader understanding of the links between firm dynamics and job growth.

The outline of the paper is as follows. The next section describes the dataset and the methodology in detail. In particular, we discuss how EIS overcomes some of the important problems in the previous datasets such as a more accurate definition of age and using establishment-level data. The third section presents the descriptive statistics, the distribution of firms (including entrants) by size and age, their employment shares, entry and exit rates by sectors. The fourth section focuses on the dynamics of job creation and job destruction. We decompose net job creation by

age and size of the firms to see a detailed picture of employment volatility. The following section analyzes the survival and the exit rates of the firms and also displays the five-year size transition matrix. The sixth section presents the regression results. The final section gives a summary of the results discusses the implications from a policymaking perspective and offers questions for further research.

2. DATA

Administered by the Ministry of Industry and Technology, EIS contains data from 8 different sources at 3 different levels. Table 1 provides a brief description of the dataset.

Table 1: EIS Data Description

Data Source	Coverage	Unit of Observation	Variables
Turkish Statistical Institute	2006-2016	Plant Level	**Firm Level:** ID; **Plant Level:** ID, Activity Code (NACE 4 Digit), Location (Province)
Business Register	2006-2016	Firm Level	**Firm Level:** ID, Activity Code (NACE 4 Digit), Location of the Administrative Center (Province), Year of Establishment
Social Security Institution	2006-2016	Worker Level	**Plant Level:** ID; **Worker Level:** ID, Gender, Age, Wage, Days Worked, Occupation (after 2014)
Ministry of Finance *	2006-2016	Firm Level	**Firm Level:** ID, Balance Sheet Data, Income Statement Data
Ministry of Customs and Trade	2006-2016	Firm-Product Level	**Firm Level:** ID, Exports (Quantity, Value, Product Code), Imports (Quantity, Value, Product Code)
Turkish Patent Institute	2009-2016	Firm Level	**Firm Level:** ID, Number of Patents, Number of Designs, Number of Brands, Number of Models
KOSGEB and TUBITAK*** **	2011-2016	Firm Level	**Firm Level:** ID, Type and Amount of support received
Ministry of Finance	2006-2016	Firm Level	**Firm Level:** Reporting ID, Partner ID, Value of Goods/Services Sold/Purchased (above 5,000 TL), Time of Transaction
** This information is only available for the specific types of firms which are obliged to provide the Ministry of Finance with their balance sheet and income statement data. Namely, firms that either make purchases for amounts above TL160000 or make sales for more than TL 220000. These firms constitute around 20-25% of all enterprises in Turkey but account for more than 90% of the total economic activity.*			
*** Small and Medium Enterprises Development Organization*			
**** The Scientific and Technological Research Council of Turkey*			

Before going into the details of the dataset and our data cleaning procedure, it is important to define the distinction between a firm and a plant as they are referred to in EIS. In the EIS a firm is defined as "any person or corporation producing goods or services for the market in one place or multiple places and in one or more sectors". A plant, on the other hand, is defined as "a firm or part of a firm producing goods and services of a single sector and in a specific and defined

geographic location." As this paper does not conduct a regional analysis, we aggregate employment data to the firm level and define size and age at the firm rather than the plant level. Main economic activity of the firm determines the sector classification.

We use the Business Register and the worker level data from the Social Security Institution in this study. Business Register data provides information on firms' year of establishment and sector of their main economic activity. Data at the worker level is aggregated to firm level to calculate the number of employees. We calculate both headcount and full-time equivalent employment figures. Results reported in the paper are the ones with the headcount measure. We prefer this measure of employment for our results to be comparable with those of Atiyas et al (2017). However, all the results are fairly robust to changing the definition to full-time equivalent employment.

As mentioned earlier, we restrict our sample to firms which have their balance sheet and income statement data[3]. Furthermore, we drop all the observations of a firm if the firm does not have any employees other than the owner(s) of the firm through the period of analysis.

We classify firms into seven age groups which are 0-1, 2-5, 6-10, 11-15, 16-20, 21-25 and 26+ years old. We classify firms into eight size groups which are 1-2, 3-9, 10-19, 20-49, 50-99, 100-249, 250-499 and 500+ employees based on base year and current year size classifications.

3. DESCRIPTIVE STATISTICS

This section presents the descriptive statistics. We start with the total number of firms and employment between 2006 and 2016, which are shown in Table 2.

[3] This does not create any artificial firm entries or exits. Entry, exit and age is defined using the Business Register dataset which includes records of all firms irregardless of their financial statements being available or not.

Table 2: Number of Firms and Total Employment, 2006 - 2016

Year	# of firms	Employment
2006	973,903.00	6,177,623.25
2007	1,137,208.00	6,828,698.25
2008	1,223,049.00	7,401,324.25
2009	1,288,916.00	7,274,863.00
2010	1,364,650.00	8,055,697.00
2011	1,441,088.00	9,090,729.75
2012	1,506,389.00	10,108,503.25
2013	1,582,658.00	10,733,920.50
2014	1,618,450.00	11,341,111.00
2015	1,628,031.00	12,301,710.25
2016	1,527,771.00	12,219,006.75

With the exception between 2015 and 2016, we observe an increase in the number of firms throughout the years. However, it should also be noted that the growth rate has been declining as we move towards the end of the sample. With an average annual growth rate of 4,7 percent, there has been an additional 553000 firms being included in the dataset. If we set aside 2009, the year of the global financial crisis, we observe the same pattern with even higher growth rates for the total number of employed people. 6 million new jobs have been generated at an average annual growth rate of 7,2 percent. Since the increase in the number of employment exceed the number of new firms, the average number of employees per firm increased throughout the years, from 6,34 in 2006 to 8 in 2016. The increase in the average size of the firm is more remarkable in the last two years mainly due to an important slowdown in the number of new firms being included in the data set.

These numbers are quite different than the Business Registers dataset that Atiyas et al (2017) employs. For example, in 2012, the last year in their sample, Business Registers dataset has 3,45 million firms with about 15,5 million people. As Table 2 shows, EIS dataset has only about 1,5 million enterprises which employs around 10,1 million people for the same year. Moreover, average number of employees per firm is dramatically different between the two datasets. The

average number of employee per firm increases roughly from 3 to 4,5 between 2006 and 2012 for the Business Registers dataset while it increases from 6,34 to 6,71 for the EIS dataset. These differences are due to the fact that BR includes all enterprises in Turkey, whereas EIS sample includes those firms that are obliged to provide the Ministry of Finance with their financial statements which are expected to be, on average, larger than those firms that do not have such obligations.

Distribution of employment with respect to the size and age of the firms

Next, we present the distribution of the number of firms and employment for 2006, 2011 and 2016, respectively. As it is explained in Section 2, we classify the size of the firms in eight categories. Table 3 presents the results where we classify the size of the firm with respect to its base year employment.

Table 3. Distribution of Firms and Employment According to Size (Base Year Size Classification)

	Share of employment			**Share of # of firms**		
Size	**2006**	**2011**	**2016**	**2006**	**2011**	**2016**
1 to 2	6.51%	10.22%	8.56%	66.30%	69.55%	60.15%
3 to 9	16.31%	16.78%	14.92%	23.64%	21.40%	27.42%
10 to 19	10.45%	10.60%	9.75%	5.09%	4.71%	6.29%
20 to 49	16.35%	15.02%	14.13%	3.42%	2.97%	4.04%
50 to 99	8.47%	8.05%	8.79%	0.78%	0.68%	1.09%
100 to 249	11.97%	11.44%	11.86%	0.50%	0.45%	0.66%
250 to 499	8.45%	7.90%	8.16%	0.16%	0.14%	0.20%
500+	21.51%	19.99%	23.83%	0.11%	0.10%	0.14%

On the left panel of Table 3, we see that the largest scale firms account for almost one fourth of total employment as of 2016. Interestingly, firms with 3 to 9 employees have the second largest share of employment in our data sample. While firms less than 10 employees constitute 87 percent of all the sample, they account for about 23 percent of total employment, which is equivalent to the employment of largest firms.

These statistics are very much in line with other developing countries. Pagés (2010) report that more than 80 percent of registered manufacturing establishments in Argentina, Bolivia, El Salvador, and Mexico have fewer than 10 employees. Kantis et al (2004) and Simmons (2004) state that approximately 97% of firms in Mexico and Thailand are small and medium enterprises.

According to Asian Development Bank Report (2009), about 90 percent of formal registered manufacturing establishments employ 5 to 59 workers in China, Indonesia, Korea, the Philippines, and Taiwan. Outside the manufacturing sector, the share of micro- and small enterprises is even higher.

In their study that compares Colombia and the United States, Eslava et al (2019) find that Colombia's employment in micro (less than 10 employees) and small (10-49 employees) establishments is 32 percent while only 4 percent of the United States' employment comes from these establishments. Table 3 shows that micro and small enterprises account for 45 percent of total employment in Turkey, which is even higher than Colombia. In addition, 50 percent of the firms in the United States is micro and small firms, while it is 97 percent in Turkey. Since the difference in the percentage of firms is not as high as it is in terms of employment, we can say that the micro and small enterprises have a larger average size in Turkey compared to the United States.

