Leibniz Institute for
EAST AND SOUTHEAST
EUROPEAN STUDIES

Arbeitsbereich Ökonomie

IOS Working Papers

No. 402 October 2023

Job creation and job destruction in Turkey: 2006–2021

Sinem H. Ayhan [*], Hartmut Lehmann [**], and Selin Pelek [***]

[*] Leibniz-Institute for East and Southeast European Studies (IOS) & IZA. Address: Landshuter Str. 4, 93047 Regensburg, Germany. Email: ayhan@ios-regensburg.de; [**] Leibniz-Institute for East and Southeast European Studies (IOS), University of Regensburg & IZA, Address: Landshuter Str. 4, 93047 Regensburg, Germany. Email: lehmann@ios-regensburg.de; [***] Galatasaray University & GIAM. Address: Ciragan Cad. No:36, 34349 Ortaköy/Istanbul, Turkey. Email: spelek@gsu.edu.tr.

Leibniz Institute for
EAST AND SOUTHEAST
EUROPEAN STUDIES

Landshuter Straße 4
D-93047 Regensburg

Telefon: (0941) 94354-10
Telefax: (0941) 94354-27
E-Mail: info@ios-regensburg.de
Internet: www.leibniz-ios.de
ISSN: 2199-9465

Contents

List of Tables

List of Figures

Abstract

This paper examines the dynamics of Turkey's labor market using job flow analysis. We analyze administrative data from 2006 to 2021, encompassing all non-financial firms and their employees registered with social security institutions, to examine employment dynamics during various periods, including significant shocks like the 2008 global recession, the local currency collapse in late 2018, and the first two years of the COVID-19 pandemic. We examine how an extended set of firm characteristics influences employment structure dynamics. Turkey's labor market is highly dynamic, with job reallocation rates ranging from 34% to 44%, surpassing Anglo-Saxon nations and significantly exceeding transition countries, but having similar rates of developing countries. High excess job reallocation rates reveal substantial and genuine job structure changes in Turkey, especially notable in the construction sector, where job creation persistence is remarkably low. Micro firms (up to 10 employees) dominate job creation and destruction, with declining job flow rates as firms grow larger or older. Low-tech industries in manufacturing display a similar pattern, contributing significantly to job creation and destruction. Firms strongly engaged in imports and/or exports also contribute more to job creation and job destruction compared to those with low exposure to international trade.

JEL-Classification: E24, J08, J23, J63, L25, L26

Keywords: Job creation, job destruction, firm characteristics, administrative data, Turkey

We would like to thank Ugur Aytun and Seyit Mümin Cilasun for the technical feedback that improved our understanding of the EIS database considerably. We also thank participants of an IOS seminar for helpful suggestions. The usual caveat applies.

1 Introduction

Labor market dynamics are fundamental in optimizing the allocation of resources and fostering the growth of productivity. Focusing on the demand side of labor market dynamics, the reallocation of resources from less efficient to more efficient firms can substantially enhance productivity. This resource reallocation happens when firms enter, or exit the market, expand, or reduce employment, leading to shifts in their market shares. Notably, the entrance or expansion of firms results in job creation, while their exit or contraction entails job destruction. Consequently, productivity gains stem from both the job creation of efficient firms and the job destruction of less efficient ones (Roberts & Tybout, 1997).

Although the connection between resource reallocation and productivity gains is well-documented in the literature[1], the understanding of labor market dynamics related to firms remains limited in developing countries, primarily due to data constraints (Flórez et al., 2021). As highlighted by previous studies, job creation and job destruction are also the primary factors influencing employment dynamics and the equilibrium level of unemployment (Hijzen et al., 2010). We contribute to the literature on developing and emerging economies by offering insights into Turkey, classified as an emerging and middle-income country by the IMF (2023). This is achieved through the analysis of an administrative dataset covering all nonfinancial private enterprises from 2006 to 2021.

The existing literature, which primarily originates from developed economies like Canada, the U.S., and the U.K., inter alia sheds light on job reallocation trends and maintains the existence of an inverse correlation between firm size and net employment growth (e.g., Baldwin et al., 1998; Haltiwanger et al., 2014; Heyman et al., 2018; Hijzen et al., 2010; Lawless, 2014; Neumark et al., 2011). However, a counter perspective by Davis et al. (1996) claims that large firms, rather than small ones, contribute significantly to job creation. The limited evidence from developing countries on job creation and job destruction including Argentina, Chile, Colombia, Mexico, and Morocco suggests a very significant job turnover rate, even surpassing that of the U.S., whose labor market is often considered a benchmark due to its flexible and vibrant nature. The studies on developing countries further confirm that job flows are higher for small firms (Cho et al., 2017; Flórez et al., 2021; Haltiwanger et al., 2014; Roberts & Tybout, 1997). There

[1] See, e.g., Roberts & Tybout (1997) for an overview of the early pertinent literature.

is also some evidence on transition economies pertaining to the first decade of transition, which consistently proposes a lower degree of job reallocation compared to industrialized countries (see, e.g., Faggio and Konings, 2003; Konings et al., 1996, Konings et al. 2003; Acquisti & Lehmann, 2000; Brown & Earle, 2002).

Our study also contributes to the general literature on job flows for three reasons. First, most of the cited studies are based on data from the manufacturing sector only, which is generally considered to be the least dynamic sector, and thus may not accurately reflect the degree of job reallocation for the entire economy. In line with this, Hijzen et al. (2010) document a significantly higher rate of job reallocation in the U.K. when they incorporate services in their analysis. Our paper analyzes the distribution of job creation and job destruction across all non-financial sectors and over time and compares the contribution of entry and exit of firms relative to expansion and contraction of existing firms. Second, the long time span of our dataset enables us to analyze labor market dynamics during both "normal" periods and in times of significant negative shocks, such as the Great Recession (2008–2009), the currency collapse in late 2018, and the initial two years of the COVID-19 pandemic (2020–2021). Third, prior research that discusses firm attributes as drivers of job flows has mainly concentrated on firm size and, in the case of the transition literature, has additionally focused on ownership type; our study encompasses a wide set of firm attributes and looks besides size at age, sector, regional location, export and import intensities as well as the technological level of production in the manufacturing sector. Our data enable us to shed some light on the impact of these factors that have received very limited attention in the literature even though they strike us as pivotal for firm productivity and employment dynamics.

Our study adopts the widely used job flow metrics formulated by Davis & Haltiwanger (1992). The results underscore the existence of a dynamic labor market in Turkey, with annual gross job reallocation rates ranging from 34% to 44% between 2007 and 2021. These figures align with rates in developing countries like Chile, Colombia, and Morocco, surpass those in Anglo-Saxon economies and are substantially higher than in transition countries. Notably, persistently high excessive job reallocation rates point to a substantial reshuffling of the Turkish job structure. There is a noticeable divide between western and eastern regions, with Istanbul, the major region of employment, contributing the most to job creation, but also to job destruction.

Our evidence demonstrates that during economic downturns job creation lags behind job destruction. This was particularly evident during the currency crisis. Turkey's construction sector, with growth rates surpassing GDP growth, is sensitive to downturns (Başlevent, 2016; Günlük-Senesen et al., 2013; Yilmaz & Yilmaz, 2019). More than half of the sector's jobs were lost in 2019, underlining its susceptibility to significant shocks. Job turnover in construction averaged over the years is high, with more destruction than creation and 70% of annual job reshuffling. The unstable nature of construction jobs is also evident in the considerably lower persistence rate of created jobs.

While the role of small firms in job creation has been extensively studied in developed countries, such research is limited for countries like Turkey. Turkish micro firms, accounting for most job growth, maintain this prominence even when controlling for age and other factors. Job flow rates decrease steadily as firms grow larger or older, and jobs created by micro and small firms are less likely to persist compared to those created by larger firms. Interestingly, this pattern does not apply to jobs created by startups, as their persistence rate is higher than that of their older counterparts.

Low-technology industries dominate the Turkish manufacturing sector, as they are responsible for the largest share of created and destroyed jobs. Their higher rate of excess job reallocation and lower rate of job creation persistence underscore the unstable nature of these low-productivity jobs. Finally, we find that firms highly engaged in both imports and exports also contribute more to job creation and destruction compared to those with low exposure to international trade. On the other hand, the regression results suggest no consistent connection between export intensity and job reallocation rates. In contrast, import intensity is estimated to be positively correlated with reduced job creation and heightened job destruction. Further investigation is needed to unravel the interplay of foreign trade and technology intensity in shaping employment dynamics.

The next section presents our data sources and discusses their strengths and weaknesses, followed by a presentation of the job flow metrics that are standard in the literature. Section 3 presents our results, starting off with the job flows for the entire economy, then turning to outcomes by region and finally honing in on a battery of results linked to firm attributes. A final section provides some conclusions.

2 Data and measures

2.1 Data

The empirical analysis makes use of a sixteen-year panel dataset of the universe of nonfinancial private firms and their employees registered in administrative records of the Turkish economy. The database is constructed by the Ministry of Science, Industry and Technology (MoSIT)[2] compiling administrative datasets from various public institutions, including the Ministry of Trade, Revenue Administration, Social Security Institution (SSI), Scientific and Technological Research Council of Turkey, Turkish Patent and Trademark Agency, Small and Medium Enterprises Development and Support Administration, and Turkish Statistical Institute (TURKSTAT). Those different sources of data have been integrated into the *Entrepreneur Information System (EIS)* resulting in a panel covering the years 2006–2021 (MoSIT, 2023).

The main data source for tracking job flows is the *Business Registers* provided by the Revenue Administration. This annual dataset focuses on enterprises as the unit of observation. Following the common practice in the literature, we exclude the self-employed, namely one-person enterprises[3] from the analysis given that they are not considered a firm that by definition grows and contracts by the hiring and firing of dependent workers (Burgess et al., 2000; Flórez et al., 2021; Hijzen et al., 2010). The firm-level data includes *yearly* information on the year of establishment, starting date,[4] geographical location (NUTS1 level), and economic sector (4-digit ISIC and NACE rev 2), as well as *quarterly* information on the number of employees. These pieces of quarterly information enable us to evaluate job flows based on quarterly measures, besides the annual analysis.

[2] This microdata is only accessible at the data center of the MoSIT upon the protocol signed between the Ministry and the Institution to which the researchers who request the data are affiliated. Extraction of the dataset is not allowed under any circumstances due to confidentiality principles.

[3] We consider one-person enterprises that do not expand and do remain in one-person size over the entire panel period as self-employed and they are excluded from the sample of analysis.

[4] While the *year of establishment* refers to the year when the firm was founded, the *starting date* tells us the year, month, and day when the firm began operating. Because the latter variable has many missing values, we rely on the year of the establishment while computing the age of the firm and use the information on the starting date only if the year of establishment is not reported and/or is clearly mis-recorded (e.g., if recorded as a year coming after the survey year).

The EIS database combines those basic firm characteristics with information on the technology level from the MoSIT and foreign trade statements from the Ministry of Trade. The technology level, reported only for the manufacturing sector, involves four categories of low-, medium-low, medium-high, and high-tech firms based on the ISIC Rev.3 classification (OECD, 2011). Foreign trade statements provide information on the type, quantity, and value of imports and exports. We should note, though, that this information refers to trade in goods only. We exploit this additional data to analyze the role of technology and foreign trade in employment dynamics.

Table 1: Description of the EIS sample of analysis, 2006–2021

	Firms	Entrants	Exiters	Total Employment				Average employment			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2006	1.110.500			5.834.939	6.317.208	6.564.838	6.912.476	5,25	5,69	5,91	6,22
2007	1.302.877	243.214	50.837	6.694.669	7.134.817	7.251.055	7.101.698	5,14	5,48	5,57	5,45
2008	1.391.626	171.819	83.070	7.308.086	7.801.716	7.774.966	7.513.178	5,25	5,61	5,59	5,40
2009	1.456.606	167.608	102.628	7.105.724	7.471.607	7.546.384	7.598.200	4,88	5,13	5,18	5,22
2010	1.534.768	191.018	112.856	7.662.303	8.251.916	8.440.549	8.498.419	4,99	5,38	5,50	5,54
2011	1.615.988	200.279	119.059	8.671.130	9.303.200	9.560.091	9.502.346	5,37	5,76	5,92	5,88
2012	1.694.233	203.894	125.649	9.814.508	10.443.349	10.555.170	10.367.211	5,79	6,16	6,23	6,12
2013	1.807.388	242.038	128.883	10.515.590	11.049.440	11.155.473	10.952.791	5,82	6,11	6,17	6,06
2014	1.884.832	210.430	132.986	11.143.615	11.638.884	11.816.350	11.605.896	5,91	6,18	6,27	6,16
2015	1.909.758	213.258	188.332	12.223.804	12.752.826	12.656.901	12.626.686	6,40	6,68	6,63	6,61
2016	1.915.929	186.349	180.178	12.414.658	12.568.485	12.466.232	12.340.691	6,48	6,56	6,51	6,44
2017	2.055.633	296.988	157.284	13.024.683	13.433.814	13.981.053	13.792.293	6,34	6,54	6,80	6,71
2018	2.144.549	255.106	166.190	14.001.832	13.791.192	13.816.286	13.146.187	6,53	6,43	6,44	6,13
2019	2.251.535	207.599	100.613	11.823.503	12.164.212	12.466.933	12.268.386	5,25	5,40	5,54	5,45
2020	2.112.301	206.802	346.036	12.907.626	12.980.783	13.580.817	13.618.405	6,11	6,15	6,43	6,45
2021	2.094.724	119.870	137.447	14.309.240	14.716.940	14.709.686	14.631.955	6,83	7,03	7,02	6,99

Note: Columns 1 to 3 display the number of total, entering and exiting firms, respectively. Columns 4 to 7 provide information on the total number of employees per quarter, while columns 8 to 11 indicate the average number of employees per firm per quarter. The abbreviation 'Q' represents quarter, with Q1 indicating the first quarter, and Q2, Q3, and Q4 defined similarly.

Table 1 presents the annual counts of firms, including the total number of firms, the number of new entries and exits, along with their total and average employment figures for each quarter. The results presented in this, and subsequent tables pertain to the sample of analysis, which excludes one-person enterprises that do not expand over the entire panel period (i.e., self-employed enterprises). With an approximately one-million increase from 2006, the number of firms in our sample reaches 2.1 million in 2021. Despite the overall upward trend in the total

number of firms over the panel period, we observe a decline between 2019 and 2020. This decline can be attributed to a significant increase in the number of exiting firms during the same period and a noticeable decrease in the number of new entrants from 2017 onwards. Like with the number of firms we also observe a similarly large increase in total employment across years. As of 2021, around 14.5 million employees, i.e., wage earners, were reported in the SSI records, which was more than double the number in 2006. The average firm size fluctuates around 5 to 7 employees during the analyzed period.[5]

The EIS database stands out as one of the pioneering datasets, not only among emerging economies but also industrialized countries. Its richness, extensive panel duration, and comprehensive coverage of the entire economy and all enterprises make it unique in its kind. Nevertheless, it also has some limitations. First, similar to other administrative datasets, the EIS only provides information on registered firms. An exit from the data may be either due to firm closure or because the firm continues its operations without registering with the SSI[6] (Acar et al., 2019). The implication of dropping out of the panel for a worker is to become non-employed (i.e., unemployed, or inactive) or to transit into informal (i.e., unregistered) employment. The share of informal employment in Turkey is not negligible. As of December 2021, about 28% of total employment is informal and the ratio is recorded as 18.3% in the non-agricultural sector (TURKSTAT, 2022c). Since there is no information on informal employment in the EIS data, when there is a movement from formal to informal employment, a shortcut approach would be to assume a transition into non-employment. Considering the relatively high share of informal employment, this approach is likely to result in a downward bias in job-to-job transitions (Akgündüz et al., 2019). On the other hand, Tansel & Acar (2017) examine labor market transitions in Turkey through a survey panel dataset.[7] They document a substantially low

[5] The rise in the number of firms and employment between 2006 and 2021 in our data set is, of course, due to an increase in registration by firms. However, when comparing, e.g., the distribution of firms by region, sector, size, and technology level for 2006 and 2021 we find quite similar distributions (see the left panels in Tables 5, 6, 8, and 14). Hence, the rise in the number of firms and employees should in our opinion not suggest a changing data generation process over time.

