Cyclicality of Job Flows: New Data and new Evidence for Spain

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Abstract

Employment falls not uniformly across firm types during recessions. We use novel administrative data from Spain, that allows us to link employment flows to the typical state space of modern firm decision problems: firms' size, age, productivity, and leverage. During recessions, employment growth is particularly negative for small, low-productivity, and high-leveraged firms, and these large declines in employment result from higher job destruction and lower job creation rates. This relatively high cyclicality is driven by more cyclical permanent-job flows and much less by differences in fixed-duration-job flows which carry much lower employment-adjustment costs for firms. We provide evidence that highly cyclical firm types have, irrespective of the stage of the cycle, more dispersed employment growth rate distributions and more dispersed productivity growth distributions which can explain more cyclical flows when fixed employment-adjustment costs are important.

Key Words: job flows, fixed-duration contracts, aggregate fluctuations

JEL Classification: E20, E24, E32, J23, J63

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1 Introduction

Recessions are characterized by firms creating fewer new jobs and increasing job destruction relative to a boom. It is the interplay of these gross job flows that leads to procyclcial employment growth (see Davis, Haltiwanger, and Schuh, 1998). These aggregate cyclical dynamics are not uniform across firms. Fort et al. (2013), Khan and Thomas (2013), and Siemer (2019) provide evidence that employment growth is particularly cyclical at young and small establishments. The standard framework to explain those findings relies on firms making employment decisions given factor adjustment costs, idiosyncratic differences in productivity, and borrowing constraints linked to their current capital stock (leverage rates) which, thus, mostly affects small/young firms (see, e.g., Khan and Thomas, 2013; Buera and Moll, 2015; Jo, 2022). These borrowing constraints being important to explain cyclical job flows is consistent with small/young firms performing particularly poorly during the Great Recession, which was partially driven by a shock to borrowing abilities (see, e.g., Chodorow-Reich, 2014), and earlier findings by Gertler and Gilchrist (1994) that small firms' employment growth declines more strongly after unexpected increases in interest rates than large firms.

We use novel administrative data for Spain which allow us to differentiate between firms' size/age, productivity, and leverage to explain cyclical yearly job flows during the Great Recession and the COVID Recession. Moreover, we distinguish between job flows where the underlying jobs have different employment-adjustment costs stemming from different contract types. That is, about 22% of workers are hired on fixed-duration contracts while the remaining workers are hired with permanent contracts and enjoy strong employment protection.

We find that low-productivity and high-leveraged firms have the strongest employment cyclicality in Spain. That is, going from the highest quartile of the employment growth distribution to the lowest quartile, while controlling for firms' leverage and size, decreases the yearly employment growth by an additional 3 percentage points during a recession. The effect is stronger during the Great Recession but also present during the COVID Recession. Similarly, going from the lowest to the highest quartile of the firm leverage distribution, while controlling for firms' productivity and size, decreases yearly employment growth by one additional percentage point. The latter is driven exclusively by the Great Recession where the additional reduction in yearly employment growth is three percentage points. Regarding gross flows, during both recessions, the job-destruction rate rises by more at low-productivity firms compared to high-productivity firms. For large firms, in addition, the job creation rate falls by less at high-productivity firms compared to low-productivity firms during recessions. Gross flows play a very similar role to explain cyclical differences among firms with different leverage rates during the Great Recession. The job destruction rate rises most at high-leveraged firms and, for large firms, the job creation rate falls most among high-leveraged firms.

We provide a novel explanation for the higher cyclicality of low-productivity and high-leveraged firms that is complementary to theories such as Den Haan et al. (2000), who stress

outside-option effects to explain a high cyclical job destruction at low-productivity firms, and Khan and Thomas (2013) and Jo (2022), who stress cyclical leverage shocks. That is, we show that the most cyclical firm categories have, irrespective of the stage of the business cycle, the most dispersed employment growth rate distributions which, in turn, is linked to more dispersed productivity growth distributions. The idea is that firms that would anyhow adjust their employment because of large idiosyncratic shocks are more likely to also respond to the same aggregate shock in the presence of some fixed costs to employment adjustments.