Another important observation for Table 3 is that higher employment shares of size groups are followed by lower employment shares. In particular, the size groups that employ 3 to 9 employees, 20 to 49 employees and 100 to 249 employees have significantly higher employment shares than their successors. This is for a reason. The government classifies enterprises based on the number of employees that they employ, which effects the subsidies and the regulations that firms are subject to. These regulations call for important adjustment costs. Therefore, a firm may have strong incentives to stay in the existing size group even it has the necessary potential to increase its employment size and waits until it feels ready to adapt itself for a larger scale.

Once we compare the above descriptive statistics with what Atiyas et al (2017) derived from the Business Registers dataset, we see that the main difference comes from the enterprises with only one employee. In Business Registers dataset, the contribution of firms with only one employee to total employment decreases from 26,72 percent in 2006 to 14,19 percent in 2012 whereas in EIS, the same percentages for the same years are 2,87 percent and 2,69 percent.[4] This, once again, is due to the fact that EIS is likely to underrepresent smaller firms as these firms are less likely to have their balance sheet and income statement information.

When we use current-average-size classification and look at the share of employment and firms with respect to size groups, we obtain the results in Table 4.

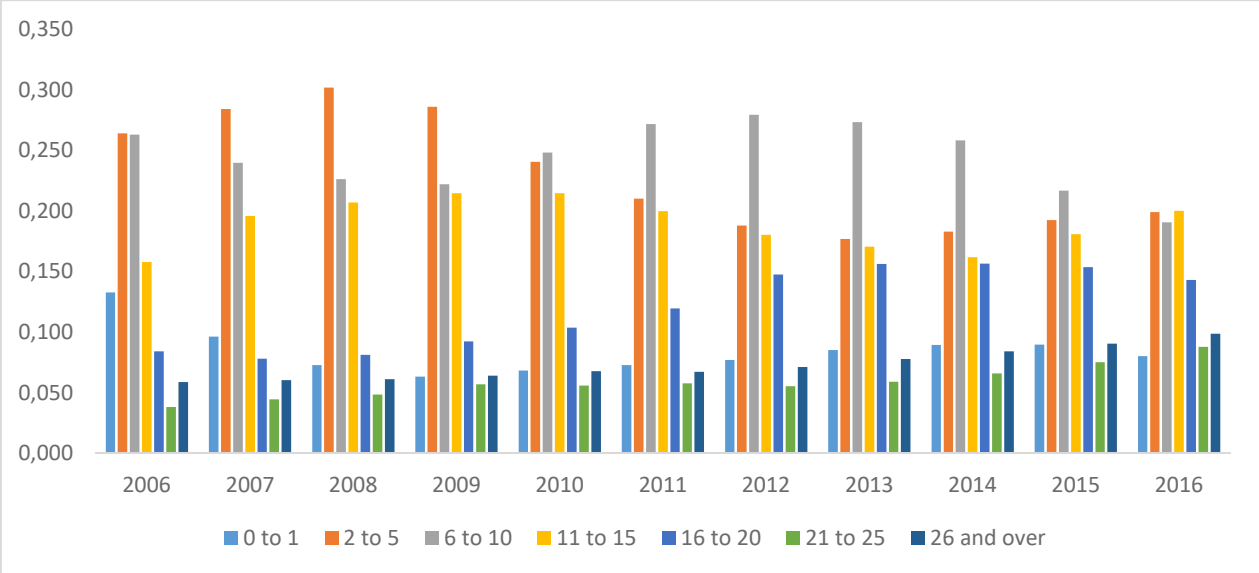
[4] Another problem in Business Registers dataset is the dramatic switch from 1-employee firms to 2-employee firms during 2008 and 2009. For example, the contribution of 2-employee firms to total employment increases from 4,51 percent in 2007 to 29,87 percent in 2008 and remains around 25 percent in 2009, which requires caution

Table 4. Distribution of Firms and Employment According to Size (Current Average Size Classification)

	Share of employment			Share of # of firms		
Size	**2006**	**2011**	**2016**	**2006**	**2011**	**2016**
1 to 2	6.51%	10.22%	8.56%	66.30%	69.55%	60.15%
3 to 9	16.31%	16.78%	14.92%	23.64%	21.40%	27.42%
10 to 19	10.45%	10.60%	9.75%	5.09%	4.71%	6.29%
20 to 49	16.35%	15.02%	14.13%	3.42%	2.97%	4.04%
50 to 99	8.47%	8.05%	8.79%	0.78%	0.68%	1.09%
100 to 249	11.97%	11.44%	11.86%	0.50%	0.45%	0.66%
250 to 499	8.45%	7.90%	8.16%	0.16%	0.14%	0.20%
500+	21.51%	19.99%	23.83%	0.11%	0.10%	0.14%

As the left panel of Table 4 shows, compared to Table 2, the contribution of each firm size category to total employment increases at the expense of the smallest firm size category. However, the changes between Table 3 and Table 4 are not very high, implying a slow mobility between the categories for each size classes. Next, we present the distribution of employment by age of the firms in Figure 1.

Figure 1. Distribution of Employment by Age



Especially in the first half of the sample, nearly half of the firms are in the age group between 2 and 10 years. However, the distribution seems to have shifted to the right starting with the second half of the sample, which is a result also supported by Atiyas et al (2017). The two tails in the age distribution, the youngest and the oldest firms, have almost equal shares. The share of new firms (start-ups) has been around 8 percent throughout the sample, showing a decline in the global financial crisis period, while the share of the oldest firms has been more stable throughout the years.

Joint distribution of employment with respect to size and age of the firms

Although the size and the age distribution of the firms in the sample provide information about the firm dynamics, a more detailed information can be obtained by analyzing the joint distribution of employment with respect to size and age. For this purpose, we first classify the age distribution into two groups: firms being 10 years old or younger are called young firms while firms older than 10 years are called mature firms. With respect to the size classification, we follow the Eurostat definition and categorize the firms with 1-9 employees as micro scale, 10-49 employees as small scale, 50-249 as medium scale and firms with 250+ as large scale firms. We present the result in Table 5.

Table 5. Distribution of Employment by Size and Age (2006, 2016)

		2006	2016	Total Change
young	micro (1-9 employees)	1,155,237.50	2,276,770.25	1,121,532.75
young	small (10-49 employees)	1,425,315.75	2,099,815.00	674,499.25
young	medium (50-249 employees)	1,005,419.25	1,607,638.50	602,219.25
young	large (250+ employees)	1,227,534.00	1,906,578.25	679,044.25
mature	micro (1-9 employees)	138,352.50	516,816.25	378,463.75
mature	small (10-49 employees)	160,364.25	751,396.00	591,031.75
mature	medium (50-249 employees)	206,746.75	840,473.50	633,726.75
mature	large (250+ employees)	563,738.75	1,773,366.75	1,209,628.00
		5,882,708.75	11,772,854.50	5,890,145.75

		2006	2016	Change (% points)
young	micro (1-9 employees)	20%	19%	-1%
young	small (10-49 employees)	24%	18%	-6%
young	medium (50-249 employees)	17%	14%	-3%
young	large (250+ employees)	21%	16%	-5%
mature	micro (1-9 employees)	2%	4%	2%
mature	small (10-49 employees)	3%	6%	3%
mature	medium (50-249 employees)	4%	7%	3%
mature	large (250+ employees)	10%	15%	5%

Table 5 shows that the largest increase in employment share, both in terms of numbers and percentage change belongs to large and mature firms, confirming the shift in the age and size profile of the firms to the right. In addition, mature firms' share increases, regardless of their size categories. Importantly, and in contrast with what Atiyas et (2017) find, the share of young and micro scale firms stays the same throughout the sample period. We see the most dramatic declines in two categories: young and small firms and young and large firms. Such a result implies that, there has not been an important transition from young and smaller scale firms to young and large scale firms over time, necessary enough to compensate for the transition of young and large firms to mature firms. Remember that firms with 3 to 9 employees was the second largest contributor to total employment. We see an important aging in this group, which, combined with the

econometric findings in the later sections, imply a negative development for the overall job creation. The 5-year size transition matrix that we present in Section 5 will provide further details about the transition of firms to other size classes over time.

Size distribution of employment across the sectors

Starting from 2001, Turkey has been experiencing an important sectoral transformation which can best be observed from the revised input output tables in 2012. While the contribution of manufacturing industry to the total value added in the economy has been on a declining trend, supporting the *premature deindustrialization* hypothesis put forth by Rodrik (2016), the contribution of construction sector has substantially increased, especially in our sample period. The change in the distribution of employment by sectors, which we show in Table 6, provides further support for the above discussion.

