Structural Stagnation

Firm-level Evidence on Job Creation in Tunisia

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Abstract: This paper examines private sector job creation in Tunisia over the period 1996-2010 using a unique database containing information on all registered private enterprises, including self-employment. Overall net job creation by firms was disappointing and the firm-size distribution became increasingly right skewed, with 2 out of every 5 net new jobs being in one-person firms (self-employment). The increasing importance of small-scale employment reflects the contributions of new firms and the fact that most entrants start small. Post-entry, however, small firms are the worst performers in terms of job creation, even if they survive; there is no "up-or-out" dynamic as is the case in the U.S. Instead we observe structural stagnation; mobility is extremely limited, with very few firms managing to grow. Moreover, the link between productivity, profitability and job creation is very weak, pointing towards severe weaknesses in the re-allocative process. A simple simulation exercise suggests that if pre-revolution trends continue unabated, by 2025, 90% of firms will be one-person enterprises and 42% of all formal jobs will be in the form of self-employment.

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1 Introduction and Motivation

Tunisia's Jasmin revolution was sparked by the self-immolation of a self-employed street vendor, Mohamed Bouazizi, on 17 December 2010, which resulted in the ousting of Ben Ali 27 day later. While Tunisia suffers from widespread poverty, persistenly high unemployment and progressively pervasive corruption, the timing of the revolution may seem somewhat surprising since it followed on the heels of a decade of substantial and sustained growth of on average 4.8% per annum between 1996 and 2010. This growth, however, was not accompanied by sharp reductions in unemployment, which hovered between 16 and 14% over the period considered, in part because the labor force expanded by 1.9% per annum.[1]

Using a unique firm-level dataset covering all private sector enterprises, including one-person firms (i.e. the registered self-employed), in Tunisia over the period 1996-2010 this paper examines why favorable pre-revolution growth performance was not accompanied by more job creation. The aim of the paper is to unveil the mechanisms by which low aggregate employment growth materializes. We focus in particular on which firms create the most jobs and the role of firm size, an issue that is at the heart of the debate about how to tackle unemployment, one of the most important policy challenges across the globe today

Examining how firms create jobs in a small developing country, suffering from high and persistent unemployment, enables us to identify similarities and differences with developed countries and offers new information about where the constraints to job growth lie. One possibility is that firm dynamics are similar to those observed in more vibrant environments but that entry rates are lower. Alternatively, weak job creation could be predominantly due to stagnation among incumbent firms. Another possibility is that job creation is adequate but job destruction is excessive. Of course, the importance of these mechanisms may be heterogeneous across different types of firms, varying inter alia with firms' size and age (Haltiwanger et al., forthcoming). Examining which firms create the most jobs also sheds light on the efficacy of the re-allocative process; limited job creation reflects distortions and frictions inhibiting the growth of productive firms, or attests to demand constraints, with productivity a potentially even more important determinant of firm growth and

[1] Labor force participation rates were relatively stagnant and, if anything, declined due to increasing educational attainment.

survival. While the data do not enable us to directly discriminate between these competing explanations, we can test whether their implications are consistent with the patterns of employment growth we observe; for example, in the former case the relationship between productivity and employment growth would be weak, whereas in the latter case it would be strong.

Tunisia, a small open Northern African country which was at the forefront of the Arab Spring, provides a very relevant context to examine these issues. As is typical of developing countries (Jutting et al., 2008) informal and small-scale non-agricultural employment are on the rise (Angel-Urdinola et al. 2012). In addition, it is exemplary of Middle Eastern and Northern African economies in suffering high unemployment despite having a relatively educated workforce and a stable macroeconomic environment during the period examined. Moreover, its government has pursued a very active industrial policy, of which exports and small business promotion were important pillars. However, it is also known for having relatively burdensome business regulation which is often applied arbitrarily and high levels of corruption. Last but not least, Tunisia is one of the few countries in the region with a high-quality firm-census and authorities willing to share those data with researchers.

Our results demonstrate private sector stagnation and firm dynamics quite different from those documented in developed countries. While the private sector generated an estimated 672,877 net new jobs over the period under consideration (amounting to an 80% increase in employment relative to 1996), labor supply also increased rapidly, such that unemployment did not decline drastically. Moreover, the firm-size distribution has become increasingly skewed towards small firms; a striking 40% of all net new jobs were accounted for by an expansion of self-employment. Gross job creation rates for self-employment are even more impressive, with start-up self-employment accounting for roughly three-fourths of net new job creation over the period considered. However, post-entry, one-person are the worst performers in terms of net job creation, such that the aggregate contribution to job creation of self-employment is much more modest than the gross entry numbers might suggest.

While we find a positive correlation between firm-size and net job creation, similar to that documented by Neumark et al. (2011) and Haltiwanger et al. (forthcoming) in the U.S., this relationship is very sensitive to regression to the mean effects, and, moreover, entirely driven by firm entry; incumbents firms on average shed labor and small firms do so relatively rapidly. In other

words, post-entry, large firms consistently outperform small firms in terms of job creation, even if we confine attention to surviving firms. Thus, the "up-or-out" dynamic that characterizes firm dynamics in the U.S. and other developed countries does not appear to be at play; instead, we observe inertia; exit rates are low, especially for larger firms, and mobility is extremely limited with very few firms managing to grow (even conditional on survival). In conjunction with most entrants starting very small, this lack of upward mobility helps explain why the firm size distribution has become increasingly skewed towards small-scale production in comparatively young firms.

Our results nonetheless underscore the pivotal role of firm age that was first pointed out by Haltiwanger et al. (forthcoming); we consistently document a strongly negative correlation between firm age and growth as is also observed in the U.S.; young firms tend to grow the fastest and contribute the most to net job creation, in spite of their higher exit rates.

The lack of dynamism is also manifested in allocative inefficiency; firm size and age are not very strongly correlated with productivity and profitability. Moreover, the process of creative destruction whereby resources are reallocated towards productive resources appears attenuated relative to developed countries. Productive firms and more profitable firms grow significantly faster, but the relationship between productivity, profitability and employment creation is weak. Although our proxies for productivity and profitability may suffer from substantial measurement error, taken at face value our estimates suggest that, ceteris paribus, doubling output per worker is associated with 1%-5% higher employment growth. Similarly, moving up a decile in the profitability distribution (by sector and year) is associated with an acceleration of employment growth of approximately 1-2% ceteris paribus. Controlling for productivity and profitability does not affect the qualitative pattern of size and age coefficients very much, and has only a very modest impact on the estimated coefficient estimates.

The results have important implications for how to address the prevailing employment challenge. They underscore the urgent need for reforms removing obstacles to firm growth, facilitating an efficient (re-)allocation of resources and encouraging entry, especially of larger firms. A simple simulation exercise shows that if such reforms are not undertaken and the pre-revolution trend towards small-scale production continues unabated, by 2025, 91% of firms will be one-person firms and these will jointly account for 42% of all employment. At the same time, the results call into question the usefulness of programs focused on the formation of SMEs, which are often

predicated on the notion that small firms generate the most jobs. The Tunisia data show exactly the opposite, with small firms being both more likely to exit and less likely to grow. Consequently, the effectiveness of these types of programs is likely to be seriously compromised unless complementary reforms are undertaken.

The remainder of the paper is organizes as follows. The next section reviews related literature, including a recent yet influential paper by Haltiwanger et al. (2011) on patterns of job creation by age and size in the U.S., whose results will serve as a benchmark. Section three describes the data and presents descriptive statistics. Our econometric strategy is presented in section 4. Section 5 presents our principal results regarding the role of age and size. The role of productivity and profitability is explored in section 6, which also examines to what extent our previous regarding size and age reflect productivity and profitability differences. A simple simulation exercise of the future evolution of the firm size distribution based on extrapolating pre-revolution trends is presented in section 7. A final section concludes.

2 Related Literature and Conceptual Considerations

The ability of productive firms to expand is increasingly recognized as critical to a country's economic success. Allocative efficiency is typically higher in developed countries than in developing countries (see e.g. Bartelsman et al, forthcoming, and Hsieh and Klenow, 2009), and this is plausibly due to distortions or frictions preventing inputs being allocated to their optimal uses. Such frictions may not only induce misallocation, but may also undermine incentives to invest and grow; Differences in the lifecycle of firms are an important mechanism by which differences in aggregate productivity materialize. Hsieh and Klenow (2012) for instance, estimate that if U.S. firms exhibited the same dynamics as Indian or Mexican firms, aggregate manufacturing TFP would be roughly 25% lower. An important question is therefore whether or not productive firms in developing countries are able to grow as quickly as those in developed countries.

A parallel literature has focused on whether small firms create the most jobs, and whether or not they have special benefits in terms of employment and productivity. This debate about the role of small businesses in job creation started with the work of Birch (1979, 1981) who claimed that small firms were the most important source of job creation in the U.S. economy. Birch's work, and

in particular his thesis that small firms grow faster than large firms, attracted considerable criticism, including by Davis et al. (1996) who pointed out several statistical pitfalls underpinning his analysis, such as attrition bias, and a failure to distinguish between gross and net job flows. They also pointed out that regression to the mean effects may yield a spurious inverse correlation between firm size and growth, since firms that experience a negative transitory shock (or whose size is measured with negative error) are more likely to (be observed to) grow, while firms that experienced a positive shock are more likely to shrink. As a consequence estimates of the relationship between firm size and growth reliant on size-classifications based on the start year of the growth spell – often referred to as base-year size classifications - are likely to be biased upwards. Conversely those using size classifications based upon the end year are likely to be biased downwards.

To avoid the attendant biases Davis et al. (1996) propose to use the average of the firm size between the start and the end year of the growth spell as the basis of the size classification. While this reduces bias considerably, this methodology is not without limitations. In particular, since firms that traverse size classes are counted as having originated in a size class that is an average of the starting and the ending size class the contribution of firms on either extreme of the size distribution is likely to be underestimated. Note that this implies that differences in results obtained using average and base size classifications cannot be attributed to measurement error alone – for they would arise even in the absence of any such error.

Recently, Neumark et al. (2011) used both methods to study patterns of job creation in the U.S. based on the National Establishment Time Series, and found that small establishment create more jobs. Haltiwanger et al. (2011) replicate this finding using the Longitudinal Database of Firms, but also show the importance of firm age in accounting for the relationship between firm-size and job creation; once firm age is conditioned on, they no longer find evidence of a systematic relationship between firm size and firm growth. The key role for firm age is associated with firm births: new firms tend to be small and thus inverse relationship between size and firm growth is due to most new firms being classified as small. They also document an "up or out" dynamic of young firms in the U.S., young firms grow much faster conditional on survival, but are also much more likely to exit.

To what extent this up-or-out dynamic reflects a process of competitive selection whereby the weakest firms are weeded out and to what extent this dynamic generalizes to developing

countries are important open-ended questions. While a large number of studies have focused on the determinants of firm growth in developing countries, most of this literature has by necessity been based on datasets that are at best partially representative (a notable exception is Klapper and Richmond, 2012). In particular, microenterprises are typically not covered, which is unfortunate since such firms account for a large, and often growing, share of employment in developing countries. Moreover, most panels tend to be relatively short, and often only cover particular sectors, most notably manufacturing. Nonetheless existing studies point towards size, age, and productivity (e.g. see Sleuwagen and Goedhuys, 2002, Bigsten et al., 2007, van Biesebroeck, 2005) as important determinants of firm growth, but the conclusions derived from this literature are not unequivocal. For example, using a panel of manufacturing firms from 9 African countries Van Biesebroeck finds that larger firms grow faster whereas Sleuwagen and Goedhuys (2002) concluded that small firms have the highest growth rates using a panel of firms from Cote d'Ivoire. While the jury is out on which firms create the most jobs, it is of interest to note that across the developing world, non-agricultural employment in small firms and informality are on the rise (Jütting et al., 2008). While this trend appears indicative of high entry into small scale activities, it is not clear whether this tendency towards increased skewness is offset or catalyzed by the post-entry performance of small firms.

3 Data and Descriptive Statistics

3.1 Data

The main dataset used for this paper is the Tunisian registry of firms, *the Répertoire National des Entreprises (RNE)* 1996-2010 collected by the Tunisian *Institut National de la Statistique (INS)*. The RNE contains information on inter alia the employment, age and main activity of all registered private[2] non-agricultural firms, except cooperatives.[3] A major and unique advantage of the Repertoire is that has no floor in terms of size and records information on firms without paid employees, i.e. the registered self-employed, which account for the bulk of all enterprises. This

[2] While the RNE also collects information on publicly owned enterprises, it does not reliably record their employment, which, according to INS estimates accounts for 21% of overall) employment. We drop such firms from the analysis.

[3] The RNE is and administrative based on files from the social security fund (CNSS) and the Ministry of Labor (DOG). For detailed information on its construction, see INS (2012).

renders it feasible to examine the dynamics of these firms, which are often not covered even by firm censuses, and to assess their contribution to aggregate net job creation, which we will demonstrate to be very important.

Another key strength of the Repertoire is that it is comprehensive in terms of covering all non-agricultural sectors, and spans a relatively long time period. The database also allows us to track and entry and exit over time, and thus to avoid survival bias.

To assess the role of productivity and profitability, which are widely recognized to be critically important but not routinely available in firm census data, the RNE was merged with confidential profit and turnover data from the Tunisian Ministry of Finance spanning the universe of private firm tax records for the period 2006 through 2010. Combining these different data-sources enables us to assess to what extent the striking relationships between firm size, age and growth documented by Haltiwanger et al. (forthcoming) reflect performance differences associated with scale and across the lifecycle.