Importantly, even conditional on productivity and leverage, small firms remain more cyclical sensitive, and this phenomenon is observable during both recessions. We link this fact again to differences in the dispersion of idiosyncratic productivity shocks for large and small firms. That is, conditional on productivity, leverage, and the business cycle, the employment growth distribution is more dispersed for small firms compared to large firms and this higher dispersion is again linked to a more dispersed productivity growth distribution. Moreover, we show that differences in the cyclical changes in the shape of the employment growth dispersion across small and large firms are important to understand the higher cyclicality of small firms. That is, for large firms, the higher job destruction in recessions mostly results from more firms moderately shrinking while fewer firms than expected from a mean shift of the distribution display large negative employment adjustments, i.e., the employment growth distribution becomes less negatively skewed during a recession. For small firms, more firms stop growing rapidly and more firms contract sizable than one would expect from a simple mean shift of the employment growth distribution during a recession. As a result, the distribution looses positive skewness.

Next, we link the differential job flows cyclicality by firms' characteristics to contract types. The differences in job flow cyclicalities across firms with different productivities and leverage arises from different cyclicalities in permanent job flows. In contrast, firms across the productivity and leverage distributions see large negative employment growth of fixed-duration jobs during recessions. To understand this finding, we show that changes in permanent-job levels have different firm-level outcomes than changes in the level of fixed-duration jobs. Changes in permanent-jobs are more persistent and are associated with changes in business models, i.e., they are associated with higher fixed-costs. Hence, differences in the dispersion of idiosyncratic productivities across firm types provide a compelling explanation for differences in cyclical changes in permanent jobs but not fixed-duration jobs across firm types. Nevertheless, we do find that small firms, conditional on productivity and leverage, do display a more cyclical fixed-duration employment growth than large firms. Though we do not provide an explanation for this finding, we show that it is partly driven by very high fixed-duration employment growth of small firms early during booms.

2 Dataset and Variable Definitions

2.1 Spanish Social Security

Afiliation records from the Spanish Social Security provide a rich administrative dataset. The administrative procedure requires employers and self-employed to report the starting and ending date of any employment relationship that is maintained. The files we access contain information on employment status and characteristics for more than 20 million affiliates every month.[1] From the microdata registers, time series for different job flows at the daily or above time frequency can be created by type of contract (permanent open-ended, temporary fixed-term, or intermittent open-ended), location, and sector of activity.[2] Each work location has a unique identification number (CCCP, Código de Cuenta de Cotización Principal), that is at the firm level. In the case of multi-establishment firms, each single establishment may be identified by a secondary identification number, which is mandatory in the case of establishments located in different provinces or under different economic activities from the principal establishment.[3]

We aggregate all workers to their principal identification number, however, also compute for each firm the individual establishments that we can identify. We drop all self-employed.[4] We then aggregate the data to the annual frequency using an end-of-period concept. This gives us an annual data set covering 2013–2023.

2.2 Central de Balances Integrada (CBI)

The CBI is an administrative firm-level data set maintained by the central bank covering the non-financial sector. It is principally based on the balance sheet data that all limited liability companies, partnerships by shares, and mutual guarantee companies have to send annually to the commercial register. In addition, non-covered firms can participate voluntarily. The Statistical Department of the Bank of Spain cleans this raw data to ensure that basic accounting criteria as well as a basic consistency between number of employees and wage payments are met.[5] The resulting data covers about 86% of all Spanish firms with a coverage rate of 75% for firms with fewer than 10 employees, and above 87% for larger firms (see Almunia, Lopez Rodriguez, and Moral-Benito, 2018).

We perform a set of additional data cleaning operations. First, we drop observations with negative employment. Moreover, we drop observations where the sum of fixed-duration and permanent employees varies from the reported total number of employees by more than 10%. Third, for a firm reporting to enter in a given year, we set the number of employees in the previous year to zero. Fourth, we drop observations with negative or missing information

[1]We thank the Ministry of Inclusion, Social Security and Migration for the access to the microdata.

[2]The data coverage of civil servants and military personal is incomplete, and occasionally there might be missing data on the type of contract or sector.

[3]Establishments also have mandatory second identifiers when some workers work under special regimes such as apprenticeship or when they contribute health payments due to work-related injuries.

[4]We identify self-employed through their contribution regime (Régimen de Citización).

[5]The final data is a collaborative effort by BELab, Banco de España and CORPME (Colegio de Registradores de la Propiedad y Mercantiles de España).

on assets, liabilities, or value-added. We deflate all balance sheet items to their 2015 values.

A last consideration is how to treat plant exit. As coverage is not complete, a firm vanishing from the data set in one year does not imply that it truly ceased to exist. To partially overcome this issue, we make use of the fact that firms report when they are in bankruptcy proceedings. Hence, if a firm reports being in such preceding and stops being in our data in subsequent years, we treat it as an exiting firm.

