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Workplace democracy and job flows [*]

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Abstract

This paper investigates the relationship between workplace democracy and job flows by comparing the behavior of worker-managed firms (WMFs) and conventional firms (CFs). The empirical analysis relies on high frequency administrative firm-level panel data from Uruguay over the period April 1996-July 2009. The main findings of the paper are that (1) WMFs exhibit much more stable job dynamics than CFs; (2) both types of firms have decreasing in age and increasing in size gross job creation profiles; (3) there are heterogeneous employment regimes within WMFs: job creation and destruction rates are high for hired workers and very low for members. This paper contributes to the literature on the role of institutions in shaping job flows. Our results have important implications for the understanding of the allocative efficiency effects of worker participation.

Keywords: Job flows, Worker-managed firms
JEL Codes: D22, J54, J63

1. Introduction

The comparison of investor-owned firms with other types of organizations has received particular attention in organizational and institutional economics. Organizational theorists have been mainly interested in the trade-off between the costs of ownership and the costs of market contracting as a key driver of the assignment of ownership rights and of the differential incidence of various organizational forms across industries (Hansmann, 2013; 1988). However, empirical comparisons of firm-level outcomes across different organizational forms remain less frequent than purely theoretical studies.

This paper investigates the effect of workplace democracy on job flows by comparing the behavior of worker-managed firms and conventional firms (hereafter respectively WMFs and CFs). The focus on WMFs is interesting due to the peculiar institutional features of this type of organizations. While CFs are ultimately controlled by capital suppliers, WMFs are defined as enterprises in which the workforce enjoys ultimate control rights (Dow, 2003).

The empirical analysis relies on a monthly panel of Uruguayan firms obtained from social security administrative records for the period April 1996-July 2009, including the universe of firms legally registered as producer cooperatives and their conventional counterparts. We investigate (1) whether participatory workplace institutions affect job flow indicators (net job creations, gross job creations and destructions), and (2) whether worker participation mediates the effect of the macroeconomic cycle as well as of firms' size and age on job flows. In order to control for confounding factors such as different age, industry and size composition of both types for firm, we follow Haltiwanger, Jarmin and Miranda (2013) and run fully non-parametric regressions of the different job flow rates on the set of available covariates. By doing this we provide composition adjusted measures of differences in job flows behavior between both types of firms.

The central findings of the paper can be summarized in five main facts. First, WMFs exhibit much more stable job dynamics than CFs. Both gross creation and destruction rates for WMFs are in the order of a half of those of CFs. Second, although net job creation in continuing CFs and WMFs follows the macroeconomic cycle as expected, creation of new WMFs during recession years makes net employment creation in WMFs much less procyclical than in CFs. This pattern points to an interesting job stabilizer role of WMFs. Third, in the last years of the period of analysis, when the Uruguayan economy was booming with GDP growth rates over 5% on average, both types of firm exhibited unprecedentedly high rates of gross job creation and destruction pointing to the existence of strong efficiency-improving labor reallocation. This is of great relevance since it indicates that job stability in WMFs does not imply incapacity of participating in economy wide efficiency-improving labor reallocation

processes. Fourth, both types of firms have decreasing in age and increasing in size gross job creation profiles. In terms of job destruction rates, although both types have a decreasing age profile in the cross-section, in the panel firms seem to destroy more employment as they get older. This is because most of the job destruction observed in the cross section is being done by very young firms which die young and do not affect the estimation of the age profile in the panel regressions. Fifth, WMFs' characteristic stable job flows pattern holds for the majority of their workers who democratically own the firm (members) but not for the minority which does not enjoy membership rights (employees). Gross job flow rates for the latter are even higher than those observed for employees working in the conventional sector. This fifth finding may have implications for understanding employment adjustment strategies in other type of organizations in which different types of workers have differential influence over firm decisions (family members vs. nonmembers in family firms, unionized vs. nonunionized workers, etc).

This study contributes to the literatures on job flows and on worker participation in three distinct ways. First, it brings a key organizational dimension, i.e. workers' control rights over firm decisions, into the analysis of job flows. While previous studies have focused on how several firm characteristics, such as age, size, and industry, correlate with job flows, there is no evidence on whether firm-level institutions facilitating worker participation affect the pace of job creation and destruction. The real-world organization of firms reveals the existence of different participatory arrangements, such as employee consultation, work councils, codetermination and worker-managed firms.[2] In spite of the growing interest among policymakers in promoting different forms of employee participation, very little is known about the microeconomic behavior associated with those institutions.[3] Second, the paper expands the existing literature on employment responses of WMFs, which has been previously restricted to studying net employment changes (Craig and Pencavel, 1992; Pencavel et al., 2006; Burdín and Dean, 2009; Pencavel, 2013). The application of the job flow approach allows disentangling whether the observed differences between WMFs and conventional firms in net job flows are attributable either to job creations, destructions, or both. Moreover, we also separate these gross job flows in those associated with the behavior of

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[2] According to Bryson et al. (2012), around one third of European workplaces with 10 or more employees have a trade union or works council body in place. Worker-managed firms are rare in most economies, even though certain regions exhibit a high concentration of this type of firms. For instance, WMFs account for 13% of economic activity in the northern Italian province of Emilia Romagna and 8% of industrial gross value added (and 4% of overall gross value) in the Basque Country, Spain, where the Mondragon Cooperative Corporation is located (Arando et al., 2012).

[3] This seems particularly true in the European context, as suggested by several European Union Directives (see, for instance, Hall and Purcell, 2011).

incumbent firms and those related to firms' entries and exits. Finally, we build separate job flows indicators for members and hired employees in WMFs, identifying two sharply different employment regimes within this type of organizations. On one hand, employment flows of hired labor are characterized by both high job creation and destruction rates. On the other, members' jobs exhibit both low creation and destruction rates. Despite having very different implications, both regimes (the one for employees and the one for members) are consistent with low net employment creation and, hence, are undistinguishable if one solely relies on net employment variations.

The rest of the paper is organized as follows. Section 2 briefly discusses the job flow literature, emphasizing stylized facts related to how firms' characteristics correlate with job flows and linking them with previous work on the employment effects of worker participation. Section 3 provides background information on Uruguayan WMFs and describes the data and the empirical methodology. In section 4 we present the main findings of the paper and section 5 concludes with some final remarks.

2. Related literature

The employment decisions of WMFs have attracted the attention of economists since the late 1950s. The basic neoclassical model of the worker managed firm assumes that these firms maximize revenue per worker rather than total profits and predicts that they don't respond in the usual way to changes in the product price; they reduce the level of employment and output when the market price increases (Ward, 1958).[4] Even though such a perverse supply response has not been robustly confirmed by empirical studies, there is, however, ample evidence that employment responses to demand shocks are less elastic in WMFs compared with conventional firms (Craig & Pencavel, 1992; Pencavel et al., 2006; Burdín & Dean, 2009; Pencavel, 2013).[5] Hence, worker participation is associated with more stable employment relationships. As mentioned before, these studies have focused on net employment variations. Beyond WMFs, there is also some research done on the German codetermination system in which employees have representation on the board of directors and have the right to form establishment-level work councils. Although work councils seem to reduce labor fluctuations (Addison et al., 2001), the literature has reached conflicting results regarding their effect on employment growth (Addison et al., 2001;

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[4] The model has not proved to be robust to several theoretical variations. For instance, it does not necessarily hold in the case of multiproduct WMFs or when the production process involves other variable inputs apart from labor. It has also been argued that worker- members will be reluctant to vote for layoffs because, in a WMF in which members are equally treated, everybody faces similar probabilities of being selected for dismissal (Moene, 1989).

[5] By contrast, wages appear to be more volatile in WMFs than in CFs.

Addison & Teixeira, 2005; Jirjahn, 2010). Moreover, none of these studies provide a detailed analysis in terms of job flows.