[6] Firm informality is not as widespread as labor informality in Turkey. Merely 4% of firms are estimated to be unregistered, which is significantly lower when compared to the approximately 30% of informal employment (Gulek, 2022).

[7] EIS data has several advantages over survey data including the Household Labor Force Survey (HLFS) and Survey of Income and Living Conditions (SILC) for an analysis of labor market transitions. First, HLFS does not have a panel structure; rather it includes retrospective information on employment status only with respect to the previous year. Although SILC is a longitudinal dataset, it is a rotating panel and is only limited to a four-year period. Contrary to the annual structure of the survey datasets, the EIS database allows for a flow analysis on a

transition probability from formal to informal employment (3 to 5%) when compared to the probability of 7 to 14% flowing into non-employment and about 80 to 90% of staying in formal employment across the four-year panel period that they have at their disposal.[8]

Another limitation of the EIS data is that it does not cover employees in the public sector. Given the possibility of finding a job in the public sector, this limitation constitutes a potential source of upward bias in transitions between employment and non-employment as in the case of informal workers. Using the 2018–2021 panel survey of Income and Living Conditions (SILC), we examined the probabilities of job-to-job transitions between private and public employment. Only 4 percent of public employees reported being in a different job in the previous year. Additionally, transitions from public to private sectors (and vice versa) were found to be extremely low, at less than 2 percent. Given these findings, the downward bias in job-to-job mobility due to flows into public employment is not expected to be a worrisome issue for the current analysis.[9]

2.2 Measures of job flows

Following the formula introduced by Davis & Haltiwanger (1992) the net employment growth rate of a firm between *t–1* and *t* is defined as:

$$g_{it} = \frac{n_{it} - n_{it-1}}{1/2(n_{it} + n_{it-1})} \quad (1)$$

where n_{it} refers to the employment of firm i at time t. Dividing the employment change by average employment constrains the growth rate g_{it} to the interval [–2, 2]. It is straightforward to see that g_{it} being symmetric about zero equals –2 in the case of firm exits and 2 for entering firms.

quarterly basis over a sixteen-year period for job reallocations. Furthermore, the EIS data cover a universe of private firms and their employees, unlike HLFS and SILC both of which survey household members for a representative sample of the working-age population.

[8] Using the recent waves of the same panel survey, SILC, we calculated the probability of transitioning from formal to informal employment. For the years 2016-2021, this probability ranged between 3% to 5%, confirming the findings of Tansel & Acar (2017).

[9] In line with our findings, Akgündüz et al. (2019) sought to comprehend the extent of bias in the EIS data by examining annual job-to-job transitions. They utilized the 2016 Household Labor Force Survey, which contains retrospective information on labor market status for current and previous years. Akgündüz et al. documented that only 5% of public sector employees and 19% of private sector employees were employed in a different job. Notably, the majority of job-to-job transitions in the Turkish labor market happen within the private sector, with about four-fifths of these transitions occurring between two wage-earner jobs.

Gross job creation is calculated by summing the positive employment changes at expanding and entering firms, while gross job destruction is determined by summing the employment losses for the subset of contracting and exiting firms. To express gross job flows as rates, we multiply them with employment weights. The rate of job creation (destruction) is thus defined as the weighted sum of all positive (negative) net growth rates in a group under investigation, which can be the economic sector, region, firm size category, firm age group, or the entire economy. The employment weight is simply the share of firm i in total employment of group j, equal to the ratio of: $\frac{x_{it}}{X_{jt}} = \frac{n_{it}+n_{it-1}}{\sum_{i\in I_{jt}}(n_{it}+n_{it-1})}$, where I_{jt} is the set of firms in group j at time t. Adhering to the original notation by Davis & Haltiwanger (1992) we can write the job creation rate POS_{jt} and job destruction rate NEG_{jt} in group j at time t as:

$$POS_{jt} = \sum_{i\in I_{jt}^{+}} (\frac{x_{it}}{X_{jt}}).\, g_{it} \quad \text{and} \quad NEG_{jt} = \sum_{i\in I_{jt}^{-}} (\frac{x_{it}}{X_{jt}}).\, |g_{it}| \qquad (2)$$

where I^{+} and I^{-} are the subsets of expanding/entering and contracting/exiting firms, respectively. Note that the job destruction rate is expressed in absolute value.

The gross job reallocation rate $GROSS_{jt}$ is defined as the sum $POS_{jt} + NEG_{jt}$, while the net change of employment also known as the net reallocation rate NET_{jt} is given by the difference $POS_{jt} - NEG_{jt}$. The gross and net job reallocation rates can be deemed as upper and lower bounds of the worker reallocation rate required to accommodate job reallocation (Davis & Haltiwanger, 1992; Hijzen et al., 2010). Lastly, we introduce the excess job reallocation rate in order to measure the number of job reallocations in excess of the amount required to accommodate net employment growth; it is computed as $EXCESS_{jt} = GROSS_{jt} - |NET_{jt}|$.

Finally, we are interested in the persistence of jobs created and of jobs destroyed. As defined by Davis & Haltiwanger (1992), the rate of one-year persistence in job creation is the fraction of newly created jobs in year t that continue to be present in year t+1. Analogously, the two-year persistence rate is the fraction of newly created jobs in year t that are present in both year t+1 and year t+2. The persistence rate in job creation for three or more years is calculated in a similar way, and the persistence rate for job destruction is defined in the same manner. The calculation of the persistence rate (p) follows Hijzen et al. (2010), i.e., $p_{i,x} = (n_{i,t+x} - n_{i,t-1})/(n_{i,t} - n_{i,t-1})$, where x stands for the length of persistence in years and

spans the set $\{1, 2, \ldots, 5\}$. The persistence rates of destroyed jobs can shed light on the question to what degree job destruction results in short- or long-term joblessness while the persistence rates of created jobs can tell us to what extent the placement of workers into new jobs is permanent or transient (Davis & Haltiwanger, 1992).

3 Results

This central section of our study initially presents the results for the entire economy, by geographical regions and subsequently explores job flows based on firm characteristics such as economic sector, size, age, foreign trade intensity, and technology level. Within each subsection, we examine rates and when appropriate also shares of job flows, as well as the persistence of jobs created, and jobs destroyed.

Before delving into our job flow analysis, we offer a concise overview of key macroeconomic indicators and institutional features in the Turkish economy, which might facilitate the understanding of the underlying factors behind the employment dynamics over the period under study. With a population exceeding 80 million, Turkey is situated among densely populated emerging economies and is classified as an upper-middle-income nation by the World Bank (2017). Figure A1 in the appendix illustrates annual GDP growth, employment, and unemployment rates from 2006 to 2022. Robust growth of GDP was sustained until the 2008 financial crisis, which caused a sharp decline of over 5 percentage points. Notably, the crisis minimally impacted the employment rate despite significant economic contraction. Swift recovery ensued in the subsequent two years, marked by impressive growth rates. Employment and economic growth rebounded to pre-crisis levels by 2010 (Ayhan, 2018; Pamuk, 2020). However, this sustained growth was interrupted, apart from 2017. In August 2018, a currency crisis and rapid inflation emerged, contributing to economic challenges in the following year. The COVID-19 pandemic further exacerbated economic vulnerabilities, leading to a sharp currency depreciation due to capital outflows (Orhangazi & Yeldan, 2021).

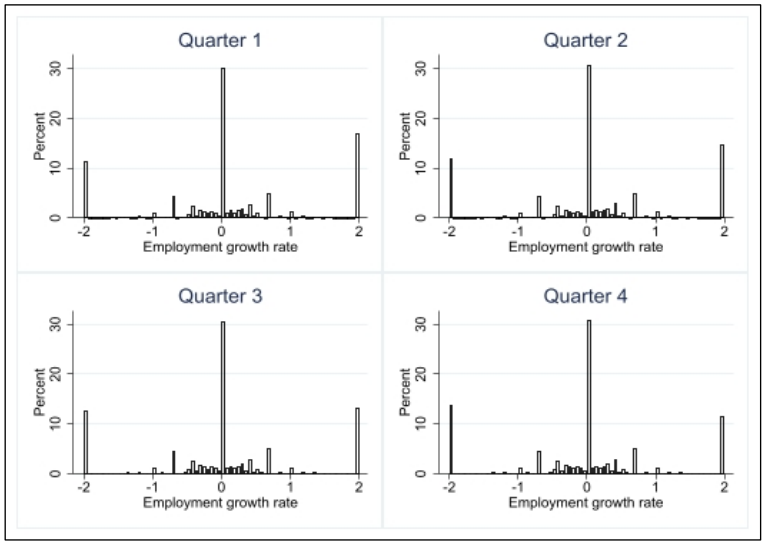
This turbulent growth pattern has implications for the labor market, resulting in persistent low employment and elevated unemployment rates. Turkey's overall employment rate remains below fifty percent, ranking second lowest among OECD countries. Figure A1 demonstrates two spikes in the unemployment rate—first during the 2008 global recession and then during the 2018 currency crisis.

3.1 Job flows in the entire economy

This section discusses both yearly and quarterly measures of job flows. While the annual measure is concerned with the changes in employment between the same quarters of two

consecutive years, the quarterly measure is produced based on the employment change with respect to the previous quarter. Figure 1 plots frequency distributions of the yearly employment growth rate, i.e., g_{it} in Eq.1. The densities are quite symmetric with a central peak at the zero-point corresponding to null growth and end point spikes corresponding to entries and exits. While about 30% of firms experience zero growth, around one fourth of net employment growth is either due to new entry or exit[10]. When excluding instances of zero growth from the distribution, as depicted in Figure A2 in the appendix, it becomes visually clearer that both entry and exit play substantial roles in job reallocations. Although entry generally appears more significant than exit, this relationship reverses when considering fourth quarter-to-fourth quarter employment changes.

Figure 1: The distribution of annual employment growth rate



Note: Annual rates are calculated with respect to one quarter-to-the same quarter employment changes.

Table 2 displays annual rates of job creation (POS) and job destruction (NEG), net employment growth (NET), job reallocation (GROSS), and the excess job reallocation (EXCESS) for the entire economy during the period 2006–2021. The annual rates presented in the table are based on the fourth quarter-to-fourth quarter employment changes that underlie the

[10] When examining *quarterly* employment changes depicted in appendix Figure A3, more than half of the firms do not experience employment growth from one quarter to the next, the entering and exiting firms account for about 7% of the quarterly growth rate observations.

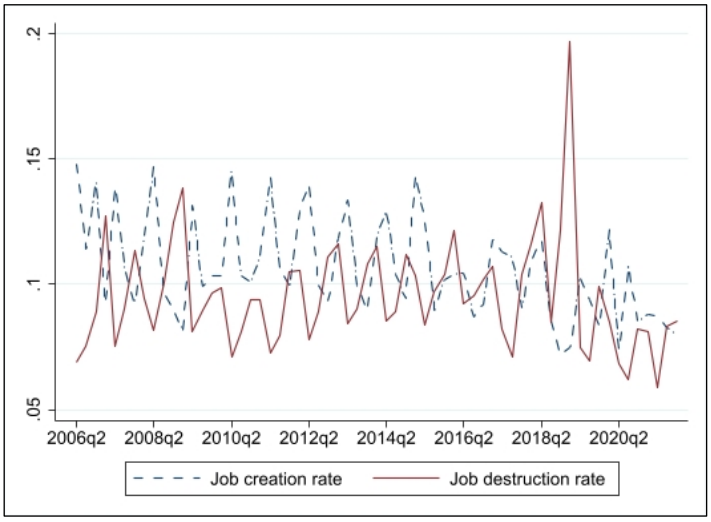
annual job creation and destruction measures. Figure A4 in the appendix shows annual job flow rates based on other quarters as well. The annual rate of job creation ranges between 14 and 23% of total employment, while the job destruction rate exhibits a greater fluctuation from 15 to 27% across years. Annual flow rates do not provide insights into intra-year transitions. Hence, our next step is to analyze job creation and destruction rates on a quarterly basis. The quarterly flow rates, shown in Figure 2, are approximately half that of their annual counterparts. Since the quarterly flow rates over a year do not add up to but exceed the annual rate, this must imply that some round-tripping occurs within a yearly span. The higher frequency of the flow rate results in larger fluctuations and an apparent seasonality pattern, especially for the job creation rate. We consistently observe peaks in the job creation rate during the second quarter of the year, which persist until the spike in the job destruction rate by the end of 2018. While the job destruction rate also has peaks and troughs within a year, there is no clear seasonal pattern.

Table 2: Annual job flow rates

	Job creation			Job destruction					
	POS	**Entry**	**Expans.**	**NEG**	**Exit**	**Contr.**	**GROSS**	**NET**	**EXCESS**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2007	0,193	0,062	0,131	0,204	0,073	0,131	0,397	–0,011	0,386
2008	0,215	0,074	0,140	0,191	0,078	0,114	0,406	0,024	0,382
2009	0,186	0,064	0,123	0,206	0,083	0,123	0,392	–0,019	0,373
2010	0,233	0,079	0,154	0,157	0,065	0,092	0,390	0,076	0,314
2011	0,234	0,079	0,155	0,156	0,065	0,091	0,390	0,078	0,313
2012	0,229	0,083	0,146	0,179	0,074	0,105	0,408	0,050	0,358
2013	0,210	0,071	0,139	0,196	0,081	0,115	0,406	0,014	0,392
2014	0,211	0,072	0,139	0,196	0,082	0,115	0,408	0,015	0,393
2015	0,230	0,079	0,150	0,187	0,076	0,111	0,417	0,043	0,374
2016	0,181	0,062	0,119	0,223	0,090	0,133	0,403	–0,042	0,361
2017	0,214	0,089	0,124	0,173	0,066	0,108	0,387	0,040	0,346
2018	0,173	0,061	0,112	0,268	0,111	0,157	0,441	–0,094	0,347
2019	0,143	0,066	0,078	0,253	0,112	0,141	0,396	–0,110	0,287
2020	0,215	0,073	0,142	0,145	0,058	0,086	0,360	0,070	0,289
2021	0,176	0,035	0,141	0,161	0,066	0,094	0,337	0,015	0,322
Mean	0,203	0,070	0,133	0,193	0,079	0,114	0,396	0,010	0,349

Note: The annual job flow rates are computed based on the fourth quarter-to-fourth quarter change in net employment. Figure A4 in the appendix depicts annual flows rates based on all four quarters.