Table 6. Distribution of Employment by Sector (2006, 2011, 2016, % changes)

	2006	2011	2016
Manufacturing (MAN)	35.36%	30.85%	29.22%
Retail and Wholesale (RW)	23.09%	22.42%	20.67%
Construction (CONS)	9.83%	11.04%	12.06%
Administrative and Support Services (ADM)	0.99%	8.43%	9.32%
Accomodation and Food Service Activities (ACC)	5.67%	6.57%	6.75%
Transportation and Storage(TRANS)	5.73%	6.12%	6.56%
Scientific and Professional Activities (SCI)	2.55%	2.61%	3.09%
Health (HEA)	0.37%	1.96%	2.55%
Education (EDU)	1.68%	0.42%	2.52%
Information and Communication Technologies (ICT)	6.24%	0.58%	1.58%
Utilities (UTIL)	1.53%	1.37%	1.54%
Mining and Quarrying (MIN)	1.37%	1.58%	1.02%
Other Services (OTH)	0.92%	1.03%	0.90%
Financial and Insurance Activities (FIN)	1.42%	0.67%	0.63%
Real Estate Activities (REST)	0.70%	1.65%	0.58%
Agriculture, Forestry and Fishing (AFF)	0.42%	0.46%	0.47%
Arts, Entertainment and Recreation (CULT)	1.90%	2.13%	0.41%
Public Administration and Defence (PUB)	0.23%	0.13%	0.12%

Table 6 shows that, manufacturing (MAN) and retail and wholesale (RW) sectors have been the dominant sectors in terms of employment share. In 2006, thee two sectors absorb 58 percent of total employment. However, we observe a major decline in two of these dominating sectors. While more than one third of the employment is absorbed by the manufacturing sector at 2006, it has gone down to 29 percent as of 2016. It is important to note that almost all of this dramatic decline has taken place between 2006 and 2011. For retail and wholesale sector, we see a less dramatic but an important decline, from 23,09 percent in 2006 to 20,67 percent in 2016. Interestingly, the employment share of information and communication technologies (ICT) sector has decreased substantially throughout the sample period.

On the other hand, administrative and support services (ADM), which absorbed less than 1 percent of the total employment increased its share substantially to nearly 10 percent. Finally, and consistent with what we observe for the Turkish economy between 2006 and 2016, construction and health sectors have increased their employment shares during that period. Next, we display the percentage changes in employment share by sector for each size class in Figure 2.

Figure 2. Distribution of Employment by Firm Size (2006-2016, % change, current average size classification)

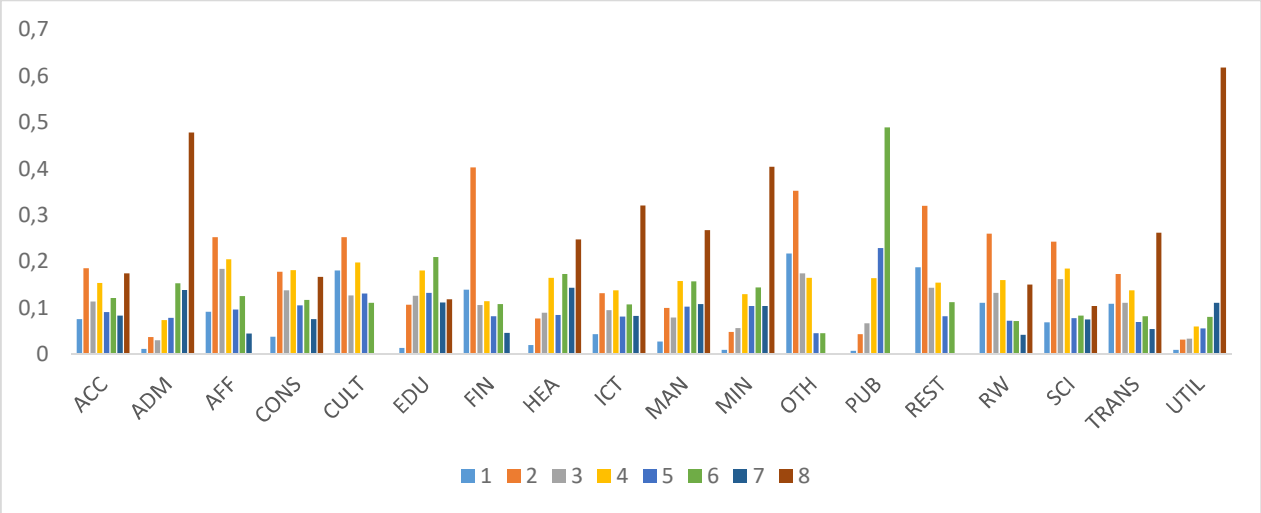


Figure 2 shows that in business administration services, health, information and communication technologies, manufacturing, transportation and utilities sectors, the largest scale firms contribute most positively to employment growth. In wholesale and retail sector, which has the second largest employment share, firms that employ 3 to 9 people make the highest contribution.

Interestingly, for construction sector, we have an equal distribution, where firm with 3 to 9 employees and 20 to 49 employees absorb more labor force than the largest firms.

4. ENTRY AND EXIT, JOB CREATION AND DESTRUCTION

In this section, for a better understanding of the interaction between the firm characteristics and their employment generation, we focus on the entry and the exit rates of the firms. It is important to know what fraction of jobs are created by the entrants and which type of firms exit the sample and thus destruct jobs. For this purpose, we first introduce the formulas for entry and exit rates, which are standard in the literature. Then, we analyze how these entries and exits change with respect to both size of the firms and the sectors that they operate.

We define the variables that we use to calculate the entry and the exit rates as follows:

E(t)= Number of firms that were not in the data set in *(t-1)* but which are in the data set in *t*

C(t)= Number of firms that are observed in the data set in both (*t-1)* and *t*

X(t)= Number of firms that were in the data set in *(t-1)* and not in the data set in *(t)*

T(t)= Total number of firms in year *(t)* which can also be written as

$$T(t)=E(t)+C(t)=C(t+1)+X(t)$$

Then, we can define the entry and the exit rates as follows:

$$ER=\text{Entry Rate}=E(t)/T(t-1)$$

$$EX=\text{Exit Rate}=X(t)/T(t-1)$$

Table 7 presents the number of new entrants, continuing firms and the exiting firms. It also shows the entry and the exit rates for the sample period. Note that Table 7 starts with 2007, which is the first year that entrants can be identified.

Table 7. Entry and Exit Rates for All Firms (2007-2016)

Year	Entrants	Continuing Firms	Exits	Entry Rates	Exit Rates
2007	184,461	952,747	21,156	11,51%	3,96%
2008	130,838	1,092,211	44,997	10,47%	5,08%
2009	128,057	1,160,859	62,190	11,48%	5,60%
2010	147,921	1,216,729	72,187	11,26%	5,65%
2011	153,592	1,287,496	77,154	10,51%	5,98%
2012	151,493	1,354,896	86,192	11,38%	6,31%
2013	171,356	1,411,302	95,087	8,85%	6,58%
2014	140,004	1,478,446	104,212	9,09%	8,50%
2015	147,077	1,480,954	137,496	2,24%	8,40%
2016	36,450	1,491,321	136,710	NA	NA

According to Table 7, we observe a high and a stable entry rate until 2012, after which we start to observe a decline and then a very sharp fall at the end of the sample period. It is interesting to note that the global financial crisis period does not seem to have a negative effect on entry rates while we see much lower entry rates for relatively high growth periods, that is between 2014 and 2016. On the other hand, as opposed to entry rates, we observe a continuous increase in the exit rates as we move towards the end of the sample. While the exit rate in 2007 is less than 4 percent, it is equal to 8,4 percent by the end of 2016.

The correlation coefficient between the entry rates and exit rates is found to be -0,72, showing that entry and exit rates move in the opposite directions with the former having a decline at the most recent years and the latter increasing steadily during the sample period. This is quite a controversial result. Starting from Beesley and Hamilton (1984), several studies have found a significant and *positive* correlation between the entry and the exit rate, providing support for the so-called "turbulence effect".[5] Within this context, Turkey emerges as an exceptional, and rather disappointing, case where mechanisms of displacement are not in effect and we see a sharp downward (upward) trend in entry (exit) rates.

[5] See Baldwin and Gorecki (1987, 1991) for a detailed analysis of the issue.

Entry and Exit Rates by the Sector

In the previous section, we saw that there have been important changes in labor absorption shares of the sectors for the sample period. It may be useful to see whether these changes in the employment shares of the sectors are consistent with entries or exits of the firms to these sectors. Table 8 presents the results, where we display the 2006-2016 average entry and exit rates for each sector.

Table 8. Entry and Exit Rates by Sector (2006-2016 averages)

	ER	EX	Difference
Accomodation and Food Service Activities (ACC)	13.27%	5.84%	7.43%
Administrative and Support Services (ADM)	13.49%	3.68%	9.81%
Agriculture, Forestry and Fishing (AFF)	11.58%	2.34%	9.24%
Construction (CONS)	11.33%	2.84%	8.49%
Arts, Entertainment and Recreation (CULT)	10.31%	4.04%	6.27%
Education (EDU)	13.82%	4.46%	9.36%
Financial and Insurance Activities (FIN)	5.18%	1.69%	3.49%
Health (HEA)	9.35%	3.68%	5.67%
Information and Communication Technologies (ICT)	12.65%	2.65%	10.00%
Manufacturing (MAN)	9.57%	4.28%	5.29%
Mining and Quarrying (MIN)	7.76%	2.03%	5.73%
Other Services (OTH)	11.98%	4.86%	7.12%
Public Administration and Defence (PUB)	4.71%	8.09%	-3.38%
Real Estate Activities (REST)	10.45%	6.79%	3.66%
Retail and Wholesale (RW)	8.47%	3.42%	5.06%
Scientific and Professional Activities (SCI)	11.96%	2.60%	9.36%
Transportation and Storage(TRANS)	7.37%	2.31%	5.06%
Utilities (UTIL)	13.76%	1.55%	12.21%
Average	10.39%	3.73%	6.66%

The average entry rate when all of the sectors are included is 10,39 percent. The entry rates for most of the sectors fluctuate around this mean with the exception of finance, public and the

transportation sectors, which have significantly lower entry rates than the average. On the other hand, utilities, accommodation, business administration services, education and information and communication technologies have the highest entry rates.