The fact that net employment changes may mask large job and worker flows has been a major discovery of empirical studies based on the flow approach to labor markets (Davis et al., 2006; Cahuc, 2014). The availability of new data sources has allowed researchers to split up net employment variations into both job flows (job creations and job destructions) and worker flows (hirings and separations). Job flows appear to be quite large and of similar magnitude among both developed and developing countries (Davis et al., 1998, 2006; Haltiwanger et al., 2014). Previous works in this literature have been focused on how firm-level attributes correlate with job flows mostly in developed countries (see, for instance, Bassanini, 2010). A partial exception to this is Haltiwanger et al. (2014), which provides evidence on job flows for 16 industrial and emerging economies, including some Latin American and transition countries. Based on harmonized micro-data, they find that annual job flows are large in most countries and that size-industry effects account for half of the overall sample variability in job flows across countries. Interestingly, their study reveals a substantial unexplained residual variation, suggesting a potential role for national and local labor market institutions and business environment conditions in shaping cross-country differences in job flows.

Closely related to the present study, Haltiwanger et al. (2013) analyze the relationship between firm size and employment growth and explore the mediating role of firm age. Using data from US private nonagricultural firms, the authors dispute the popular belief that small business account for most of the job creation. They find that after controlling for firm age there is no systematic inverse relationship between net employment growth rates and firm size, emphasizing the crucial role of firm births and the fact that new firms are usually smaller than incumbents.

The role of institutions in shaping the pace of job flows has been studied in a lesser extent. There is some evidence that labor markets characterized by more stringent employment protection legislation, higher unemployment benefits and more coordinated wage bargaining systems exhibit lower job flows (Gomez-Salvador et al., 2004; Cahuc, 2014). Casacuberta et al. (2005) analyze annual job flows in Uruguay during the period 1982-1995 using firm survey data and find that highly unionized industries exhibit higher job creation and lower job destruction rates. Serrano and Malo (2002) analyze the relationship between collective bargaining and job flows in Spain, distinguishing between sectoral and firm-level bargaining institutions. They do not find clear effects of firm-level bargaining on gross job flows. However, there is very little research done examining the relationship between corporate governance institutions - including those giving workers the right to exercise either partial of full control over the firm's decisions - and job flows.

3. Data and methodology

3.1 Data and background information on Uruguayan WMFs

Worker-managed firms in Uruguay must be legally registered as Producer Cooperatives and have a ratio between permanent employees and members of less than 20%. In particular, WMFs following these rules are exempted from paying the employer payroll tax to social security as well as corporate tax. Furthermore, during this period the law required a minimum of six members in order to register a new cooperative firm. Even though certain key organizational features are predetermined by law, WMFs are free to decide upon a broad range of associational rules. Regarding their governance structure, WMFs have a General Worker Assembly that selects a Council (which usually selects the managers) to supervise the daily operations. Each member of the assembly has only one vote, regardless of her capital contribution to the firm. Uruguayan WMFs mainly operate under a collective ownership regime. Employees (non-members) in WMFs do not enjoy any formal privileges in comparison with employees in CFs. Specifically, they do not necessarily have control over management decisions and residual claimancy rights. Employees may become members according to rules defined by each WMF.[6]

The empirical study is conducted using an unbalanced panel of Uruguayan firms, consisting of monthly firm-level observations over the period April 1996 - July 2009. The data come from social security administrative records provided by *Banco de Previsión Social* (BPS), which is the public agency in charge of social security affairs in Uruguay. The data set covers the entire population of firms registered as Producer Cooperatives (PCs) and conventional firms in the 112 3-digit sectors in which at least one PC was registered during the reference period.[7] The available firm-level information in this dataset includes firms' industry class (5 digits, ISIC, fourth revision), age, employment, and average wage, distinguishing members and nonmembers in the case of PCs.[8]

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[6] Dean (2013) reports that 20.1% of worker members have joined the WMF as employees.

[7] The data refer to firms and not to establishments. It is worth noticing that the fraction of multi-establishment firms in Uruguay is small. 89% of Uruguayan firms have only one establishment, and only 4% has more than two (Source: own processing of BPS data). Conversions of one type of firm into another cannot be identified in the data. However, a recent survey shows that only 11% of WMFs that were active in 2009 had been formed through conversions of CFs (Alves et al. 2012).

[8] Information about the workforce composition of each firm (gender, occupation, age) is not available. Workers cannot be tracked over time in a consistent manner for both types of firms. These limitations prevent us from analyzing workers flows and job flows jointly and investigating whether they vary by workers' characteristics. There is also no information on working hours. Employment variables refer to formal employment. The fraction of informal

3.2 Methodology

The paper deals with three main concepts of job flows: gross job creation, gross job destruction and net job creation. As in Davis, Haltiwanger, and Schuh (1998), let's start by defining X_t as a firm's number of jobs at time t, which in our case will be the month. $\Delta X_t = X_t - X_{t-1}$ is the first difference operator on the number of jobs at time t, and then gross job creation for a given set of firms S is defined as:

$$C_t = \sum_{S+} \Delta X_t \tag{1}$$

Where S^+ is the subset of firms with $\Delta X_t > 0$. Analogously, Gross job destruction is given by:

$$D_t = \sum_{S-} |\Delta X_t| \tag{2}$$

Net job creation is simply the difference $N_t = C_t - D_t$. Job flows become more meaningful when expressed as rates on the existing stock of jobs, which is usually done by dividing the absolute job flows defined in (1) and (2) by the average number of jobs in periods t and $t-1$:

$$Z_t = 0.5(X_t + X_{t-1}) \tag{3}$$

Gross job creation, gross job destruction and net job creation rates for a given firm are, respectively[9]:

$$c_t = \frac{C_t}{Z_t}, \quad d_t = \frac{D_t}{Z_t}, \quad n_t = \frac{N_t}{Z_t} \tag{4}$$

These rates can be conveniently aggregated for any set S of firms of a certain age, size, industry or year (or combinations of those) by taking sum-weighted averages of each firm i rates:

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workers is quite low in Uruguay compared to other developing countries (20% in 2014; source: INE).

[9] One additional job flow concept used in the literature is that of job reallocation. The job reallocation (rate) is given by the sum of gross job creation (rate) and gross job destruction (rate) and is interpreted as a summary measure of the intensity of job flows.

$$c_{S,t} = \sum_{i \in S} \frac{Z_{i,t}}{Z_{S,t}} c_{i,t} \tag{5}$$

$$d_{S,t} = \sum_{i \in S} \frac{Z_{i,t}}{Z_{S,t}} d_{i,t} \tag{6}$$

$$n_{S,t} = \sum_{i \in S} \frac{Z_{i,t}}{Z_{S,t}} n_{i,t} \tag{7}$$

For example, in some parts of the empirical analysis we will be looking at annual average job flow rates. These annual averages are obtained by computing the aggregate rates above when S is the set of firms belonging to a given year.

4. Results

4.1 Job flows: general patterns

Between 1996 and 2009 conventional firms in Uruguay created and destroyed each month a number of jobs equivalent to roughly 4% of the existing stock of jobs (see Table 1). The number of jobs created was actually higher than those destroyed, yielding an average monthly net rate of job growth of 0.30%. In terms of gross flows, WMFs had on average much lower gross creation and destruction in comparison with CF in the period, with magnitudes that are less than a half of those exhibited by CFs. Although differences in gross rates between both types of firms are sharp, the difference in terms of net creation is small, with WMFs exhibiting a net monthly rate of 0.17%. In other words, for a given amount of net creation, CFs create and destroy a much higher number of jobs than WMFs.

Figure 1 shows how the pattern of net job creation for CFs followed the economy's growth rate very closely. The Uruguay's economy grew between 1996 and 1998, went through a harsh recession between 1999 and 2002, and then a period of several years of high growth followed. WMFs' net job creation also followed the general evolution of the economy, but less tightly, in particular during the years of economic crisis. While CFs had net job destruction during four consecutive years between 1999 and 2002, WMFs created more jobs than what they destroyed during those years and only had slightly negative job growth in 2002, which was the worst year of the crisis.