The CBI provides data starting in 1995. However, as observed by Pijoan-Mas and Roldan-Blanco (2024), before 2004, the share of fixed-duration workers is substantially different from the share reported by the national statistical agency based on social security records and we, therefore, discards those years. Our final sample consists of yearly observations from 2004-2021 with a total number of 8,055,112 firms/year observations.

2.3 Variable definitions

In the Social Security Data, we define a worker as employed in a given firm when he works in the firm at the end of January in a given year. In the CBI, the employment definition is more ambiguous and refers to the median number of employees over a year. From these definitions follow the number of jobs at a firm i as well as the number of job flows $JF_{it} = E_{it} - E_{it-1}$. When a plant decreases employment within a year ($JF_{it} < 0$), we count this as job destruction, JD_{it}. When employment increases ($JF_{it} > 0$), we count this as job creation, JC_{it}.

To define flow rates, we follow Davis and Haltiwanger (1992) and use the average of contemporaneous and lagged employment as the denominator which assures that the resulting rates are bounded between -2 (exiting firms) and 2 (entering firms):[6]

$$D_{it} = [E_{it} + E_{it-1}]/2.$$

For example, the employment growth rate is given by:

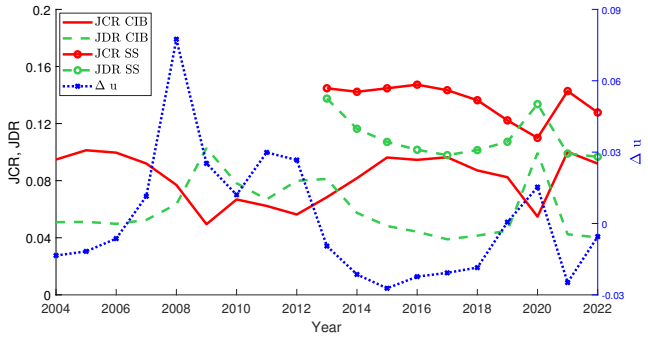
$$EGR_{it} = \frac{JF_{it}}{D_{it}}. \tag{1}$$

As we are interested in business cycle properties, we have to take a stance on the cyclical indicator. We follow Fort et al. (2013) and employ the growth rate of the aggregate unemployment rate. An alternative measure used by the literature, is the (HP-filtered) unemployment rate (see, e.g., Moscarini and Postel-Vinay, 2012). The growth rate of the unemployment rate is generally more closely associated with large contractions in economic activity, which is a key component of the recession definition of the NBER, than the overall unemployment rate.[7] Hence, when we refer to the cyclicality of flow rates, we consider a recession as starting when the unemployment rate starts growing though its level may still be relatively low. Similarly, we consider a boom as starting when the unemployment rate

[6] See Davis et al. (1996) for a thorough discussion of these rates.

[7] In our data, the correlation between the GDP growth rate and the growth rate of the unemployment rate is -0.77. The correlation with the unemployment rate is -0.47.

Figure 1: Aggregate Job Flows



Notes: The figure displays yearly aggregate job flows in Spain. JCR: job creation rate; JDR: job destruction rate; Δu: change in the unemployment rate. Sources: Central de Balances Integrada (CBI), Spanish Social Security (SS), and INE.

starts falling though its level may still be high.

3 Aggregate fluctuations

The top panel of Figure 1 shows that aggregate movements of job flows in Spain. The level of the gross job flow rates is higher in the social security data compared to the administrative CBI survey data, however, the cyclical fluctuations are very similar. The cyclical fluctuations in job flows are comparable to those shown by Davis et al. (2012) and Bachmann et al. (2021) for the U.S. and Germany, respectively. In all countries, during times of falling economic activity, the employment growth rate is falling which is the result of a lower job creation rate and a higher job destruction rate. Mirroring behavior in the U.S. and Germany, the latter typically experiences a sharp, short-lived spike at the beginning of a recession and remains elevated throughout the recession. We note that the spike in the CBI data during the Great Recession occurred in 2009 though the rise in the unemployment rate is most pronounced in 2008. The reason is that the CIB measures employment as the year-average employment level. Hence, though unemployment stared rising rapidly in September 2008, most of the employment effect is only measured in 2009. This timing is not an issue in the 2020 COVID recession which started in March of that year.