Some features of the data have to be borne in mind when interpreting the results. To start with, our database is a database of firms, not establishments; we thus do not observe job-reallocation due to plant openings or closings. In addition, the INS data contain information on the number of salaried employees, but not on the number of unpaid employees or the number of firm owners. In fact, the vast majority of firms do not report employing any salaried employees because they are one-person firms in which the proprietor also supplies all the labor. To arrive at a measure of employment we assume that all firms employ at least one unpaid workers (in the case of self-employment, this implies we count the proprietor as employee). This assumption is not accurate since some firms do not employ any unpaid workers, which would result in upwards bias in the employment numbers, whereas others may employ multiple such workers, which would imply downwards bias in our employment estimates. Yet, this assumption enables us to estimate the contribution of registered self-employment, which we will show to be very large. Moreover, it ensures that absolute size differentials in terms of the number of salaried workers are preserved. In robustness checks not presented to conserve space but available upon request, we also experimented with employment measures that assume that firms that hire wage employees do not have any unpaid laborers, but this alternative imputation method does not affect the overall qualitative pattern of results we obtain.

The repertoire only provides information on registered employment. Consequently, it does not document informal employment, which is substantial in Tunisia.[4] The employment numbers (and flows) in our data are likely to be biased downwards both due to under-reporting of labor by registered firms and because some firms may not register at all. Underreporting may also impact estimates of the relationship between firm size and net job creation; if the extent of underreporting conditional on being formal increases with firm size, results regarding the relationship between firm size and growth might be biased downwards. On the other hand, microenterprises that register may be more successful and more capital-intensive then ones that choose to remain informal, which may bias employment growth numbers of small firms upwards. In practice, underreporting appears to be confined to a few sectors. A comparison between the employment numbers obtained using the Labour Force Surveys and the Repertoire National suggests that while overall underreporting is in the order of magnitude of approximately a third of all jobs reported in the RNE on average, half of the discrepancy between the total employment numbers recorded in the RNE and the LFS is accounted for by the construction sector alone, where underreporting is known to be rife.[5] For most sectors, the discrepancies between the LFS and RNE numbers are very small.[6]

Data on turnover and profits are not available for all firms, even though the confidential database we obtained access to is the most comprehensive database of turnover and taxes available in Tunisia. The reason that such data are missing for a number of firms is that the tax obligations for these firms do not depend on their output and turnover and tax inspectors consequently do not have strong incentives to verify the tax declarations of such firms, which provide the basis for the output and profit data from the Ministry of Finance.[7] In addition, for firms in this category for whom we have data the reporting quality is low. In the analysis that uses profitability and productivity measures, we therefore exclude this group of firms. We also discard firms that do not

[4] According to a recent World Bank study (World Bank, 2011), roughly two-fifth of GDP is produced informally, i.e. not declared to the tax authorities.

[5] Based on LFS estimates, total employment in 2010 was 2.014.106, versus 1.421.788, jobs documented in the RNE. The bulk of this discrepancy is accounted for by the construction sector, where the discrepancy between LFS and RNE estimates of total employment amounts to 337.000 jobs.

[6] In robustness checks not presented to conserve space, but available from the authors upon request, we examine the robustness of the results to excluding sectors where underreporting is most severe; the qualitative pattern of results did not change substantially as a consequence.

[7] These are firms in the regime "totalement exportatrice", commonly referred to as "offshore: firms, and firms in the regime forfaitaire.

report hiring any paid laborers as well as firms which exhibit extreme volatility in gross output per worker, as well as extreme values relative to the sector-year-average when using information on turnover and profits.[8]

Finally, because the RNE is based on administrative data, the timing of firm exit is a concern; the legal date of firm closure may lag the termination of economic activity. Surveys conducted by the INS suggest that at most 1% of firms which report employing at least one wage workers are in fact inactive. For the registered self-employed that do not use any wage labor, the number of such "falsely active" firms is 8%. The INS has a deterministic model to identify such zombie firms, which we exclude from the analysis after they have become "falsely active". That is, we assume they exit in the year they are first observed to be "falsely active" rather than the year that they in fact disappear from the data. Firms that are always observed to be "falsely active" are excluded from the analysis altogether.

We also adjust the year of exit of firms that have ever employed salaried workers to the year after they stop doing so, rather than the year they legally cease to exist, provided they do not record producing output in that or any subsequent year. The reason for doing this is that our employment imputation procedure (remember we assume each firm that is in the RNE has at least one unpaid worker) exacerbates the potential problem of misclassifying firms as being active when in fact they are inactive. Unfortunately, we cannot make this adjustment for the registered self-employed that have never used any paid labor, and we are consequently likely to overestimate the longevity of such firms somewhat, at least in the short-run. These data-cleaning procedures thus inevitably introduce a degree of asymmetry, whose consequences are explored in the appendix in which it is shown what raw size transition matrices would look like in the absence of these corrections, or if we were to focus strictly on wage employment. The results we obtain using these alternatives are qualitatively similar to the ones we present in this paper (in part because we will employment weight our regressions).[9]

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[8] We exclude firms which had a jump in gross output per worker in excess of 100% that did not persist the subsequent period. We also exclude firms who on average experiencing swings in gross output per worker in excess of 150%. Moreover, we exclude the top and bottom 1% of firms in terms of gross output per worker and profits by sector-year.

[9] In robustness checks that we do not present to conserve space we also estimate regressions using a sample that excludes the self-employed and constructs employment measured based on the number of salaried workers only. The results, which are available upon request, are qualitatively similar to the ones presented in this paper, which we think are

3.3 Descriptive Statistics

A first look at the data yields a number of surprising stylized facts. To start with, the Tunisian firm-size distribution, presented in Table 1, is strikingly skewed. Over the period 1996-2010, one-person firms (i.e. the registered self-employed) account for approximately 83% of all firms, and 28% of employment. The skewness is also manifested in the very limited number of large firms; on average, in each year there were approximately only 51 firms that employed more than a thousand employees. These relatively large firms, which tend to be older on average, account for an important share of employment; for example, even though fewer than 0.2% of all firms employ more than 200 workers, such firms account for more than a quarter of all employment. Nonetheless, by international standards, employment is concentrated in comparatively small firms. For example, in the U.S. 48% of all employment is in firms employing more than 10,000 workers (Haltiwanger et al., 2012), whereas no such firm is observed in our data, with the maximum employment size ever observed being 9222 workers.

Second, the firm size distribution has become increasingly skewed towards small-scale production, as is demonstrated in Figure 1 which depicts the evolution of the firm size distribution graphically. The share of firms that are one-person enterprises has increased most markedly, resulting in an increasingly right-skewed firm-size distribution. While the overall trend is obviously towards small scale production, two seeming discontinuities in the trend warrant discussion. To start with, the share of one-person firms declined considerably in 1998 and 1999, presumably in response to simplification of bankruptcy procedures instituted in 1998, which included temporary fiscal amnesty for firms in certain sectors. If anything, this change in bankruptcy laws would cause us to underestimate the trend towards a more right-skewed size distribution since more firms exited than would have likely been the case that the law not been changed. It could also cause us to underestimate the upward mobility of small firms, because these were more likely to drop out. This obviously does not take into account that lower exit costs might have contributed to increased entry, especially of small firms, and enhanced mobility. Second, the proportion of one-person firms

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more informative about the functioning of the Tunisian labor market for they highlight the important role of self-employment.

increases especially rapidly in 2002 and 2003, likely reflecting a significant deceleration of GDP growth in 2002, when GDP growth was lowest over the period considered.[10]

<FIGURE 1 ABOUT HERE>

A third stylized fact is that employment is disproportionately concentrated in young firms compared to developed countries. Table 2 documents the distribution of employment by firm size age and size over the period 1996-2010, demonstrating that most jobs were concentrated in old large firms and relatively young one-person firms (i.e. self-employment). Overall older firms account for a larger share of employment,[11] reflecting a positive correlation between size and age. New firms only account for 3.7% of all jobs on average, whilst firms of at least 10 years of age account for more than half of all jobs. Yet, these patterns are not as dramatic as those observed in developed countries. For example, in the U.S., firms younger than 6 years of age account for about 15% of all employment, while in Tunisia they account for double that share, approximately 30% of all jobs.

<TABLE 1 ABOUT HERE>

<TABLE 2 ABOUT HERE>

Fourth, prima facie, the correlation between size, age and firm performance in terms of productivity and profitability appears relatively weak, which may reflect measurement error. Table 3 provides descriptive statistics on real gross output per worker and real profits per worker,[12] reported for the sub-sample of firms for which such declarations are likely to be reliable. To start with, the

[10] In robustness checks not presented to conserve space we examine the robustness of our results to excluding these periods. The overall qualitative pattern of results does not change.

[11] Note, however, that the share of employment accounted for by firms of a particular age peaks at 4 years of age and declines monotonically thereafter.

[12] Since we do not observe capital and material inputs, estimating TFP, which would be our preferred productivity proxy, is not feasible.

largest firms are not necessarily the most productive nor the most profitable. The relationship between mean output per worker and firm size is not monotonic. Once we demean output per worker by sector averages and focus on medians, we observe a mildly positive relationship between firm size and output per worker, although the very largest firms record the lowest levels of output per worker. This points to the presence of measurement error, which is also evidenced by the fact that large firms consistently report lower average profits per worker than small firms.

Another manifestation of limited dynamism is that output per worker does not appear to rise very much with firm age. In fact, average output per worker appears highest for firms that are 5 years old and appears to fall after that, even though older firms tend to be larger. By contrast, profits per worker rise with firm age, save for the very oldest firms. Yet, most of the increment in average profitability occurs in the first three years of a firm's existence, which, incidentally, is the period during which firms are arguably more likely to invest (note that firms can deduct the costs of investment spending from the profits they report to the tax authorities such that low profits declared to the tax authorities may simply reflect high levels of investment). Consistent with the profit numbers, older firms are also on average less likely to report losses than smaller firms, save again for the very oldest firms.

While we should be cautious in interpreting these findings regarding productivity and profitability given the nature of the data, they do not appear to be driven by measurement error alone. Mouelhi (2012) documents very similar patterns of output per worker and profits by firm-size and age using the Tunisian Annual Enterprise Survey, which is an extensive survey containing detailed information on output, labor usage and profitability conducted amongst a sub-sample of approximately five thousand firms.

A fifth stylized fact is that aggregate job creation has been highly disappointing and driven mostly by entry as is shown in Figure 2, which decomposes net job creation into the contributions of entering firms, exiting firms and continuing firms. With the exception of 2001, most of the net new jobs were in entering firms. In fact, without these entrants, net new job creation over the period would have been negative.

<FIGURE 1 ABOUT HERE>

<TABLE 3 HERE>

Sixth, the bulk of net job creation is driven by entry of one-person firms (self-employment), which accounts for 74% of all net new job creation using the base year size classification.[13] Table 4 documents annual average job creation patterns by firm-size and age over the period 1996-2010, using size classifications based on last year's (base) size and average size. Figure 2 shows these results graphically for the base-size classification.[14] The table and graph show that subsequent to entry, such firms exhibit far less growth, such that the net contribution to job creation of one-person firms is much more modest, especially when using the average size classification. Across size classes net job creation is typically concentrated amongst the youngest firms. In addition, it appears as though the contribution of relatively old small firms to net job creation is limited in absolute terms, as most of the net new job creation by older firms appears concentrated in relatively larger firms.

<TABLE 4 HERE>

<FIGURE 2 HERE>

Seventh, mobility is extremely limited. Table 5A presents annual transitions of firms between broad size-classes, whereas Table 5B present a similar matrix for transitions between 1996 and 2010, the longest period available in our database. Most firms do not grow, even in the long-run. Very few firms change size class, even during a fourteen-year period; the self-employed are least likely to expand into a larger size class, perhaps in part reflecting that traversing size classes would effectively amount to a doubling of firm-size for them. But relatively few micro and small firms ever grow large. For example, only 2% of all firms employing between 10 and 50 people in 1996 employed more than 100 workers by 2010. The lack of mobility may in part be driven by very restrictive labor regulations that make firing both costly and difficult. The transition matrices also show that smaller

[13] Note that the contributions of one-person firms to job creation are estimated to be even higher when using the average size classification, because new firms are classified at the average of their size. For example, firms that enter as a 2-person firms will be counted as contributing to job creation by one-person firms.

[14] A similar graph that uses the average size classification is available from the authors upon request; the advantage of the base size classification relative to the average size classification in this context is that it does not exaggerate the contribution of start-up self-employment.

firms are more likely to die,[15] but overall exit rates seem quite low,[16] perhaps in part due to complex bankruptcy procedures and a lack of competition. Prima facie, these statistics are both at odds with the existence of an up-or-out dynamic often observed in developed countries such as the U.S. in which entrants tend to either grow and survive or exit.

<TABLE 5 (A AND B) HERE>

Thus, at first sight, the meager net job creation that underpins Tunisia's disappointing aggregate unemployment numbers does not appear due to excessive job destruction, but rather reflects a lack of mobility and limited entry, especially of large firms.

4 Econometric Strategy

Our goal is to examine the drivers of job creation, focusing in particular on the role of size, age, productivity and profitability. To this end, we estimate employment-weighted firm-level regressions of net employment growth, using as our measure of firm-level employment growth, g_{ist} the change in employment from year t-1 to year t, divided by average size: $g_{ist} = 2\frac{E_{ist}-E_{ist-1}}{(E_{ist}+E_{ist-1})}$ where E_{it} denote employment in firm i of type s at year t (following Davis et al., 1996, and Haltiwanger et al., forthcoming).[17] This measure is symmetric, bounded by -2 and 2 and accommodates both entry and exit.[18] By virtue of employment weighting the mean of the dependent variable is equal to the

[15] Note that the relationship between firm size and firm exit is not strictly monotonic in the short-run, which is due to our corrections for the timing of exit (see also Appendix B).