Figure 2: Quarterly rates of job creation and destruction



Note: Quarterly job flow rates are calculated based on the net change in employment from one quarter to the subsequent one.

The job creation rate is higher than the job destruction rate in most years. The noticeable exception occurs in 2016 and above all in the consecutive years of 2018 and 2019 when many more jobs are destroyed than created. Consequently, a negative net growth rate is recorded in these three years, amounting to about –4%, –9% and –11% of total employment respectively. The negative employment growth can be attributed to the economic contraction, with an approximately 7-percentage-point decrease in the GDP growth rate from 2017 to 2019, which has translated into an almost 3-percentage-point increase in the unemployment rate, as shown Figure A1 in the appendix.

The annual rate of gross job reallocation, ranging between 34 and 44% over the period 2007–2021, is comparable to the job turnover rates reported for developing countries such Chile, Colombia, and Morocco (Roberts & Tybout, 1997) but much higher than the one found in transition economies (see, e.g., Faggio and Konings, 2003; Brown and Earle, 2002; Acquisti & Lehmann, 2000; Konings et al., 1996, 2003). The evidence from the industrialized economies also points to a less significant volatility, with estimated rates of job reallocation in the U.S. and Canada fluctuating around 20% (Baldwin et al., 1998; Davis & Haltiwanger, 1992). What is very striking is the large excess job reallocation rate, which is quite close to the gross job reallocation rate. This can be interpreted as an expression of a very powerful and dynamic process of job reallocation across the entire economy.[11]

[11] This process slows down in 2019 and 2020 as the much lower excess job reallocation rates attest.

3.1.1 Persistence in job creation and job destruction

Table 3 indicates a one-year persistence rate of, on average, 59% for jobs created and 75% for jobs destroyed, which decreases steadily as moving away from the reference year (time t) of the initial employment change. The average five-year persistence rate for newly created and newly destroyed jobs are 29% and 41%, respectively. The higher persistence rate of job destruction is consistent with the one found in the UK and the US. Hijzen et al. (2010) relate this to the large contribution of firm exits to job destruction, which have per se a permanent character. Compared to their results, we find a relatively low rate of persistence. Furthermore,

Table 3 shows a low level of variation across years, except during periods of economic contraction. In particular, the currency crisis of 2018 has resulted in a discernible decrease in the share of job creation persisting after one year. While 55% of jobs created in 2017 persist one year later, this ratio drops to 48.6% for jobs created in 2018. Concurrently, we note an approximate 6 percentage point increase in the persistence rate of job destruction during the same period. In summary, the relatively low persistence rates in Turkey can be interpreted as evidence pointing to a relatively short life of newly created jobs and a relatively small incidence of long-term unemployment in comparison with industrialized countries such as the UK.

Table 3: Persistence of jobs created and destroyed across years

	Persistence of jobs created at *t*					**Persistence of jobs destroyed at *t***				
	t+1	t+2	t+3	t+4	t+5	t+1	t+2	t+3	t+4	t+5
2007	0,607	0,457	0,395	0,358	0,331	0,752	0,632	0,543	0,473	0,419
2008	0,593	0,475	0,413	0,370	0,338	0,759	0,613	0,514	0,444	0,394
2009	0,635	0,509	0,436	0,384	0,350	0,716	0,564	0,469	0,409	0,364
2010	0,644	0,509	0,430	0,380	0,350	0,707	0,560	0,476	0,419	0,363
2011	0,627	0,485	0,408	0,361	0,319	0,716	0,581	0,498	0,425	0,383
2012	0,605	0,465	0,392	0,334	0,303	0,732	0,597	0,496	0,442	0,398
2013	0,598	0,457	0,366	0,318	0,278	0,739	0,583	0,506	0,451	0,412
2014	0,595	0,435	0,362	0,303	0,237	0,715	0,593	0,510	0,458	0,431
2015	0,541	0,415	0,330	0,236	0,224	0,763	0,623	0,547	0,510	0,455
2016	0,592	0,423	0,298	0,274	0,240	0,736	0,619	0,569	0,500	0,459
2017	0,550	0,353	0,314	0,265	.	0,769	0,684	0,582	0,527	.
2018	0,486	0,387	0,310	.	.	0,827	0,668	0,592	.	.
2019	0,633	0,450	.	.	.	0,745	0,634	.	.	.
2020	0,579	.	.	.	.	0,768	.	.	.	.
Average	0,588	0,442	0,365	0,318	0,291	0,751	0,618	0,533	0,466	0,414

3.2 Job flows by region

To understand how important regional variation is for labor market dynamics, we rely on the NUTS1 level geographical classification and carry out the job flow analysis based on 12 regions. As shown in The regional ranking of these job creation and job destruction shares is very similar to the regional ranking by employment shares as inspection of the left panel of Table 4 and of Table 5 makes clear.

Table 4: Annual job flow rates by region

	Firms (%)			Employment (%)							
	Average	2006	2021	Average	2006	2021	**POS**	**NEG**	**GROSS**	**NET**	**EXCESS**
Aegean	15,33	16,52	14,56	11,63	13,17	11,07	0,189	0,193	0,382	–0,003	0,379
Central Anatolia	3,82	3,68	3,87	2,93	2,98	2,89	0,201	0,200	0,401	0,000	0,401
Central East Anatolia	2,04	1,72	2,15	1,72	1,32	1,97	0,275	0,266	0,542	0,009	0,532
East Black Sea	2,72	2,49	2,65	1,89	1,84	1,80	0,216	0,217	0,433	–0,002	0,432
East Marmara	10,03	10,23	10,13	10,04	10,55	10,05	0,175	0,169	0,344	0,005	0,338
Istanbul	29,51	29,91	29,59	39,11	39,08	38,32	0,174	0,164	0,338	0,010	0,328
Mediterranean	11,62	11,23	11,70	8,51	7,95	8,97	0,223	0,212	0,434	0,011	0,423
Northeast Anatolia	1,20	1,09	1,18	0,79	0,63	0,95	0,253	0,246	0,499	0,006	0,492
Southeast Anatolia	4,61	3,79	5,11	5,00	3,43	5,97	0,257	0,240	0,497	0,017	0,480
West Anatolia	10,50	10,94	10,71	12,51	13,04	12,00	0,203	0,203	0,406	0,000	0,406
West Black Sea	4,35	4,30	4,14	3,08	3,27	3,11	0,199	0,199	0,399	0,000	0,399
West Marmara	4,27	4,10	4,21	2,78	2,74	2,89	0,197	0,197	0,394	0,000	0,393

Note: The annual job flow rates are computed based on fourth quarter-to-fourth quarter change in net employment.

Table 4, nearly one third of the firms are in Istanbul, which accounts for approximately 40% of the total employment. The economic importance of Istanbul is followed by the Aegean, Mediterranean, West Anatolia, and East Marmara regions, all of which are located on the West or Southwest coast of the country. On the other hand, our findings suggest a higher rate of job turnover in eastern Anatolia compared to the western regions. The relatively higher gross job flow rates of the eastern regions can be explained by their much lower initial levels of employment. We, therefore, also calculate the percent shares of job creation and job destruction by region[12], which are presented in Table 5. The regional ranking of these job creation and job

[12] For the computation of the *share of job creation*, we consider all firms in the economy with a positive increase in employment. The total sum of these positive changes in employment signifies the total job creation in the economy, serving as the denominator for the job creation share calculation. Then, for a given category (say, a

destruction shares is very similar to the regional ranking by employment shares as inspection of the left panel of Table 4 and of Table 5 makes clear.

Table 5: Shares of job creation and destruction by region

	Job creation			Job destruction		
	Total	Entry	Expans.	Total	Exit	Contr.
Aegean	11,45	13,00	11,01	11,98	13,51	11,28
Central Anatolia	3,05	3,48	2,92	3,13	3,35	3,03
Central East Anatol.	2,40	3,18	2,18	2,39	2,64	2,28
East Black Sea	2,10	2,41	2,02	2,18	2,19	2,18
East Marmara	9,12	8,88	9,19	9,10	9,26	9,02
Istanbul	35,32	29,64	36,92	34,46	32,07	35,54
Mediterranean	9,76	11,12	9,37	9,56	10,08	9,33
Northeast Anatolia	1,01	1,37	0,91	1,02	1,19	0,95
Southeast Anatolia	6,52	7,72	6,19	6,32	6,90	6,06
West Anatolia	13,26	11,77	13,69	13,66	11,84	14,49
West Black Sea	3,17	3,89	2,96	3,27	3,67	3,09
West Marmara	2,84	3,54	2,64	2,92	3,30	2,75

Note: Entries indicate percent shares and columns add up to 100.

3.2.1 Persistence rates by region

We have thus far observed a significant contrast in terms of job creation and job destruction between western and eastern regions. Next, we explore whether jobs established or eliminated in specific regions exhibit varying levels of persistence. In this instance, we calculate persistence rates for each category, and to enhance visual clarity, we aggregate twelve NUTS1-level regions into five broader categories: Istanbul, Aegean, Mediterranean, remaining West (covering West Anatolia, East Marmara, West Marmara, West Black Sea), and East (encompassing Central Anatolia, Central East Anatolia, East Black Sea, Northeast Anatolia, Southeast Anatolia). The east-west divide does not significantly impact the persistence rate. As illustrated in Figure A5 in the appendix, the pattern of persistence rates is quite similar for both job creation and job destruction across regions, with Istanbul having slightly higher persistence rates.

region in this context) that experienced positive employment changes, we add up these changes and this sum becomes the numerator for the job creation share metric. The *share of job destruction* is calculated in the same manner, but this time, we take all firms in the economy that have negative changes in employment and sum the absolute values of these negative changes.

3.3 Job flows by economic sector

Table 6 demonstrates great heterogeneity in gross job flow rates across sectors, with the manufacturing sector ranking the second lowest. Our estimates align with the findings of Hijzen et al. (2010) for the UK, showing that the gross job reallocation rate in the manufacturing sector is approximately 20% lower than that observed in the services sector and the overall economy. It is also important to highlight that our results reflect an overrepresentation of the manufacturing sector's employment share. This is due to the relatively larger portion of unregistered employment in agriculture and services, which is not included in the EIS data.[13]

Table 6: Annual job flow rates by sector

	Firms (%)			Employment (%)							
	Average	2006	2021	Average	2006	2021	POS	NEG	GROSS	NET	EXCESS
Agriculture	0,66	0,44	0,85	0,52	0,37	0,71	0,223	0,202	0,424	0,021	0,403
Mining	0,28	0,29	0,26	1,09	1,38	0,88	0,137	0,140	0,277	–0,002	0,275
Manufacturing	15,66	17,32	14,92	30,26	35,31	28,67	0,132	0,125	0,257	0,007	0,250
Energy supply	0,29	0,12	0,42	1,39	1,30	1,23	0,182	0,181	0,363	0,001	0,362
Construction	9,33	8,39	9,64	10,59	10,23	8,72	0,353	0,381	0,734	–0,028	0,706
Trade	36,01	39,37	33,21	21,46	23,08	19,36	0,183	0,168	0,351	0,014	0,337
Transportation	12,24	11,86	10,48	6,28	5,76	5,82	0,200	0,178	0,379	0,022	0,356
Accommodation	8,30	7,47	8,01	6,28	5,38	6,13	0,196	0,194	0,390	0,001	0,389
Information	1,23	0,84	1,50	1,58	1,33	1,73	0,176	0,153	0,329	0,023	0,306
Insurance	1,11	1,36	1,02	0,75	0,81	1,14	0,202	0,160	0,362	0,041	0,321
Real estate	1,76	2,20	2,25	0,68	0,88	0,86	0,287	0,315	0,602	–0,027	0,575
Professional	6,39	4,40	9,22	12,10	8,89	14,72	0,228	0,232	0,460	–0,004	0,456
Education	1,26	0,74	2,36	2,88	1,99	4,54	0,199	0,192	0,391	0,007	0,383
Health	1,08	1,00	1,75	2,54	1,75	3,74	0,139	0,101	0,240	0,038	0,202
Entertainment	0,86	0,90	0,79	0,42	0,35	0,47	0,221	0,201	0,422	0,020	0,403
Other	3,54	3,29	3,34	1,16	1,18	1,28	0,236	0,246	0,483	–0,010	0,473
Average							*0,201*	*0,194*	*0,395*	*0,007*	*0,388*

Note: The annual job flow rates are computed based on fourth quarter-to-fourth quarter change in net employment. For sectoral classification, NACE Rev.2 is used while some sectors are displayed in aggregated categories. See appendix Table A2 for the details of the aggregation.

An analysis of job creation and job destruction shares by sector mirrors the sectoral employment distribution. The services sector constitutes more than half of both job creation and job destruction, while manufacturing contributes to around one fifth of each, slightly exceeding the role of the construction sector. These findings are shown in Table A1 of the appendix. Construction, accounting for only 10% of total employment, has by far the largest

[13] According to the 2022 national records, 15.8% of employment was in agriculture, 21.7% in the manufacturing sector, 6.0% in construction, and 56.5% in services (TURKSTAT, 2023).

job turnover rate, with job destruction slightly exceeding job creation. Consequently, the excess job reallocation is also very high, with 70% of all jobs in construction being reshuffled each year throughout the economy (Table 6). Such an amazingly high value seems to point to very little stability in the job structure of this sector.[14]

In Table 7 we decompose total job creation rates into the parts caused by firm entry and expansion, and job destruction rates into the parts brought about by firm exit and contraction for the selected sectors of manufacturing, services, and construction. The services sector displayed in Table 7 is an aggregate category covering all sectors present in Table 6 apart from the first five sectors, i.e., agriculture, mining and quarrying, manufacturing, energy and water supply, and construction. Similar calculations for the sectors including agriculture and livestock, mining and quarrying, energy and water supply are presented in Table A3 in the appendix.

A comparison of the sources of total job turnover reveals that the importance of exit in job destruction is slightly greater than the importance of entry in job creation. While this observation applies to all sectors, it is more evident in the services and construction sectors, where roughly 40% of gross job reallocation is due to the sum of firm entry and exit. In the manufacturing sector, the entry of new firms accounts for on average one quarter of the job creation, whereas about one third of the job destruction is due to firm exit. Furthermore, Table 7 indicates very substantial variation in job reallocation across years, which is the most pronounced in the construction sector. The rate of job creation in construction firms was halved between 2017 and 2019, accompanied by a 29-percentage-point increase in the rate of job destruction in the sector. Strikingly, more than half of the jobs in the construction sector were destroyed in 2019, reflecting the heightened vulnerability of this sector to the large negative shock that occurred as a result of the currency crisis mentioned before.

The quarterly job flow rates, shown in Figure A6 in the appendix, enable us to trace within-year fluctuations. We see a sharp spike in the job destruction rate in the construction sector in the fourth quarter of 2018, accompanied by a relatively modest decline in the job creation rate. While the following quarter witnesses a proportional decrease in the job destruction rate, the recovery in the job creation rate comes with a delay of about one year, in the first quarter of

[14] Using the SILC dataset covering 2018–2021, we examined the extent of informality in the construction sector. The transition from a formal job to an informal one is approximately 5 percent. Among informal workers in the construction sector, 6 percent had a formal job in any field of activity in the previous year. Therefore, the bulk of the dynamics of job destruction found in the sector cannot be attributed to shifts into informality.