4 Fluctuations by firm characteristics

Economic theory has long linked cyclical movements in employment dynamics to firms' idiosyncratic productivities and financial situations. Due to the absence of direct measures for these firm characteristics, much of the literature studies the cyclical dynamics in firms' age and size as proxies. A key advantage to the Spanish data is that in the CIB, apart from firm size and age, we also have more direct measures for firm productivity and its financial situation. In constructing these measures, we follow economic theory. First, search models of the labor markets, such as Den Haan et al. (2000), highlight that output net of wage costs per worker, $\frac{Y-W}{L}$, is a key determinant for firms' job creation and destruction decisions. In

the data, we calculate this ratio as a firm's value added minus the wage bill and divide by total employment. Beyond search theory suggesting that $\frac{Y-W}{L}$ is a more relevant measure for firms' decisions than their value added per worker, or sales per worker in Haltiwanger, Hyatt, McEntarfer, and Staiger (2025), accounting for the wage bill has the additional advantage of controlling for average worker quality differences between firms. For convenience, we will refer to this measure as productivity hereafter. Second, most literature on financial frictions, (see, e.g., Khan and Thomas, 2013; Buera and Moll, 2015; Jo, 2022), model firms' borrowing capacity as the amount of debt they can take on relative to their assets. Hence, to measure firms' financial situations, we measure their ratio of debt relative to assets (leverage ratio). As we measure labor market flows between periods t and $t-1$, we also measure leverage as the mean between their values in t and $t-1$. For productivity, to avoid that time-to-build effects introduce noise, we measure productivity in $t-1$.[8]

That is not to say that once we condition on leverage and productivity, firm age and firm size do not have independent information on firms' financial situation and productivity. For example, a younger firm may face stronger financial frictions conditional on its leverage ratio than an older firm because it has not yet established a long term business relationship with a bank. Similarly, a young/small firm may have a high productivity but a low value added per worker because it sells its products at low prices to gain market shares. Moreover, a small firm may find it more difficult to overcome financial frictions because banks may not be willing to design financial products that are particular to the firm.

To account for the potential importance of firms size and firm age, we define two categories for each. We consider a firm as young when it is younger than 5 years old in period t. Moreover, we consider a firm as small when it has a D_{it} measured firm size of fewer then 250 employees. Given these definitions, we find that, as Fort et al. (2013) also find for the U.S., the unconditional employment growth rate of small (young) firms is more strongly related to the change in the unemployment rate than the employment growth rate of large (old) firms. In the case of Spain, the firm-size effect is stronger than the firm-age effect. That is, the unconditional effect of firm size on the cyclicality of employment growth is twice more negative than the unconditional effect of firm age. Moreover, once we condition both on firm age and firm size, we find that the effect of firm size remains quantitatively larger and the effect of firm age becomes close to zero. Given this evidence, and to keep the dimensionality manageable, our analysis presents detailed results for different firm sizes while controlling for firm age.

In particular, we evaluate the importance of firm characteristics on the cyclical of employment dynamics using a regression approach where the functional form is more flexible for firm size relative to firm age. In particular, we allow firm age, size, their interaction, productivity, and leverage to have independent recession effects. In addition, we allow firm size to have interaction effects with productivity and leverage and this interaction effect being

[8]For both variables, for entrants, we use the values in t. Similarly, for exiting firms, we always use the $t-1$ values.

different during booms and recessions:

$$Y_{it} = \beta_0 + \beta_1 R_t + \beta_2 H_{it} + \beta_3 H_{it} R_t + \beta_4 S_{it} + \beta_5 S_{it} R_t + \beta_6 H_{it} S_{it} R_t + F_1(R_t, S_{it}, A_{it-1}) + F_2(R_t, S_{it}, L_{it}) + \epsilon_{it}, \quad (2)$$

where Y_{it} is a firm-level job growth rate, H_{it} is a dummy for young firms, S_{it} is a dummy for small firms, A_{it-1} is a categorical measure of the four quartiles of the firms' unconditional productivity distribution, L_{it} is a categorical measure of the four quartiles of the firms' unconditional leverage distribution, and R_t is a dummy that is one in a recession period and zero in a boom period.[9] The functions F_1 and F_2 includes a full set of interactions of the recession dummy, the size dummy, and the categorical variables A_{it-1} and L_{it}. All regression results are D_{it} weighted. We note that we do not control for industry fixed effects in our baseline specification so that the results can be interpreted at the aggregate level. Nevertheless, the results are broadly robust to including 3-digit industry fixed effects.