Figure 1

Figure 2 shows some interesting patterns in terms of the evolution of gross job creation and destruction for each type of firm. In this graph, the vertical difference between creation and destruction rates is the average monthly net job creation rate in a given year. Keeping this in mind, we can explain the evolution of net job growth described in Figure 1 by looking at the differences between job creation and destruction rates in Figure 2. Job creation in both types of firms anticipated the crisis and fell in the first years of the period while the economy was still growing. The job creation rate for CFs fell below a relatively stable job destruction rate in 1999 and stayed below until the economy recovered in 2003.

It is interesting to note how the destruction rate grew almost ten points in the final years of the period when the economy was growing rapidly. This pictures a highly dynamic labor market during these years, which required lots of job destruction to accommodate the high job creation rates in the booming Uruguayan economy. Most importantly, given the main question of the paper on the relative performance of WMFs with respect to CFs, this upward shift in the magnitudes of gross job creation and destruction occurred for both types of firms. It seems that although WMFs exhibited a much more stable pattern than CFs, they were capable of joining the higher economic dynamism and economy wide reallocation of labor by increasing their rates of job creation and destruction.

Figure 2

4.2 The role of firms' entries and exits

In Table 1 we decompose job creation and destruction rates in two components: jobs destroyed and created by firms' entries and exits and by incumbent firms. We draw three important conclusions from Table 1. First, for both types of firms most of job creation and destruction is not due to firms entering and exiting the market but corresponds to job flows of incumbent firms'. Second, since job creation and destruction rates due to this motive are relatively similar for both types of firms and overall job creation and destruction are much higher for CFs, this means that firms' exits and enters are relatively more relevant in explaining absolute job dynamics in WMFs than in CFs.[10]

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[10] Firms' entries account for 16% and 30% of total job creation in CFs and WMFs respectively. Job destruction due to firms' exits represents 16% and 25% of total job destruction in CFs and WMFs.

Table 1

A third important fact to note from Table 1 is that the result referred above on positive net creation by WMFs during the recession years corresponds entirely to creation of new firms. While negative net creation in CFs between 1999 and 2003 is explained both by net exit of firms and net destruction of jobs by continuing firms, WMFs exhibited positive net job creation during the crisis, and this was due to jobs created by new firms outnumbering jobs destroyed by firms exiting the market. Creation of WMFs may have a job stabilizer role during recessions, with unemployed workers getting together to create new firms.[11]

Summing up before we turn into the regression analysis, we have the following general picture. First, both types of firms exhibited high dynamism in terms of job creation and destruction in the period under analysis, and the macroeconomic cycle played a fundamental role in explaining the dynamics of job creation and destruction in CFs.[12] Second, the macro cycle also mattered a lot for WMFs but in a less straightforward way. While continuing WMFs exhibited milder negative net job creation during the recession, creation of new WMFs during these years led to overall positive net job creation. Finally, job reallocation rates (defined as the sum of creation and destruction) peaked during the recent economic boom, reaching unprecedentedly high values, which may have important implications in terms allocative efficiency and the growth potential of the Uruguayan economy.

4.3 Regression analysis

The simple comparison of unconditional average rates by types of firms above seems to indicate that WMFs are less dynamic than CFs in terms of both job creation and job destruction. The regression analysis will expand the empirical analysis in two directions. First, it will reassess the question on the relative performance of WMF in terms of job dynamics by controlling for firm age, size, and industry. Second, it will tell us if these observable firms' characteristics correlate *differently* with job creation and destruction for each type of firm.

Previous research has documented that younger firms tend to create and destroy more jobs than older firms (Haltiwanger, Jarmin and Miranda 2013)

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[11] This includes WMFs created through transformation of conventional firms in financial distress.

[12] This might be seen as a rather mechanical result given that these firms constitute the large majority of the economy.

and that job creation and job destruction rates tend to vary a lot by industry. While these are considered well established facts in the literature, the relationship between net job growth and firm size appears to be more complex. Most studies have shown an inverse relationship between net job growth and firm size (see, for instance, Neumark, Wall, and Zhang, 2011), but this correlation vanishes when controlling for firms' age (Haltiwanger et al., 2013). Our aim is to analyze if these stylized facts hold when we look at different organizational forms, in other words, we ask if WMFs have the same size and age profile than CFs in terms of job creation and job destruction.

The regression strategy has three main components. We start by estimating a set of fully non-linear regressions of the job flow rates on 9 dummies for age, 7 dummies for size, 4 industry dummies, and a dummy for each of the calendar years in the sample, all interacted with a binary variable indicating the type of firm.[13] Because of their very flexible specifications, these are our preferred regressions for obtaining the composition adjusted age and size profiles for each type of firm.

In Figure 3 we follow Haltiwanger, Jarmin and Miranda (2013) and plot, for each type of firm, the partial effects of each age dummy on net creation when holding size, industry and year composition constant at their sample means. The figure also includes the 95% confidence intervals for those partial effects of age.

Figure 3

Figure 4 plots the marginal effects for gross creation and destruction rates and shows a decreasing and strongly non-linear relationship between firms' age and both gross job creation and destruction rates.[14] Also, for both types of firms, destruction rates are above creation rates for all age groups beyond their first year of life, which means that most of net job creation is done by very young firms during their first year of life. WMFs do have significantly lower creation

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[13] Age dummies are 1, 2-3, 4-5, 6-7, 8-9, 10-11, 12-13, 14-16, 17 and more years. Size dummies are 1, 2-4, 5-10, 11-20, 21-50, 51-100, 101 and more employees. Industry dummies are Manufacturing, Transport, Services and Other Sectors (Retail trade, Sanitation and Construction). These partial effects can be computed by running either separate regressions for each type of firm or one single regression interacting all the covariates with a binary variable indicating the type of firm.

[14] It's important to note that this pattern corresponds both to "genuine" deceleration of job dynamics as firms age and also to the evolutionary selection process driving firms' entering and exiting the market which take place early in firms life and constitutes around 1/6 of gross flows for CFs and 1/3 for WMFs.

and destruction rates than CFs for all ages, which confirms the general picture previously given by the simple comparison of unconditional means. It is worth noting that these differences between the two types of organizations are not driven by the fact that WMFs are larger than CFs (as shown in Table A.1) because our regression analysis controls for firm size in a very flexible manner.

Figure 4

Figure 5 plots the partial effects of seven firm size dummies on net creation by type of firm. The figure shows that both types of firms create more jobs than what they destroy as they get larger. This result has already been pointed out by Haltiwanger et al (2013), and it contradicts the widespread belief that small firms have higher net job creation rates. One way to rationalize this belief for CFs is that it is actually true for *gross* job creation. As Figure 6 shows, small CFs do create more jobs than big firms, but they also destroy much more jobs. As firms get bigger, employment becomes more stable overall and both gross job creation and destruction rates go down. Because the former goes down at a slower rate than the latter, we get the increasing net job creation-size relationship in Figure 5. This pattern does not hold though for WMFs, as gross creation seems to grow with firm size.[15]

Figure 5

Figure 6

The second component of the regression analysis consists in running more parametric versions of the fully non-linear regressions which were behind the graphs above. These new regressions are presented in the first three columns of Table 2 and are useful in terms of providing quantitative estimates of the partial correlations coefficients and their standard errors, which would be impossible

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[15] The graphs starts at 5-10 because they Uruguayan legislation established a minimum of 6 workers to form a WMF during this period.

to present for the fully binary model. Results in Table 2 confirm the stylized non-linear decreasing age patterns for both types of firms. Also, the small and non-significant coefficient on the interaction between WMF and age shows that age job flows profiles are very similar for both types of firms. Regression coefficients for size are very small for all job flow rates. Their small magnitude may help to rationalize the fact that previous studies have found mixed effects of firms' size on job flows.

The coefficient on the WMF dummy variable in the last row of coefficients in Table 2 confirms statistically significant and quantitatively relevant differences in the job dynamics of CFs and WMFs. Conditional on the set of observables, WMFs created around 1.5 p.p. less net jobs in the period. This is a quantitatively relevant magnitude given CFs' average net creation rate of 4 pp (Table 1). Again, this net difference hides bigger gaps in gross rates. The coefficients on the WMFs dummy in the second and third columns of Table 2 indicate that WMFs created 4.7 pp and destroyed 3.3 pp less jobs than CFs, conditional on the set of covariates.