Regarding the exit rates, accommodation, public, restaurants have the highest exit rates where as we see the smallest exit rates in finance and the utilities sectors.

When we look at the manufacturing sector, where we had seen an important decline in its employment share during the sample (see Table 6), we see an entry rate below the average and an exit rate above the average. Therefore, the dramatic decline in the employment share of manufacturing sector is consistent with a low entry and high exit rate that we see in Table 8. For the retail and the wholesale sector, which has the second largest employment share, we observe both low entry and exit rates, where the former is more pronounced. As a result, the net entry rate for the retail and the wholesale sector is one of the lowest rates.

Sectors such as construction and business administration services, which have successfully increased their employment shares during the sample period also have higher entry and lower exit rates compared to other sectors. Therefore, we can conveniently claim that the changes in the employment shares that we saw for each sector in the previous sections are consistent with the entry and exit rates that we display in Table 8.[6]

Finally, we look at the correlation coefficient between the entry and the exit rates. While a positive and high correlation will support the existence of a creative destruction effect, a strong negative correlation between the entry and the exit rates will imply that sector wide profitability shocks are important. We find that the correlation coefficient between the entry and the exit rates is -0,10. Similar to the correlation coefficient for the overall entry and exit rates, Turkey emerges as a counter example. Several studies including Bartelsman et al (2004) and Bartelsman et al (2005) report a positive correlation between the entry and the exit rates across industries. Pisani and Pagan (2004) explain that in recessions, the reduction in the number of opportunity driven entrepreneurs can be compensated by the expansion of necessity-driven entrepreneurs, which may lead to the fact that entry rates do not exhibit fluctuations. However, we think that their argument does not also apply in this case since we observe strong and opposite trends in entry and exit rates.

[6] The only important exception seems to be the ICT sector. Although its contribution to total employment decreased significantly during the sample period (see Table 5), we see one of the highest entry and lowest exit rates. Such a case could be explained if we observed too many micro and small scale firm entrants and some large scale firm exits. However, as Figure 2 shows, around one third of the employment change for this particular sectors comes from the large scale firms.

Size Distribution of Entrants

Next, we focus on the entrants and analyze their contribution to employment after we classify them according to their sizes.

Figure 3. Size Distribution of Entrants' Employment (percentage %, current average year classification)

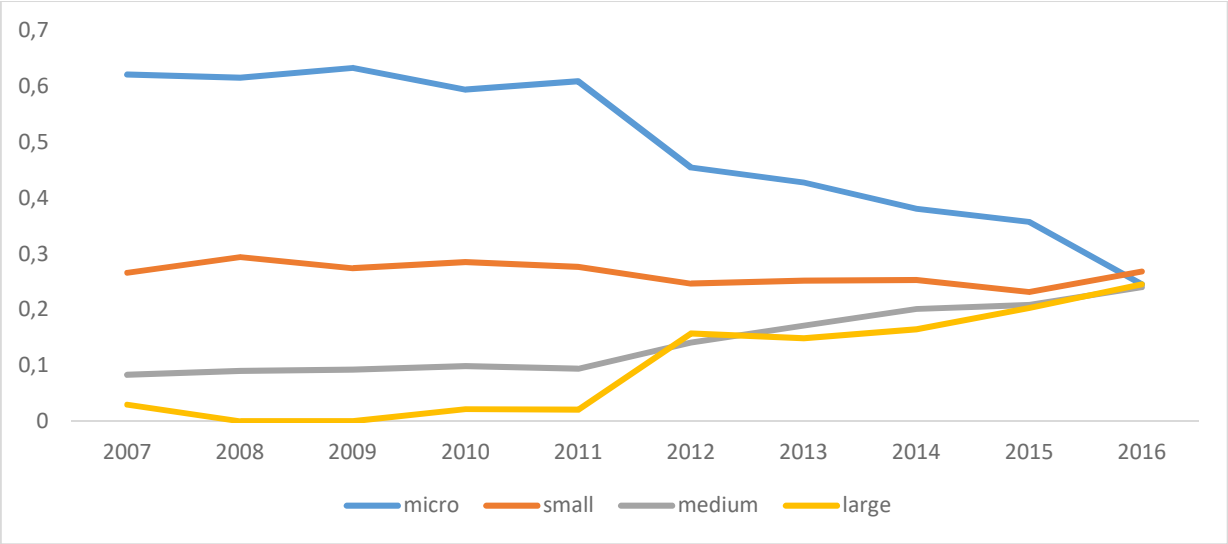


Figure 3 shows one of the most interesting results of the paper. We see a dramatic decline in the share of micro-scale entrants in total employment generated by the entrants only. While micro-scale entrant firms account for more than 60 percent of total employment in 2006, their share goes down to around 25 percent in 2016. Interestingly, the share of small scale firms stays constant over time. Instead, we observe a significant increase in the shares of both medium and large scale firms. By the end of the sample period, each size category has almost the same share in total employment generated by the entrants. Therefore, among the youngest firms, while the micro scale firms is by far the largest contributor to employment in the first half of the sample, this story dramatically changes at the second half where each firm size have equal shares in generating employment.[7]

Job Creation and Destruction

As it is mentioned in the introduction, the recent literature emphasizes the importance of young firms in job creation. Several empirical studies point out that it is basically the young firms, or the start-ups, who create and destruct jobs in an economy. In this section, we answer this issue via

[7] Once we compare the number of entrants with respect to their sizes, we also see an important decline for micro scale entrants, from 98 percent of all entrants in 2006 to 88 percent at the end of the sample period.

decomposing job creation and destruction for entering, exiting and continuing firms. We present the results in Table 9.

Table 9. Job Creation and Destruction by Entering, Continuing and Exiting Firms (2006-2016)

	Job Creation	Job Destruction	Net Job Creation
Entry	2,573,763	0	2,573,763
Continuing	17,681,418	13,089,779	4,591,639
Exit	0	1,124,018	-1,124,018

Between 2006 and 2016, the net jobs that have been created is around 6,041 million. While the firms have created 20,255 million jobs, they also have destructed a total of 14,213 million jobs. The entering firms have created 2,573 million of the new jobs, which corresponds to 13 percent of the total new jobs. The rest has been created by the continuing firms. Regarding the job destruction, continuing firms are responsible for a total of 13,09 million jobs being destroyed, which makes 92 percent of the total jobs being destructed. Only 8 percent of the destructed jobs has come from the exiting firms.[8] These ratios are consistent with what Bartelsman et al (2009) have found for the developing countries in their study.

The next step is to find out the proportion of job creation and destruction with respect to firm size categories. Table 10 and Table 11 decompose job creation and destruction into size groups by using base year and current average size classification, respectively.

[8] These numbers are in sharp contrast with Atiyas et al (2017), which find a much higher proportion of new jobs being created by the entrants. However, as they also mention, their results are possibly overestimated due to the problematic definition of entering firms in the Business Registers dataset. In fact, when they restrict their sample to 2006-2008, continuing firms' share in net job creation increases dramatically.

Table 10. Job Creation and Job Destruction by Size (base year size classification, 2006-2016)

Number of Employees	Job Creation	Job Destruction	Net Job Creation	%
1 to 2	5,232,267.25	1,408,981.75	3,823,285.50	63.28%
3 to 9	3,945,119.00	2,864,595.25	1,080,523.75	17.89%
10 to 19	2,076,420.00	1,728,536.50	347,883.50	5.76%
20 to 49	2,473,718.25	2,286,591.25	187,127.00	3.10%
50 to 99	1,496,352.00	1,294,641.25	201,710.75	3.34%
100 to 249	1,748,196.25	1,602,283.50	145,912.75	2.42%
250 to 499	1,124,288.00	1,053,112.75	71,175.25	1.18%
500+	2,158,819.50	1,975,054.50	183,765.00	3.04%

Once we classify the size of the firms with respect to their base year size, we find that micro scale firms that employ 1 to 2 employees are responsible for 63 percent of the net jobs created, which is followed by the next size group (3 to 9 employees) which account for 18 percent of the total net jobs created. In other words, firms that employ 10 people or less generate more than 80 percent of the net jobs being created. The correlation coefficient between job creation and job destruction for different sizes is found to be 0,37, which basically implies that these two variables do not move strongly in the same direction. However, these results change dramatically once we adopt the current year average size classification.