2020. Likewise, we observe an increase in job destruction and a modest reduction in job creation in the other sectors during this contraction period, but to a lesser extent when compared to the construction sector. In contrast, in the manufacturing sector, which was hit hardest by the 2008 economic crisis, we observe a 17% job destruction rate in 2009, the highest value of the entire panel period (Table 7). As the economy moves from recession to expansion, a remarkable reduction in the rate of job destruction and an increase in the rate of job creation is observed as of 2010. So, overall employment turnover seems to be countercyclical, but the sensitivity of the sectors differs depending on the type of the recession.

Table 7: Annual job flow rates by sector: Source components

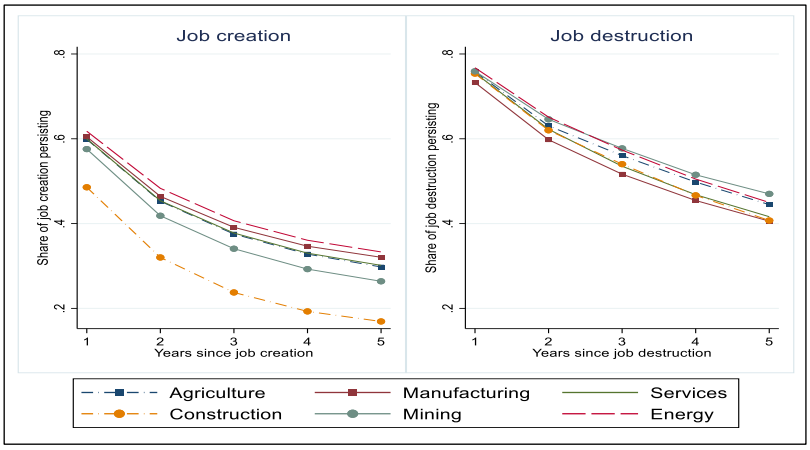
	Manufacturing						**Services**						**Construction**					
	Job creation			Job destruction			Job creation			Job destruction			Job creation			Job destruction		
	Total	Entry	Expans.	Total	Exit	Contr.	Total	Entry	Expans.	Total	Exit	Contract.	Total	Entry	Expans.	Total	Exit	Contract.
2007	0,136	0,030	0,105	0,156	0,047	0,109	0,193	0,067	0,126	0,217	0,081	0,137	0,361	0,122	0,239	0,380	0,138	0,242
2008	0,155	0,042	0,114	0,157	0,052	0,104	0,221	0,081	0,140	0,188	0,081	0,106	0,367	0,130	0,237	0,380	0,149	0,231
2009	0,115	0,028	0,087	0,172	0,057	0,115	0,194	0,071	0,123	0,202	0,087	0,115	0,348	0,123	0,225	0,393	0,155	0,238
2010	0,172	0,039	0,133	0,101	0,035	0,066	0,233	0,087	0,146	0,162	0,071	0,091	0,438	0,152	0,286	0,307	0,122	0,185
2011	0,164	0,038	0,126	0,107	0,036	0,071	0,243	0,089	0,154	0,154	0,068	0,086	0,406	0,142	0,264	0,319	0,128	0,191
2012	0,164	0,043	0,121	0,128	0,044	0,083	0,238	0,092	0,146	0,174	0,076	0,097	0,385	0,144	0,241	0,352	0,133	0,218
2013	0,152	0,037	0,115	0,136	0,047	0,089	0,212	0,077	0,135	0,189	0,082	0,106	0,360	0,128	0,232	0,381	0,151	0,229
2014	0,140	0,033	0,107	0,134	0,046	0,088	0,212	0,077	0,134	0,189	0,083	0,106	0,388	0,146	0,242	0,385	0,159	0,226
2015	0,147	0,036	0,111	0,131	0,043	0,087	0,229	0,084	0,145	0,180	0,078	0,102	0,420	0,160	0,259	0,354	0,138	0,216
2016	0,112	0,027	0,085	0,154	0,050	0,104	0,177	0,065	0,113	0,219	0,094	0,126	0,333	0,126	0,207	0,410	0,163	0,247
2017	0,141	0,046	0,095	0,105	0,032	0,073	0,217	0,096	0,121	0,169	0,068	0,101	0,394	0,170	0,224	0,330	0,122	0,208
2018	0,110	0,027	0,082	0,146	0,046	0,100	0,182	0,068	0,114	0,260	0,113	0,147	0,243	0,092	0,151	0,548	0,228	0,321
2019	0,107	0,039	0,068	0,155	0,052	0,103	0,167	0,080	0,086	0,240	0,109	0,132	0,194	0,085	0,109	0,615	0,296	0,320
2020	0,146	0,032	0,113	0,089	0,029	0,060	0,190	0,067	0,123	0,165	0,069	0,095	0,618	0,286	0,332	0,243	0,098	0,144
2021	0,123	0,016	0,107	0,103	0,034	0,070	0,182	0,037	0,145	0,162	0,070	0,092	0,292	0,084	0,208	0,423	0,186	0,237
Average	*0,132*	*0,033*	*0,099*	*0,125*	*0,041*	*0,084*	*0,196*	*0,073*	*0,123*	*0,185*	*0,079*	*0,105*	*0,353*	*0,134*	*0,219*	*0,381*	*0,155*	*0,226*

Note: The annual job flow rates are computed based on fourth quarter-to-fourth quarter change in net employment. The sum of entry and expansion is equals to the rate of job creation (POS) and the sum of exit and contraction is equal to the rate of job destruction (NEG) in the corresponding year and sector.

3.3.1 Persistence rates by sector

The unique nature of the construction sector in employment dynamics is also evident in the considerably lower persistence rate of jobs created in this sector compared to the other four sectors. Predictably, jobs in the manufacturing and energy sectors demonstrate higher security. However, we do not observe a substantial difference in the rate of job destruction persistence. Figure 3 illustrates that about 40% of jobs that were destroyed remain eliminated even five years after their initial destruction, both in the manufacturing and construction sectors, while the persistence rates in the other three sectors are up to 7% points higher.

Figure 3: Persistence of jobs created and destroyed by sector



3.4 The role of firm size

Firm size plays a key role in explaining job creation performance and job turnover patterns more broadly, as is well established in the literature. It is particularly relevant for developing countries where according to the available evidence new jobs are disproportionately created by small firms (Flórez et al., 2021). To empirically validate this affirmation in the context of the Turkish labor market, we focus on annual job flow measures by firm size. We use the average firm size of the previous two years, namely $(n_{t-1} + n_{t-2})/2$, to avoid the problems of the size distribution fallacy and of the potential regression to the mean bias raised by Davis et al. (1996) and de Wit & de Kok (2014). Adhering to the size classification of the EIS database, we define '*micro firms*' as those employing less than 10, *'small firms'* as those with 10 to 49 employees, *'medium firms'* as those with 50 to 249 employees, and *'large firms'* as those employing 250 and more workers.

Small and Medium Enterprises (SMEs) in Turkey are important contributors to employment and job creation, which is in line with the evidence in many other developing as well as developed countries (Ayyagari et al., 2011; Başçı & Durucan, 2017; Cho et al., 2017; Dalgıç & Fazlıoğlu, 2021; Robu, 2013; Şener et al., 2014). SMEs account for 99.7% of all enterprises in Turkey and provide 71% of total employment (TURKSTAT, 2022b). Similarly, in our sample of analysis presented in Table 8, micro and small firms together account for 98.5% of the total number of enterprises. While the vast majority of the firms are of micro-scale (91%), they only make up 22% of the total employment. A majority of the workforce is employed in medium and large firms, which mirrors the findings from the UK (Hijzen et al. 2010). Table 8 points to an inverse relationship between job reallocation rates and firm size. Strikingly, the job creation rate of firms of the smallest size is more than double that of firms of size 3–9. The job destruction rate also decreases monotonically with size, but the differences across size categories are less pronounced than is the case for job creation.

Table 8: Annual job flow rates by firm size

	Firms (%)			Employment (%)							
	Average	2006	2021	Average	2006	2021	**POS**	**NEG**	**GROSS**	**NET**	**EXCESS**
1–2	71,68	68,33	68,96	6,68	6,47	6,10	0,582	0,230	0,812	0,352	0,460
3–9	19,31	21,68	21,53	15,33	17,05	14,59	0,214	0,250	0,464	–0,036	0,428
10–19	4,58	5,07	4,82	10,11	10,90	9,23	0,179	0,234	0,413	–0,055	0,358
20–49	2,93	3,43	2,98	14,66	17,00	12,86	0,153	0,210	0,362	–0,057	0,305
50–99	0,77	0,77	0,87	8,72	8,50	8,63	0,158	0,200	0,358	–0,042	0,316
100–249	0,48	0,47	0,54	11,95	11,57	11,85	0,138	0,179	0,316	–0,041	0,275
250–499	0,15	0,15	0,17	8,28	8,16	8,11	0,120	0,167	0,287	–0,047	0,240
500+	0,11	0,11	0,13	24,28	20,36	28,64	0,093	0,117	0,210	–0,024	0,187

Note: The annual job flow rates are computed based on fourth quarter-to-fourth quarter change in net employment. Firm size refers to the average previous year firm size.

Figure 4: Rates of job creation and destruction by firm size

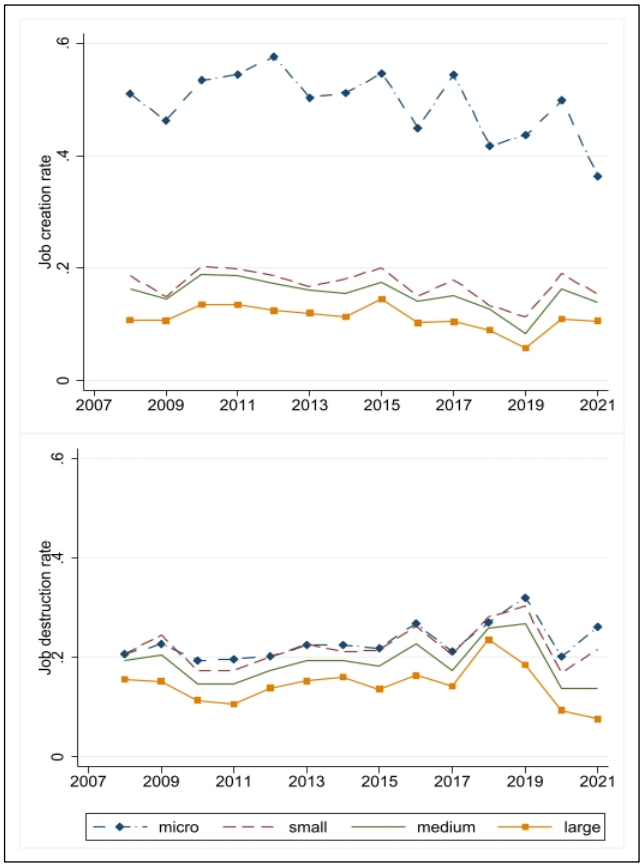


Figure 4 highlights the importance of the micro firms in job creation. The job creation rate of micro firms is more than double the one for small firms and about four times as large as the rate for large firms. The job destruction rate, on the other hand, shows very little differences across size categories, but we do find the same ranking as with job creation. One point worthy to note is the cyclical pattern common to all size categories. There is a reduction in the job creation rate and an accompanied increase in the job destruction rate right after the contraction periods of the 2008 crisis and more recently in 2019.

Given that firms have no employees prior to entering the market, jobs generated by new entrants contribute predominantly to the job count of small firms. Therefore, the contribution of the micro firms to job creation would be overstated by considering job flow rates, as reported in Table 8. To provide a more accurate picture, we calculate the shares of job creation and job destruction and decompose them into their subcomponents. Table 9 shows that micro firms account for a much greater proportion of job creation (43.5%) and job destruction (30%) than larger size categories. This large share of created jobs primarily stems from new entries, with 94% of all entries being associated with micro firms. Even among expanding firms, micro firms contribute a higher share (33%) to job creation than larger counterparts. For small and medium-sized firms, on the other hand, approximately 26% and 20% of jobs created are generated by expansion of existing firms. A comparable trend is observed in terms of job destruction. More than 50% of exits are attributed to micro firms, and the contribution of larger size categories decreases uniformly. However, the share of micro firms in job destruction due to contraction

(21%) is less evident compared to other size categories. Together, small, and medium-sized firms make up the majority of contraction (52%), while large-scale firms (employing over 250 workers), constituting a third of the workforce, contribute around 18% to job creation and 22% to job destruction, surpassing the contribution by medium-scale firms. This evidence is in line with the one found in Colombia (Flórez et al., 2021), the UK (Hijzen et al. 2010) and the cross-country study of Haltiwanger et al. (2014), which document a more important role of small and large firms in job turnover, relative to medium firms.

Table 9: Shares of job creation and destruction by firm size

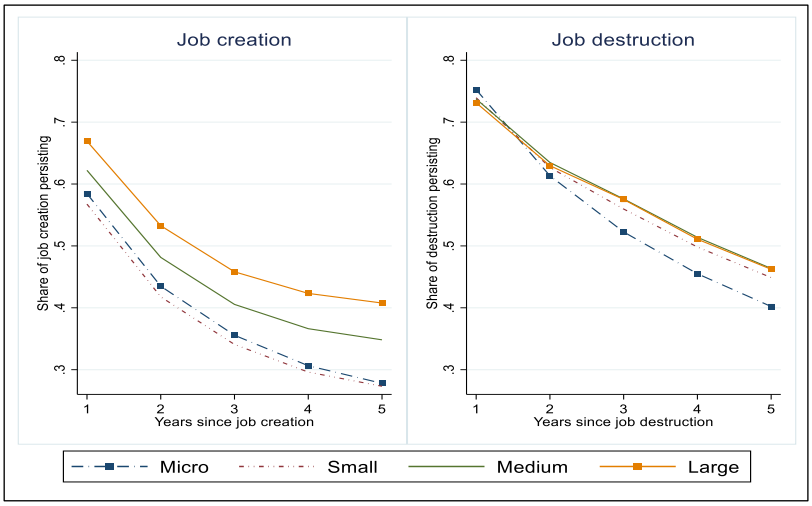
	Job creation			Job destruction		
	Total	Entry	Expans.	Total	Exit	Contr.
1–2	25,05	85,96	12,60	9,41	24,27	3,30
3–9	18,42	7,62	20,63	20,42	26,77	17,81
10–19	9,96	2,04	11,58	12,33	12,38	12,31
20–49	12,18	1,45	14,38	15,85	13,12	16,97
50–99	7,59	0,91	8,96	9,08	6,57	10,11
100–249	9,05	1,05	10,69	11,12	7,16	12,75
250–499	5,49	0,52	6,50	7,18	3,90	8,54
500+	12,25	0,45	14,67	14,61	5,82	18,22

Note: Firm size refers to the average previous year firm size. Entries indicate percent shares and columns add up to 100.

3.4.1 Persistence rates by firm size

The analysis of persistence by firm size enables us to test the hypothesis that jobs created by small firms, which make a remarkably significant contribution to employment growth, may be less stable than those generated by larger firms (Hijzen et al., 2010). Figure 5 illustrates the persistence rates for both created and destroyed jobs across four broad size categories. For each category, the persistence rate has a downward trend, with a steeper gradient for job creation. Confirming the hypothesis that the jobs created in small firms are less secure, we find a lower persistence rate for jobs created in micro and small firms relative to larger firms. We also find that the persistence rate of job destruction remains much lower for micro firms. Hence, destroyed jobs are more frequently "resurrected" by firms of micro size than they are by larger firms.