[16] Note that the exit rates reported here are not out of line with those documented for other countries in the Middle East and Northern Africa region (see e.g. World Bank, 2012 , Hallward-Driemeier and Thompson, 2009), which are low by international comparisons.

[17] The desirable features of this growth rate measure, which is a second order approximation of the log difference for growth rates around zero are discussed in Davis, Haltiwanger and Schuh (1996). The underlying statistical properties are discussed in detail in Tornqvist, Vartia and Vartia (1985).

[18] To see, this, note that for firms that enter at year t, $E_{it-1} = 0$, while for firms that exit $E_{it} = 0$, such that for entering firms $g_{it} = 2$, while for exiting firms $g_{it} = -2$.

appropriate employment weighted mean, and coefficient estimates can consequently be interpreted as employment weighted conditional means.[19]

To assess to what extent the observed relationship between firm size and firm growth is due to firm size per se or to other firm characteristics, we consider progressively elaborate sets of explanatory variables. Following Haltiwanger et al. (forthcoming) we first include size and age dummies separately and subsequently jointly. We use both size dummies based on average firm size, that is the average of firm size between year t and year t-1, and based on last year's size to examine the impact of measurement error and regression to the mean effects. These variables are available for the period 2006-2010. Subsequently, we examine the impact of productivity and profitability, proxied by gross output per worker and profits per worker respectively, variables which are available for a subset of firms for the period 2006-2010. These are not only of interest in and of themselves, but also help us understand to what extent the striking correlations between firm-age, firm-size and growth documented by Haltiwanger et al. (forthcoming) reflect the important of size and age per se, or rather reflect performance differences associated with scale and/or the lifecycle of firms.

We first include these measures separately and then jointly. Our most general specification thus takes the form;

$$g_{ist} = \beta_S Size + \beta_A Age + \beta_P Productivity + \beta_\pi Profitability + \beta_\tau \tau + \beta_I I + e_{it}$$

Where $Size$ is a vector size dummies, Age is a vector of age dummies, τ is a vector of time dummies and I a vector of industry dummies, and $Productivity$ and $Profitability$ are proxies for these concepts. How these proxies are defined depends on which size classification is used; for the base-year classification we use last period's log output per worker and rank in the profits per worker distribution respectively, except for entrants for which we use contemporaneous values since lagged values are not available. The use of the profitability rank, as opposed to levels, helps reduce the

[19] As explained by Davis et al. (2006) using this measure, it is straightforward to generate aggregate measures of job creation and destruction at any level of aggregation by using appropriately employment weighted summations of this measure. For example, the job creation rate of firms of type s at time t can be computed as $JC_{ist} = \sum_i \frac{X_{ist}}{(\sum_i X_{ist})} \max\{0, g_{ist}\}$, where $\frac{X_{ist}}{(\sum_i X_{ist})}$represents the relative employment share of firm i of type s at time t.

impact of extreme observations and thus measurement error whilst allowing for both negative and positive values.[20] When using the average size classification we opt instead to use the average of log output per worker and the profitability rank over the period over which the growth spell is defined. This serves to minimize the impact of potential measurement error resulting in a spurious correlation between productivity, profitability and firm growth. For entrants, we again use the contemporaneous values of these variables, whereas for exiting firms we use their last observed values.

This specification, and the models it nests, enable us to test a range of hypotheses; for example, if patterns of job creation by firm size documented in the U.S. extrapolate to the Tunisian context, we would expect the coefficient estimate on small firms to be larger than that of large firms $\beta_{Ssmall} > \beta_{Slarge}$, when we only control for firm size. Including controls for age is likely to reduce the magnitude of firm size effects (the β_S estimates) and may well reverse their ordering (that is $\beta_{Ssmall} < \beta_{Slarge}$). If the most productive firms expand quickly after entry, or if the most successful entrants increase both in terms of size and output per worker, one might expect that including controls for productivity would suppress both the magnitude of the impact of size and age dummies.[21]

5 Regression Analysis

5.1 Size vs Age

Figure 4 presents the results regressions of net job creation on firm-size and age dummies. The underlying regressions are presented in Table 6. Given the large number of observations, the estimated coefficients are always statistically significant at the 1% level. The solid lines denote regressions where we use as size category last year's size and the dotted lines size categories which

[20] As an alternative profitability measure, we also estimated our key specifications using the Z-score of output per worker as a proxy for profitability instead. However, the qualitative pattern of results did not appreciably change as a result.

[21] In robustness checks not presented to conserve space we have also experimented with interaction effects to test whether or not productivity and profitability are more important determinants of firm growth for small and young firms. The results, which are available from the authors upon request, were not strongly supportive of these hypotheses.

are based on last year' s size. Note that the omitted category is that of firms with more than 1000 employees. The coefficients are thus relative to this group of firms. To facilitate interpretation of the magnitude of the effects, we follow Haltiwanger et al. (2011) and do not report the omitted category at zero but rather at its unconditional average, which we also add to all other size coefficients. This does not affect the relative pattern of coefficient estimates, yet enables one to better gauge the relative magnitude of the effects.

The graph yields a number of interesting findings. To start with, the contribution of self-employment to net job creation stands out, as is evidenced by the fact that job creation rates are highest for one-person firms; The coefficient estimates suggest that job creation by one-person firms is 14.5% higher than that of firms which employ more than 1000 employees when using the base size classification, but only 8.2% when using instead a size classification based on average size. The difference between these classification methods is suggestive of substantial measurement error. While both graphs are crudely consistent with an inverse relationship between firm-size and net job creation, this association is rather weak when the average size classification is applied.[22] For example, the net job creation rate of firms employing between 10 and 50 worker is approximately 5.4% higher than that of the very largest firms, whereas the corresponding percentage for firms with between 200 and a thousand workers is 3.8%.

Controlling for firm age results in a significantly positive relationship between firm age and size, regardless of which firm size methodology is used. Using the base size classification, the contribution of net job creation by the self-employed is now 9.2% lower than that of the largest firms whereas it is 13.5% lower using the average-size classification. These findings resonate with those of Haltiwanger (2011), who demonstrated that, in the U.S. the inverse relationship between firm-size and growth diminishes, and even reverses, when controlling for firm age. Note, however, that an important difference with Haltiwanger's results is that once firm age is conditioned on the relationship between firm size and age fully reverses (albeit that the relationship between size and age is not monotonic when using the base size classification), whilst in the U.S. the reversal of the relationship between and size only obtains when using the average size classification.

That young firms contribute the most to job creation is shown in Figure 5, which depicts the association between firm age and growth, demonstrating that it is strongly downward sloping. Controlling for firm-size only strengthens the association between age and growth. The reason is

[22] For example, if anything the relationship between firm size and net job creation is upward sloping in the range between 2 and 50 employees.

that smaller firms, which tend to be younger, grow less quickly than large firms post-entry, as we shall demonstrate in the next section.

5.2 Different Margins of Adjustment: Exit and the Contribution of Continuing Firms

The importance of controlling for age and the importance of firm entry suggested by the descriptive statistics presented in section 3 beg the question to what extent the dynamics reflect entry and exit. In this section we explore this further by separately documenting the contributions to net job creation by continuing and exiting firms.

Figure 6 depicts the relationships between net job creation by firm size and separately for continuing firms and firms that exit. The underlying regressions are presented in the Appendix. Remarkably, the relationship between firm-size and net job creation is now generally positive for both continuing and exiting firms, as is evidenced by the and mildly upward sloping graph for continuing firms and the strongly upward sloping graph for firms that exit. The former result is surprising for it shows that even amongst firms that survive, large firms outperform small firms in terms of job creation. The latter result is of course consistent with the pattern of exit rates documented in Table 5 since net job creation due to firm exit can be interpreted as an employment weighted exit rate. Thus, amongst incumbents, large firms consistently create more jobs than small firms.

Controlling for firm age reduces the strength of the correlation between firm size and exit, because younger firms are more likely to die, as is shown in Figure 7, and because small firm tend to younger than old firms. Interestingly, controlling for firm age appears to strengthen the correlation between firm size and growth amongst continuing firms. The explanation for this finding is that young firms tend to grow faster, as is demonstrated in Figure 6, and that small firms are on average younger. Conversely, controlling for firm size mutes the correlation between firm age and net job creation due to firm exit, and net job creation by continuing firms.

Taken together, the pattern of job creation we document contrasts with that observed in the U.S., in spite of some commonalities. Unconditionally, we find an inverse relationship between firm size and growth when using the base year size categorization, which diminishes dramatically when one instead uses an average size classification, although the important contribution of self-employment to job creation is salient in both classification methodologies. Controlling for age, we

now find a negative relationship between firm size and growth irrespective of which size-class methodology we use. This reflects the fact that post-entry firms stagnate and that small firms are more likely to exit and less likely to grow, such that they on destroy more jobs than large firms. Instead of there being an "up or out" dynamic there appears to be an "stagnate or out" pattern of growth. The overall picture of job creation is thus extremely bleak; incumbent firms do not grow on average and ultimately disappear.

6 Productivity and Profitability

To assess to what extent the results presented in the previous section reflect a process of creative destruction whereby the most productive firms expand and the least efficient producers are weeded out, we explore the role of productivity and profitability here. To minimize the impact of measurement error and misreporting, we confine the analysis to firms which employed at least one salaried employee, and whose tax obligations vary with their level of output and profits. We also exclude from the analysis firms which reported implausibly high changes in gross output per worker, as well as extreme observations. The resulting sample of firms accounts for roughly two-fifths of all output and roughly a third of all employment. The reason for the drop in employment is that when controlling for productivity, we exclude self-employment as well as firms for which gross output and profits data are highly unreliable since they do not have to pay turnover tax.

The regressions are presented in Table 7; we first estimate regressions separately controlling for productivity and profitability, and year and activity dummies only. These regressions can be interpreted as providing insight into whether, within sectors, job are being created in firms that are more productive and profitable. Subsequently we add controls for age and size. To assess to what extent changes in result reflect sample selection, we also present regressions estimates where we control for firm age, size, activity and year, but not for productivity and profitability.

The specifications presented in columns 1, 2, and 3 demonstrate that on average firms that are more productive and more profitable generate more jobs. Note, however, that the explanatory power of these variables is low, as is evidenced by the low R2's. Moreover, although strongly statistically significant, the relationship between employment creation, productivity and profitability is weak. For example, ceteris paribus, a doubling of the amount of output per worker is associated

with a 3.9% increase in employment growth. Similarly, moving a decile upwards in the profitability distribution is associated with a 1.2% increase in job creation. While these weak relationships may in part reflect measurement error (perhaps due to misreporting) in the productivity and profitability variables resulting in attenuation bias, taken at face value they suggest the reallocative process is not efficient in (re-)allocating labor to its most productive and profitable uses. This is consistent with the weak firm dynamics portrayed above.

Controlling for firm age and size, as is done in columns, 5, 6, and 7, results in marginally higher coefficient on both productivity and profitability. Conversely, controlling for productivity and profitability hardly affects the firm-size and age coefficients relative to a specification which does not control for productivity and profitability (presented in column 4) most likely because productivity and profitability are not very strongly correlated with size. The growth premium associated with young firms increases somewhat, reflecting the fact that while they tend to grow faster, such firms also tend to be less profitable and productive on average. Nonetheless, these impacts are certainly not very large.

Using a base-year size classification, as is done in Table 8, yields stronger correlations between productivity, profitability and job creation. This is to be expected if there is measurement error in our employment measure resulting in a spurious correlation between output and profits per worker and subsequent growth. Nonetheless, the resulting correlations remain rather weak.

In sum, these results are suggestive of a severely attenuated process of creative destruction and an extremely rigid reallocative process, which is consistent with the lack of firm dynamics documented in preceding sections.

7 A Simple Simulation Exercise

The results presented thus far underscore the need for urgent reforms catalyzing creative destruction by removing obstacles to firm growth, facilitating an efficient (re-)allocation of resources and promoting entry, especially of large firms. To illustrate what the Tunisian firm size distribution might look like in the future if such reforms to promote job creation are not undertaken, we conduct a simple simulation exercise extrapolating the pre-revolution trend forward. We distill from our data a simple annual transition matrix T that takes into account both the evolution of existing firms as well as firm entry which we use to project forward the pre-revolution tendency. More

formally, assume there are n discrete size categories and let D_t be a n x 1 matrix denoting the number of firms per size category. The evolution of the firm-size distribution at time t+i can then be modeled as:

$$D'_{t+\mathrm{i}} = D'_t T^i$$
$$= D_t{}'(E+R)^i$$

where E is a n x n transition matrix of firms that exists at time t; the matrix provides information on what proportion of firms in a given size category have either moved into a different size category or remained the same size. Note that the row columns of this matrix need not sum to 1 since from each firm-size category a certain number of firms will exit; we calibrate this matrix using the Table 3.3. (minus the column on exit). To account for firm entry we add to this transition matrix a diagonal entry/replacement matrix R with off-diagonal entries equal to zero and diagonal entries corresponding to the entry rate by firm size category, defined as the number of new firms at time t divided by the total number of firms in that particular size category at time t-1. We use annual averages to calibrate these entry rates. The resulting transition matrix is presented in the appendix.

The results of our simulation exercise are presented in Figures 8 and 9 which present the simulated evolution of the firm size and employment distribution by firm-size respectively. While the number of enterprises is projected to continue to grow by approximately 5.0% on average each year, most of this growth is accounted for by an increase in the number of small firms; consequently employment will increasingly be concentrated in small firms, which will become ever more prevalent.[23] If pre-revolutions trends continue, by 2025, 90% of all firms will be one-person enterprises and these will account for 42% of all jobs. Since our data capture registered firms only, these numbers may in fact underestimate the right-skewness of the firm-size distribution.