Table 11. Job Creation and Job Destruction by Size (current year average size classification, 2006-2016)

Number of Employees	Job Creation	Job Destruction	Net Job Creation	%
1 to 2	2,436,434.75	2,028,564.25	407,870.50	6.75%
3 to 9	4,262,165.50	3,154,380.50	1,107,785.00	18.34%
10 to 19	2,407,543.50	1,769,005.00	638,538.50	10.57%
20 to 49	2,914,805.25	2,089,563.00	825,242.25	13.66%
50 to 99	1,838,882.75	1,244,141.50	594,741.25	9.84%
100 to 249	2,204,321.25	1,493,856.50	710,464.75	11.76%
250 to 499	1,402,407.25	931,427.50	470,979.75	7.80%
500+	2,788,620.00	1,502,858.50	1,285,761.50	21.28%

Table 11 shows that 21 percent of the total new jobs being created comes from the largest firms while the contribution the micro scale firms reduce to 6,75 percent. The second largest contribution to net job creation comes from the firms that employ 3 to 9 people, which creates 18 percent of the total net jobs. Finally, the correlation coefficient between job creation and job destruction for different sizes increases to 0,95. It implies that, once we work with the current year average sizes and categorize the firms accordingly, we find a high degree of employment turbulence within the size groups.

Size and Age Distribution of Net Job Creation

Before we move on to the size and age distribution of net job creation, it will be useful to remind our main findings about firm entries and job creation. We have been observing a decline in the entry rates for the recent years and a stable increase in the exit rates throughout the sample period. The employment shares of new entrants show that, as we move toward the end of the sample, the employment contribution of micro scale start-ups decline sharply while we observe that larger scale start-ups contribute significantly. These new entrants as a whole account for 13 percent of the net jobs that have been created in the economy. Finally, size classification methodologies significantly change the results about the relationship between firm size and job creation and destruction.

Next, we present the size and age distribution of net job creation, which will complement the findings that we summarized above. While Table 12 presents the results for the number of net jobs being created via using two class size methodologies, Table 13 presents the results in percentages of the net jobs being created.

Table 12 shows that a total of 5,89 million net new jobs have been created and start-ups account for 4,84 million of these net jobs. Remember that the number of net new jobs being created at Table 9 was 6,041 million. The difference comes from not being able to identify the age of several firms in the dataset, which we had to exclude from this analysis.

As the last column of the upper panel in Table 12 shows, there is an inverse relationship between firm age and net new jobs being created if we exclude the largest firms. In fact, the contribution of firms between 21 and 25 years old is negative. In addition, for micro scale firms, as they start to age, their contribution to net new jobs at each age category becomes negative.

Comparing the lower and the upper panel of Table 12 shows the importance of the choice of size class methodology on the results. First, if we exclude the young firms, the net job creation by micro-scale firms is negative for all age groups. We find the same result for small scale firms which are older than 10 years.

Table 12. Net Job Creation by Firm Size and Firm Age (2006-2016)

Firm Size (Base Year Size Methodology)

Firm Age	1 to 2	3 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500+	All
0 to 1	2,005,781	1,116,881	464,157	438,758	213,543	230,900	138,119	231,900	4,840,037
2 to 5	871,451	49,904	-30,307	-110,318	-19,086	-26,924	-31,186	-29,681	673,853
6 to 10	433,850	-17,723	-34,894	-58,769	2,783	-16,534	-32,872	-90,351	185,492
11 to 15	222,730	-6,533	-11,149	-31,923	-1,223	-26,515	-12,823	-20,050	112,516
16 to 20	122,052	-7,689	-11,526	-22,082	1,633	-20,124	-13,640	-5,962	42,664
21 to 25	45,122	-12,580	-6,416	-12,446	-2,316	-14,134	-9,689	-5,695	-18,153
26+	32,261	-14,940	-10,011	-4,422	-1,359	-530	16,236	36,503	53,738
All	3,733,247	1,107,321	359,855	198,799	193,975	126,140	54,146	116,663	5,890,146

Firm Size (Current Year Average Size Methodology)

Firm Age	1 to 2	3 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500+	All
0 to 1	849,237	1,394,512	663,541	682,704	358,849	377,833	205,968	307,394	4,840,037
2 to 5	-178,703	-32,608	61,999	146,372	145,551	180,108	116,294	234,841	673,853
6 to 10	-108,873	-99,495	-24,561	24,355	56,536	74,185	73,722	189,623	185,492
11 to 15	-55,657	-57,752	-23,169	-2,105	16,890	31,995	23,722	178,590	112,516
16 to 20	-35,641	-46,295	-18,813	-12,577	13,358	19,664	18,944	104,024	42,664
21 to 25	-15,780	-22,878	-13,130	-11,906	-6,043	-2,696	-4,834	59,114	-18,153
26+	-16,836	-17,684	-9,354	-8,385	-4,244	2,619	8,336	99,286	53,738
All	437,749	1,117,800	636,512	818,459	580,896	683,708	442,152	1,172,872	5,890,146

Table 13. Net Job Creation by Firm Size and Firm Age (2006-2016, % shares)

Firm Size (Base Year)

Firm Age	1 to 2	3 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500+	All
0 to 1	0.34	0.19	0.08	0.07	0.04	0.04	0.02	0.04	0.82
2 to 5	0.15	0.01	-0.01	-0.02	0.00	0.00	-0.01	-0.01	0.11
6 to 10	0.07	0.00	-0.01	-0.01	0.00	0.00	-0.01	-0.02	0.03
11 to 15	0.04	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.02
16 to 20	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
21 to 25	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26+	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
All	0.63	0.19	0.06	0.03	0.03	0.02	0.01	0.02	1

Firm Size – Average

Firm Age	1 to 2	3 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500+	All
0 to 1	0.14	0.24	0.11	0.12	0.06	0.06	0.03	0.05	0.82
2 to 5	-0.03	-0.01	0.01	0.02	0.02	0.03	0.02	0.04	0.11
6 to 10	-0.02	-0.02	0.00	0.00	0.01	0.01	0.01	0.03	0.03
11 to 15	-0.01	-0.01	0.00	0.00	0.00	0.01	0.00	0.03	0.02
16 to 20	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.01
21 to 25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
26+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
All	0.07	0.19	0.11	0.14	0.1	0.12	0.08	0.2	1

Table 13 presents the size and age distribution of net job creation by percentage shares and thus provides a clearer picture. It shows that 82 percent of the net new jobs have been created by newly established firms and firms which are 1 year old. That percentage increases to 93 percent once we include the firms that are 5 years old or younger. There is a strong and negative relationship between the age of the firm and its net job creation. In addition, 63 percent of the net new jobs have been created by smallest scale firms. More importantly, start-ups in that size category creates one third (34 percent) of the net new jobs. More than half of the net new jobs have been created by start-ups that employ less than 10 people.

Once we change our class size methodology and employ the current year average size classification, we see that the contribution of micro-scale firms to net job creation reduces to 7 percent. In fact, if we exclude the start-ups, the micro-scale firms' contribution at each size group

becomes negative. The smallest scale start-ups account for about 850.000 of the net new jobs, which makes 14 percent of the total net new jobs. The importance of start-ups that employ 3 to 9 people further increases once we use current year average size method. This group accounts for almost 1.4 million (24 percent of the total) net new jobs, which is by far the highest contribution among all of the size and age groups. In fact, putting the age aside, the share of this size group (3 to 9 people) in total net new jobs is 19 percent, which is the second highest share in terms of size groups. The largest scale firms have the highest share, where 20 percent of all the net new jobs are created by them. Within this group, the major contribution comes from the youngest firms.

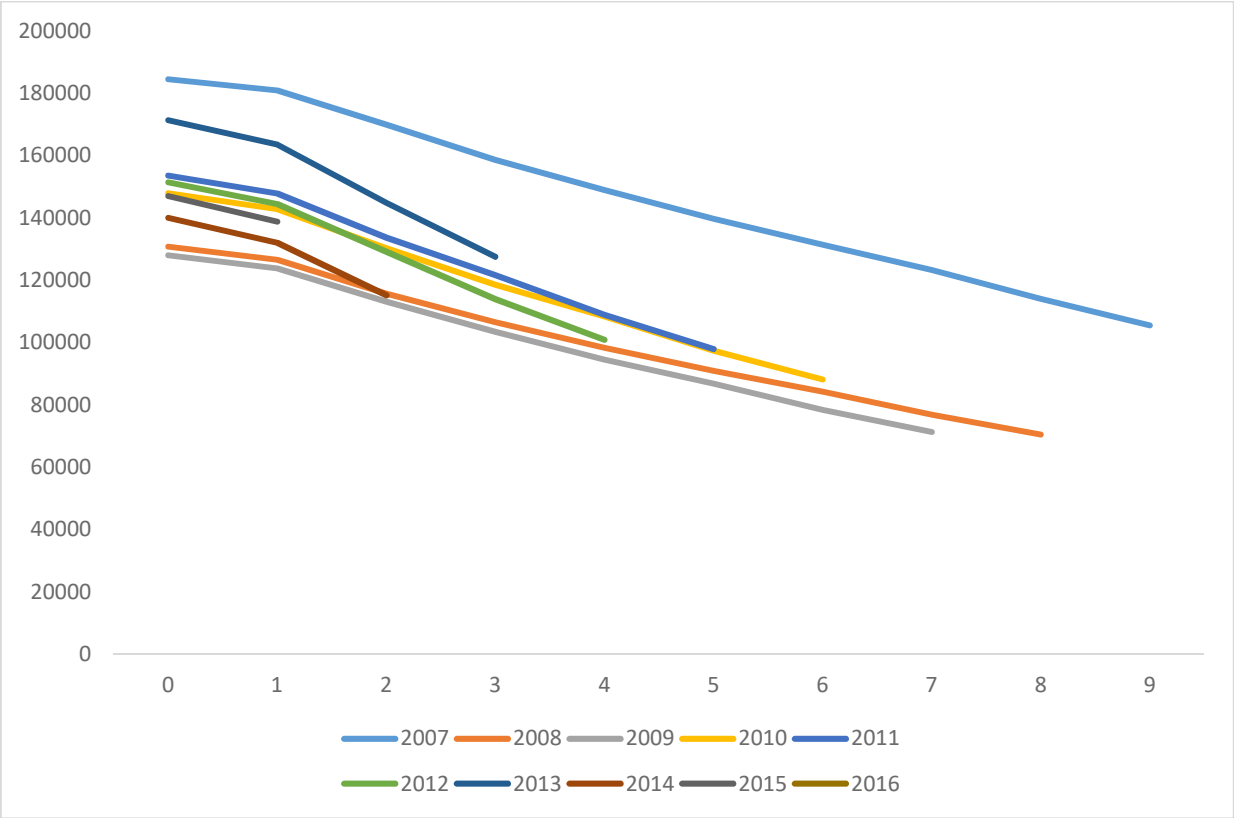
Consequently, the size and the age distribution of the new jobs shows that age seems to be the dominant factor in net new job creation. More than 80 percent of the net new jobs have been created by start-ups of different scales. The contribution of the start-ups with 3 to 9 employees is remarkable.