Figure 5: Persistence of jobs created and destroyed by firm size



3.5 The role of firm age

Recent studies emphasize the importance of young firms in job turnover (Esaku, 2020, 2022; Lawless, 2014). As presented in Table 10, three fourth of the firms and nearly 70% of the total employment are comprised of firms that are up to 10 years old. Strikingly, the share of new entrants (i.e., aged 0–1) in firm counts exhibits a dramatic drop between 2006 and 2021, accompanied by a decline in their share in total employment. However, new-entry firms have the highest rate of job creation. The job destruction of this group is also the largest but with a smaller distance to other age categories. The job turnover rate declines monotonically as firms get older, and firms become more destructive than creative, which translates into a falling negative employment growth rate as firms get older.

As discussed above, the disproportionately high contribution of micro firms to job creation comes mainly about because of new entrants. In our sample, new-entry firms that are of micro scale account for 21% of the total number of firms, while 46% correspond to young incumbent (aged 2 to 10 years old) micro firms (see Table A4 in the appendix). We further examine the combined contribution of firm size and age to employment dynamics through the joint distribution of job flow shares across size and age categories. Young small firms up to 10 years old and up to 50 employees account for more than a third of total job creation. The proportion of the same group is about 16% of the job destruction. Although less prominent than the young small firm group, older and bigger firms (i.e., aged above 10 years and with more than 50

employees) still account for an important share of job destruction compared to their contribution to job creation (see Table A5 in the appendix).

Table 10: Annual job flow rates by firm age

	Firms (%)			Employment (%)							
	Average	2006	2021	Average	2006	2021	**POS**	**NEG**	**GROSS**	**NET**	**EXCESS**
0–1	22,57	23,78	12,83	17,12	15,59	11,12	0,359	0,238	0,597	0,122	0,475
2–5	30,59	25,54	32,75	29,04	26,26	29,98	0,213	0,218	0,431	–0,005	0,426
6–10	20,27	20,66	22,96	22,81	25,32	21,17	0,162	0,175	0,336	–0,013	0,323
11–15	11,48	9,81	13,25	14,75	14,19	19,06	0,140	0,148	0,288	–0,008	0,281
16–20	6,24	4,42	7,95	7,64	7,29	7,83	0,133	0,148	0,282	–0,015	0,267
21–25	3,51	2,51	5,29	4,25	3,07	5,44	0,120	0,143	0,264	–0,023	0,241
26+	5,35	13,29	4,98	4,39	8,28	5,39	0,121	0,154	0,275	–0,033	0,242

Note: The annual job flow rates are computed based on fourth quarter-to-fourth quarter change in net employment.

We have thus far observed that firm size and age are negatively associated with job creation and destruction. While there is abundant evidence of the negative relationship between firm size and job reallocation, especially from Western countries, relatively little is known about the extent to which firm-age accounts for this relationship. To address this issue, we estimate a firm-level growth rate equation conditioning on firm size, age, and their interaction. Table 11 shows the results of a regression, where the dependent variable is the net employment growth rate g_{it}, as formulated in Eq.1. In the regressions we use the average firm size (i.e., number of employees) over the previous four quarters rather than the current or initial firm size to avoid the regression to the mean fallacy. Firm size is expressed in natural logarithms, while firm age is measured as a categorical variable: firms aged 0–1 serve as the baseline category, followed by those aged 2–5, 6–10, and above 10 years old. We include firm size (ln) and four categories of firm age as dummies (columns 1 and 2), as well as their interactions (columns 3 to 5). Additionally, we incorporate sector, region, and year-quarter dummies (column 4), and employ employment weights in regression estimation (column 5).

The results confirm the expected negative association of firm size with net employment growth (column 1), even after controlling for firm age (column 2). The size-age interaction terms allow for size effects to differ depending on the life span of the firm. The estimated coefficients on size and age are robust to the inclusion of sector, region, and time fixed effects,

as all relevant coefficients remain the same as we move from column (3) to (4). The use of employment weights in the regression has a discernible impact, as it reduces the coefficient estimates substantially, while still retaining statistical significance (column 5).

Table 11: Regression results. Dependent variable: Net employment growth rate of a firm

	(1)	(2)	(3)	(4)	(5)
					Weighted
Firm size (*ln*)	–0.006***	–0.004***	–0.072***	–0.070***	–0.018***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.005)
Firm age 2–5		–0.217***	–0.299***	–0.297***	–0.162***
		(0.001)	(0.002)	(0.003)	(0.003)
Firm age 6–10		–0.214***	–0.293***	–0.294***	–0.165***
		(0.001)	(0.002)	(0.002)	(0.003)
Firm age 11+		–0.210***	–0.286***	–0.289***	–0.163***
		(0.001)	(0.002)	(0.002)	(0.003)
Age 2–5 * ln(size)			0.086***	0.085***	0.022***
			(0.003)	(0.003)	(0.004)
Age 6–10 * ln(size)			0.082***	0.081***	0.022***
			(0.002)	(0.003)	(0.004)
Age 11+ * ln(size)			0.079***	0.079***	0.021***
			(0.002)	(0.003)	(0.003)
Constant	0.023***	0.198***	0.262***	0.378***	0.224***
	(0.003)	(0.004)	(0.004)	(0.007)	(0.006)
Dummies:					
Sector	No	No	No	Yes	Yes
Region	No	No	No	Yes	Yes
YearXQuarter	No	No	No	Yes	Yes
Observations	68,407,523	67,594,950	67,594,950	67,594,880	67,594,880

Note: Base line age category is firms aged 0–1 years old. The specifications include 16 sector dummies, 12 NUT1-level regional dummies, and 64 year-quarter dummies. Robust standard errors clustered at two-digit sector level in parentheses *** p<0.01, ** p<0.05, * p<0.1

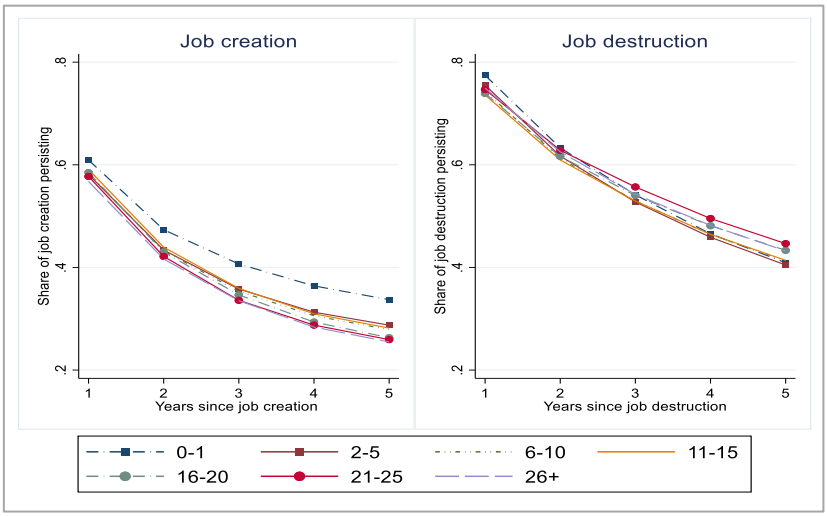
The size effect is notably negative and significant for the baseline group of firms aged 0–1. Essentially, smaller new firms experience relatively faster growth and larger new entrants contribute less to the overall employment growth (or shrink more) relative to the more established larger firms. When considering older age groups, the size effects are calculated by combining the coefficient related to size and its interaction term. For example, the actual size effect for firms aged 2–5 is the combination of the size effect for the baseline category (new

entrants) and its interaction with the corresponding age group (–0.018 + 0.022). Consequently, in comparison to start-ups, the actual size effect for older age categories is positive, although this effect is substantially mitigated by the negative size effect seen in the baseline category.

3.5.1 Persistence rates by firm age

Not only do startups exhibit the highest rate of job creation, but the jobs they generate are also more stable than the jobs of established firms. Figure 6 illustrates that six out of ten jobs created by startups remain in the next year, and approximately 34% of these newly created jobs endure for five years. While the one-year persistence rate is only slightly lower for more established firms, the gap widens to eight percentage points when it comes to the five-year persistence rate. The difference in the persistence of job destruction between new entry firms and their older counterparts is, on the other hand, negligible.

Figure 6: Persistence of jobs created and destroyed by firm age



3.6 Importance of foreign trade in job reallocation

Another important aspect of a firm that affects employment dynamics is its engagement in international trade. If, as often suggested in the trade literature, exporting firms are more productive, we would presume that they play a bigger role in job creation. To explore this presumption, we quantify the firm's involvement in international trade, distinguishing between imports and exports. We create a trade intensity measure by dividing the total values of imports

and exports for each sector by Gross Domestic Product (GDP). We then categorize sectors into quintiles based on their level of trade intensity and examine how job reallocation rates vary depending on import and export intensity. We then examine the shares of job creation and job destruction within each trade intensity quintile. The results are presented in Table 12. As trade intensity quintiles rise, we observe a slight downward trend in the rates of job creation and job destruction. On the other hand, the proportionate contribution of these flows, reflected in percentage shares, increases from the first to the top quintile. We also see a positive association between trade intensity and employment size. Approximately 40% of employment is concentrated in the highest quintile of importing firms, while the lowest quintile constitutes only 10% of total employment. A comparable pattern, albeit within a narrower range, is evident in export firms. In proportion to their employment shares, we observe that firms in the top quintile make the most significant contributions to job creation and destruction, exceeding the contribution of the bottom quintile by more than double.

Next, we examine whether the observed correlation between a firm's trade intensity and its potential for employment growth holds within a regression framework with controls for sector, region, and year dummies. Following Hijzen et al. (2010) we estimate the impact of import and export intensities on job creation using the following regression [15]:

$$g_{it}^{+} = \beta_0 + \sum_{q=2}^{5} \beta_1 IMP_{qj} + \sum_{q=2}^{5} \beta_2 EXP_{qj} + \gamma_t + \delta_j + \theta_r + \epsilon_{it} \qquad (3)$$

We define the variable g_{it}^{+} to be equal to g_{it} for firms that are expanding or entering with $g_{it} > 0$ and zero otherwise, where the growth rate g_{it} is calculated as in Eq.1. IMP_{qj} and EXP_{qj} refer to quintile (q) dummies for import and export share of sector j, respectively. The variables γ_t, δ_j , and θ_r indicate year, sector, and region dummies. Job destruction results can be obtained in a similar manner by defining the dependent variable g_{it}^{-} as equal to g_{it} for contracting or exiting firms with $g_{it} < 0$ and zero for all other firms.

[15] In a further analysis, we adhere to the *change* in trade intensity measure of Hijzen et al. (2010) and classify each sector according to the change in the import or export intensity between the average for the first three years (2006–2009) and the average for the last three years (2019-2021) and then allocate sectors into quintiles according to the change in trade intensity. The results are presented in Table A6 in the appendix. We hardly find any systematic relationship between changes in trade intensity and the job turnover rate.

Table 12: Rates and shares of job flows by foreign trade intensity

	Rates of job flows					Employ-ment	Shares of job flows (%)					
							Job creation			Job destruction		
	POS	NEG	GROSS	NET	EXCESS	(%)	Total	Entry	Expans.	Total	Exit	Cont.
Import intensity quintile:												
q1	0,134	0,113	0,247	0,021	0,268	9,79	11,06	14,93	10,76	13,55	18,22	12,97
q2	0,128	0,104	0,232	0,024	0,256	11,04	11,83	17,29	11,42	13,97	14,8	13,87
q3	0,120	0,086	0,206	0,034	0,24	15,93	15,89	15,75	15,9	16,77	17,83	16,64
q4	0,110	0,075	0,185	0,035	0,220	24,67	22,68	16,39	23,15	22,49	21,66	22,6
q5	0,119	0,069	0,188	0,05	0,238	38,58	38,54	35,64	38,76	33,21	27,49	33,93
Export intensity quintile:												
q1	0,127	0,088	0,215	0,039	0,254	15,01	16,6	26,85	15,83	15,17	17,3	14,88
q2	0,120	0,096	0,216	0,024	0,24	13,74	14,54	13,7	14,6	15,48	17,84	15,17
q3	0,118	0,094	0,212	0,024	0,236	15,88	16,66	14,7	16,81	17,37	17,78	17,31
q4	0,110	0,083	0,193	0,027	0,220	21,36	20,96	17,42	21,23	20,66	20,10	20,73
q5	0,119	0,079	0,198	0,04	0,238	34,00	31,24	27,34	31,53	31,33	26,98	31,90

Note: The annual job flow rates are computed based on fourth quarter-to-fourth quarter change in net employment. Employment and shares of job flows indicate percent shares and columns add up to 100.

Table 13 shows the regression results. While columns (1) and (4) include year dummies, columns (2) and (5) additionally control for sector dummies, and columns (3) and (6) are the most comprehensive, including all three sets of fixed effects. In all specifications, we use the employment weights described in Section 0. The regression results suggest a negative relationship between import intensity and job creation while it is found to be positively associated with job destruction. There is a steady increase in the relationship as moving from low to higher quintiles. On the other hand, we do not find such a systematic relationship between export intensity and job reallocation rates. However, we do find that firms with high export intensity have substantially less job destruction than firms with less export intensity. Further exploration of the trade intensity data and further research in the link between trade intensity and job flows are required to comprehend these somewhat puzzling estimates and their divergence from the observed rise of the share of job creation and job destruction as we move from lower to higher quintiles in trade intensity in Table 12.