When presenting results, we always present the recession effect for each quartile of the productivity/leverage distribution while holding all other firm characteristics at their conditional population means. For example, the recession effect for large firms, $S_{it} = 0$, at the kth quartile of the productivity distribution is given by

$$\hat{\beta}_1 + \sum_{j=1}^{2} Share^l_{Hj} {}^* \hat{\beta}_3 + \sum_{j=1}^{4} Share^l_{Lj} \hat{F}_2(R_t, S_{it} = 0, L_{it} = j) + \hat{F}_1(R_t, S_{it} = 0, A_{it-1} = k), \quad (3)$$

where $Share^l_{Hj}$ are the time-averaged means of large firms that are young, and $Share^l_{Lj}$ are the time-averaged means of large firms of different quartiles of the leverage distribution. Hence, we display the recession effect for different productivity types for the average large firm.

4.1 Firm characteristics in the cross section

Table 1: Summary statistics

	Emp. share (in %)	Productivity (in 000s of €)	Leverage ratio (in %)	Fixed duration (in %)
Small	56.0	13.6	83.6	21.9
Large	44.0	23.9	62.3	24.6

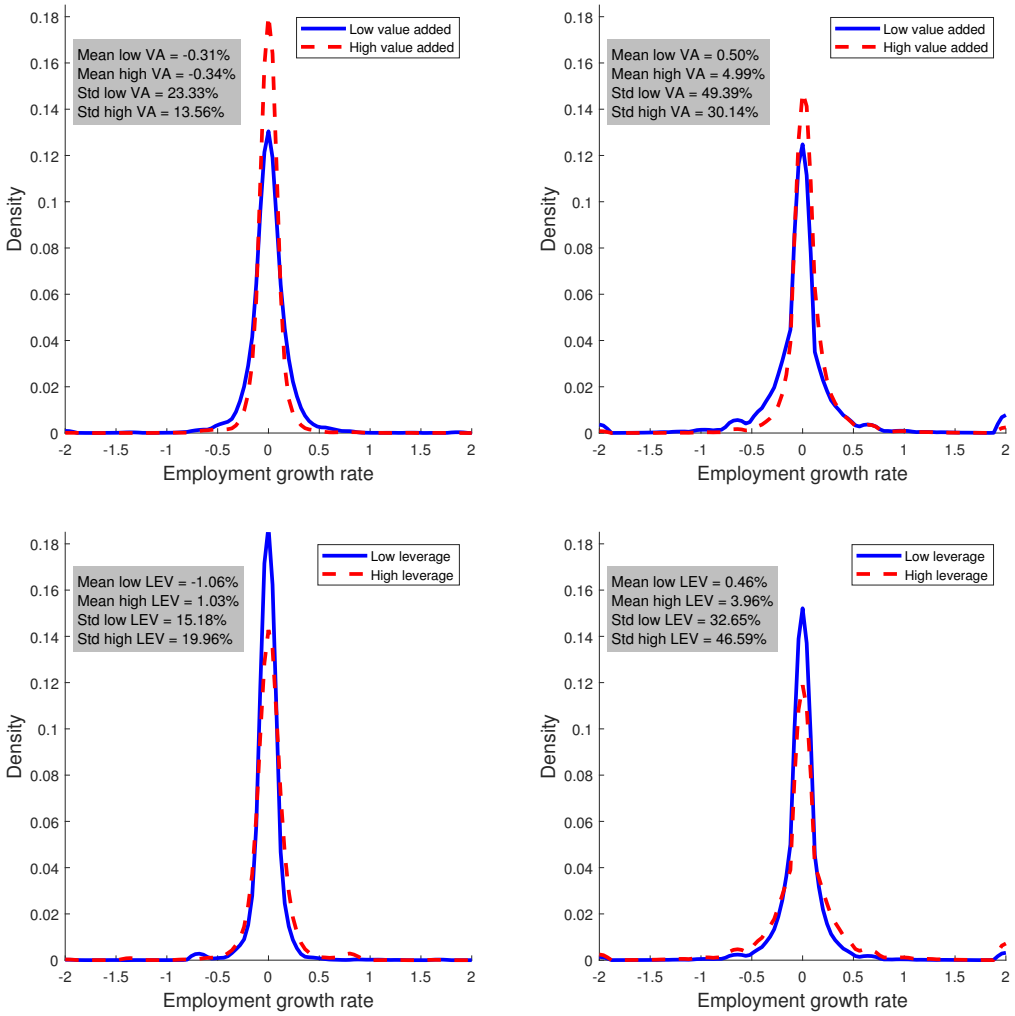
Notes: The table displays summary statistics for small and large firms. Source: Central de Balances Integrada.