The third component of the regression empirical strategy exploits the panel structure of the data, and it looks at the partial correlations between the changes in job flow rates and firms' age and size within firms over time with firm fixed effects' regressions. The coefficients on age show that as firms age they contribute with substantially less net employment creation, over 1.6% less each year. Although this lower net creation is attenuated by firms destroying fewer jobs as they age, lower gross job creation over time dominates[16]. Interestingly, the panel regression coefficients on size seem to indicate that firms' employment growth over time (remember total employment is our measure of size) is achieved not so much by creating more jobs but mostly by destroying less jobs.

Table 2

4.4 Job flows by workers' status in WMFs

Previous works on WMFs in Uruguay had already documented these firms' relatively more stable employment patterns (Burdin & Dean 2009). However, Figure 7 shows that this robust pattern hides another interesting one; WMFs tend to react to shocks by adjusting the number of non-member employees rather than hiring or firing members. Job creation and destruction rates in

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[16] The difference in the sign of the age coefficient between the cross section and panel regressions might be associated with most of the job destruction observed in the cross section being done by very young firms which die young and do not affect the estimation of the age profile in the panel regressions.

Figure 7 are much higher for WMFs employees than for members. Burdin & Dean (2009) showed that net employment in WMFs is relatively inelastic to changes in output prices, both for members *and* employees. Putting our findings together with theirs shows that although employee jobs in WMF are not more dynamic in terms of net job movements, their net rates hide strong job creation and destruction flows.

We also analyze if there are any differences in the firms' age profile of net employment creation of members compared to hired workers within WMFs. Following the same method we used in the previous section, in Figure A1 (Appendix) we plot the partial effects of each firm age dummy on net creation, separating members' and employees' job creation and holding size, industry, and year composition constant at their means. Figure A1 shows a decreasing relationship between firm age and net employment creation for both members and employees. As we saw before, most net job creation is done by young firms. Beyond this, no clear differential pattern between members and employees emerges from the graph. Even though rather imprecisely estimated, net creation rates of employees appear to be greater than net creation of members during most of the WMF lifecycle.[17] The observed difference between net creation of members and employees in WMFs suggests that the employee-to-member ratio increases as firms get older.[18]

Figure 7

5. Conclusions and discussion

According to the results presented in this paper, firm level institutions regarding worker participation seem to play an important role in determining the strength of job flows and their relationship with the macroeconomic cycle. Worker-managed firms, the most extreme form of worker participation in contemporary economies, create and destroy significantly fewer jobs than conventional firms in order to achieve a certain net job change. The different size distribution of

[17] In addition, the decreasing age-profile of net creation of employees is non-monotonic: it decreases with firm age until age 6-7 and then increases. Net creation of members decreases sharply until age 2-3 and then remains stable.

[18] This result does not necessarily support the so-called degeneration hypothesis that states that successful WMFs (defined as those in which members get higher wages than they would get as hired workers in conventional firms) will replace outgoing members with hired employees. Previous studies on Uruguayan WMFs do not find a relationship between employee-to-member ratio and firm success (Dean, 2014). The increasing age profile of this ratio calls for alternative explanations.

WMFs and CFs does not seem to explain this result as firm size is explicitly controlled for in our regression analysis.

Although the gap in job dynamics between both types of firms did not change a lot along the pronounced macroeconomic cycle experienced recently by the Uruguayan economy, WMFs had positive net job creation during the worst years of crisis because several new firms were created. Interestingly, we document heterogeneous employment regimes within WMFs. On one hand, employment flows for hired labor are characterized by both high job creation and destruction rates. On the other, members' jobs exhibit both very low job creation and destruction rates. Similarly to Haltiwanger, Jarmin and Miranda (2013), the paper documents a strongly decreasing and non-linear relationship between job flow rates and firm age, which holds for both types of firm. We also find a mildly increasing relationship between net employment creation and firm size in the case of CFs, after controlling by firm's age. This relationship follows an inverted U-shape pattern in the case of WMFs. Our results highlight the essential role of start-ups and young firms compared to mature firms in explaining employment growth dynamic also in the case of the worker-managed firms' sector. To boost net employment creation in this sector, policy interventions should be targeted to ameliorating market failures preventing entry and post-entry expansion of worker-managed firms during their first years of existence.

The evidence presented in this paper may also have implications in terms of the comparative performance of both types of firms and also shed light on what might be the effects of other common participatory initiatives at the firm level, such as employee consultation, representation, and codetermination. The ease with which firms are able to expand or reduce employment is usually recognized as a crucial indicator of labor market health, and, more importantly, as a determinant of aggregate productivity (Bartelsman et al., 2013). According to this literature, recessions may have the positive side effect of reallocating resources from less productive to more productive firms. At the macro level, our results suggest that worker participation reduces the pace of labor reallocation which might be productivity-damaging if a significant fraction of firms adopt this type of arrangements.[19] Also, at the firm level, the more rigid employment regime of WMFs may prevent productivity gains associated with the more intense use of firings and hirings, both being selection and disciplinary devices (see, for instance, Bloom and Sadun, 2012). This may offset (at least partially) commonly emphasized productivity advantages associated with worker participation, resulting from greater employee motivation, lower monitoring costs and higher investment in firm-specific skills.[20]

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[19] For instance, the government may impose by law the obligation of shareholders to extend control rights to employees.
[20] It could well also be that, in an efficiency wage framework, the more stable employment regime of WMF is an endogenous consequences of exogenous advantages that these firms have

However, the process of labor reallocation may also involve substantial costs, particularly during recessions. For instance, workers may have firm or industry-specific skills or face substantial transaction costs in changing jobs (Furubotn & Wiggins, 1984). Management may have incentives to misinform workers about the situation of the enterprise and to use this information strategically. For instance, if managers do not have the obligation of informing and negotiating mass redundancy plans with employees -as they would do in participatory workplaces-, employees' ideas regarding alternative cost-saving solutions that management fails to see are less likely to be considered. Participatory arrangements may mitigate inefficiencies associated with asymmetric information and employer ex-post opportunism. In a participatory firm, wage moderation might be agreed upon in exchange for job preservation and the promise that wage concessions in bad times will be compensated with higher wages in good times. Such a promise may not be credible in the absence of employee information and participation, as managers cannot credibly commit not to distort information ex-post and renege on contracts (Dow 2003, p254). This bargaining failure may result in plant closings, entailing potentially allocational inefficiencies. Finally, workers value job stability in itself. Then, although greater job stability might entail productivity losses due to misallocation, it might have a welfare enhancing effect in terms of higher workers' utility.[21]

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in terms of effort monitoring (i.e. because supervision costs are lower, the equilibrium probability of job loss is lower too).

[21] The impact of job insecurity on workers' well being has been analyzed by many studies. See, for instance, Clark et al (2010) and Otterbach and Sousa-Poza (2014).

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Appendix

Table A1: Basic Descriptive Statistics

|	1996		2009	
	WMF	CF	WMF	CF
Nº of firms	163	45830	206	54587
Firm size (mean)	30,1	6,6	28,0	7,5
Firm size (s.d.)	96,7	42,0	92,9	50,1
Distribution of firms by firm size				
1 to 4	1.9%	74.1%	1.7%	72.6%
5 to 19	86.6%	21.5%	81.1%	21.9%
20 to 99	4.9%	3.7%	13.4%	4.7%
More than 100	6.5%	0.7%	3.9%	0.8%
Distribution of workers by firm size				
1 to 4	0.2%	19.8%	0.2%	17.2%
5 to 19	28.3%	28.6%	27.1%	26.1%
20 to 99	6.3%	22.4%	20.1%	25.1%
More than 100	65.2%	29.1%	52.6%	31.6%
Firm age (mean)	7,3	13,8	13,1	15,6
Firm age (s.d.)	13,4	15,6	13,8	14,6
Industry				
Manufacturing	15,4%	14,0%	19,1%	19,1%
Transport	64,2%	10,3%	34,7%	34,7%
Services	14,9%	38,6%	34,3%	34,3%
Other sectors	5,5%	37,0%	11,8%	11,8%
Employees/members ratio	7,0%	-	13,0%	-

Notes: Firm size is measured as total employment in each firm. Firm age measured in years. s.d. = standard deviation. *Source:* Own calculations based on firm-level data from the Banco de Previsión Social.