The results presented above are consistent with the previous literature. Haltiwanger et al (2013) emphasizes the importance of start-ups in net job creation. One important difference in this paper from Haltiwanger et al (2013) and other studies is the critical role of the firms that employ 3 to 9 employees. They do not only have the second largest share of employment, they also contribute significantly to net job creation, especially at their early ages.

5. Survival and Size Transitions

Until now, our main focus was to understand the entry dynamics of the firms and the impact of size and age on job creation. However, we have not analyzed what fraction of these firms continue their life and create net new jobs conditional on their survival. For this purpose, at this section, we first display the survival rates of firms for each year. Then, we observe how these firms evolve over time by looking at their size transition probabilities. In the previous section we saw that small and older firms have negative net job creation compared to their younger counterparts. Such a result implies that, micro and small scale firms that stay in the same size group for a certain period of time lose their competency to create new jobs and face with exit. For this purpose, a size transition matrix may give detailed information about employment growth dynamics of firms over time. Figure 4 reports the survival rates of the entrants for each year.

Figure 4. Survival Rates of the Entrants (all years)



As expected, survival rates for each year follow a similar trend. The only difference is the higher survival rate for the entrants in 2007, which is the first year in our sample. It is also important to note that 57 percent of the entrants in 2007 survive throughout the sample of 10 years. Although we have limited data for the entrants in the following years, on average, 69 percent of the entrants survive at the end of their fifth year.

Quatraro and Vivarelli (2014) state that the survival rates of new firms in developing countries are less than 50 percent within the first five years of their economic activity. These low survival rates are also reported in earlier studies including Geroski (1995), Audretsch et al (1999) and Johnson (2005). Therefore, our findings show that Turkey has one of the highest survival rates of new entrants.[9] It is another question whether it is good in terms of employment growth to have very high survival rates where these surviving firms cannot create jobs or achieve higher productivity. Our paper is silent on this issue.

[9] It is important to understand the factors that lead to higher survival rates. Many studies such as Agarval and Audretsch (2001) have found a positive relationship between start-up size and survival. We do not answer this very important question about birth at size and survival in this paper.

Next, we look at the 5-year size transition matrix of firms between different size groups. We display the transition probabilities that we obtained based on current year average size classification methodology.

Table 14. 5-year Size Transition Matrix (average, current year average size classification)

Size	Exit	1 to 2	3 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500+
1 to 2	22.91%	**58.65%**	16.03%	1.58%	0.64%	0.12%	0.06%	0.01%	0.01%
3 to 9	14.59%	22.52%	**49.54%**	9.94%	2.91%	0.35%	0.12%	0.02%	0.01%
10 to 19	10.61%	12.05%	21.62%	**32.89%**	20.04%	2.06%	0.61%	0.09%	0.04%
20 to 49	8.94%	9.71%	8.24%	12.93%	**43.77%**	12.48%	3.42%	0.39%	0.12%
50 to 99	8.79%	8.82%	4.89%	4.30%	16.60%	**30.25%**	23.03%	2.70%	0.61%
100 to 249	7.13%	7.00%	3.59%	2.55%	5.55%	11.80%	**43.63%**	15.36%	3.39%
250 to 499	5.70%	5.44%	2.64%	1.70%	2.73%	3.73%	15.75%	**39.12%**	23.20%
500+	4.73%	3.21%	2.50%	1.34%	1.82%	2.03%	3.73%	10.85%	**69.79%**

We see that almost 23 percent of the micro scale firms (1 to 2 people) exit within five years and 59 percent of them stay in the same group. In other words, 81 percent of the micro scale firms either die or cannot grow at the end of five years while only 19 percent of them can jump into the next size group. This result is fairly important since we already know that net job creation of micro and small scale enterprises turns out to be negative after their first years.

As the size of the firm increases, the probability of exit in the first five years also goes down, as expected. Another important result is for the firms that employ 3 to 9 people. It should be reminded that, this group was the second largest size group in terms of net job creation, regardless of the size classification. While almost half of these firms stay in the same group, 22,5 percent of them reduce their employment size and start to employ 1 to 2 people while 14,5 percent of them exit. As a result, only 15 percent of the firms in that group jump to a higher size category. We see more or less the same pattern for small scale firms that employ 10 to 19 people. While one third of these firms stay at the same size group, 44 percent of these firms either shrink in size or exit.

Table 14 also supports one of our previous arguments about why firms prefer to stay in a certain size group. As we mentioned earlier, the government' size classification of enterprises also determines the regulations and the subsidies that these enterprises are subject to. Moving up to a higher size classification will also bring important adjustment and transition costs. Therefore, we could expect an accumulation of firms at the employment thresholds. In fact, once we look at the probabilities of staying at the same size group, we see that firms which employ less than 10 people,

less than 50 people and less than 250 people have significantly higher probabilities than their successors. This finding is further supported by looking at the medium scale firms that employ 50 to 99 people and large scale firms that employ 250 to 499 people. The probability that the firms in these groups will jump to the next higher class size (but stay in the same official size classification) is remarkable, which is 23 percent for both size groups.

6. REGRESSION ANALYSIS

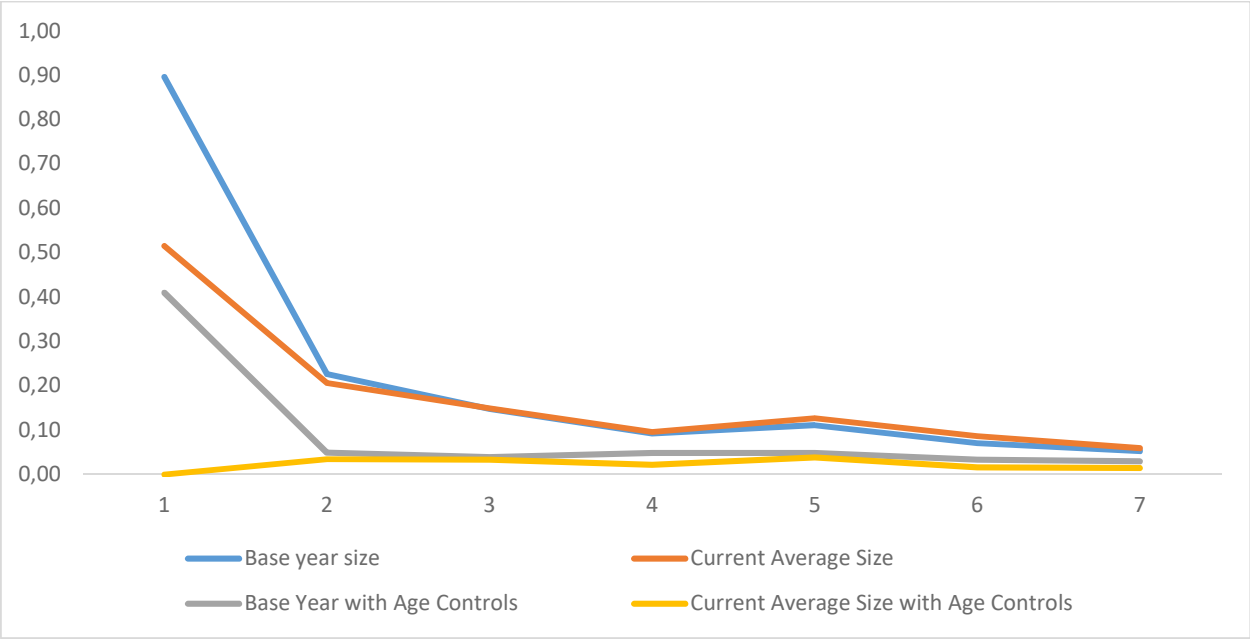
In this section, we conduct a non-parametric regression analysis to understand the impact of size and age on job creation. Consistent with Haltiwanger et al (2013), we estimate a fully saturated dummy variable model where we regress net employment growth at the firm level on firm size classes by themselves, on firm age classes by themselves and their interaction.[10] Since we want to understand the effect of firm size (age) on net employment growth after controlling for the firm age (size), we basically compute the partials of firm size (age) from a model that holds the age (size) distribution of employment constant at the sample mean. For this purpose, we have to choose a baseline group to compare the differences that each size and age group has on employment growth. For that purpose, we take the largest (500+) and the oldest (26+) as our baseline group. Finally, based on the literature about the "regression fallacy" problem or the regression-to-the-mean effect, we use both base-year size classification and current year average size classification during the regression analysis.