Before turning to the aggregate dynamics of the different worker flow rates, we highlight some firm characteristics and associated behavior of job flows in the cross-section. Table 1 shows that firms with fewer than 250 employees make up about 56% of total employment in Spain. Hence, economy-wide job flows are approximately the average of small and large

[9] We define as a boom the periods from 2004-2006 and 2014-2018. We define as a recession the periods from 2008-2013 (Great recession) and 2020 (COVID recession). We omit 2007/2013 which were years where the unemployment rate was slowly starting to rise/fall.

Figure 2: Firm types and employment growth

Large firms | Small firms



Notes: The figures display employment-weighted (Gaussian) kernel estimates of the employment growth rate distribution for different firm types. Source: Central de Balances Integrada.

firms' job flows. Small and large firms differ substantially in their productivity and financial conditions. Small firms are about 43% less productive than large firms. Moreover, small firms have on average a 21 percentage points higher leverage ratio.

Figure 2 links the firm characteristics to job flows. In particular, it plots kernel density estimates of the employment growth distributions for small and large firms in the lowest/highest productivity categories and lowest/highest leverage categories. All distributions display a strong concentration around zero employment growth. That is, about 14% of firms do not meaningfully adjust their employment in a given year. A high share of non-adjusters is usually interpreted as evidence for sizable fixed costs in factor-adjustment costs. While this behavior is present across firm characteristics, its degree varies considerably across characteristics. High-productivity, low-leveraged, and large firms show particularly strong

concentration around zero employment growth.[10] As a result, the standard deviations of the employment growth rate distributions are relatively small for those type of firms. For example, the standard deviation of employment growth of small, low-productivity firms (0.49) is 3.5 times larger than that of large, high-productivity firms (0.14). This difference in standard deviations is driven by low-productivity firms having about a 60% higher dispersion than high-productivity firms, and small firms having about a 120% higher dispersion than large firms. Similarly, the standard deviation of employment growth of small, high-leveraged firms (0.47) is almost 3.5 times larger than that of large, low-leveraged firms (0.15). Here, the difference results mainly from small firms having a higher dispersion (again 120% higher) with leverage having a relatively small, but still sizable, effect (about 135%).

Small firms displaying a relatively high employment growth rate dispersion may be little surprising. In the presence of demand shocks to individual products, large firms are likely better able to reallocate labor to different product lines and tasks within the firm. Moreover, having a wider customer network, large firms may be able to offset losing individual customers by shifting sales to other customers. It is less obvious why firm-level productivity or leverage may affect the employment growth rate distribution.

4.2 Job flows and firm characteristics over time

The role of productivity in aggregate job flows The top panel of Table 2 shows the estimated effect on the employment growth rate of moving from a boom to a recession for different quartiles of the firms' value-added distribution. Low-productivity firms decrease employment growth most during a recession. The effect is visible for both small and large firms but somewhat more pronounce for the latter with the recession effect on employment growth of the highest productivity firms being 3.5 percentage points smaller than for the lowest productivity firms. As shown above, small firms are on average less productive and, hence, part of their higher cyclicality as a group results from low-productivity firms performing particularly poorly during a recession. However, our results show that even conditional on firm-level productivity, small firms have particularly low employment growth during recessions.

We note that the two recessions in our data are quite different from each other. (Bentolila, Jansen, and Jiménez, 2018) show that the Great Recession was accompanied by a large negative credit supply shock in Spain resulting from some banks experiencing financial difficulties. The recession also lasted very long in Spain as the initial housing shock and resulting banking crisis was followed by a sovereign debt crisis. In contrast, the COVID recession was short lived but included government mandated lock-downs that affected firms across the board. Moreover, the government provided unprecedented support to workers and firms during the recession with a particular focus on saving jobs through generous furlough schemes (see Diaz, Dolado, Jáñez, and Wellschmied, 2025). Given these very different characteristics of the two recessions, we now turn to each one in individual. For the former, we compare the recession period from 2008-2013 to the boom period from 2004-2006. For the

[10] These patterns also hold during booms and during recessions.