Figure A1: Composition adjusted Net Job Creation rates by Worker status in WMF and Age.
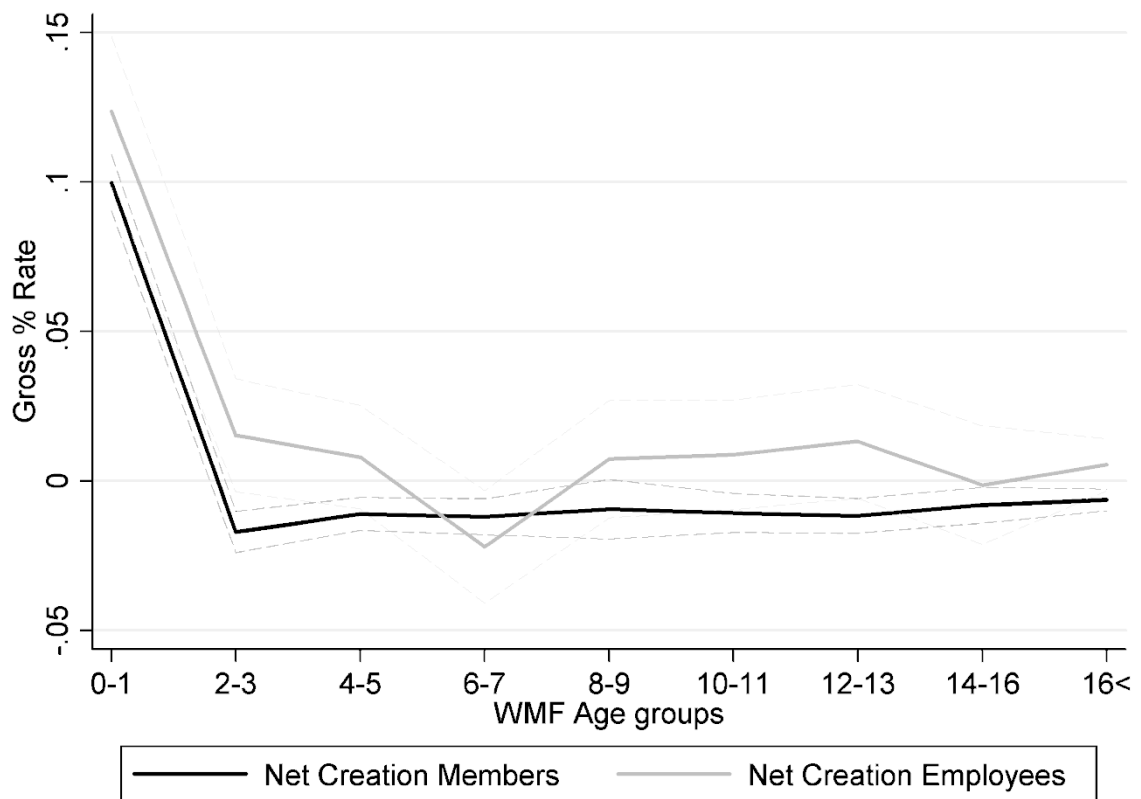
Notes: These composition adjusted monthly rates are obtained by computing the marginal effect of each age group in a regression that also includes size, industry and year controls. Marginal effects are calculated evaluating the set of other variables at their mean levels. Dotted lines correspond to 95% Confidence Intervals. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.
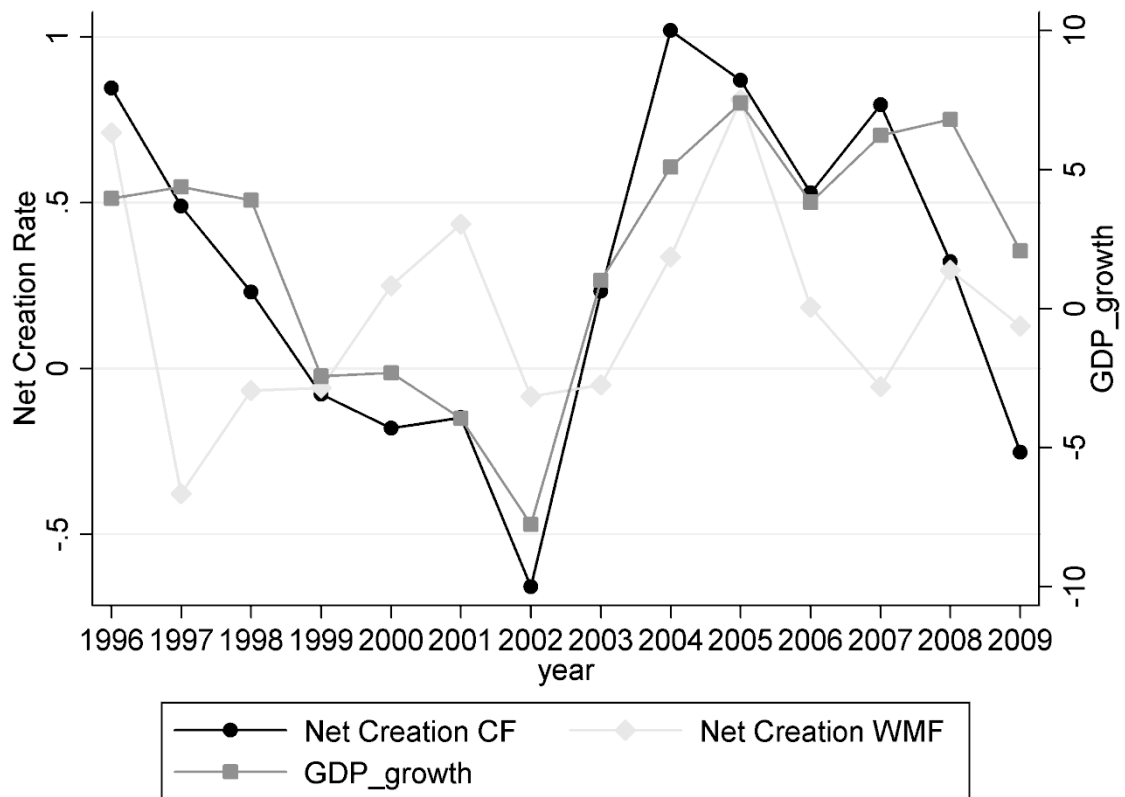