<FIGURE 8 HERE>

<FIGURE 9 HERE>

[23] To arrive at the employment distribution by firm size we assume that the average number of jobs per firm within a given firm-size category is constant over time; e.g. we do not model changes in the distribution within size categories.

We can also manipulate the transition matrix to run counterfactual experiments. While it is trivial to show that if firms exhibit more upward mobility, job creation will be higher and the distribution will be less skewed, the importance of firm size at startup is perhaps less obvious.[24] This may be considered surprising since a vast literature attests to the importance of size as a predictor of survival, productivity and employment growth. To illustrate the superior dynamic employment creation performance of large firms, we run two counterfactual experiments where we hold constant the number of jobs accounted for by firm entry (at least in the first year), but re-allocate those jobs to firms that are larger. First, we assume that entry in itself has no impact on the skewness of the firm size distribution. That is, we assume that entry rates do not vary across firm size categories (in practice this amounts to setting entry rates equal to roughly 7.5% for each size category). Note, however, that the distributions of entrants is still right skewed since the firm-size distribution is itself right skewed. This re-allocation of entrants alone would accelerate aggregate net job creation by roughly 0.5% per annum. Second, we allocate all entry jobs to the very largest firm-size category, that of firms which employ more than 1000 workers. This is a palpably implausible scenario but serves to make the case that size at entry matters a lot; in this counterfactual scenario we obtain an exponential growth pattern, with a doubling of the number of employment opportunities within approximately 4 years.

While simplistic, these simulations show the dangerous current trend towards ever higher shares of self-employment, and how a small shift to relatively larger firms would have sizeable positive employment consequences.

8 Conclusion

Using a unique confidential database containing information on all registered private sector employment in Tunisia, we have unveiled job creation patterns that are dramatically different from those observed in the U.S. Instead of private sector vibrancy, we observe inertia and the firm size distribution becoming increasingly skewed towards small firms. In spite of substantial GDP growth, job creation did not substantially outpace the growth of the labor force, and, moreover, 2 out of every 5 net new job created over the period 1997-2010 are in self-employment.

[24] To the authors' knowledge, there are surprisingly few papers that explicitly focus on firm size at startup; a notable exceptions is Mata and Machado (1996).

Although our results are consistent with the notion that small firms generate the most jobs, albeit that this relationship is sensitive to measurement error, this relationship is entirely driven by firm entry, and the fact that most entrants start small. Post-entry, small firms are the worst performers in terms of net job creation even if they survive, in spite of being much more likely to exit than large firms. Thus the "up-or-out" dynamic that characterizes the process of market selection in the U.S. appears not to be at play in Tunisia; exit rates in Tunisia are much lower, and mobility is extremely limited, with very few firms managing to grow, even if we consider a very long time horizon. This inertia, in conjunction with entrants starting small, helps explain why the firm-size distribution has become increasingly skewed towards small-scale employment in relatively young firms.

Our results are nonetheless consistent with Haltiwanger et al.'s (2011) finding that firm age is a far better predictor of firm growth than firm size, as young firms consistently create the most new jobs. Once firm age is conditioned on, the relationship between firm-size and age fully reverses.

Moreover, our results suggest that the process of creative destruction is severely attenuated in Tunisia. Allocative efficiency appears quite low, in the sense that the relationship between size and firm performance in terms of productivity and profitability is not very pronounced. While both profitability and productivity are positively correlated with net job creation, this correlation is weak. Consistent with the idea that the best firms have difficulties expanding and gaining market share, we observe that average productivity does not rise rapidly with firm age, and, if anything, reduces for firms that have been in existence for more than four years, even though average profitability appears to rise with firm age.

Uncovering what obstructs the process of market selection and explaining why firm dynamics are so different from those observed in developed countries is an important area for future research. From a policy point of view, our results suggest that unless reforms are undertaken, the tendency towards increased skewness towards small-scale production will continue; by 2025 as many as 90% of firms could be one-person firms and 42% of jobs would be in the form of self-employment. Catalyzing creative destruction by removing obstacles to firm growth, facilitating an efficient (re-)allocation of resources and promoting entry, especially of large firms, could help promote job creation. However, programs that promote the formation of SMEs without addressing constraints that inhibit them from growing warrant caution. Perhaps this should not come as a

surprise, since Beck et al. (2005) have shown that countries in which the firm-size distribution is skewed towards small-scale production, neither outperform others in terms of job creation nor in terms of output growth.

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Tables and Graphs

Table 1: Firm Size and Employment Distributions: 1996-2010 (Annual Averages)

	# of Firms	% of Firms	# of jobs	% of employment	Age	Entry
# of workers	'96-'10	'96-'10	'96-'10	'96-'10	'96-'10	
1	344684	83.30%	345753	28.18%	8.04	12.11%
2	29318	7.46%	56290	4.76%	12.59	5.34%
[3, 4]	16505	4.07%	53696	4.44%	10.64	5.92%
[5 , 9]	10223	2.52%	64010	5.29%	11.4	3.92%
[10 , 19]	4657	1.15%	61661	5.12%	12.08	2.93%
[20, 49]	3077	0.77%	94056	7.83%	13.3	2.36%
[50 , 99]	1362	0.34%	95241	7.92%	13.63	2.03%
[100 , 199]	898	0.23%	126078	10.55%	15.85	1.63%
[200 , 999]	636	0.16%	228812	18.93%	15.88	1.01%
>= 1000	51	0.01%	86874	6.98%	18.95	0.83%
Total	405843		1191822		8.46	11.06%

Table 2: Employment by Size and Age

	Size											
Age	**1**	**2**	**[3,4]**	**[5,9]**	**[10,49]**	**[49,50]**	**[50,99]**	**[100, 199]**	**[200 ,999]**	**>= 1000**	**Total**	**Share**
0	37843	2773	1697	1543	1269	1676	1354	1012	1785	74	51026	3.72%
1	33123	3789	3456	3839	3437	5027	4364	4197	7203	2333	70767	5.16%
2	29763	3766	3518	4145	3683	5788	5178	5995	9080	3731	74647	5.44%
3	27058	3588	3371	4066	3756	5807	5596	6547	10745	4922	75456	5.50%
4	24757	3385	3139	3958	3518	5498	5080	6248	9796	4794	70173	5.12%
5	22742	3213	2969	3752	3554	5260	5034	6393	8751	3148	64813	4.73%
6	20828	3033	2868	3592	3466	5012	4987	6064	9092	3101	62044	4.52%
7	19102	2917	2685	3420	3350	4882	4958	6494	8432	2632	58871	4.29%
8	17319	2728	2558	3249	3185	4676	4758	6195	8822	2801	56290	4.10%
9	15598	2506	2430	3067	3008	4417	4406	6137	8492	2204	52264	3.81%
[10-14]	57612	10958	10318	12624	12641	18243	17652	24096	40619	7788	212551	15.50
[15-19]	32379	7860	7869	8849	8799	13621	13430	17728	34325	9045	153906	11.22
[20-29]	27506	7477	8241	9375	9483	15570	16173	23334	53567	31639	202365	14.75
>=30	8229	2586	2880	3949	4303	7474	10135	16875	49627	60360	166419	12.13
Total	373858	60579	57999	69427	67453	102950	103105	13731	260334	138573	137159	
Share	27.26%	4.42%	4.23%	5.06%	4.92%	7.51%	7.52%	10.01	18.98%	10.10%		

Table 3: Productivity and Profitability by Size and Age;

	Productivity				Profitability		
'06-'10	Ln (Y/L)		ln(Y/L) demeaned by sector average		Profits per worker		
N=142823	*Mean*	*Median*	*Mean*	*Median*	*Median*	*Rank*	*Loss*
By size							
1	18.27	18.27	0.10	0.06	43270.5	68	0.22
2	18.12	18.11	0.00	0.06	30175.17	60	0.21
[3, 4]	18.11	18.12	0.05	0.10	24649.95	56	0.21
[5 , 9]	18.09	17.97	0.10	0.09	17441.44	50	0.22
[10 , 19]	18.14	18.03	0.18	0.20	15521.26	48	0.24
[20, 49]	18.04	17.98	0.18	0.21	11807.01	44	0.28
[50 , 99]	17.94	17.91	0.20	0.30	9634.71	42	0.29
[100 , 199]	17.82	17.79	0.17	0.32	5474.89	37	0.32
[200 , 999]	17.62	17.65	0.11	0.39	2862.82	35	0.32
>= 1000	17.28	17.48	-0.38	-0.17	1139.67	33	0.33
By Age							
0	18.14	18.15	0.11	0.13	17309.07	48.87	0.35
1	18.11	18.09	0.07	0.09	20696.91	50.65	0.28
2	18.14	18.10	0.10	0.11	23506.23	52.49	0.25
3	18.16	18.13	0.12	0.14	25290.63	53.51	0.23
4	18.14	18.12	0.10	0.12	26403.74	54.39	0.21
5	18.14	18.12	0.09	0.10	26504.66	54.72	0.21
6	18.13	18.10	0.10	0.09	26626.39	54.77	0.21
7	18.06	18.02	0.02	0.03	27422.17	55.43	0.19
8	18.06	18.04	0.02	0.04	27467.47	55.46	0.19
9	18.07	18.03	0.02	0.05	26702.92	55.57	0.18
[10-14]	18.16	18.12	0.09	0.11	27922.79	56.03	0.18
[15-19]	18.16	18.10	0.12	0.16	27096.64	55.37	0.20
[20-29]	18.16	18.15	0.09	0.15	28721.50	56.83	0.19
>=30	18.18	18.13	0.11	0.14	21356.52	52.86	0.23
Total	18.14	18.11			25199.97		0.23

Note: The sample is confined to firms which employ at least one wage workers and whose tax obligations vary with their gross output and/or profits. Y is measured as gross output declared to the tax authorities. Profits are measured as the profits declared to the tax authorities.

Table 4: NJC by Size and Age 1997-2010

						Average Size					
Age	**1**	**2**	**[3,4]**	**[5,9]**	**[10.49]**	**[49,50]**	**[50,99]**	**[100,199]**	**[200,999]**	**>=1000**	**Total**
0	538051	17081	15438	17184	17318	23684	13959	10560	13780	.	667055
1	-25133	19239	23714	31551	33425	52094	40475	40177	53750	9665	278956
2	-30304	2990	4887	6712	9100	17549	20103	16768	27457	6613	81875
3	-23967	467	1018	3010	3001	7909	8352	9164	21313	10138	40404
4	-20083	-332	-49	932	457	1192	5221	3642	1683	7251	-86
5	-18259	-948	-626	-178	-539	813	-426	962	-6247	-256	-25703
6	-16050	-1070	-826	-1052	-1414	-3010	669	288	4576	2341	-15547
7	-13735	-1351	-1133	-845	-1124	-1398	-1113	803	-1178	-402	-21476
8	-11901	-1227	-474	-1184	-1244	-2512	-2814	431	399	1989	-18538
9	-10166	-1321	-767	-1104	-1187	-3204	-3039	277	1308	-966	-20168
[10-14]	-34812	-4493	-3759	-5877	-7655	-12446	-11523	-7748	-1270	-1305	-90887
[15-19]	-21556	-4131	-3544	-5012	-5542	-8327	-11918	-9719	490	374	-68882
[20-29]	-17093	-4397	-4132	-5888	-6452	-11274	-13957	-10351	-7341	3915	-76969
>=30	-8304	-2347	-2375	-3312	-4577	-8338	-8896	-10253	-13847	5094	-57155
Total	286689	18161	27372	34939	33569	52733	35092	45001	94871	44451	672877
						Base Year Size					
Age	**1**	**2**	**[3,4]**	**[5,9]**	**[10.49]**	**[49,50]**	**[50,99]**	**[100,199]**	**[200,999]**	**>=1000**	**Total**
0	494329	35822	21857	19929	16429	22264	18324	13761	23301	1040	667055
1	89570	36497	23432	23816	22956	33522	20133	15596	10074	3359	278956
2	-3317	4996	5867	7626	10074	17479	15033	8527	14425	1165	81875
3	-6105	421	1568	4189	7003	7154	7085	3763	11312	4014	40404
4	-6228	-495	228	939	1375	2829	2273	1461	-2643	177	-86
5	-7131	-1841	-525	1010	271	1558	-1094	-1602	-10894	-5455	-25703
6	-6805	-1455	-1315	-83	-44	-304	-504	-2989	-3399	1350	-15547
7	-6238	-1933	-1123	-925	-36	-261	-95	-2039	-7309	-1517	-21476
8	-4232	-1753	-875	-814	-179	-1206	-1198	-5055	-3916	690	-18538
9	-4111	-1495	-862	-1022	-747	-1703	-976	-2926	-3979	-2349	-20168
[10-14]	-10562	-5970	-3853	-4941	-5154	-8875	-11641	-12413	-18894	-8584	-90887
[15-19]	-6546	-5250	-3726	-5423	-4472	-6298	-8960	-12717	-9729	-5763	-68882
[20-29]	-5649	-4686	-4594	-5050	-5959	-6722	-8143	-13074	-23133	42	-76969
>=30	-3225	-2200	-2437	-2888	-3576	-4541	-6556	-9290	-22446	4	-57155
Total	513749	50660	33640	36364	37941	54896	23682	-18998	-47230	-11828	672877