Table 2: Aggregate job flows, productivity, and size

Size		Q1	Q2	Q3	Q4
		Employment growth rate in %			
Large	Aggregate	-7.5	-4.4	-4.7	-4.3
Small		-9.1	-8.3	-7.3	-6.4
		Employment growth rate in %			
Large	GR	-6.2	-5.0	-4.6	-3.6
Small		-9.8	-6.1	-5.4	-5.1
Large	COVID	-9.7	-8.1	-8.0	-7.5
Small		-11.5	-11.9	-10.9	-9.4
		Job destruction rate in %			
Large	GR	3.4	2.0	1.9	1.1
Small		5.0	3.4	3.0	2.1
Large	COVID	7.3	5.1	6.6	6.3
Small		6.2	6.2	5.2	3.9
		Job creation rate in %			
Large	GR	-3.3	-2.6	-2.6	-2.0
Small		-4.4	-2.4	-2.3	-2.9
Large	COVID	-2.4	-3.0	-1.4	-1.3
Small		-5.3	-5.7	-5.8	-5.5

Notes: The table displays the estimated effect of moving from a boom to a recession on job flows for different quartiles of the firms' value-added distribution as well as large and small firms. Results are based on regression (3).

latter, we consider the recession year 2020 to the boom period 2014-2018. The rows entitled "Great Recession" and "COVID Recession" display the results.

The second panel of Table 2 shows that the effects of firms' productivity on the cyclicality of employment growth is visible during both recessions for both small and large firms. Yet, the effect is larger during the Great Recession. For both small and large firms, going from the highest to the lowest firm productivity quartile reduces the employment growth rate by an additional four percentage points during the Great Recession. During the COVID Recession, is about two percentage points, and all type of firms observed a large decline in their employment growth rates.

The third and fourth panels show that the differences in the recession effect on employment growth rates of firms with different productivities reflect both differences in the recession effect on the job-destruction rates and job-creation rates. During both recessions and for both size categories, the job-destruction rate rises by more at low-productivity firms compared to high-productivity firms. Most striking, large, high-productivity firms see almost no rise in their job-destruction rates during the Great Recession. Again, the differences across firms of different productivities are more muted during the COVID Recession, where even the most productive firms saw a large increase in their job-destruction rates.

Further contributing to the less cyclical employment growth rate of high-productivity firms, their job-creation rates falls by less during recessions compared to low-productivity firms. Again standing out, large, high-productivity firms display only a small decline in their job-creation rate during recessions. Among small firms, productivity has a much smaller

impact on the Recession effect on the job-creation rates. Particularly during the COVID recession, we observe a similar decline in job-creation rates across the productivity distribution.

Existing theories of cyclical employment growth stress outside-option effects to explain the higher cyclicality of low-productivity firms (see, e.g., Den Haan, Ramey, and Watson, 2000). In those theories, as workers have always the option of not working, a reduction in aggregate productivity leads to some worker-firm matches having negative surplus value. as low-productivity firms offer lower average surplus, those firms are the most likely to destroy jobs. While this theory provides a compelling explanation for the more cyclical job-destruction rate at low-productivity firms, it cannot explain the more volatile job-creation rate at the same firms. In fact, modern theories of heterogeneous firms that stress the importance of job-to-job transition, such as Moscarini and Postel-Vinay (2013), suggest that the job creation rate is more procyclcial at high-productivity firms as those firms poach workers from less productive competitors during booms to create jobs.

The employment growth rate distributions shown in Figure 2 provides an explanation for the more procyclcial job-creation rate at low-productivity firms. Recall that the employment growth rate dispersion is higher among low-productivity compared to high-productivity firms. Put differently, those productivity types with the most cross-sectional dispersion in employment growth rates are those firm types with the strongest cyclical movements in the distribution. One possible interpretation of the results are SS-type employment adjustment costs being at work: Firms that would anyhow adjust employment because of idiosyncratic changes to their fortune will do so taking into account the stage of the business cycle. How to interpret the higher employment growth rate dispersions at low-productivity firms? This may result from adjustment costs being lower at these firms or shocks being more dispersed among those firms. We find evidence for the latter. Conditional on firm size, the dispersion of productivity growth is higher at low-productivity firms. Using a simple model that decomposes productivity changes into persistent and transitory changes suggest that particularly transitory shocks to productivity drive this higher dispersion at low-productivity firms.