Figure A2: Composition adjusted gross Job Creation and Destruction rates by Worker status in WMF and Age.
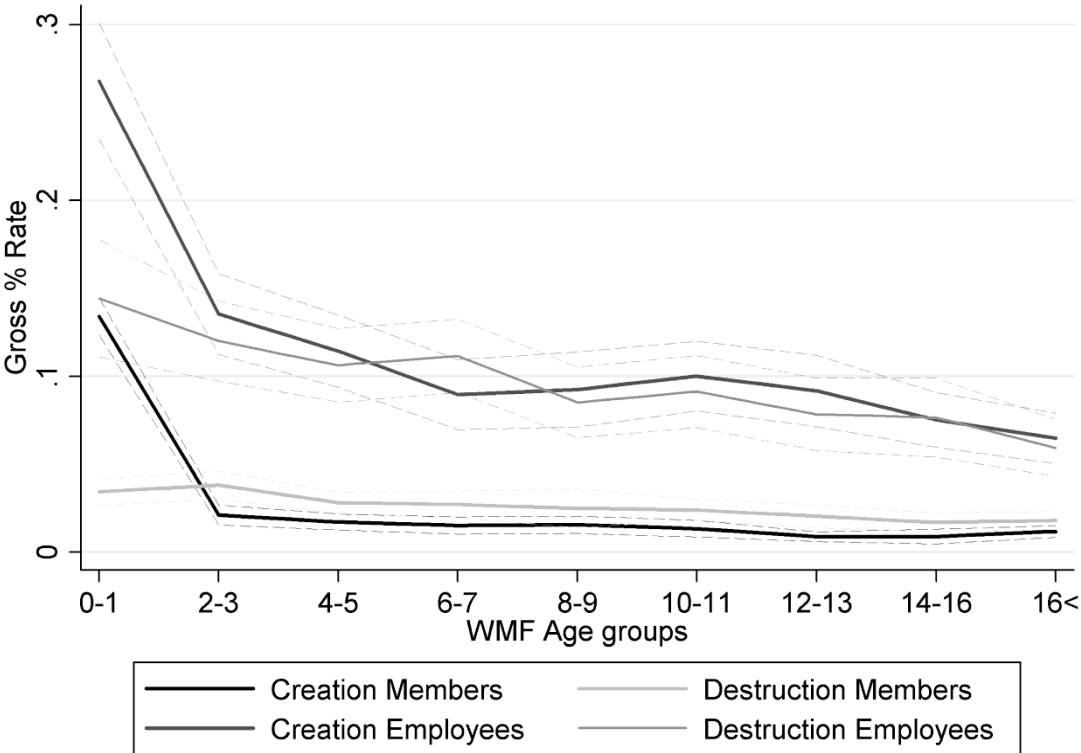
Notes: These composition adjusted monthly rates are obtained by computing the marginal effect of each age group in a regression that also includes size, industry and year controls. Marginal effects are calculated evaluating the set of other variables at their mean levels. Dotted lines correspond to 95% Confidence Intervals. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.
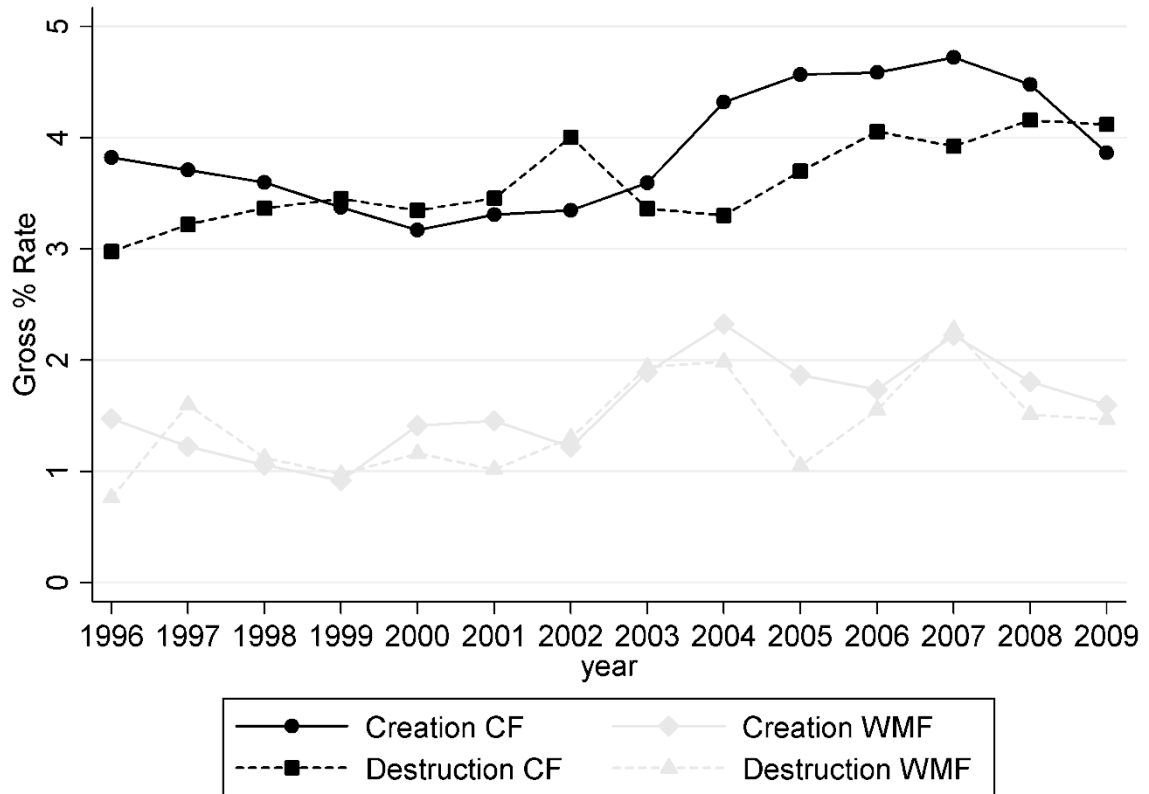
Figures