Net employment growth and firm size

Due to the large number of estimated coefficients, we use figures to display the estimated coefficients for each model. We have four alternative models: base year size classification with no control for the age effect, current year average size specification with no control for the age effect, base year size classification with control for the age effect and finally current year average size specification with control for the age effect. We run the regression models first for all the firms in the sample. Then, we restrict the sample to continuing firms only to understand how excluding start-ups and firm exits affect the estimation results. Figure 5 shows the relationship between net employment growth and firm size for all firms under four alternative models.

[10] As Angrist and Pischke (2009) discuss, fully saturated dummy variable models can be conveniently used in case of a bounded or limited dependent variable. For a further discussion on the regression methodology that we use here, see Haltiwanger et al (2013) and the references therein.

Figure 5. Relationship between net growth and firm size (all firms)



Once we use base-year size classification and do not control for age (blue line), we see that the average annual rate of net employment growth in micro scale firms (1 to 2 employees) is 90 percentage points higher than our baseline group. The growth premium for other size groups (in ascending order) are 23, 15, 9, 11, 7 and 5 percentage points, which indicates a strong and negative impact of firm size on net employment growth, even after excluding the smallest size firms.

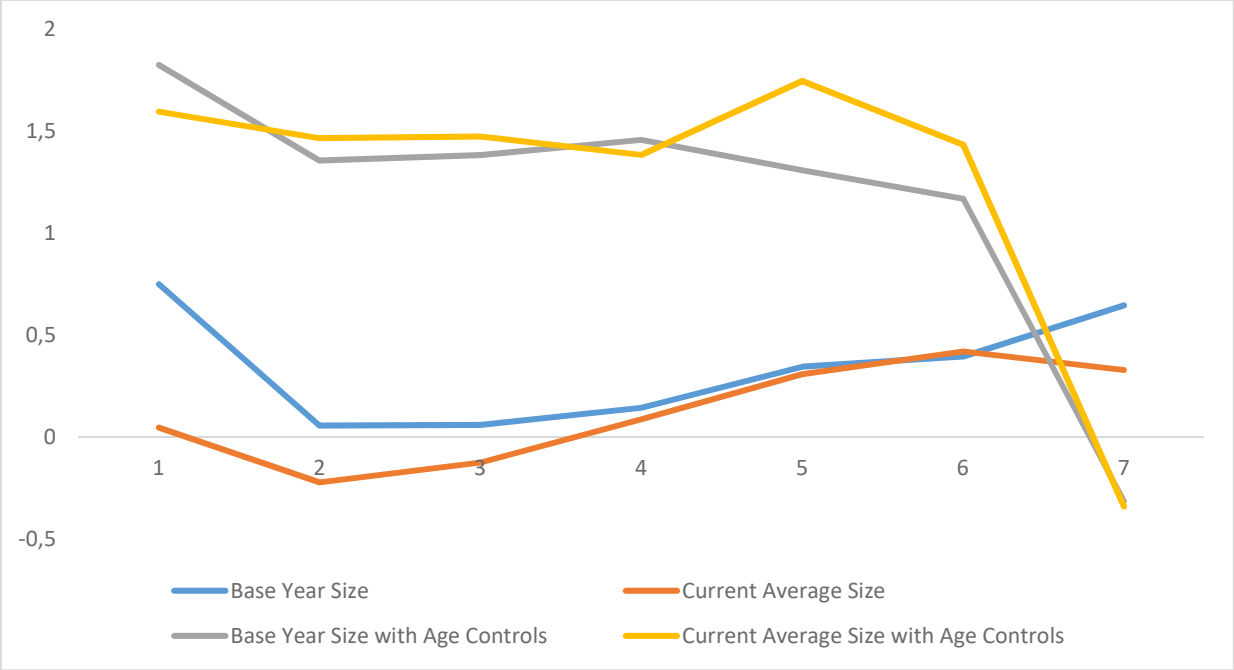
Once we use current year average size classification but do not control for age (orange line), we still observe the same negative relationship between the firm size and the employment growth. While we see a less significant growth premium for the smallest size class (the growth rate difference decreases from 90 percentage points to 52 percentage points), the growth differences for other size classes do not change much. Such a finding implies that regression-to-the-mean effect is pronounced only for firms in the smallest size category.

On the other hand, after controlling for the firm age and using the base-year size classification (grey line), the growth difference between the smallest size class and our baseline group becomes even less. For other size groups, the differences are minor and the inverse relation that we found between firm size and employment growth before further weakens. Finally, if we use the current average size classification and control for age (yellow line), the inverse relationship that we found for all of the above specifications disappear. In fact, we find that while other size groups have minor and positive growth premium, there is no growth difference between the smallest size

group and our baseline group. Consequently, the estimation results confirm the importance of controlling for the firm age while trying to understand the link between firm size and employment growth.

Next, we show the estimation results when we restrict the sample to continuing firms only. As Figure 6 shows, after excluding the start-ups from our sample, the regression results and thus the relationship between the net employment growth and firm size changes to a significant extent. The estimation results are displayed in Figure 6.

Figure 6. Relationship between net growth and firm size (continuing firms)



First, when we do not control for the age of the firm (blue and orange lines), size classification becomes important not only for the smallest size classes but for most of the other size classes as well. We observe a difference between the estimated coefficients that are obtained by using base year size and current year average size. This is kind of surprising since we exclude the start-ups from our sample, which are expected to increase their employment most rapidly compared to other age groups. As we mentioned before, Davidsson et al (1998) argue that base year and current year average size classifications yield very different outcomes in case of temporary employment fluctuations. If the start-ups, including the larger ones that make significant contributions to employment growth, are assumed to generate mostly permanent employment, excluding them from the sample may result in a remarkable difference in the estimated coefficients that are obtained by using two different size classifications.

In addition, we see a positive relationship between net employment growth and firm size after we exclude the smallest size class. Thus, it seems that the start-ups are accountable for the the

negative relationship between firm size and net job creation once we included all the firms. Excluding these start-ups of different scales will change the nature of the relationship between firm size and net job creation.

We get more interesting results for continuing firms when we control for the firm age. Regardless of the size methodology, the growth difference between different firm sizes and our reference group becomes much larger. It may be the case that once we exclude the largest start-ups, which generates the highest net jobs in their size group, and control for the age factor, which, disproportionately and positively affects the employment growth for this group, the growth premium between all other sizes and our reference group increases.

In addition, for continuing firms, once we control for the firm age, size classification does not matter for most of the size groups. This is expected since we are ruling out the role of start-ups which generate most of the employment fluctuations and also we control for age. Finally, we do not find a clear pattern between size categories and the employment growth especially for small and medium scale firms. This finding supports Gibrat's Law, which predicts that firm size and employment growth are not necessarily related.[11]

Net employment growth and firm age

Next, we show estimation results for the effect of firm age on net employment growth after we control for the size of the firms. We present only the estimated coefficients from the regression model which uses current average size classification and controls for age. Similar to the previous case, we use figures to display the estimated coefficients, first for all firms and then for continuing firms.

[11] Several papers, including Lotti et al (2006, 2009) and Daunfeldt and Elert (2013) have shown a Gibrat-like behavior among the surviving most efficient firms. However, in our case, it would be a very strong statement to say that the continuing firms (excluding the start-ups and firms that exit) may have approached their efficient scale of production and resembling a Gibrat-like behavior.