Table 5: Employment Transitions

EMPLOYMENT TRANSITIONS								
Short-Run: Annual Transitions								
	Size in year t+1							
Size in year t	Exit	1	[2-5]	[5,9]	[10.49]	[49,99]	[100,999]	>=1000
1	6.51	91.98	1.34	0.10	0.06	0.01	0.01	0.00
[2-5]	8.16	7.82	79.61	3.93	0.44	0.02	0.01	0.00
[5,9]	6.91	1.30	14.18	68.75	8.71	0.10	0.04	0.00
[10.49]	3.79	0.90	1.80	8.76	80.51	3.73	0.49	0.00
[49,99]	2.72	0.61	0.43	0.50	16.04	67.84	11.84	0.01
[100,999]	1.83	0.37	0.21	0.26	1.91	8.31	86.56	0.56
>=1000	1.59	0.00	0.14	0.14	0.14	0.14	11.56	86.27
Long-Run: 1996-2010								
	Size in 2010							
Size in 1996	Exit	1	[2-5]	[5,9]	[10.49]	[49,99]	[100,999]	>=1000
1	59.25	37.81	2.45	0.31	0.15	0.01	0.02	0.00
[2-5]	53.36	15.59	25.44	4.29	1.21	0.05	0.07	0.00
[5,9]	53.69	2.59	14.64	18.07	10.21	0.53	0.27	0.01
[10.49]	46.54	2.18	5.71	9.69	28.93	4.92	2.02	0.02
[49,99]	43.42	1.77	2.65	1.87	18.96	19.16	12.18	0.00
[100,999]	38.11	1.17	1.93	1.17	7.37	10.30	38.44	1.51
>=1000	18.75	0.00	0.00	0.00	3.13	0.00	37.50	40.63

Table 6: Regression; NJC all firms 1996-2010 (size and age) (average + base year size)

	Net Job Creation All Firms 1997-2010					
	Average size classification			*Base year size classification*		
	1	**2**	**3**	**4**	**5**	**6**
Size						
1	0.0824		-0.1349	0.1447		-0.0917
2	0.0344		-0.0570	-0.0063		-0.1217
[3,4]	0.0507		-0.0294	-0.0287		-0.1053
[5,9]	0.0547		-0.0185	-0.0450		-0.1041
[10.49]	0.0538		-0.0143	-0.0515		-0.1012
[49,50]	0.0543		-0.0048	-0.0587		-0.1003
[50,99]	0.0394		-0.0022	-0.0637		-0.0962
[100,199]	0.0381		0.0106	-0.0804		-0.0979
[200,999]	0.0390		0.0207	-0.0640		-0.0797
Age						
0		2.0188	2.1046		2.0047	2.0132
1		0.3669	0.4310		0.0473	0.0558
2		0.0944	0.1443		-0.0639	-0.0551
3		0.0471	0.0914		-0.0706	-0.0622
4		0.0048	0.0465		-0.0985	-0.0906
5		-0.0234	0.0177		-0.1238	-0.1158
6		-0.0124	0.0274		-0.0999	-0.0914
7		-0.0210	0.0175		-0.0987	-0.0904
8		-0.0197	0.0174		-0.0951	-0.0868
9		-0.0230	0.0122		-0.0944	-0.0861
[10-14]		-0.0257	0.0063		-0.0899	-0.0816
[15-19]		-0.0298	-0.0038		-0.0894	-0.0816
[20-29]		-0.0304	-0.0137		-0.0712	-0.0675
Activity Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	6211700	6211700	6211700	6211700	6211700	6211700
R2	0.0048	0.2964	0.3039	0.0196	0.3711	0.3714

Note: The dependent variable is the Davis-Haltiwanger-Schuh growth rate. Regressions in columns 1,2, and 3 are weighted by the average size of the firm over the period over which the growth spell is measured (i.e. the current year and last year), while the regressions presented in columns 4, 5 and 6 are weighted by the base size employment (e.g. last year's employment, save for entrants, for which we use contemporaneous employment since lagged employment is not available). The resulting coefficients are thus interpretable as conditional average net jobs flows. Standard errors are not presented since all coefficient estimates are significant at the 1% level due to the large number of observations.

Table 7: NJC, Productivity and Profitability –2007-2010 - onshore firms employing wage workers

NJC 2007-2010 Onshore firms employing wage workers only Average Size Classification						
	1	**2**	**3**	**4**	**5**	**6**
Productivity and Profitability						
Productivity	0.0057			0.0288		0.0154
Profitability		0.0009			0.0015	0.0013
Size						
1			-0.2978	-0.3084	-0.3205	-0.323
2			-0.1348	-0.1417	-0.1546	-0.1555
[3, 4]			-0.0853	-0.0928	-0.1025	-0.1041
[5 , 9]			-0.0577	-0.0655	-0.0700	-0.0724
[10 , 19]			-0.0349	-0.0454	-0.0459	-0.0500
[20, 49]			-0.0295	-0.0411	-0.0393	-0.0441
[50 , 99]			-0.0087	-0.0199	-0.0189	-0.0234
[100 , 199]			-0.0158	-0.0274	-0.0249	-0.0298
[200 , 999]			0.0138	0.0058	0.0042	0.0013
Age						
0			2.1065	2.1229	2.1235	2.1299
1			0.6579	0.6769	0.6722	0.6803
2			0.1736	0.1901	0.1826	0.1902
3			0.0846	0.0990	0.0924	0.0990
4			0.0070	0.0192	0.0125	0.0183
5			-0.0108	-0.0009	-0.0065	-0.0018
6			0.0071	0.0152	0.0128	0.0163
7			0.0061	0.0123	0.0096	0.0125
8			0.0463	0.0526	0.0486	0.0517
9			0.0471	0.0546	0.0501	0.0537
[10-14]			0.0034	0.0106	0.0049	0.0086
[15-19]			0.0167	0.0207	0.0168	0.0189
[20-29]			-0.0041	0.0006	-0.0033	-0.0009
Activity Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	129516	129516	129516	129516	129516	129516
R2	0.0068	0.0092	0.3360	0.3395	0.3432	0.3440

Note: The dependent variable is the Davis-Haltiwanger-Schuh growth rate. Regressions are weighted by the average size of the firm over the period over which the growth spell is measured (i.e. the current year and last year). Standard errors are not presented since all coefficient estimates are significant at the 1% level due to the large number of observations.

Table 8: NJC, Productivity and Profitability –1997-2010 - onshore firms employing wage workers

NJC All Firms 2007-2010; Onshore firms employing wage workers only Base Size Classification						
	1	**2**	**3**	**4**	**5**	**6**
Productivity and Profitability						
Productivity	0.0392			0.0555		0.0444
Profitability		0.0012			0.0017	0.0011
Size						
1			-0.1911	-0.2185	-0.2179	-0.2305
2			-0.1411	-0.1579	-0.1633	-0.1690
[3, 4]			-0.1183	-0.1347	-0.1381	-0.1443
[5 , 9]			-0.1046	-0.1212	-0.1184	-0.1268
[10 , 19]			-0.0946	-0.1158	-0.1068	-0.1196
[20, 49]			-0.0634	-0.0871	-0.0744	-0.0895
[50 , 99]			-0.0746	-0.0981	-0.0858	-0.1007
[100 , 199]			-0.0764	-0.0987	-0.0867	-0.101
[200 , 999]			-0.0611	-0.0788	-0.0726	-0.0828
Age						
0			2.0291	2.0585	2.0457	2.0634
1			0.2123	0.2509	0.2287	0.2539
2			-0.0006	0.0315	0.0101	0.0320
3			-0.0258	0.0032	-0.0169	0.0032
4			-0.1270	-0.1009	-0.1211	-0.1023
5			-0.1253	-0.1045	-0.1203	-0.1055
6			-0.0901	-0.0733	-0.0833	-0.0722
7			-0.0882	-0.0739	-0.0838	-0.0739
8			-0.0344	-0.0212	-0.0325	-0.0226
9			-0.0309	-0.0170	-0.0278	-0.0178
[10-14]			-0.0604	-0.0456	-0.0581	-0.047
[15-19]			-0.0438	-0.0355	-0.0436	-0.0371
[20-29]			-0.0518	-0.0424	-0.0514	-0.0440
Activity Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	129516	129516	129516	129516	129516	129516
R2	0.0100	0.0081	0.4159	0.4261	0.4231	0.4287

Note: The dependent variable is the Davis-Haltiwanger-Schuh growth rate. Regressions are weighted by base year firm size (i.e. last year's size for continuing and exiting firms and contemporaneous firm size for entrants). Standard errors are not presented since all coefficient estimates are significant at the 1% level due to the large number of observations.

Figure 1: Evolution of the Firm Size Distribution

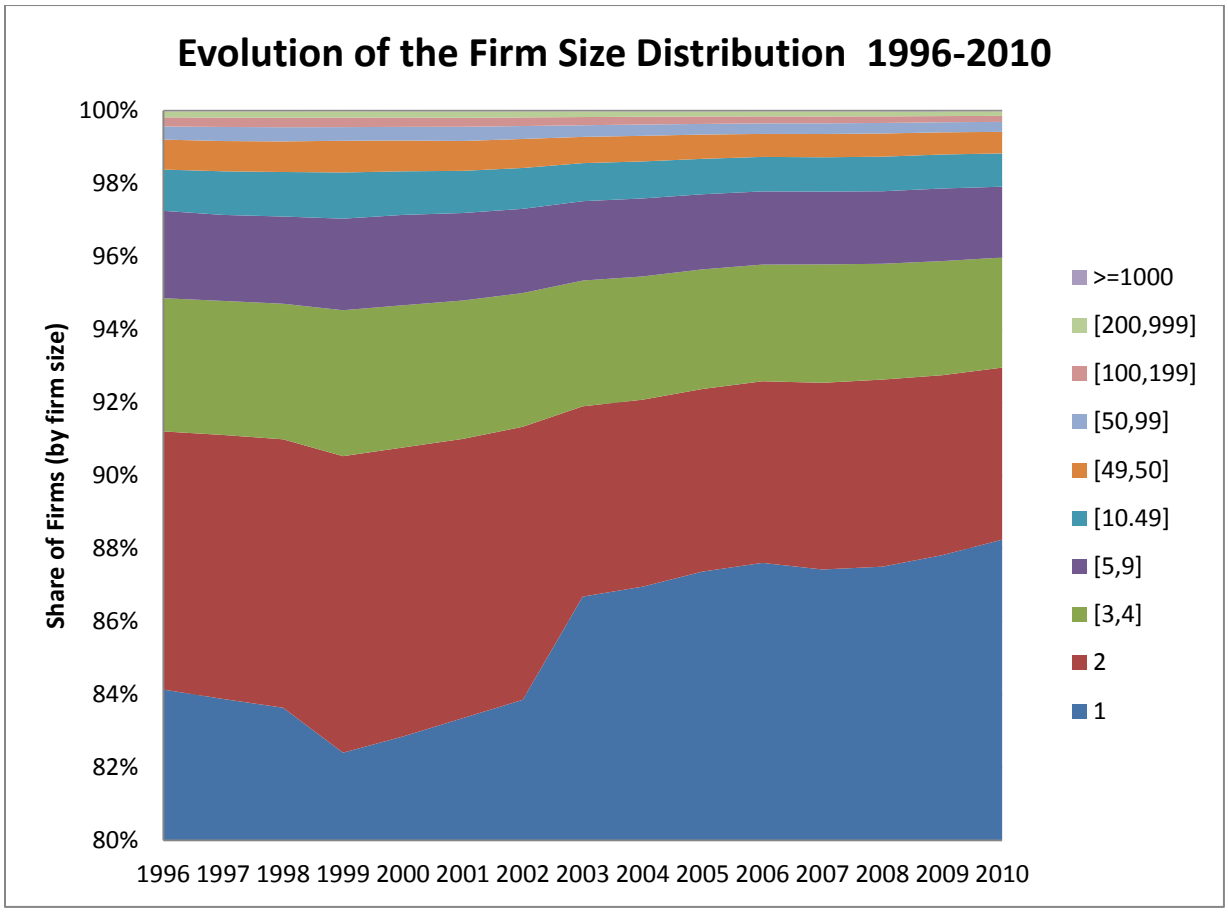


Figure 2: Aggregate Job Creation Patterns

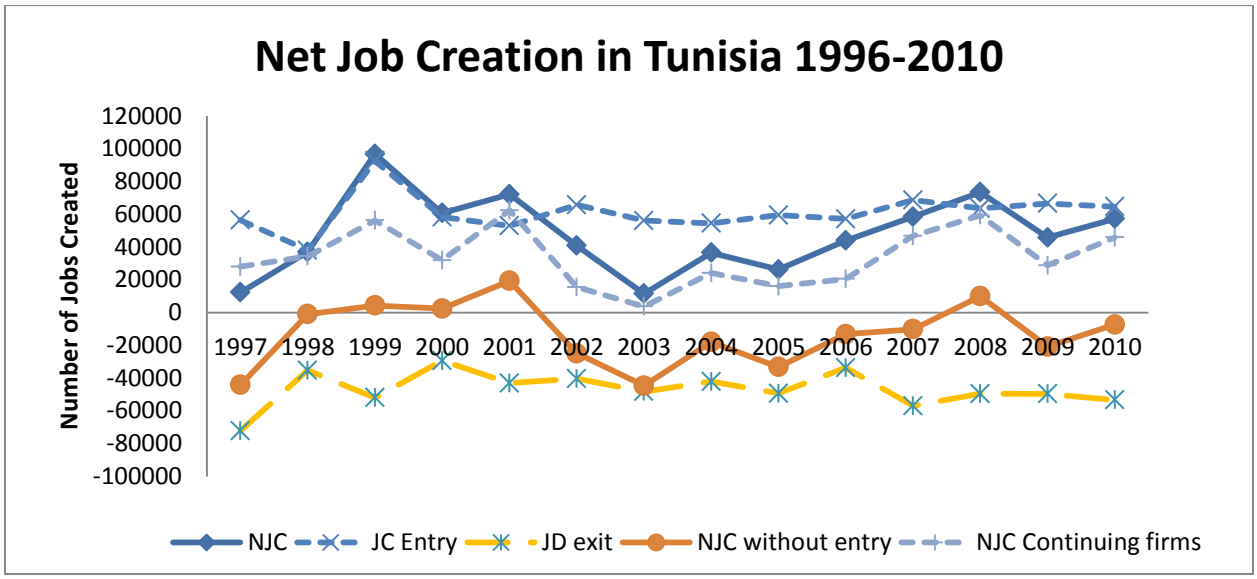


Figure 3: NJC by base size and age (green=positive growth, red=negative growth)