Figure 1: Annual Net Job Creation rates by type of firm.

Notes: Annual Net creation rates are computed as annual averages of monthly rates. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.

Figure 2: Gross Job Creation and Destruction rates by type of firm.

Notes: Rates computed as annual averages of monthly rates. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.

Figure 3: Composition adjusted Net Job Creation rates by type of firm and age.
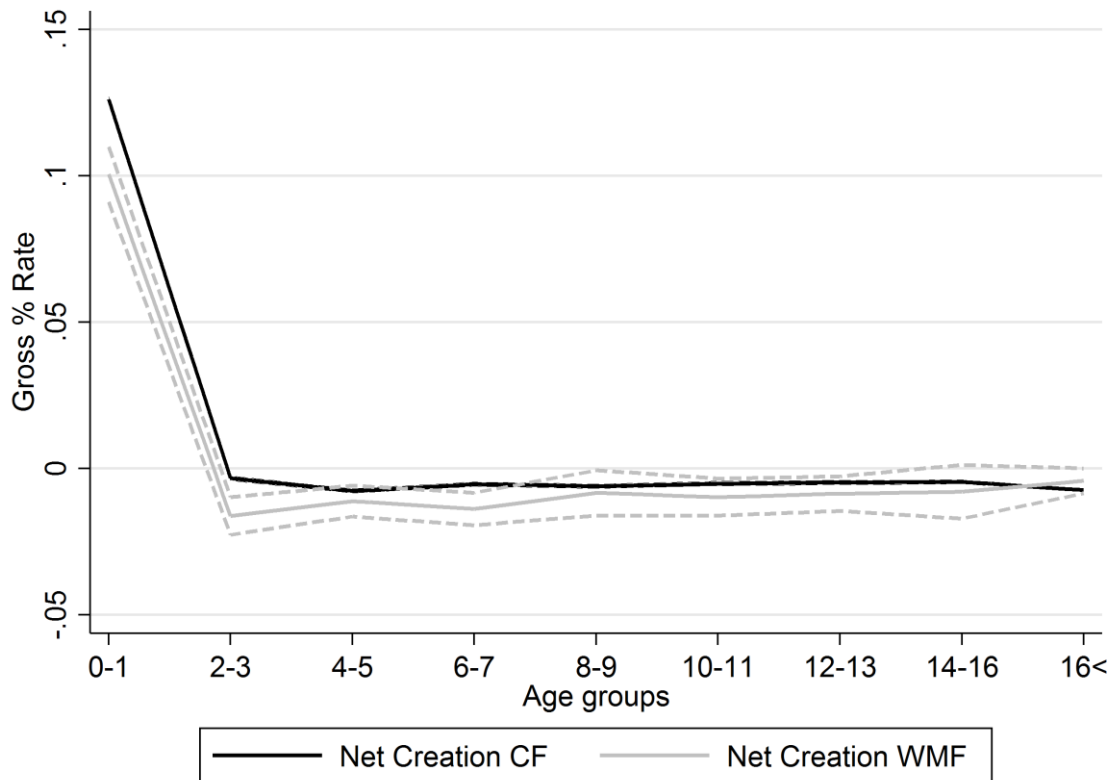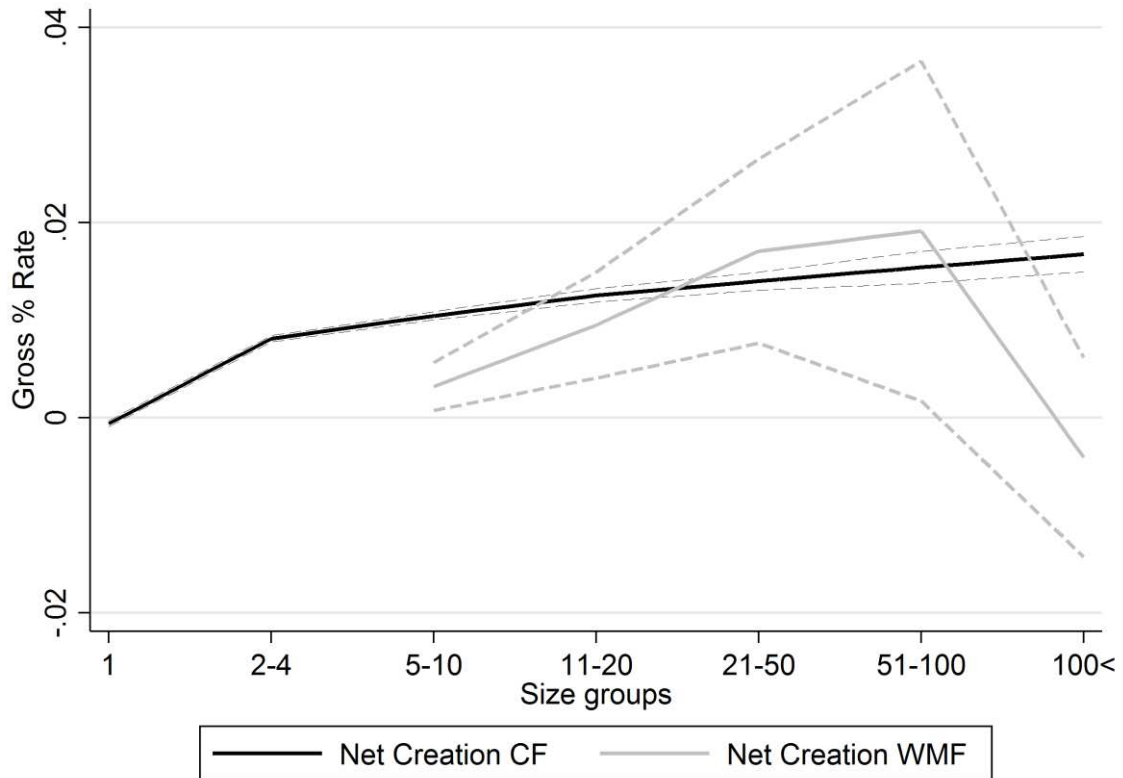
Notes: These composition adjusted monthly rates are obtained by computing the marginal effect of each age group in a regression that also includes size, industry and year controls. Marginal effects are calculated evaluating the set of other variables at their mean levels. Dotted lines correspond to 95% Confidence Intervals. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.

Figure 4: Composition adjusted gross Job Creation and Destruction rates by type of firm and age.
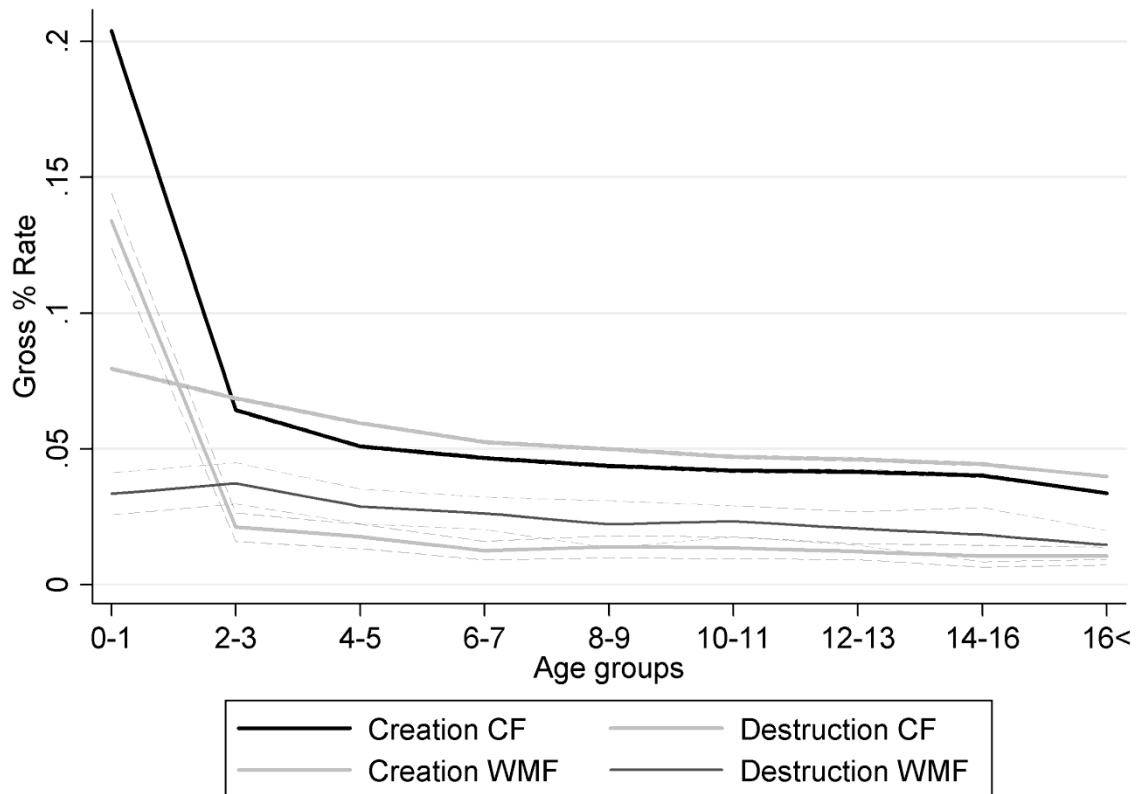
Notes: These composition adjusted monthly rates are obtained by computing the marginal effect of each age group in a regression that also includes size, industry and year controls. Marginal effects are calculated evaluating the set of other variables at their mean levels. Dotted lines correspond to 95% Confidence Intervals. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.

Figure 5: Composition adjusted Net Job Creation rates by type of firm and firm size.

Notes: These composition adjusted monthly rates are obtained by computing the marginal effect of each size group in a regression that also includes age, industry and year controls. Marginal effects are calculated evaluating the set of other variables at their mean levels. Dotted lines correspond to 95% Confidence Intervals. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.