Table 13: Regression results. Job creation and destruction rates by import and export intensity

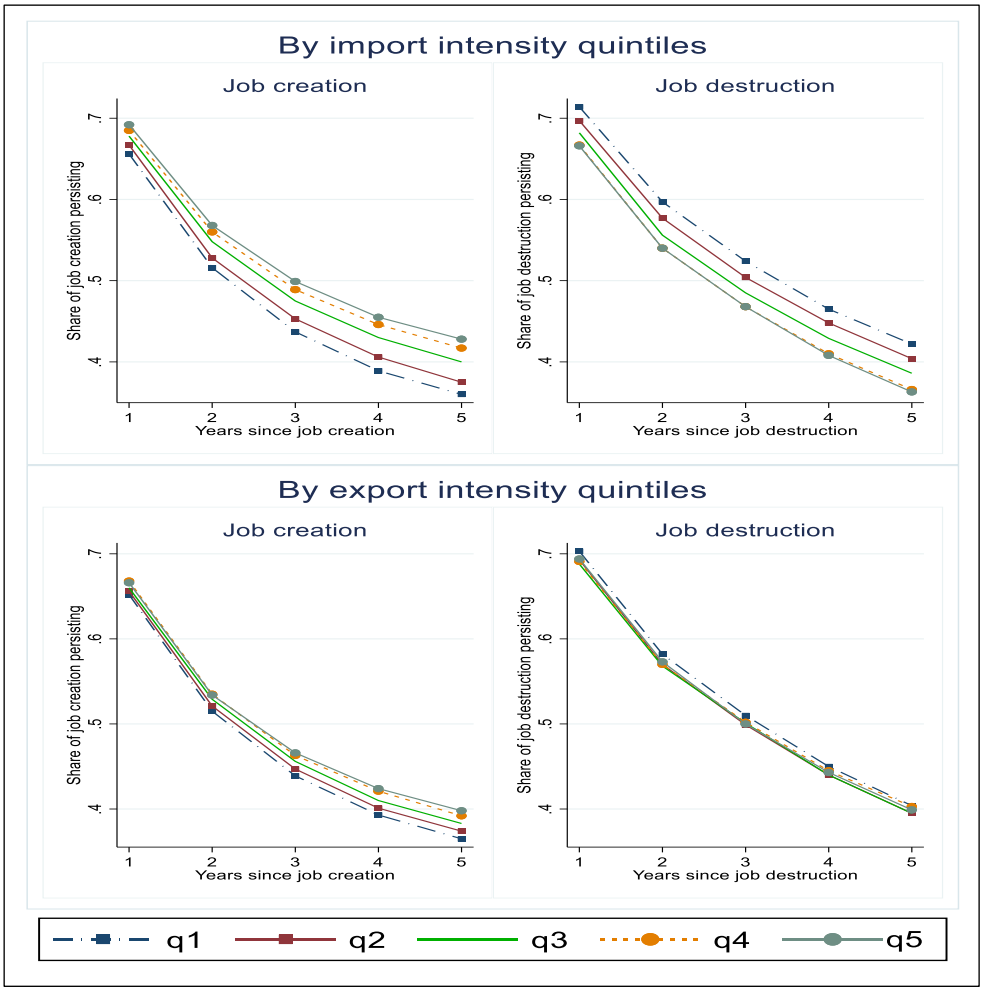
	Job creation			Job destruction		
	(1)	(2)	(3)	(4)	(5)	(6)
Import share quintile:						
q2	–0.025***	–0.011**	–0.011**	0.035***	0.017***	0.017***
	(0.006)	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)
q3	–0.021**	–0.010*	–0.011*	0.036***	0.024***	0.024***
	(0.008)	(0.006)	(0.006)	(0.009)	(0.007)	(0.007)
q4	–0.026***	–0.017**	–0.018**	0.043***	0.035***	0.036***
	(0.010)	(0.008)	(0.008)	(0.011)	(0.008)	(0.008)
q5	–0.023	–0.025**	–0.027**	0.046***	0.049***	0.050***
	(0.014)	(0.012)	(0.012)	(0.014)	(0.011)	(0.011)
Export share quintile:						
q2	–0.023***	–0.010*	–0.010**	0.021***	0.013**	0.013**
	(0.007)	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)
q3	–0.030***	–0.010	–0.010	0.016*	0.003	0.003
	(0.009)	(0.007)	(0.006)	(0.009)	(0.007)	(0.007)
q4	–0.029***	–0.001	–0.001	0.017*	–0.005	–0.005
	(0.009)	(0.008)	(0.008)	(0.010)	(0.008)	(0.008)
q5	–0.019	0.013	0.014	0.000	–0.025**	–0.026**
	(0.012)	(0.011)	(0.010)	(0.013)	(0.012)	(0.011)
Dummies:						
Year	Yes	Yes	Yes	Yes	Yes	Yes
Sector	No	Yes	Yes	No	Yes	Yes
Region	No	No	Yes	No	No	Yes
Constant	0.212***	0.239***	0.230***	–0.241***	–0.235***	–0.237***
	(0.007)	(0.013)	(0.013)	(0.010)	(0.017)	(0.017)
Observations	15754215	15754215	15753783	15754215	15754215	15753783

Note: The specifications include 99 two-digit sector dummies, 12 NUT1-level regional dummies, and 16 year dummies. Quintiles are computed based on the ratio of import or export to GDP. The first quintile is used as a baseline category. Clustered standard errors at sector level in parentheses *** p<0.01, ** p<0.05, * p<0.1

3.6.1 Persistence rates by foreign trade intensity

Figure 7 illustrates that persistence for job creation is highest in the top import quintile, progressively decreasing towards the bottom quintile. A similar pattern is observed for exporting firms, although to a lesser extent. This suggests that jobs are more stable in firms highly engaged in foreign trade. On the other hand, approximately two-thirds of jobs destroyed by the top quintile importing firms appear to recover five years later, whereas about 42% of jobs remain destroyed after five years in the bottom import quintile. For exporting firms, the difference in job destruction persistence is at a negligible level.

Figure 7: Persistence of jobs created and destroyed by foreign trade intensity



3.7 The role of technology level

Finally, we explore the variation in employment dynamics based on the technology intensity of industries. Technology levels are available only for the manufacturing sector; they are determined by the direct research and development (R&D) intensity of industries.[16] As presented in Table 14, the majority of manufacturing firms, averaging around 57%, fall within the low-tech industries category. These firms collectively employ about 52% of the manufacturing workforce. Conversely, firms in high-tech industries constitute less than 1% of all firms, contributing to a mere 2.4% of the employment in manufacturing. Although the share

[16] For the classification of manufacturing industries into categories based on R&D intensities, see Table A7 in the appendix.

of firms in low-tech industries has slightly decreased by about three percentage points over the past 16 years, this does not indicate a shift towards high-tech development. The decline in low-tech industries' share has been compensated by an increase in the share of low-medium and high-medium technology firms. In addition, only firms in low-tech industries exhibit a negative net employment growth rate, unlike higher technology firms where job creation outpaces job destruction. A fall in the excess rate is also evident as we move from low to high-tech firms. This suggests that jobs within the low-tech segment of manufacturing, which presumably are less productive, are less stable and more susceptible to reshuffling.

Table 14: Annual job flow rates by technology level

	Firms (%)			Employment (%)							
	Average	2006	2021	Average	2006	2021	POS	NEG	GROSS	NET	EXCESS
Low	56,48	57,92	54,83	51,61	53,00	50,08	0,133	0,136	0,268	–0,003	0,265
Low-med	30,82	29,49	31,19	27,13	26,48	27,08	0,143	0,133	0,276	0,010	0,266
High-med	12,05	11,98	13,18	18,84	18,11	19,90	0,116	0,092	0,208	0,024	0,185
High	0,65	0,61	0,8	2,42	2,41	2,93	0,107	0,069	0,175	0,038	0,137

Note: The annual job flow rates are computed based on fourth quarter-to-fourth quarter change in net employment. The technology level is reported only for manufacturing industry and based on OECD ISIC Rev.3 classification.

Analyzing the share of jobs created and destroyed across the distribution of technology intensity reveals a pattern similar to the employment distribution by technology levels. Table 15 demonstrates that approximately 58% of new entries originate from low-tech firms, whereas among existing firms, low-tech industries account for only half of job creation resulting from expansion. One in five jobs created through expansion belongs to either high-medium or high-tech firms. Likewise, low-tech firms predominantly contribute to the overall number of jobs destroyed, with their share in exits being particularly prominent.

Table 15: Shares of job creation and job destruction by technology level

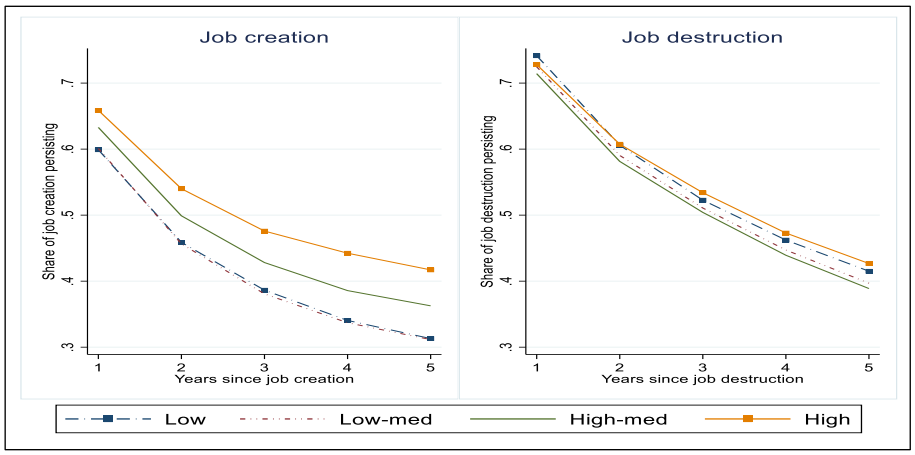
	Job creation			Job destruction		
	Total	Entry	Expans.	Total	Exit	Contr.
Low	51,75	58,39	50,55	55,81	62,68	52,90
Low-med	29,64	28,62	29,83	28,92	25,05	30,56
High-med	16,64	11,90	17,49	13,95	11,34	15,05
High	1,97	1,09	2,13	1,32	0,93	1,49

Note: Entries indicate percent shares and columns add up to 100. The technology level is reported only for manufacturing industry and based on OECD ISIC Rev.3 classification.

3.7.1 Persistence rates by technology level

Figure 8 illustrates that jobs created by low- and low-medium technology industries exhibit less stability, while those by high-tech industries are the most secure. This gap widens as time progresses from the initial year of creation. For instance, a year after creation, 66% of jobs from high-tech firms and 60% from low-tech firms persist. However, these rates decrease to 44% and 31%, respectively, after five years. This evidence fits our finding of a higher excess job reallocation rate among low-tech firms and our results thus imply that low-tech jobs are less stable and more prone to reshuffling. When it comes to the persistence of jobs destroyed, on the other hand, differences across technology levels are far less pronounced.

Figure 8: Persistence of jobs created and destroyed by technology level



4 Conclusions

In this study, we document Turkey's labor market dynamics, with a specific focus on the demand side. Besides presenting estimates of job flows for the entire economy and by region, we investigate how firm attributes such as size, age, sector, foreign trade engagement, and technology level influence employment dynamics through job flows. Adopting standard job flow measures, their estimation helps us uncover a dynamic labor market in Turkey, demonstrating gross job reallocation rates ranging from 34% to 44%. These rates align with those observed in developing countries, signifying a substantial reshuffling of the employment structure. Economic downturns, particularly the currency crisis but also the Great Recession, emerge as significant factors, impacting on job creation and job destruction, notably in sectors like construction.

Small firms, particularly micro firms, emerge as dominant contributors to job creation, maintaining this prominence even when adjusting for various factors. The study also reveals insights into job persistence, presenting differences based on firm size, age, sector, and technology type. Furthermore, the study emphasizes the crucial role of firms engaged in international trade, both imports and exports, in job creation and job destruction.

Our exploration of Turkey's labor market dynamics highlights the necessity of considering an integrated perspective, encompassing firm attributes, including trade intensity and technology level, for a comprehensive understanding of Turkey's evolving labor market. Our empirical study is embedded in the pertinent literature whenever appropriate, i.e., whenever the literature discusses the nexus between certain firm attributes and job flows. Often our results confirm evidence from the already existing literature, but in some instances our estimates are not in line with the available evidence or have no counterpart in the literature. Further research is, therefore, required, where one particular focus should be an effort to unravel the complex relationship between foreign trade, technology intensity, and employment dynamics, a research area that thus far has hardly been studied.

References

Acar, A., Bossavie, L., & Makovec, M. (2019). *Do Firms Exit the Formal Economy after a Minimum Wage Hike?: Quasi-Experimental Evidence from Turkey*. World Bank, Washington, DC. https://doi.org/10.1596/1813-9450-8749

Acquisti, A., & Lehmann, H. (2000). *Job Creation and Job Destruction in the Russian Federation* (Trinity Economics Papers 20001). http://www.tcd.ie/Economics/TEP/2000_papers/TEPNo1AA20.pdf

Akgündüz, Y. E., Aldan, A., Bağır, Y. K., & Torun, H. (2019). Job mobility in Turkey. *Central Bank Review*, *19*(3), 83–91. https://doi.org/10.1016/j.cbrev.2019.08.002

Ayhan, S. H. (2018). Married women's added worker effect during the 2008 economic crisis—The case of Turkey. *Review of Economics of the Household*, *16*(3), 767–790. https://doi.org/10.1007/s11150-016-9358-5

Ayyagari, M., Demirguc-Kunt, A., & Maksimovic, V. (2011). *Small vs. Young Firms across the World: Contribution to Employment, Job Creation, and Growth*. The World Bank. https://doi.org/10.1596/1813-9450-5631

Baldwin, J., Dunne, T., & Haltiwanger, J. (1998). A Comparison of Job Creation and Job Destruction in Canada and the United States. *The Review of Economics and Statistics*, *80*(3), 347–356. JSTOR.

Başçı, S., & Durucan, A. (2017). A Review of Small and Medium Sized Enterprises (SMEs) in Turkey. *Yildiz Social Science Review*, *3*(1), 59–80.

Başlevent, C. (2016). Basic Patterns in Construction Sector Employment: How Can Informality Be Reduced? (In Turkish: İnşaat Sektörü İstihdamındaki Temel Örüntüler: Kayıtdışılık Nasıl Azaltılabilir?). *Ekonomi-tek – International Economics Journal*, *5*(2), 35–60.

Brown, J. D., & Earle, J. S. (2002). Gross Job Flows in Russian Industry Before and After Reforms: Has Destruction Become More Creative? *Journal of Comparative Economics*, *30*(1), 96–133. https://doi.org/10.1006/jcec.2001.1757

Burgess, S., Lane, J., & Stevens, D. (2000). Job Flows, Worker Flows, and Churning. *Journal of Labor Economics*, *18*(3), 473–502. https://doi.org/10.1086/209967

Cho, J., Chun, H., Kim, H., & Lee, Y. (2017). Job Creation and Destruction: New Evidence on the Role of Small Versus Young Firms in Korea. *The Japanese Economic Review*, *68*(2), 173–187. https://doi.org/10.1111/jere.12133

Dalgıç, B., & Fazlıoğlu, B. (2021). Innovation and firm growth: Turkish manufacturing and services SMEs. *Eurasian Business Review*, *11*(3), 395–419.

Davis, S. J., & Haltiwanger, J. (1992). Gross Job Creation, Gross Job Destruction, and Employment Reallocation. *The Quarterly Journal of Economics*, *107*(3), 819–863. https://doi.org/10.2307/2118365

Davis, S. J., Haltiwanger, J., & Schuh, S. (1996). Small business and job creation: Dissecting the myth and reassessing the facts. *Small Business Economics*, *8*(4), 297–315. https://doi.org/10.1007/BF00393278

de Wit, G., & de Kok, J. (2014). Do small businesses create more jobs? New evidence for Europe. *Small Business Economics*, *42*(2), 283–295. https://doi.org/10.1007/s11187-013-9480-1

Esaku, S. (2020). Job creation, job destruction and reallocation in Sub-Saharan Africa: Firm-level evidence from Kenyan manufacturing sector. *Cogent Economics & Finance*, *8*(1), 1782113. https://doi.org/10.1080/23322039.2020.1782113

Esaku, S. (2022). Which firms drive employment growth in Sub-Saharan Africa? Evidence from Kenya. *Small Business Economics*, *59*(1), 383–396. https://doi.org/10.1007/s11187-021-00536-y

EUROSTAT. (2008). *NACE Rev. 2—Statistical classification of economic activites in the European Community* [Methodologies and Working Papers]. European Commission.