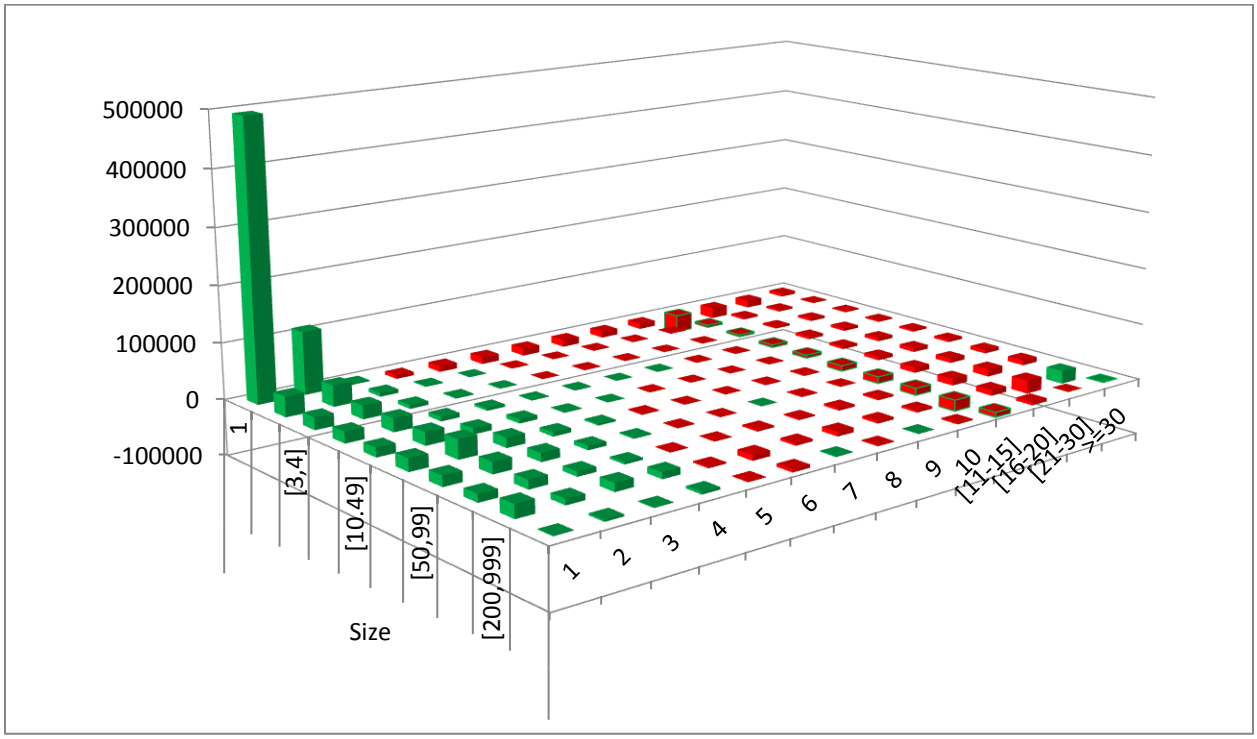
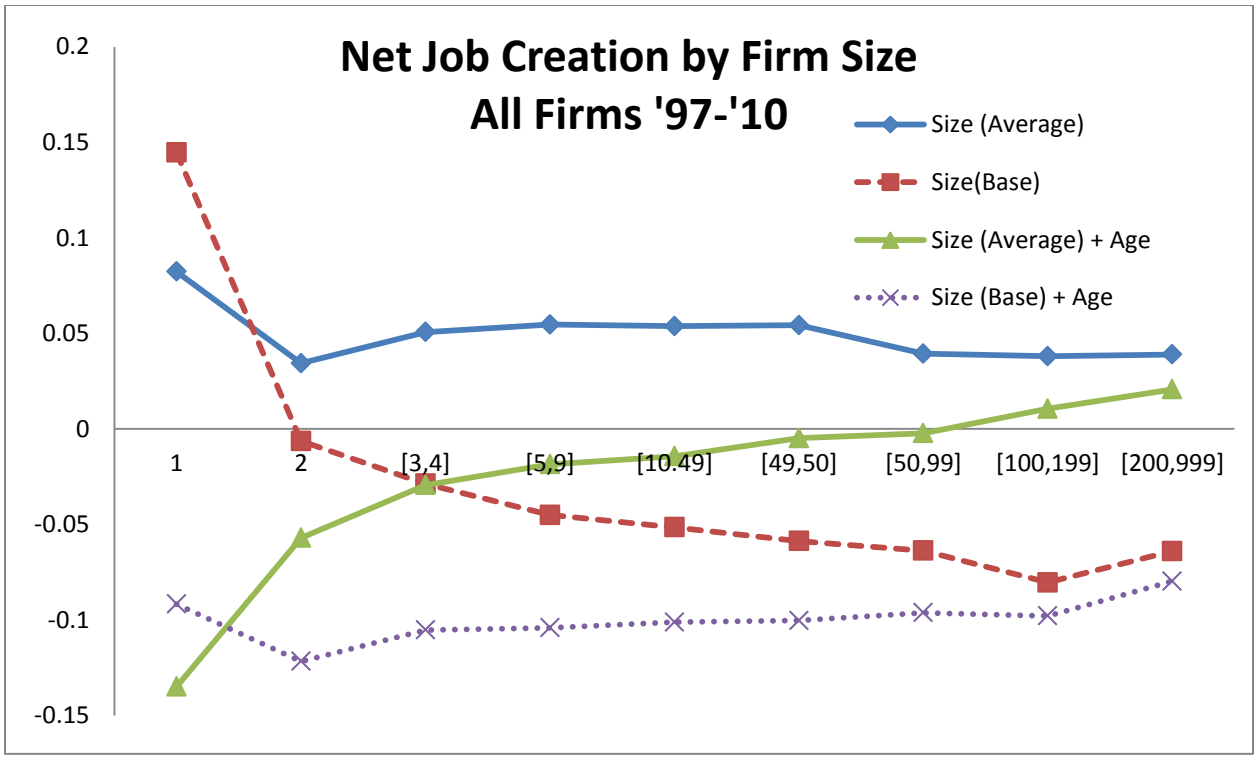
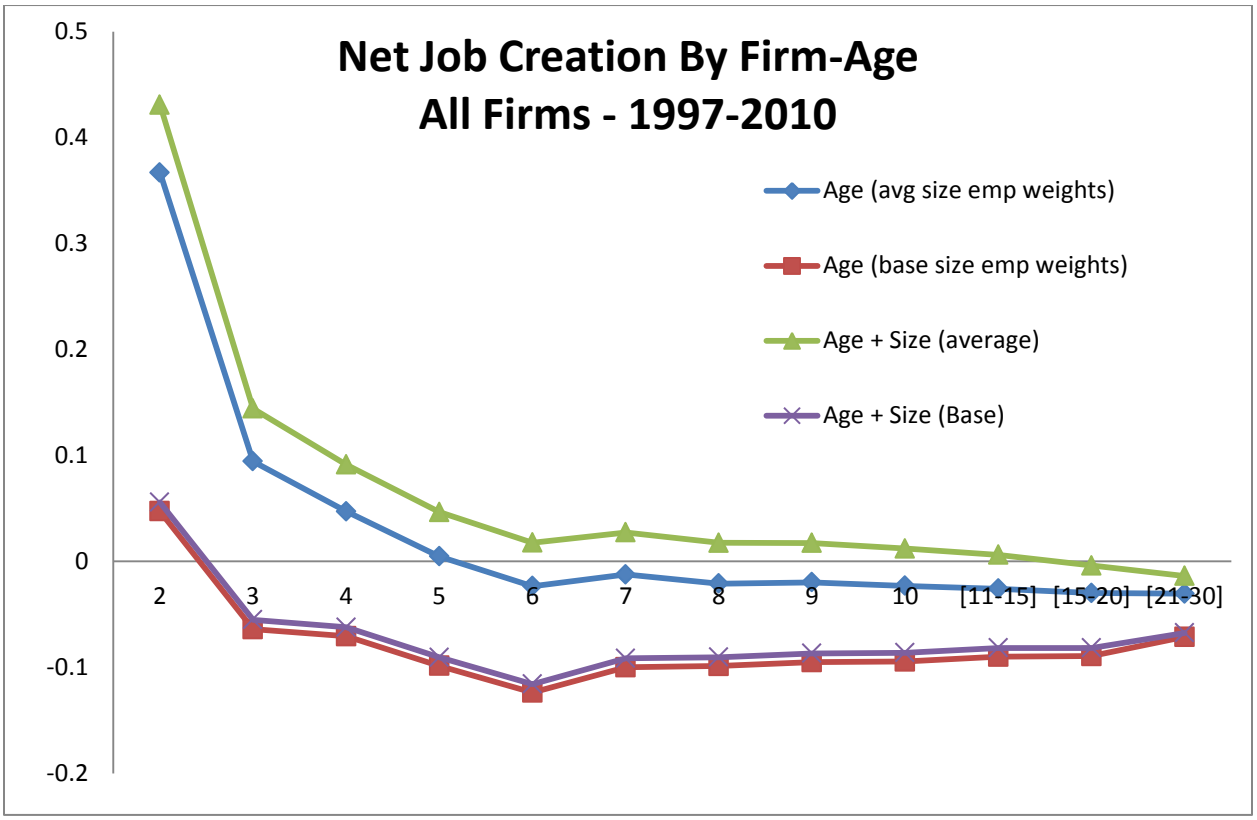


Figure 4: NJC by firm size



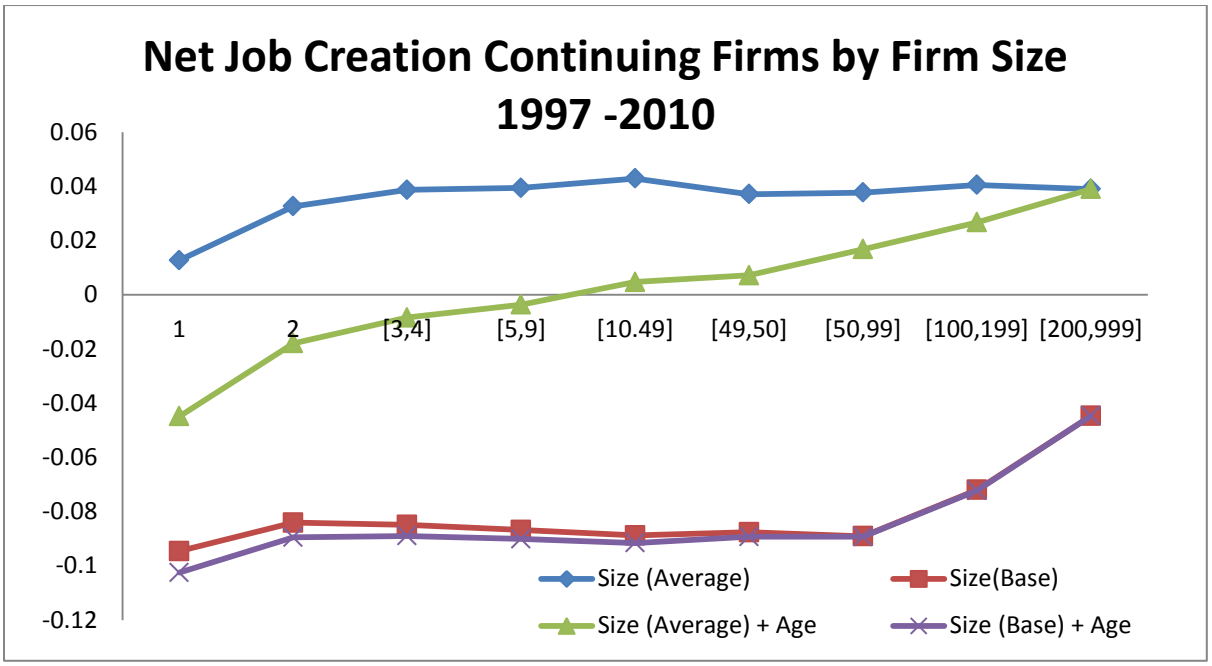
Notes: The figure plots weighted regression coefficients of net job creation, measured by the Davis-Haltiwanger-Schuh growth rate, on firm size and age dummies, controlling for sector and year. The underlying regression coefficients are presented in Table 6.