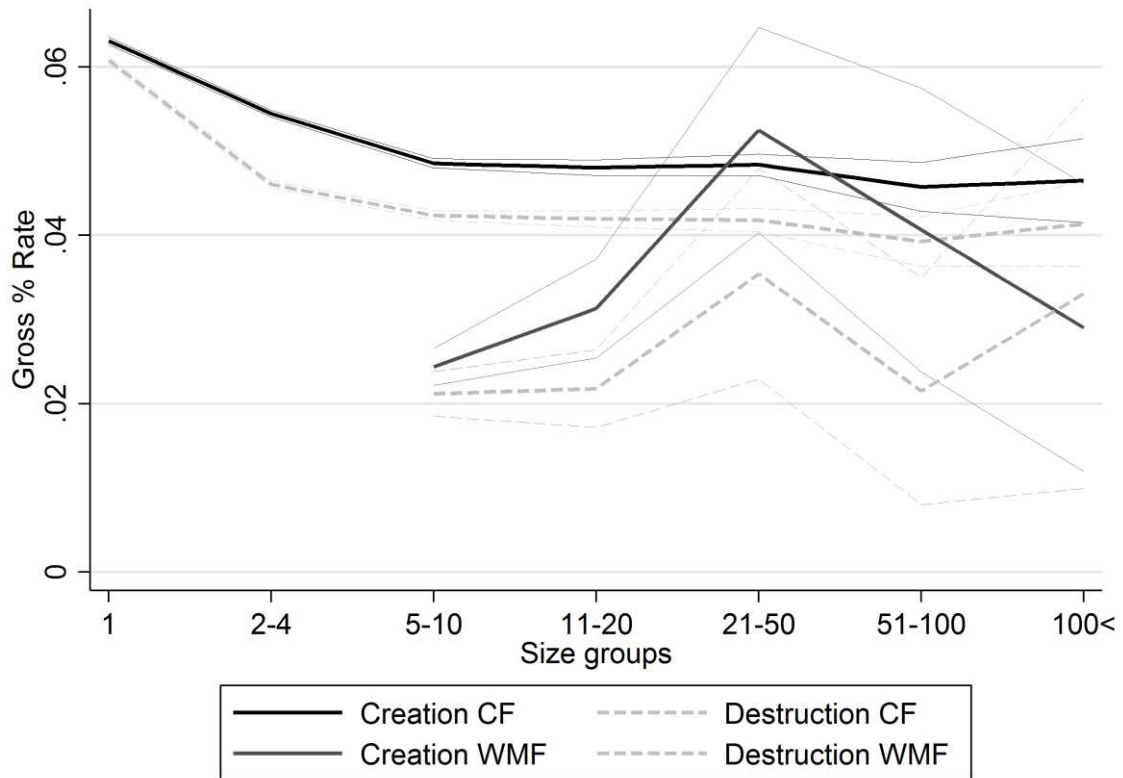Figure 6: Composition adjusted gross Job Creation and Destruction rates by type of firm and firm size.

Notes: These composition adjusted monthly rates are obtained by computing the marginal effect of each size group in a regression that also includes age, industry and year controls. Marginal effects are calculated evaluating the set of other variables at their mean levels. Dotted lines correspond to 95% Confidence Intervals. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.

Figure 7: Gross Job Creation and Destruction rates for members vs employees in WMFs.
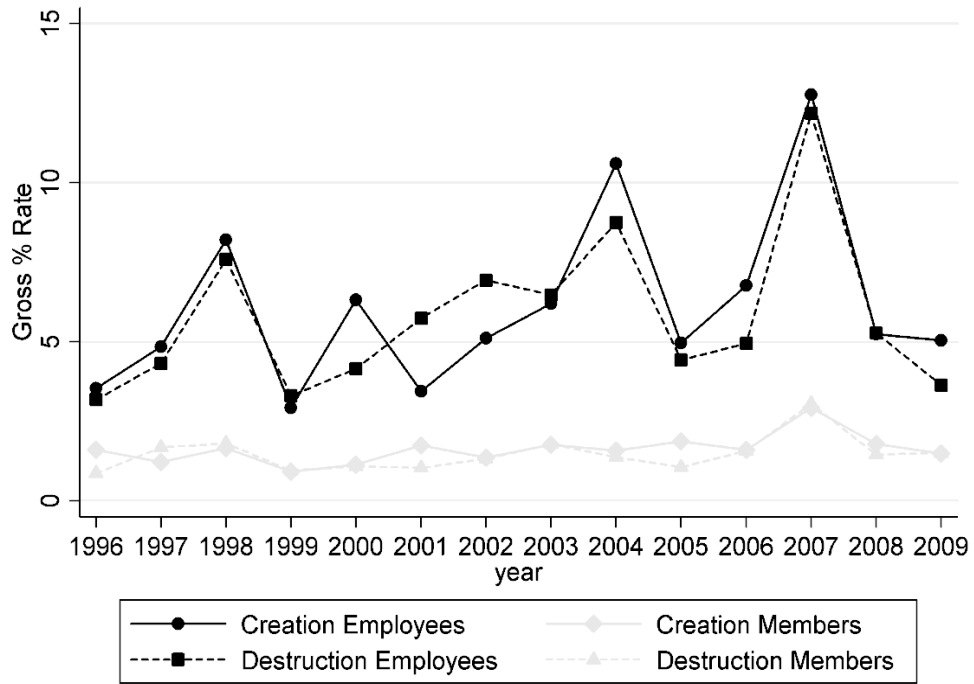
Notes: Rates computed as annual averages of monthly rates. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.

Table 1: Monthly Job Flow rates

	Creation		Destruction		Net	
	CFs	WMFs	CFs	WMFs	CFs	WMFs
Total	3,95	1,61	3,64	1,44	0,30	0,17
Due to enter and exit of firms	0,63	0,48	0,57	0,34	0,06	0,13
1996-1998	0,70	0,41	0,50	0,26	0,20	0,15
1999-2002	0,61	0,54	0,65	0,23	-0,04	0,32
2003-2009	0,62	0,46	0,55	0,43	0,07	0,03
Excluding enter and exit of firms	3,31	1,14	3,08	1,10	0,24	0,03
1996-1998	2,99	0,82	2,72	0,95	0,27	-0,14
1999-2002	2,69	0,71	2,90	0,89	-0,22	-0,18
2003-2009	3,74	1,47	3,28	1,26	0,46	0,21
By sector						
Manufacturing	2,96	2,61	2,91	2,23	0,05	0,38
Transport	5,14	0,49	4,74	0,59	0,40	-0,10
Services	3,52	3,99	3,12	3,12	0,40	0,87
Other sectors	5,09	4,79	4,76	4,26	0,33	0,53

Source: Own calculations based on firm-level data from the Banco de Previsión Social; see section 3.2 for details.

	Net	Creation	Destruction	Net	Creation	Destruction
Age	-0.238***	-0.397***	-0.160***	-1.577***	-1.036***	0.541***
	(0.00181)	(0.00283)	(0.00239)	(0.00861)	(0.00618)	(0.00548)
Age Squared	0.00232***	0.00379***	0.00147***	0.0169***	0.0131***	-0.00378***
	(0.00003)	(0.00005)	(0.00004)	(0.00015)	(0.00011)	(0.0001)
Age*WMF	-0.0458	0.0345	0.0803***			
	(0.0366)	(0.0346)	(0.0227)			
Age Squared*WMF	0.00041	-0.00039	-0.0008***			
	(0.00035)	(0.00038)	(0.00025)			
Size	0.0247***	-4.03e-05	-0.0248***	0.161***	0.0188***	-0.142***
	(0.00303)	(0.001)	(0.00278)	(0.00605)	(0.00152)	(0.00493)
Size Squared	-0.00001***	0.0000	0.00001***	-0.00003***	-0.0000**	0.00002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Size*WMF	0.0344**	0.0300***	-0.00443			
	(0.0140)	(0.00894)	(0.00738)			
Size Squared*WMF	-0.00007***	-0.00003***	0.00003***			
	(0.00002)	(0.00001)	(0.00001)			
Manufacturing	-0.722***	-0.557***	0.165***			
	(0.0402)	(0.0514)	(0.0556)			
Transport	0.518***	0.0912*	-0.427***			
	(0.0308)	(0.0543)	(0.0498)			
Services	-0.567***	-0.402***	0.165***			
	(0.0220)	(0.0389)	(0.0390)			
WMF	-1.514***	-4.772***	-3.257***			
	(0.318)	(0.302)	(0.303)			
R-squared	0.0023	0.0101	0.0028	0.0212	0.0808	0.0863
Observations	7,323,929	7,323,929	7,323,929	7,323,929	7,323,929	7,323,929
Year Fixed Effect	Yes	Yes	Yes	No	No	No

Firm Fixed Effects	No	No	No	Yes	Yes	Yes
N of firms	131,466	131,466	131,466	131,466	131,466	131,466

Notes: Dependent variables defined as monthly rates. Columns 1-3 report Pooled OLS estimates. Columns 4-6 report panel data fixed effect estimates. Firm size is measured as total employment in each firm. Firm age measured in years. Standard errors (reported in parentheses) are clustered at the firm level. * Significant at 10%; ** significant at 5%; *** significant at 1%. *Source:* Own calculations using firm-level data from the Banco de Previsión Social; see section 3.2 for details.