Flórez, L. A., Morales, L. F., Medina, D., & Lobo, J. (2021). Labor flows across firm size, age, and economic sector in Colombia vs. The United States. *Small Business Economics*, *57*(3), 1569–1600. https://doi.org/10.1007/s11187-020-00362-8

Gulek, A. (2022). *Formal Effects of Informal Labor Supply: Evidence from the Syrian refugees in Turkey* (SSRN Scholarly Paper 4264865). https://doi.org/10.2139/ssrn.4264865

Günlük-Senesen, G., Kaya, T., & Senesen, Ü. (2013). Does the Construction Sector Create Employment or Stimulate Imports? (In Turkish: İnşaat Kesimi İstihdam mı Yaratıyor, Dışalımı mı Uyarıyor?). *Ekonomi-tek – International Economics Journal*, *2*(3), 23–46.

Haltiwanger, J., Scarpetta, S., & Schweiger, H. (2014). Cross country differences in job reallocation: The role of industry, firm size and regulations. *Labour Economics*, *26*, 11–25. https://doi.org/10.1016/j.labeco.2013.10.001

Heyman, F., Norbäck, P.-J., & Persson, L. (2018). Who creates jobs and who creates productivity? Small versus large versus young versus old. *Economics Letters*, *164*, 50–57. https://doi.org/10.1016/j.econlet.2017.12.034

Hijzen, A., Upward, R., & Wright, P. W. (2010). Job Creation, Job Destruction and the Role of Small Firms: Firm-Level Evidence for the UK. *Oxford Bulletin of Economics and Statistics*, *72*(5), 621–647. https://doi.org/10.1111/j.1468-0084.2010.00584.x

IMF. (2023). *Fiscal Monitor—On the Path to Policy Normalization*. International Monetary Fund (IMF). https://www.imf.org/en/Publications/FM/Issues/2023/04/03/fiscal-monitor-april-2023#Chapters

Konings, J., Kupets, O., & Lehmann, H. (2003). Gross job flows in Ukraine. *Economics of Transition*, *11*(2), 321–356. https://doi.org/10.1111/1468-0351.00149

Konings, J., Lehmann, H., & Schaffer, M. E. (1996). Job creation and job destruction in a transition economy: Ownership, firm size, and gross job flows in Polish manufacturing 1988–1991. *Labour Economics*, *3*(3), 299–317. https://doi.org/10.1016/S0927-5371(96)00014-0

Lawless, M. (2014). Age or size? Contributions to job creation. *Small Business Economics*, *42*(4), 815–830.

MoSIT. (2023). *Entrepreneur Information System (EIS) Database 2006–2021* [dataset]. Ministry of Science, Industry and Technology (MoSIT). https://gbs.sanayi.gov.tr/

Neumark, D., Wall, B., & Zhang, J. (2011). Do Small Businesses Create More Jobs? New Evidence for the United States from the National Establishment Time Series. *The Review of Economics and Statistics*, *93*(1), 16–29.

OECD. (2011). *ISIC REV. 3 Technology Intensity Definition- Classification of manufacturing industries into categories based on R&D intensities*. OECD Directorate for Science, Technology and Industry 7 July, 2011 Economic Analysis and Statistics Division.

Orhangazi, Ö., & Yeldan, A. E. (2021). The Re-making of the Turkish Crisis. *Development and Change*, *52*(3), 460–503. https://doi.org/10.1111/dech.12644

Pamuk, Ş. (2020). Economic Policies, Institutional Change, and Economic Growth since 1980. In A. S. Akat & S. Gürsel, *Turkish Economy at the Crossroads* (S. 1–36). WORLD SCIENTIFIC. https://doi.org/10.1142/9789811214899_0002

Roberts, M. J., & Tybout, J. R. (1997). Producer Turnover and Productivity Growth in Developing Countries. *The World Bank Research Observer*, *12*(1), 1–18. JSTOR.

Robu, M. (2013). The Dynamic and Importance of SMEs in Economy. *The USV Annals of Economics and Public Administration*, *13*(1(17)), 84–89.

Şener, S., Savrul, M., & Aydın, O. (2014). Structure of Small and Medium-Sized Enterprises in Turkey and Global Competitiveness Strategies. *Procedia – Social and Behavioral Sciences*, *150*, 212–221. https://doi.org/10.1016/j.sbspro.2014.09.119

Tansel, A., & Acar, E. Ö. (2017). Labor mobility across the formal/informal divide in Turkey: Evidence from individual-level data. *Journal of Economic Studies*, *44*(4), 617–635. https://doi.org/10.1108/JES-06-2015-0103

TURKSTAT. (2022a). *Household Labor Force Surveys* [dataset]. Turkish Statistical Institute (TURKSTAT).

TURKSTAT. (2022b). *Small- and Medium-Scale Enterprise Statistics—TURKSTAT News Bulletin*. Turkish Statistical Institute (TURKSTAT). https://data.tuik.gov.tr/Bulten/Index?p=Kucuk-ve-Orta-Buyuklukteki-Girisim-Istatistikleri-2021-45685

TURKSTAT. (2023). *Household Labor Force Statistics—TURSTAT News Bulletin*. Turkish Statistical Institute (TURKSTAT). https://data.tuik.gov.tr/Bulten/Index?p=Isgucu-Istatistikleri-2022-49390#:~:text=2022%20yılında%204%20milyon%20866,kişi%20hizmet%20sektöründe%20istihdam%20edildi

TURKSTAT. (2022c, Februar 10). Labor Force Statistics—TURKSTAT News Bulletin December 2021. *TUIK Haber Bülteni*. https://data.tuik.gov.tr/Bulten/Index?p=Isgucu-Istatistikleri-Aralik-2021-45642

World Bank. (2017). *Turkey—Country partnership framework for the period FY18—FY21*. World Bank Group. http://documents.worldbank.org/curated/en/299101516112110060/Turkey-Country-partnership-framework-for-the-period-FY18-FY21

Yilmaz, K., & Yilmaz, D. Ö. (2019). AKP and Construction Based Employment: A Comparative Analysis of the Construction Sector in the Context of Employment and Growth 1923–2015 (in Turkish: AKP ve İnşaata Dayalı İstihdam: İnşaat Sektörünün İstihdam ve Büyüme Bağlamında Karşılaştırmalı Bir Analizi 1923–2015). *Çalışma ve Toplum: Ekonomi ve Hukuk Dergisi*, *61*, 1287–1320.

Appendix

Appendix Tables

Table A1: Shares of job creation and destruction by sector

	Job creation			Job destruction		
	Total	Entry	Expans.	Total	Exit	Contr.
Agriculture	0,58	0,81	0,52	0,54	0,66	0,49
Manufacturing	20,94	14,44	22,78	20,51	19,65	20,90
Services	56,91	61,24	55,68	55,30	60,63	52,89
Construction	19,42	22,18	18,64	21,52	17,89	23,15
Mining	0,80	0,46	0,90	0,83	0,51	0,98
Energy	1,35	0,87	1,48	1,30	0,66	1,58

Note: Entries indicate percent shares and columns add up to 100.

Table A2: NACE Rev. 2 sectoral classification and the aggregation used in our analysis

Section	Title	Classification in Table 6	Classification in Figure 3
A	Agriculture, forestry and fishing	Agriculture	Agriculture
B	Mining and quarrying	Mining	Mining
C	Manufacturing	Manufacturing	Manufacturing
D	Electricity, gas, steam and air conditioning supply	Energy	Energy
E	Water supply; sewerage, waste management and remediation activities		
F	Construction	Construction	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	Trade	Services
H	Transportation and storage	Transportation	
I	Accommodation and food service activities	Accomodation	
J	Information and communication	Information	
K	Financial and insurance activities	Insurance	
L	Real estate activities	Real estate	
M	Professional, scientific and technical activities	Professional	
N	Administrative and support service activities		
O	Public administration and defence; compulsory social security		
P	Education	Education	
Q	Human health and social work activities	Health	
R	Arts, entertainment and recreation	Entertainment	
S	Other service activities	Other	
T	Activities of households as employers; undifferentiated goods- and services- producing activities of households for own use		
U	Activities of extraterritorial organisations and bodies		

Source: EUROSTAT (2008). Broad Structure of NACE Rev.2

Table A3: Annual job flow rates by source components for remaining sectors

	Agriculture and livestock						Mining and quarrying						Energy and water supply					
	Job creation			Job destruction			Job creation			Job destruction			Job creation			Job destruction		
	Total	Entry	Expans.	Total	Exit	Contract.	Total	Entry	Expans.	Total	Exit	Contract.	Total	Entry	Expans.	Total	Exit	Contract.
2007	0,197	0,060	0,137	0,217	0,078	0,139	0,154	0,032	0,123	0,141	0,036	0,105	0,123	0,033	0,090	0,072	0,016	0,057
2008	0,224	0,077	0,147	0,207	0,083	0,123	0,146	0,038	0,108	0,148	0,042	0,107	0,217	0,056	0,162	0,100	0,021	0,079
2009	0,214	0,070	0,144	0,203	0,077	0,125	0,155	0,036	0,119	0,128	0,031	0,097	0,213	0,048	0,165	0,168	0,038	0,130
2010	0,260	0,084	0,176	0,165	0,069	0,096	0,166	0,032	0,134	0,091	0,024	0,068	0,232	0,059	0,173	0,159	0,031	0,128
2011	0,312	0,111	0,200	0,161	0,062	0,099	0,150	0,035	0,116	0,116	0,031	0,085	0,198	0,054	0,144	0,133	0,027	0,105
2012	0,233	0,077	0,156	0,233	0,086	0,146	0,133	0,031	0,101	0,142	0,040	0,102	0,197	0,059	0,138	0,169	0,041	0,128
2013	0,243	0,082	0,161	0,205	0,076	0,130	0,133	0,033	0,100	0,169	0,048	0,121	0,212	0,065	0,147	0,193	0,058	0,135
2014	0,242	0,081	0,161	0,184	0,078	0,106	0,122	0,030	0,092	0,205	0,057	0,147	0,247	0,072	0,175	0,233	0,073	0,160
2015	0,252	0,089	0,164	0,204	0,078	0,126	0,170	0,036	0,135	0,134	0,036	0,097	0,228	0,063	0,165	0,175	0,059	0,116
2016	0,174	0,066	0,108	0,247	0,095	0,151	0,111	0,029	0,082	0,152	0,041	0,111	0,193	0,069	0,124	0,223	0,073	0,150
2017	0,217	0,088	0,129	0,177	0,067	0,110	0,212	0,050	0,162	0,135	0,034	0,101	0,206	0,091	0,115	0,180	0,054	0,125
2018	0,188	0,070	0,118	0,226	0,087	0,139	0,131	0,032	0,099	0,178	0,045	0,133	0,150	0,060	0,090	0,371	0,136	0,234
2019	0,153	0,063	0,090	0,350	0,155	0,196	0,100	0,031	0,069	0,228	0,058	0,170	0,119	0,045	0,074	0,147	0,050	0,098
2020	0,375	0,139	0,235	0,125	0,051	0,074	0,149	0,030	0,119	0,093	0,026	0,067	0,161	0,048	0,114	0,119	0,037	0,082
2021	0,178	0,044	0,134	0,165	0,068	0,098	0,135	0,030	0,105	0,094	0,025	0,069	0,170	0,039	0,131	0,111	0,035	0,077
Average	*0,223*	*0,078*	*0,145*	*0,202*	*0,080*	*0,122*	*0,137*	*0,032*	*0,105*	*0,140*	*0,037*	*0,103*	*0,182*	*0,059*	*0,123*	*0,181*	*0,056*	*0,125*

Note: The annual job flow rates are computed based on fourth quarter-to-fourth quarter change in net employment. The sum of entry and expansion is equals to the rate of job creation (POS) and the sum of exit and contraction is equal to the rate of job destruction (NEG) in the corresponding year and sector.

Table A4: Joint distribution of % firms by size and age

Age/Size	1–2	3–9	10–19	20–49	50–99	100–249	250–499	500+	*Total*
0–1	17,15	3,76	0,88	0,53	0,14	0,08	0,02	0,02	*22,57*
2–5	21,94	5,87	1,43	0,89	0,23	0,14	0,04	0,03	*30,59*
6–10	14,11	4,15	1,01	0,67	0,17	0,11	0,03	0,03	*20,27*
11–15	7,71	2,51	0,62	0,42	0,11	0,07	0,02	0,02	*11,48*
16–20	4,14	1,41	0,34	0,23	0,06	0,04	0,01	0,01	*6,24*
21–25	2,38	0,77	0,18	0,12	0,03	0,02	0,01	0,00	*3,51*
26+	4,05	0,99	0,16	0,09	0,02	0,02	0,01	0,01	*5,35*
Total	*71,48*	*19,45*	*4,61*	*2,95*	*0,77*	*0,48*	*0,15*	*0,11*	*100*

Table A5: Joint distribution of the share of job flows by firm size and age (%)

Age/Size	Micro (1–9)	Small (10–49)	Medium (50–249)	Large (250+)	*Total*
		Job creation			
0–1	9,22	4,64	3,77	2,61	*20,23*
2–5	7,53	4,02	3,53	2,41	*17,50*
6–10	6,18	3,28	3,00	2,15	*14,60*
11–15	5,51	2,90	2,61	1,93	*12,95*
16–20	5,22	2,79	2,45	1,80	*12,27*
21–25	4,87	2,76	2,42	1,60	*11,65*
26+	4,56	2,66	2,27	1,30	*10,79*
Total	*43,09*	*23,05*	*20,05*	*13,81*	*100*
		Job destruction			
0–1	4,84	4,63	4,19	3,60	*17,27*
2–5	4,72	4,33	3,95	3,21	*16,21*
6–10	4,58	3,86	3,53	2,74	*14,72*
11–15	4,34	3,52	3,19	2,33	*13,38*
16–20	4,28	3,43	3,04	2,27	*13,02*
21–25	4,23	3,42	3,06	2,10	*12,82*
26+	4,28	3,53	3,02	1,76	*12,58*
Total	*31,27*	*26,73*	*23,98*	*18,02*	*100*

Note: Job flows are computed based on based on fourth quarter-to-fourth quarter change in net employment. Columns and rows together add up to 100.

