



On the persistence of job creation in old and new firms[☆]

René Böheim^a, Alfred Stiglbauer^b, Rudolf Winter-Ebmer^{c,*}

^a University of Linz, Austria and WiFo, Vienna, Austria

^b Oesterreichische Nationalbank, Vienna, Austria

^c University of Linz, Austria and Institute for Advanced Studies, Vienna, Austria

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ABSTRACT

We analyze the persistence of new jobs in new and old firms. This measure assesses the sustainability of job creation in different circumstances. We find that new jobs in Austria last significantly longer in new than in old firms.

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1. Introduction

The stimulation of the creation of new businesses is a buzzword in policy circles (e.g., [Almus, 2004](#)). Commentators and policy analysts typically cite the creation of new jobs, the implementation of innovative ideas and – less often – more competitiveness in the industry as advantages. The net employment created by these new firms is not clear, because they will increase competition, possibly drive out incumbent firms, which may lead to an aggregate decline in employment.

[Davis et al. \(1996\)](#) compare job creations in large and small U.S. firms and conclude that regression to the mean and measurement error lead to the – exaggerated – assertion that most job creation is in small firms. They argue that the systematically lower employment levels in initial periods lead to an upwardly biased estimate of employment growth in these small firms. This result is relevant for the study of job creation by new firms, because new firms typically start with an employment level below the equilibrium number of workers

and will therefore exhibit a more dynamic growth than old firms, which are arguably closer to their optimal number of workers.

Other studies (e.g. [Geroski and Mazzucato, 2002](#)) compare the survival rates of new firms to existing ones and find that new firms have a relatively high risk of failure during the first years of their existence. While this is an important result for the survival of new firms, the failure rates of new and incumbent firms should not be used to assess the creation of jobs. The comparison of the failure rate of a new firm that *created* five new jobs with the failure rate of a firm that *already profitably employed* five workers in the past 5 years misses the point. The real question is if jobs created by an incumbent firm – an expansion – are more persistent than the creation of the same number of jobs in a new firm. While the number of start-ups, along with the associated job creation, might perturb the market and change competitiveness in the industry, only the persistence of jobs created gives valuable information about the viability of capacity investment, firm setup and expansion.

[Boeri and Cramer \(1992\)](#), [Wagner \(1994\)](#) and [Fritsch and Weyh \(2006\)](#) analyze the employment in start-up firms for several cohorts. They find that employment levels in new firms rise only in the first year(s), but decline significantly thereafter. Again, these results suffer from a lack of an appropriate comparison group for job stability in the new firms.

We compare the persistence of job creations between jobs created in new firms and those created in incumbent firms using a large data set covering 21 years of job creation. The data are matched employer–employee data from Austrian administrative sources, providing not

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* Corresponding author. Altenbergerstrasse 69, 4040 Linz, Austria. Tel.: +43 702468 8236; fax: +43 702468 8217.

E-mail address: Rudolf.winterebmer@jku.at (R. Winter-Ebmer).

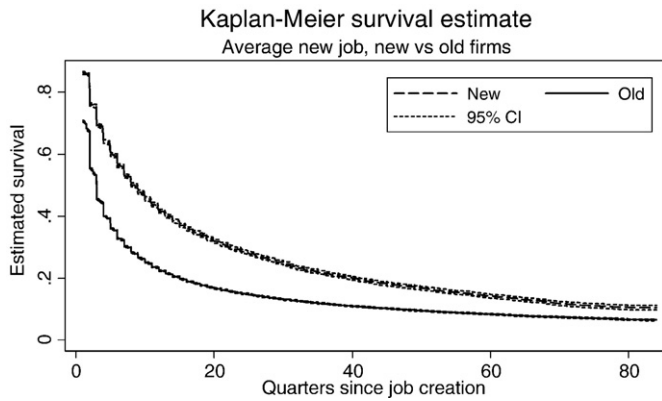


Fig. 1. Kaplan–Meier estimates of the survival of job creation.

only characteristics at time of job creation, but also a detailed history of the firms. Our results indicate that a typical new job survives considerably longer if created in a new firm, even after controlling for business cycle effects and workplace characteristics.

2. Measuring job creation

The data from the Austrian social security system cover all employees in the Austrian private sector. The data cover the period of January 1978 to December 1998 and we observe the employment in each establishment in every quarter.¹ We identify a job creation if the number of employed persons in an establishment in any quarter t is greater than in the preceding quarter $t-1$. Of all job creations over this period, we draw a 10% random sample, stratified by quarter, sector, and the age of the establishment. Data cleaning results in an estimating sample of approximately 377,000 job creations in about 144,000 old and 24,000 new establishments.

We formulate our analysis in terms of job flows, i.e. the creation and destruction of employment positions in a firm. This is the appropriate perspective if we aim to measure the success or failure of an additional job. Alternatively, one could look at worker flows, which focuses on the persistence of workers in particular firms. This is the preferred perspective for an analysis of differences in job tenure between new and old firms.²

3. Empirical methods

As firms can create several jobs at the same time, we use the survival time of a typical new job, which is calculated as the mean duration of all the jobs created at a point in time in an establishment. Fig. 1 displays Kaplan–Meier estimates of the survivor functions of jobs created in new and old firms, together with 95% confidence intervals. A survivor function shows the proportion of jobs creations in period 0 which are still active after n quarters. The survivor function for jobs created in new firms is consistently above the one for old firms. The persistence of job creation is considerably higher in new firms; this is the case immediately after job creation, but also up to 80 quarters after job creation. After 5 years, about 65% of jobs in new firms are lost; about 80% created in old firms are lost.