Figure 5: NJC by firm age

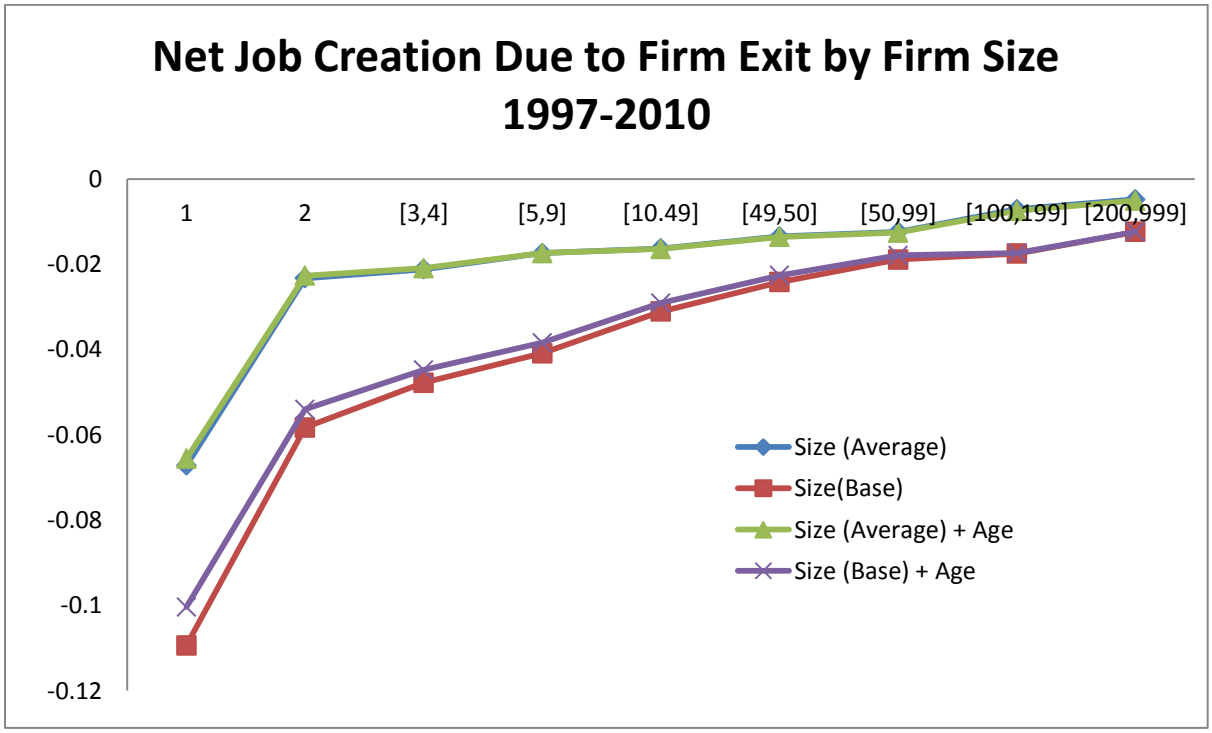


Notes: The figure plots weighted regression coefficients of net job creation, measured by the Davis-Haltiwanger-Schuh growth rate, on firm size and age dummies, controlling for sector and year. The underlying regression coefficients are presented in Table 6.

Figure 6: NJC by firm size – Continuing Firms and Firm Exit

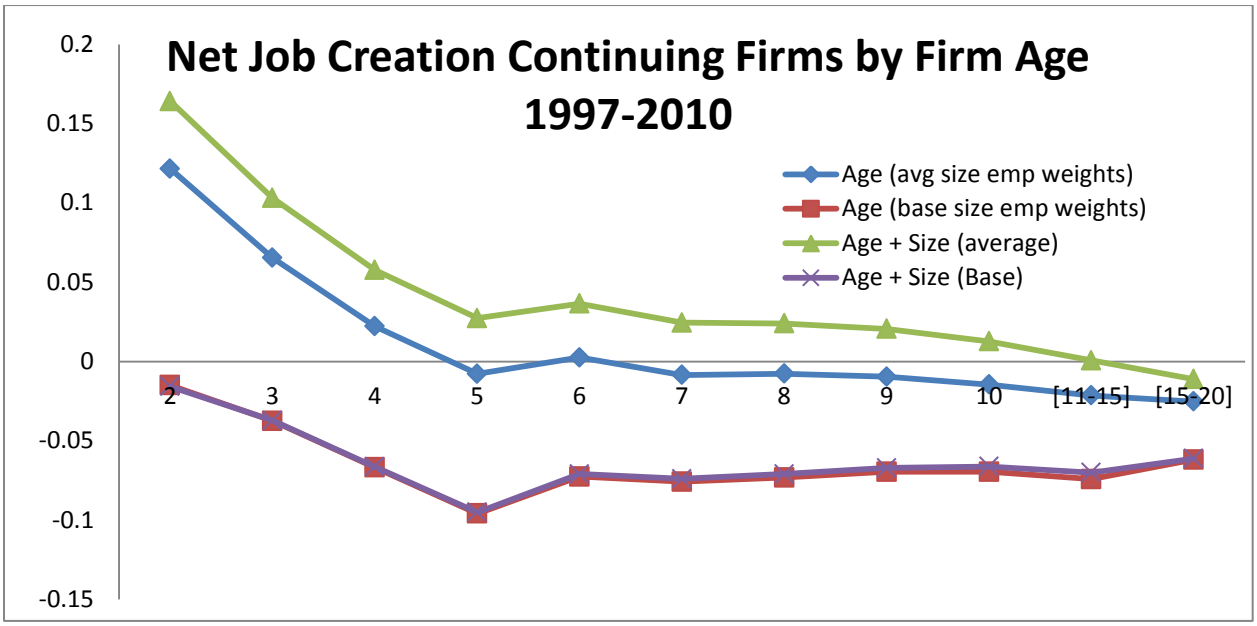


Notes: The figure plots weighted regression coefficients of net job creation, measured by the Davis-Haltiwanger-Schuh growth rate, on firm size and age dummies, controlling for sector and year. The underlying regression coefficients are presented in Table A1.

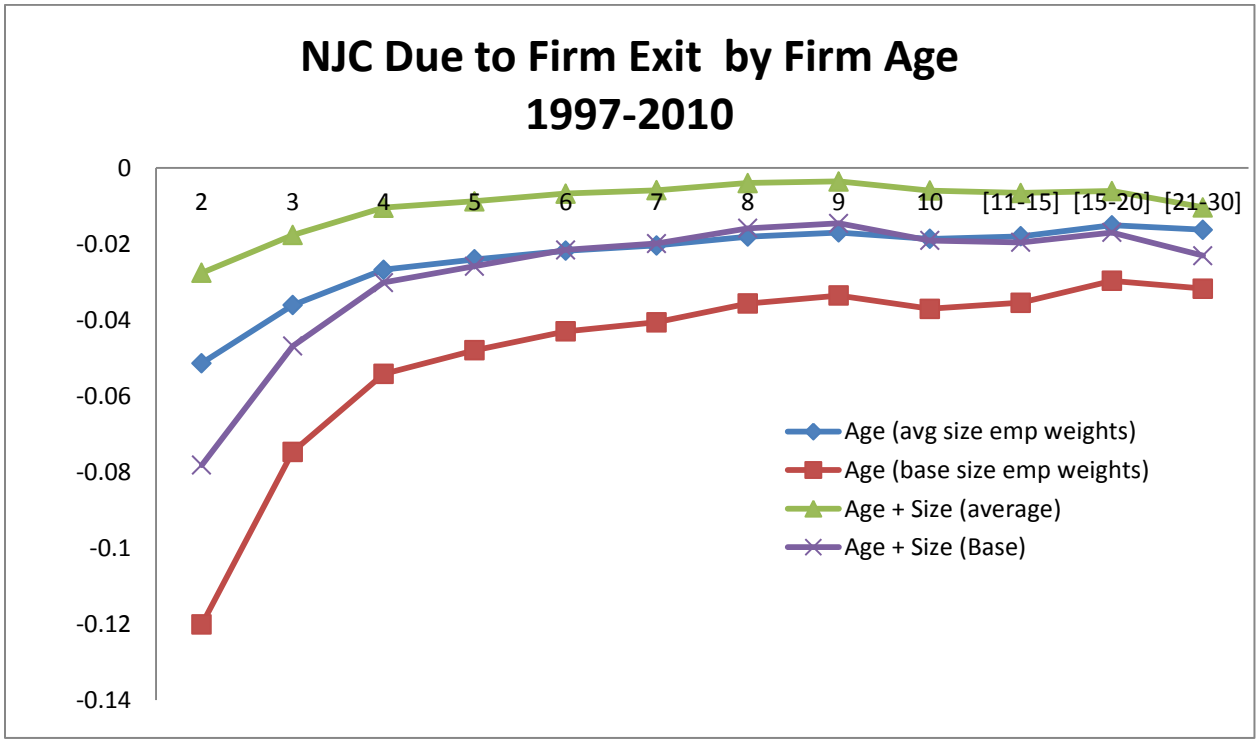


Notes: The figure plots weighted regression coefficients of net job creation, measured by the Davis-Haltiwanger-Schuh growth rate, on firm size and age dummies, controlling for sector and year. The underlying regression coefficients are presented in Table A2.

Figure 7: NJC by firm age – Continuing Firms and Firm Exit



Notes: The figure plots weighted regression coefficients of net job creation, measured by the Davis-Haltiwanger-Schuh growth rate, on firm size and age dummies, controlling for sector and year. The underlying regression coefficients are presented in Table A1.



Notes: The figure plots weighted regression coefficients of net job creation, measured by the Davis-Haltiwanger-Schuh growth rate, on firm size and age dummies, controlling for sector and year. The underlying regression coefficients are presented in Table A2.

Figure 8: Simulated Evolution of the Firm-Size Distribution

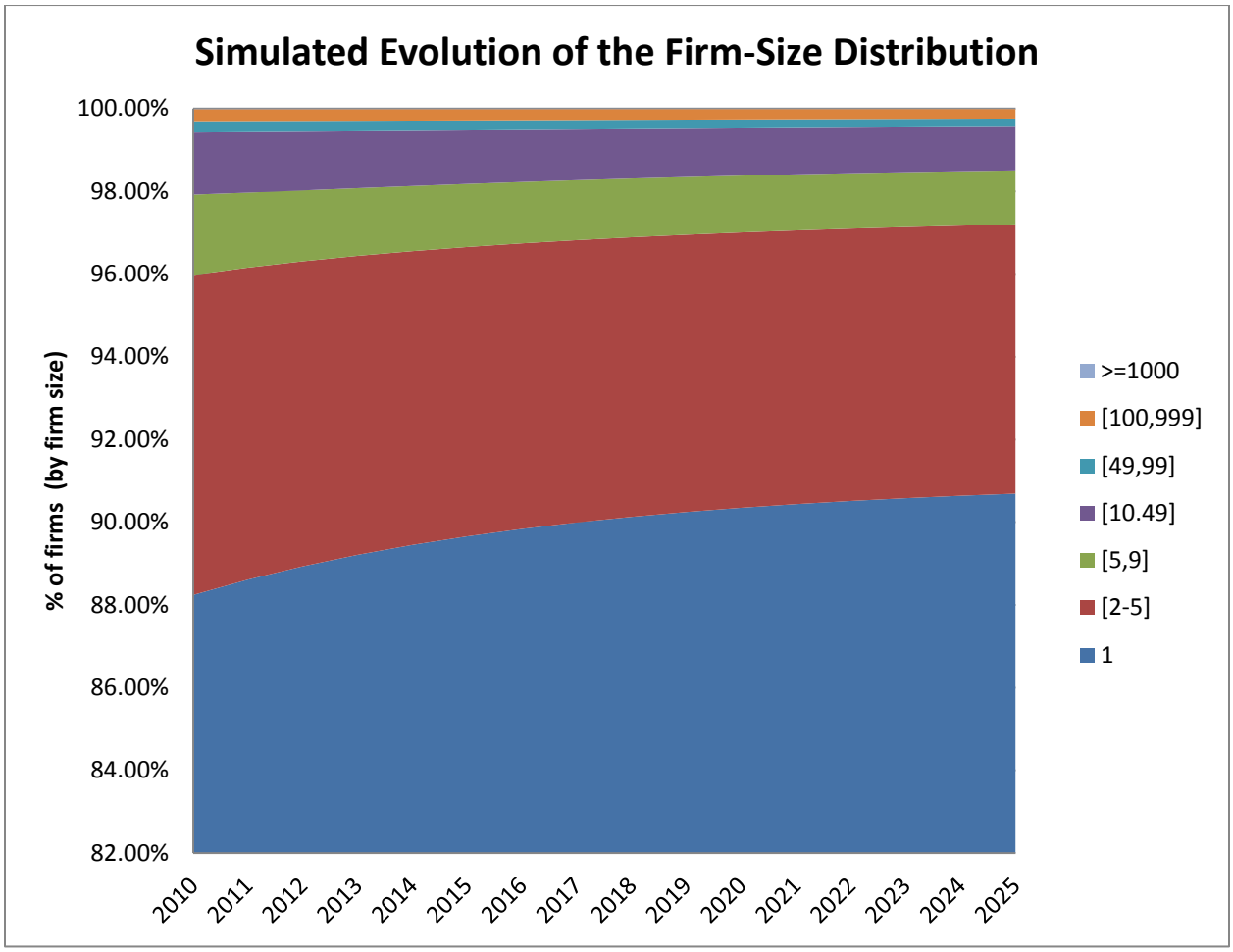
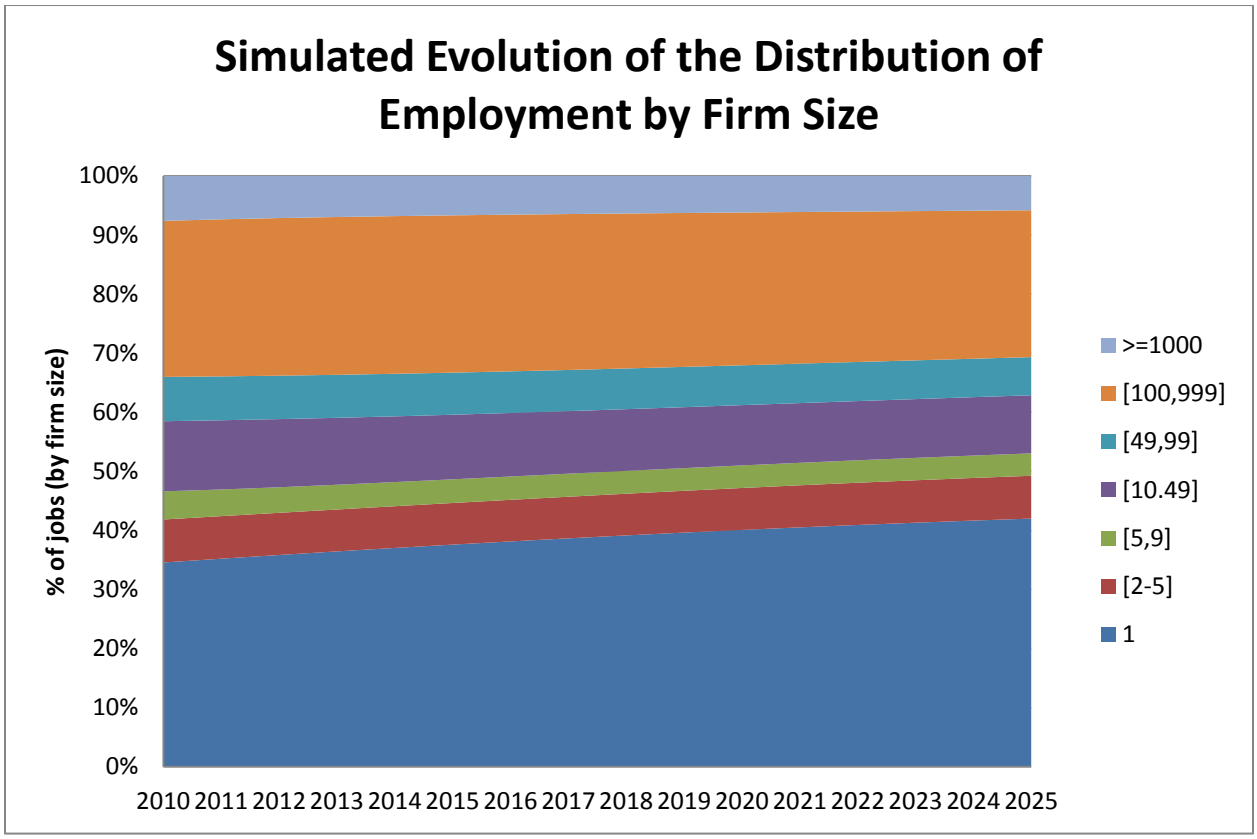