Figure 7. Relationship Between Net Employment Growth and Firm Age (All Firms)

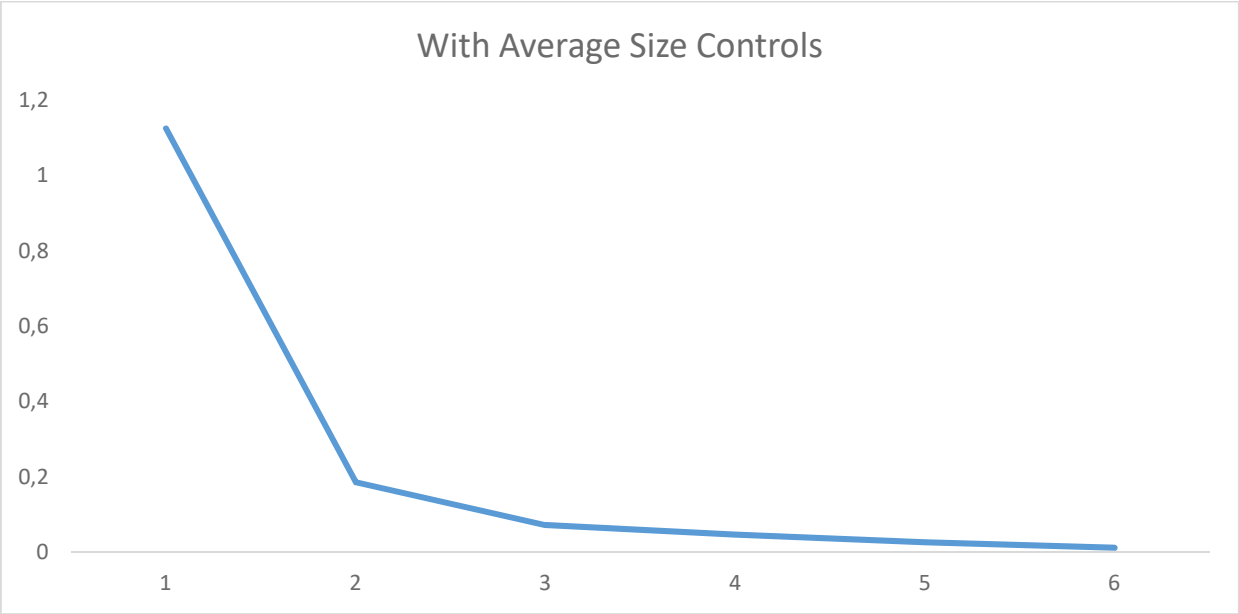


Figure 8. Relationship Between Net Employment Growth and Firm Age (Continuing Firms)

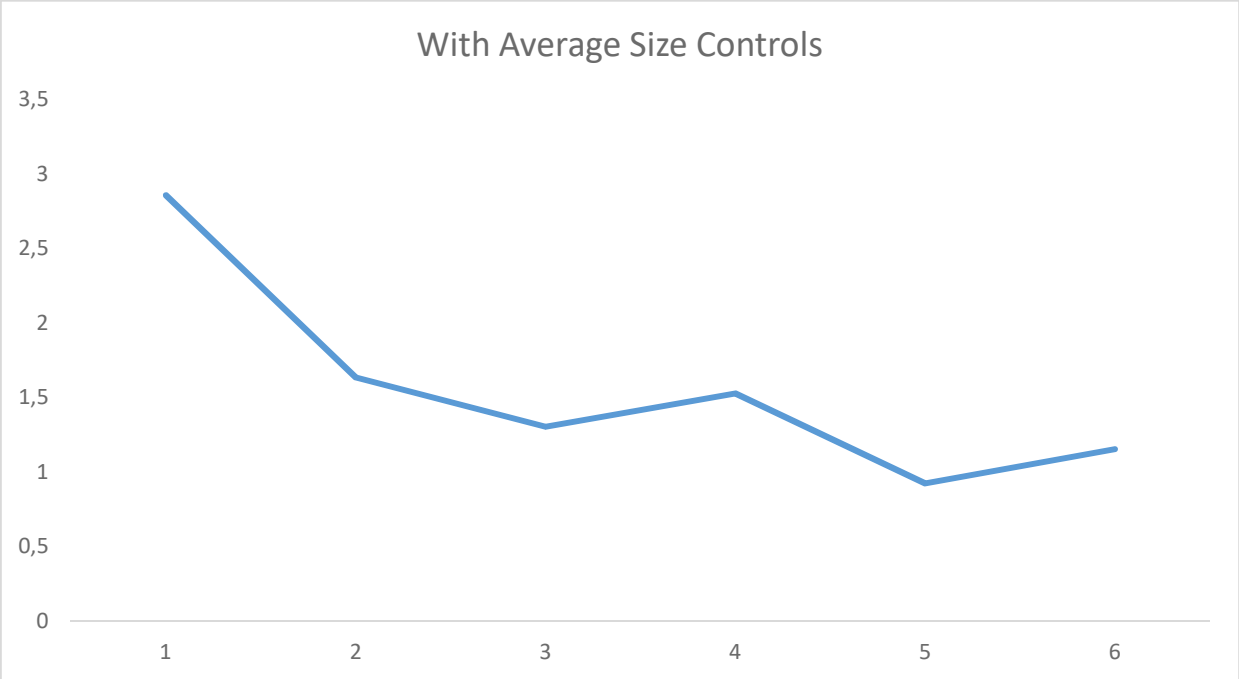


Figure 7 shows the results when we include all the firms in the sample. As expected, after controlling for the size, the estimated coefficient for the start-ups are much higher, supporting the claim that youngest firms contribute disproportionately to employment growth. The net

employment growth rate difference between the start-ups and the oldest firms, which is also the baseline group in our analysis, is 112 percent. Even after we take out the estimated coefficient for the smallest size and look at the relationship between firm age and net employment growth, we still observe a mild and negative relationship. This finding is strongly supported by Figure 8, where we restrict the sample to continuing firms only. We observe the same inverse relationship, with coefficients taking much larger values. It seems that, conditional on survival, young firms generate higher employment growth rates than their older counterparts.

7. CONCLUSION

This paper contributes to the growing literature about the relationship between firm characteristics and job creation in developing countries by analyzing Turkey with Entrepreneurship Information Dataset, which does not suffer from the main problems of the previous studies, such as defining firm age, including start-ups, working with firm-level (instead of establishment-level) data and analyzing a broader time span. Our data set is annual data, which categorizes firms into 8 size classes and 7 age classes. Our main findings can be summarized as follows:

i) Although there have been an additional 553000 new firms between 2006 and 2016, we observe a significant downward trend in new entrants and an upward trend in exits as we move towards the end of the sample. The growth rate in the number of employment exceeds the number of firms, which increases the average number of employees from 6,34 to 8 at the end of the sample period as a result.

ii) Due to this slowdown in the net entry rates, there is a rightward shift in the age and the size profile of firms. We observe dramatic declines in the shares of young/small firms and young/large firms. Especially the aging in the size group that employs 3 to 9 people is important in the sense that the young firms in this size group contribute positively to net job creation while it turns out the other way around as the firms at this size group get older.

iii) Its negative and significant correlation coefficient between entry and exit rates makes Turkey a counter example for the literature on “turbulence effect”. This finding is disappointing since it implies that mechanisms of displacement and creative destruction are not in effect.

iv) Another surprising finding, which is also controversial with the literature is the dramatic decline in the share of micro-scale entrants in total employment generated by the entrants only. While micro-scale entrant firms account for more than 60 percent of total employment in 2006, their share goes down to around 25 percent in

2016. By the end of the sample period, each size category has almost the same share in total employment generated by the new entrants. In fact, once we compare the number of entrants with respect to their sizes, we also see an important decline in the share of micro scale entrants. These entrants account for 13 percent of the total new jobs while exiting firms are responsible for 8 percent of the destructed jobs.

v) There is an inverse relationship between firm age and net new jobs being created if we exclude the largest firms. In addition, for micro scale firms, as they start to age, their contribution to net new jobs at each age category becomes negative. More than 80 percent of the net new jobs have been created by the new firms.

vi) Although we have a robust understanding about the impact of firm age on employment, the relationship between firm size and employment is more complex. The methodology for classifying firm size is critical and it can change the results about the relationship between firm size and employment growth to significant extent. Once we use current year average size classification instead of base year size classification, the impact of smallest scale size groups on employment declines significantly. However, regardless of the size classification, young firms that employ 3 to 9 people contribute significantly to net job creation.

vii) Turkey has one of the highest survival rates of new entrants compared to other developing countries. Although we do not discuss the costs and the benefits of high survival rates and the "up-or-out" dynamics in this paper, the fact that old firms become significantly slower in generating employment growth should be taken together with high survival rates.

viii) The size transition matrix shows that as the size of the firm increases, the probability of exit in the first five years also goes down. 23 percent of the micro scale firms (1 to 2 people) exit within five years and 59 percent of them stay in the same group. Only 19 percent of them can jump into the next size group within the first five years. This percentage even goes down to 15 percent for the firms that employ 3 to 9 people. This result is important since we already know that net job creation of micro and small scale enterprises turns out to be negative after their first years.

ix) There is a significant accumulation of firms at the size thresholds, which implies that firms delay their promotion to a larger firm size because of the incurred administrative and adjustment costs. Both the size distributions and the size transition probabilities support this finding.

x) The choice of size classification and controlling for the age of the firm significantly changes the regression results about the effect of firm size on employment growth. Unless we use both current year average size classification and age factor together, we

find that smaller firms contribute more to employment growth. Even after we control for age, as long as we use base year size classification there is a positive effect of being on the smallest size group on employment growth. However, once we control for age and account for the regression-to-the-mean effect, there is no positive effect of being a small firm on employment growth.

xi) We get more interesting results once we restrict the sample to continuing firms and run the regressions. There is a positive relationship between net employment growth and firm size if we omit the smallest size class. We conclude that it is basically the start-ups, which derived the negative relationship between firm size and net job creation once we included all the firms.

xii) Finally, the regression results also show that youngest firms contribute disproportionately to employment growth. The net employment growth rate difference between the start-ups and the baseline group exceeds 100 percent. Moreover, the impact of firm age on employment growth remains robust even when we exclude the start-ups and restrict the sample to continuing firms only.

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