Table A6: Regression results. Job creation and destruction rates by the change in import and export share

	Job creation			Job destruction		
	(1)	(2)	(3)	(4)	(5)	(6)
Quintiles of the change in import share:						
q2	0.011	0.001	0.003	–0.007	0.008	0.006
	(0.012)	(0.009)	(0.009)	(0.013)	(0.010)	(0.010)
q3	0.040***	0.025**	0.027**	–0.026*	–0.006	–0.007
	(0.013)	(0.011)	(0.011)	(0.014)	(0.012)	(0.012)
q4	0.023*	0.008	0.011	–0.008	0.011	0.009
	(0.012)	(0.010)	(0.010)	(0.013)	(0.011)	(0.010)
q5	0.006	0.003	0.003	0.005	0.011	0.010
	(0.011)	(0.009)	(0.009)	(0.013)	(0.011)	(0.010)
Quintiles of the change in import share:						
q2	0.011	0.005	0.006	–0.007	–0.010	–0.012
	(0.013)	(0.010)	(0.010)	(0.015)	(0.011)	(0.011)
q3	0.010	0.004	0.004	–0.000	–0.006	–0.007
	(0.013)	(0.009)	(0.009)	(0.014)	(0.010)	(0.010)
q4	0.016	0.020**	0.020**	0.007	0.002	0.003
	(0.011)	(0.009)	(0.008)	(0.013)	(0.010)	(0.009)
q5	0.009	0.014	0.014	0.014	0.010	0.010
	(0.012)	(0.010)	(0.010)	(0.014)	(0.011)	(0.011)
Dummies:						
Year	Yes	Yes	Yes	Yes	Yes	Yes
Sector	No	Yes	Yes	No	Yes	Yes
Region	No	No	Yes	No	No	Yes
Constant	0.169***	0.214***	0.201***	–0.208***	–0.224***	–0.223***
	(0.011)	(0.016)	(0.016)	(0.012)	(0.019)	(0.019)
Observations	11478963	11478963	11478544	11478963	11478963	11478544

Note: The specifications include 99 two-digit sector dummies, 12 NUT1-level regional dummies, and 16 year dummies. Quintiles are computed based on the change in imports (or exports) as a share of GDP, as described in Section 0. Clustered standard errors at sector level in parentheses *** p<0.01, ** p<0.05, * p<0.1

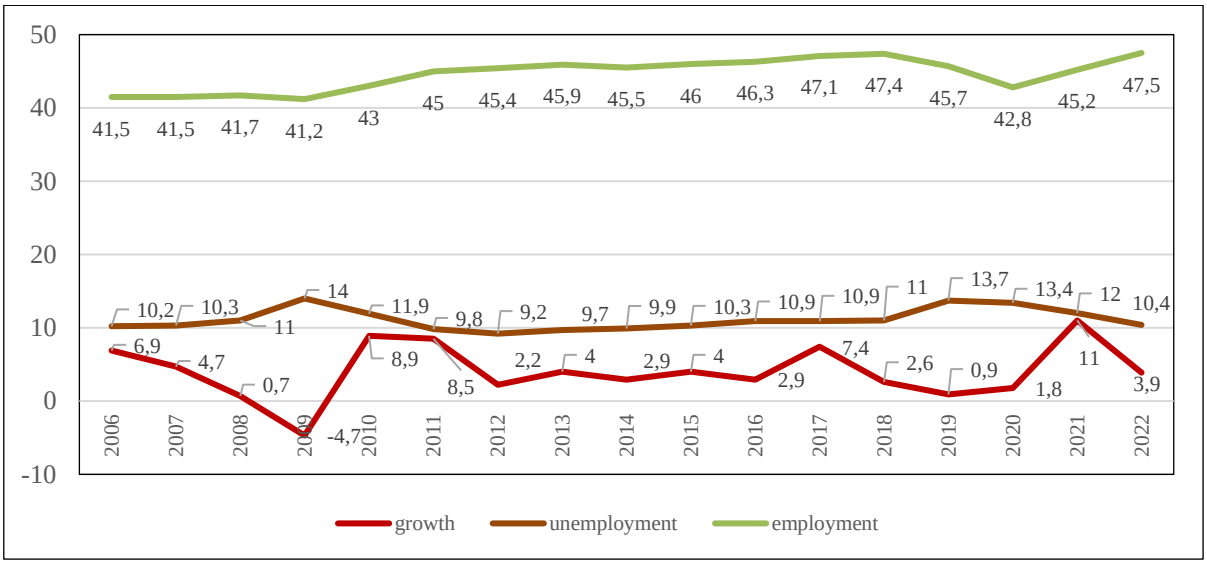
Table A7: Technology intensity classification of manufacturing industries

Low-technology industries	**Medium-low-technology industries**	**Medium-high-technology industries**	**High-technology industries**
Manufacturing, n.e.c.; Recycling	Building and repairing of ships and boats	Electrical machinery and apparatus, n.e.c.	Aircraft and spacecraft
Wood, pulp, paper, paper products, printing and publishing	Rubber and plastics products	Motor vehicles, trailers and semi-trailers	Pharmaceuticals
Food products, beverages and tobacco	Coke, refined petroleum products and nuclear fuel	Chemicals excluding pharmaceuticals	Office, accounting and computing machinery
Textiles, textile products, leather and footwear	Other non-metallic mineral products	Railroad equipment and transport equipment, n.e.c.	Radio, TV and communciations equipment
	Basic metals and fabricated metal products	Machinery and equipment, n.e.c.	Medical, precision and optical instruments

Source: OECD (2011), ISIC REV.3 Technology Intensity Definition

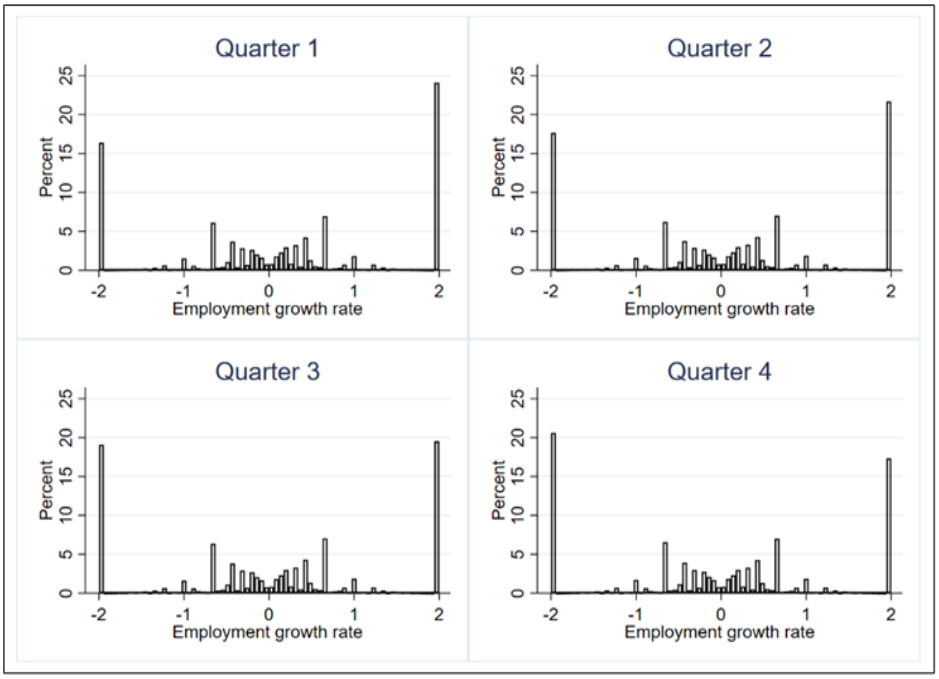
Appendix Figures

Figure A1: Basic macro indicators: Rates of GDP growth, unemployment, and employment



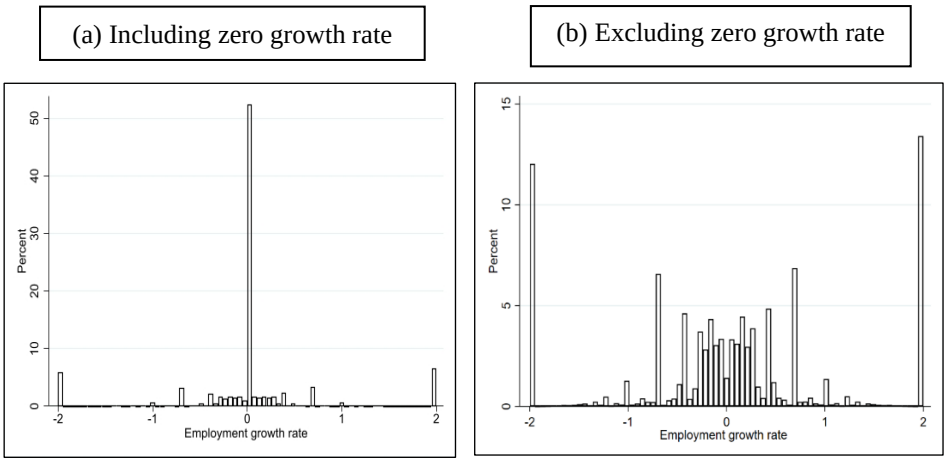
Source: TURKSTAT (2022). Household Force Surveys and National Accounts, 2006–2022.

Figure A2: The distribution of *annual* employment growth rate – excluding zero employment growth rate



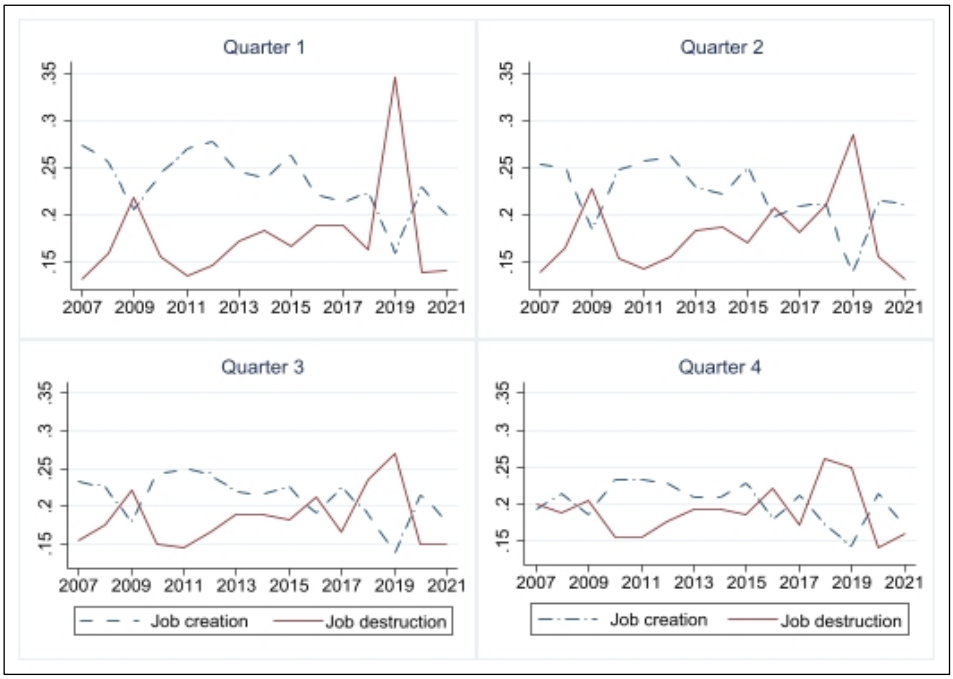
Note: Annual employment growth rate is calculated based on the change in employment from one quarter of a given year to the same quarter in consecutive year.

Figure A3: The distribution of *quarterly* employment growth rate



Note: Quarterly employment growth rate is calculated based on the change in employment from a given quarter to previous quarter.

Figure A4: Annual rates of job creation and destruction with respect to one quarter-to-the same quarter employment changes



Note: The annual job flow rates are computed based on the fourth quarter-to-fourth quarter change in net employment.

Figure A5: Persistence of jobs created and destroyed by geographical regions

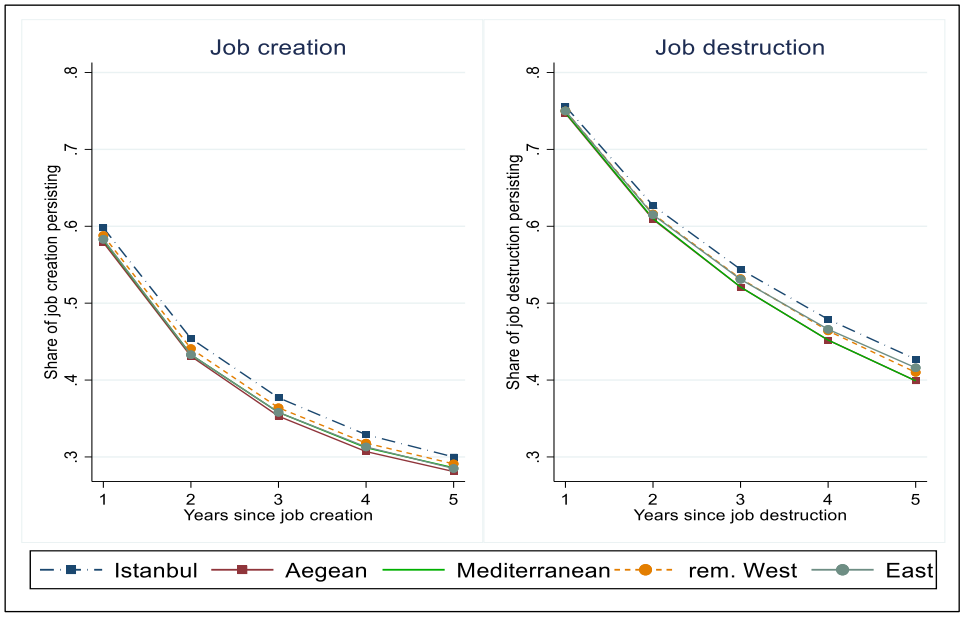
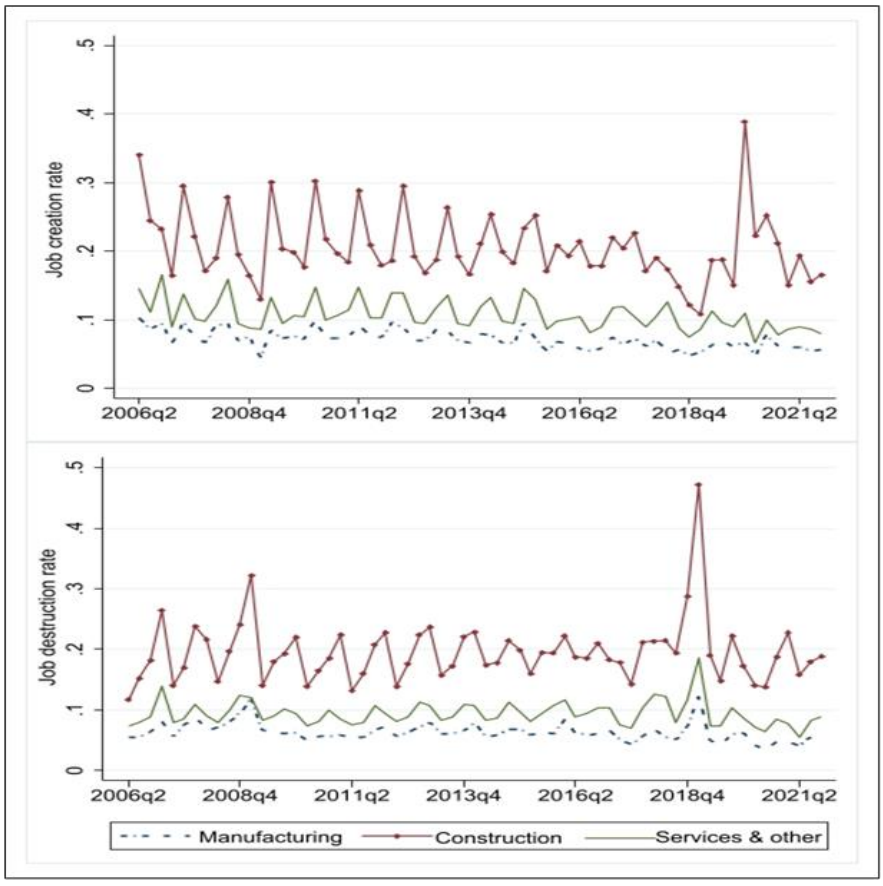


Figure A6: Quarterly rates of job creation and job destruction by sector



Note: Quarterly job flow rates are calculated based on the net change in employment from one quarter to the subsequent one.