Like Audretsch and Mahmood (1995) we use a Cox proportional hazard model. While these authors (among others) estimate the

hazard rates of new firms we are interested in the hazard rates of new jobs. The Cox model specifies the hazard function $h(t)$ as:

$$h(t) = h(0) \exp(X'\beta). \quad (1)$$

The hazard rate $h(t)$ is the rate at which a job will cease to exist in period t , given that it existed up to $t-1$. The baseline function $h(0)$ specifies the hazard function when all covariates are set to zero, X is the vector of covariates and β is the vector of coefficients to be estimated. Covariates included in the vector X are controls for the sector, regional indicators, seasonal and year dummy variables. We also control for a range of workplace-specific indicators, namely the median wages of new and old workers, the share of new workers in all new workers who are younger than 25 or older than 50 years of age, who are blue-collar workers, or female. In addition, we control for the local and sectoral unemployment rate at the time of expansion. To account for small fluctuations in the number of workers from year to year, we include dummy variables for firms employing only one new worker and for firms whose employment was the same in period t and in period $t-2$.

4. Results

Table 1 presents results for the persistence of job creations in new and old firms. A hazard ratio greater than 1 signifies a larger hazard and a job is lost sooner. Job creation in new firms is more persistent than in old firms. In manufacturing, the hazard of losing a new job in a new firm is about 45% lower than in an old firm and it is some 33% lower in the service sector. This corresponds with descriptive results from the literature. Cross-tabulations of persistence by age in Davis et al. (1996) and Armington and Acs (2000) indicate higher job creation persistence when jobs are created by new firms. These results

Table 1
Cox-regression coefficients of new firm dummies in various sub-samples.

	Manufacturing	Services
	Hazard ratio (SE)	Hazard ratio (SE)
All firms		
New firm dummy	0.5656 (0.013)	0.6754 (0.006)
<i>N</i>	58,592	118,563
Robustness		
More than 1 new job		
New firm dummy	0.4934 (0.020)	0.5491 (0.012)
<i>N</i>	23,700	34,301
More than 5 new jobs created		
New firm dummy	0.5684 (0.056)	0.5909 (0.038)
<i>N</i>	6461	6588
Number of employees at t not equal the number at $t-2$		
New firm dummy	0.4986 (0.021)	0.5555 (0.012)
<i>N</i>	21,782	32,217
Old firms with more than 5 employees at $t-1$, more than 1 job created, and number of employees at t not equal $t-2$		
New firm dummy	0.4898 (0.021)	0.5504 (0.012)
<i>N</i>	17,994	24,092

Note: Results from Cox regressions of time until the average new job in the establishment is lost. The regressions control for the median wages of new and old workers, the share of new workers in all new workers who are younger than 25 (older than 50) years of age, blue-collar workers, or female; the local and sectoral unemployment rate at the time of expansion, dummy variables for firms employing only one new worker, dummy variable if employment was the same in period t and in period $t-2$; sector, region, season and year.

¹ For a more extensive discussion of features of the data and data processing, like sectoral coverage as well for other uses of the data, see Hofer and Winter-Ebmer (2003), Zweimüller et al. (2009), Stiglbauer et al. (2003) and Böheim et al. (2008).

² Schnabel et al. (2008) look at this issue.

are robust to variations in the set of covariates, and to a pooling of the samples.

To demonstrate the robustness of these results, we re-estimated the hazard for various sub-samples. The results confirm the robustness of our main result and show that new jobs in new firms have a statistically and economically significant longer duration than those in existing establishments. These restrictions should eliminate cases where the measured job creation might be an artifact arising from a temporary adaptation of the workforce. In particular, we restrict the sample to job creations with at least two (five) new jobs, as most job creations involve small expansions. While the hazard rates in the case of a larger expansion are somewhat lower indicating that medium sized expansions in new establishments have the best survival prospects (Böheim et al., 2008), the difference between old and new firms remains the same: the advantage of new firms is even larger in the case when more than one job is created.

Another sub-sample results from excluding old firms where firm size in period t was equal to the firm's size two quarters earlier. Such a restriction is justified if one considers the small expansions to be fluctuations around an optimal size of the workforce. Correcting for such possibly spurious job creations does not change our results.

5. Summary and conclusions

The dynamics of job creation have received a lot of attention from macro and labor economists who have concentrated on the simultaneous creation and destruction of jobs, as well as on the cyclical determinants of job creation. In addition, the discussion in industrial organization has concentrated on firm creation, growth and survival, providing a range of insights and stylized facts on the post-entry performance of firms (e.g. Geroski, 1995). However, no previous study has analyzed the persistence of new jobs in old and new firms. We analyze the persistence of job creation, distinguishing between job creation in existing and in entering establishment, because the creation of employment by supporting the creation of new firms is a prime concern for economic policy, often subsidized by governments.

Jobs created by entering establishments in Austria last considerably longer than new jobs in old establishments, which should support the creation of new firms. These results are robust to many different specification checks.

According to our results, governments should support new firms rather than old ones. The data show that new firms create jobs that last on average almost 50% longer than those created in already existing companies. Well-targeted policies can improve output and entrepreneurial activity (e.g., Wenli, 2002) and empirical evidence suggests that crowding out is less problematic in Europe than in the US (e.g., Almus and Czarnitzki, 2003).

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