Figure 9: Simulated Evolution of the Distribution of Employment by Firm Size



Appendix A: Tables Underpinning Figures 4 and 5

Table A1: NJC Continuing Firms-2010

Net Job Creation: Continuing Firms 1997-2010						
	Average size classification			Base year size classification		
	1	**2**	**3**	**4**	**5**	**6**
Size						
1	0.0127		-0.0448	-0.0946		-0.1025
2	0.0326		-0.0179	-0.0841		-0.0895
[3,4]	0.0387		-0.0084	-0.0849		-0.0890
[5,9]	0.0394		-0.0036	-0.0868		-0.0901
[10.49]	0.0429		0.0047	-0.0888		-0.0916
[49,50]	0.0371		0.0072	-0.0876		-0.0893
[50,99]	0.0377		0.0168	-0.0891		-0.0893
[100,199]	0.0405		0.0267	-0.0720		-0.0723
[200,999]	0.0390		0.0390	-0.0447		-0.0447
Age						
2		0.3886	0.4428		0.0574	0.0502
3		0.1216	0.1642		-0.0150	-0.0158
4		0.0654	0.1031		-0.0375	-0.0373
5		0.0222	0.0577		-0.0669	-0.0665
6		-0.0078	0.0273		-0.0959	-0.0951
7		0.0025	0.0365		-0.0726	-0.0710
8		-0.0085	0.0245		-0.0758	-0.0740
9		-0.0077	0.0240		-0.0732	-0.0710
10		-0.0096	0.0205		-0.0696	-0.0672
[11-15]		-0.0146	0.0127		-0.0696	-0.0663
[15-20]		-0.0214	0.0007		-0.0742	-0.0701
[21-30]		-0.0253	-0.0111		-0.0619	-0.0612
Activity	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	5265688	5265688	5265688	5265688	5265688	5265688
R2	0.0093	0.0592	0.0699	0.0085	0.0108	0.0127
Adjusted	0.0093	0.0592	0.0699	0.0085	0.0108	0.0127

Note: The dependent variable is the Davis-Haltiwanger-Schuh growth rate. Regressions in columns 1,2, and 3 are weighted by the average size of the firm over the period over which the growth spell is measured (i.e. the current year and last year), while the regressions presented in columns 4, 5 and 6 are weighted by the base size employment (e.g. last year's employment, save for entrants, for which we use contemporaneous employment since lagged employment is not available). The resulting coefficients are thus interpretable as conditional average net jobs flows. Standard errors are not presented since all coefficient estimates are significant at the 1% level due to the large number of observations.

Table A2: NJC Due to Firm Exit – All Firms 1997-2010

Net Job Creation Due To Firm Exit: All Firms 1997-2010						
	Average size classification			Base year size classification		
	1	**2**	**3**	**4**	**5**	**6**
Size						
1	-0.0672		-0.0656	-0.1094		-0.1004
2	-0.0233		-0.0227	-0.0583		-0.0540
[3,4]	-0.0212		-0.0209	-0.0478		-0.0448
[5,9]	-0.0174		-0.0174	-0.0409		-0.0384
[10.49]	-0.0163		-0.0164	-0.0311		-0.0291
[49,50]	-0.0135		-0.0136	-0.0242		-0.0226
[50,99]	-0.0124		-0.0126	-0.0189		-0.0179
[100,199]	-0.0071		-0.0075	-0.0175		-0.0174
[200,999]	-0.0048		-0.0051	-0.0124		-0.0124
Age						
2		-0.0514	-0.0276		-0.1201	-0.0782
3		-0.0361	-0.0177		-0.0747	-0.0469
4		-0.0268	-0.0105		-0.0542	-0.0302
5		-0.0241	-0.0088		-0.0480	-0.0259
6		-0.0218	-0.0068		-0.0430	-0.0216
7		-0.0204	-0.0059		-0.0406	-0.0199
8		-0.0181	-0.0040		-0.0357	-0.0159
9		-0.0170	-0.0036		-0.0336	-0.0146
10		-0.0187	-0.0060		-0.0371	-0.0191
[11-15]		-0.0180	-0.0066		-0.0355	-0.0196
[15-20]		-0.0151	-0.0061		-0.0297	-0.0170
[21-30]		-0.0163	-0.0104		-0.0318	-0.0231
Activity Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	5542320	5542320	5542320	5542320	5542320	5542320
R2	0.0152	0.0086	0.0158	0.0231	0.0175	0.0248
Adjusted R2	0.0152	0.0086	0.0158	0.0231	0.0175	0.0247

Note: The dependent variable takes the value -2 if if firms exit and 0 otherwise. Regressions in columns 1,2, and 3 are weighted by the average size of the firm over the period over which the growth spell is measured (i.e. the current year and last year), while the regressions presented in columns 4, 5 and 6 are weighted by the base size employment (e.g. last year's employment, save for entrants, for which we use contemporaneous employment since lagged employment is not available). The resulting coefficients are thus interpretable as conditional average net jobs flows. Standard errors are not presented since all coefficient estimates are significant at the 1% level due to the large number of observations.

Appendix B: Including the Self-Employed and Accounting for Exit – Alternative Definitions

We illustrate the impact of the procedure we use to identify and correct for the presence of inactive firms whilst incorporating the registered self-employed by showing what happens when we i) do not correct their date of exit and ii) exclusively focus on firms with paid workers. We do this by showcasing transitions matrices corresponding to those reported in Table 5, since these best illustrate the consequences of adopting different definitions of firm exit.Table B1 demonstrates that not correcting the date of exit yields disproportionately many transitions into the 1-person firm category and lower exit rates, save for 1-person firms, as is to be expected if the legal timing of exit does not coincide with the cessation of production. Not accounting for discrepancies between the legal date of exit and the termination of economic activities leads to downward bias in our mobility estimates, and lower exit rates, as can be seen by observing the relatively large proportion of firms that transit into the 1-person category. While in the short-run the differences with the definition used in Table 5 may not seem that large, over time they become substantial as is evidenced by a comparison of the long-run panels of Table 5 and Table B1.

Yet another option would have been to focus on firms that hire salaried workers only. The mobility matrices for these firms suggest a more vibrant private sector, with much higher shares of firms transiting to inactivity/exit, and more dynamism amongst the smallest firm-size categories. Nonetheless we consider accounting for self-employment crucial in view of its contribution to job creation, and consequently opted for an employment measure that enabled us to include them.However, one major drawback of our cleaning procedures is that the rate of firm exit reported in Table 5 does not decline monotonically with firm size.

In any case, our main conclusions are qualitatively robust to using different methods to deal with the self-employed and supposedly inactive firms which nonetheless appear in the data. The reason is of course that we employment weight our regressions, which obviously minimizes the impact of falsely inactive firms that are very small.

Table B1: Alternative Transition Matrices

EMPLOYMENT TRANSITIONS – INCLUDING INACTIVE ACTIVE FIRMS

Short-Run: Annual Transitions

	Size in year t+1							
Size in year t	Exit	1	[2-5]	[5,9]	[10.49]	[49,99]	[100,999]	>=1000
1	8.81	89.89	1.15	0.09	0.05	0.01	0.01	0.00
[2-5]	7.50	9.53	78.69	3.82	0.43	0.02	0.01	0.00
[5,9]	6.41	2.91	13.88	68.07	8.59	0.10	0.04	0.00
[10.49]	3.11	2.38	1.81	8.61	79.88	3.71	0.49	0.00
[49,99]	1.98	1.98	0.43	0.49	15.97	67.39	11.75	0.01
[100,999]	1.35	1.21	0.23	0.24	1.95	8.30	86.16	0.55
>=1000	1.01	0.72	0.29	0.14	0.14	0.14	11.51	86.04

Long-Run: 1996-2010

	Size in 2010							
Size in 1996	Exit	1	[2-5]	[5,9]	[10.49]	[49,99]	[100,999]	>=1000
1	66.93	30.87	1.83	0.23	0.11	0.01	0.02	0.00
[2-5]	38.95	31.10	24.54	4.12	1.17	0.04	0.07	0.00
[5,9]	38.71	18.98	14.30	17.37	9.87	0.49	0.26	0.01
[10.49]	28.73	21.12	5.85	9.31	28.20	4.80	1.97	0.02
[49,99]	24.90	20.85	3.09	1.83	18.63	18.73	11.97	0.00
[100,999]	20.12	19.70	2.24	1.08	7.28	10.10	38.00	1.49
>=1000	12.12	9.09	0.00	0.00	3.03	0.00	36.36	39.39

EMPLOYMENT TRANSITIONS – FIRMS USING WAGE WORKERS ONLY

Short-Run: Annual Transitions

	Size in year t+1							
Size in year t	Exit/No paid workers	1	[2-5]	[5,9]	[10.49]	[49,99]	[100,999]	>=1000
1	21.68	71.04	6.62	0.46	0.17	0.02	0.01	0.00
[2-5]	11.77	9.83	70.99	6.50	0.86	0.03	0.02	0.00
[5,9]	9.21	1.44	13.98	64.76	10.43	0.14	0.05	0.00
[10.49]	5.07	0.55	1.81	8.46	79.49	4.08	0.54	0.00
[49,99]	3.55	0.31	0.31	0.47	15.86	67.63	11.86	0.01
[100,999]	2.31	0.20	0.13	0.27	1.86	8.2	86.47	0.56
>=1000	1.59	0.14	0.14	0.00	0.14	0.14	11.56	86.27

Long-Run: 1996-2010

	Size in 2010							
Size in 1996	Exit/No paid workers	1	[2-5]	[5,9]	[10.49]	[49,99]	[100,999]	>=1000
1	75.67	15.91	6.69	1.12	0.51	0.04	0.06	0.00
[2-5]	58.01	10.59	21.9	6.76	2.50	0.09	0.14	0.01
[5,9]	56.90	3.75	11.74	15.62	10.92	0.74	0.33	0.00
[10.49]	48.36	2.40	4.69	8.98	28.04	5.33	2.19	0.02
[49,99]	45.70	1.21	1.42	1.62	18.3	19.31	12.44	0.00
[100,999]	38.75	1.27	1.44	1.10	7.36	10.15	38.41	1.52
>=1000	18.75	0.00	0.00	0.00	3.13	0.00	37.5	40.63

Appendix C: Transition Matrix Used for Simulating the Evolution of the Firm Size Distribution

Size category (# workers)	1	[2-5]	[5,9]	[10.49]	[49,99]	[100,999]	>=1000
1	1.06	0.01	0.00	0.00	0.00	0.00	0.00
[2-5]	0.08	0.84	0.04	0.00	0.00	0.00	0.00
[5,9]	0.01	0.14	0.72	0.09	0.00	0.00	0.00
[10.49]	0.01	0.02	0.09	0.83	0.04	0.00	0.00
[49,99]	0.01	0.00	0.01	0.16	0.70	0.12	0.00
[100,999]	0.00	0.00	0.00	0.02	0.08	0.88	0.01
>=1000	0.00	0.00	0.00	0.00	0.00	0.12	0.86