So far, our discussion centers around the relative poor performance of low-productivity firms compared to high productivity firms during recessions. As low-productivity firms are on average smaller, this fact explains part of the higher unconditional volatility of small compared to large firms noted earlier. However, panel two of Table 2 shows that small firms display a larger reduction in employment growth rates conditional on productivity during both recessions. This larger conditional employment cyclicality of small compared to large firms results from job destruction rising and job creation falling by more at small firms during the Great Recessions. During the COVID Recession, the higher cyclicality of small firms conditional on observables results entirely from a larger fall in their job-creation rates.

Again, a higher cyclicality of job flows for small firms conditional on productivity (and conditional on leverage as we show below) is difficult to explain for many existing theories of cyclical job flows. Again, the employment growth rate distributions shown in Figure 2 provide a way forward. That is, the cross-sectional dispersion of employment growth conditional on

the business cycle stage and productivity is much higher for small firms compared to large firms. Moreover, the higher employment growth dispersion of small firms is associated with productivity growth dispersion also being higher for those firms and the difference arises from both transitory and persistent changes being more dispersed at small firms. Hence, an analogous argument applies as above regarding the cyclical differences between low and high-productivity firms.

What is more, differences in the cyclical changes in the shape of the employment growth dispersion across small and large firms provide further insights. That is, the employment growth distribution is not shifting in a parallel fashion to the left during a recession and the shape of the shift differs for large and small firms. In particular, part to understanding the relatively strong decline in the job creation rate of small firms is to understand why fewer small firms than one would expect from a mean shift in the employment growth rate distribution stop growing rapidly during recessions. Similarly, part to understanding the relatively strong rise in the job destruction rate of small firms is to understand why more small firms than one would expect from a mean shift in the employment growth rate distribution start shrinking rapidly during recessions. On the flip side, part to understanding the relatively weak rise in the job destruction rate at large firms during recessions, is to understand why fewer large firms than one would expect from a mean shift in the employment growth rate distribution contract rapidly.

The role of leverage in aggregate job flows We now turn to the effect a firm's leverage has in shaping the recession effect on job flows. The first panel of Table 3 shows that firms' employment growth rate declines more at high-leveraged compared to low-leveraged firms during a recession. The effect is particularly strong among small firms. Going from the lowest-leveraged to the highest-leveraged firm quartile leads to an additional reduction in employment growth during a recession of 0.8 percentage points for large firms and 2.0 percentage points for small firms.

Consistent with the Great Recession implying tightening financial conditions for firms, we find that the differential effect of leverage on employment growth is driven by that recession. Going from the lowest to the highest leverage category reduces employment growth by an additional 3.0 percentage points for small and large firms. The third and fourth panels show that this strongly negative employment growth at high-leveraged firms during the Great Recession is driven by job destruction rising by more and job creation falling by more at high-leveraged firms. In contrast, we do not find a systematic relationship between firm leverage and the recession effect on employment growth during the COVID Recession, as the second panel shows.

Jo (2022) shows that a well-calibrated heterogeneous firm model can explain high-leveraged firms increasing their job destruction and reducing their job creation by more than low-leveraged firms in response to an aggregate deleveraging shock. However, such theories cannot address why even conditional on leverage, small firms have more cyclical employment growth than large firms which we observe during both recessions. During the Great Recession, this higher conditional cyclicality results from job destruction rising and job creation

Table 3: Aggregate job flow rates, leverage, and size

Size		Q1	Q2	Q3	Q4
		Employment growth rate in %			
Large	Leverage	-4.6	-5.2	-5.2	-5.4
Small		-7.1	-7.5	-7.8	-9.0
		Employment growth rate in %			
Large	GR	-2.8	-4.2	-5.8	-6.0
Small		-5.7	-5.8	-6.8	-8.8
Large	COVID	-6.1	-8.5	-10.2	-7.9
Small		-10.5	-11.3	-10.9	-11.6
		Job destruction rate in %			
Large	GR	1.2	2.1	2.3	2.4
Small		2.8	3.2	3.6	5.2
Large	COVID	4.3	5.3	7.4	8.5
Small		5.4	5.3	5.4	6.1
		Job creation rate in %			
Large	GR	-1.6	-1.8	-3.5	-3.4
Small		-3.0	-2.7	-3.3	-3.8
Large	COVID	-1.8	-3.3	-2.8	0.6
Small		-5.1	-6.0	-5.4	-5.4

Notes: The table displays the estimated effect of moving from a boom to a recession on job flows for different quartiles of the firms' leverage distribution as well as large and small firms. Results are based on regression (3).

falling by more at small firms during the Great Recessions. During the COVID Recession, the higher conditional cyclicality results entirely from a larger rise in their job-destruction rates.

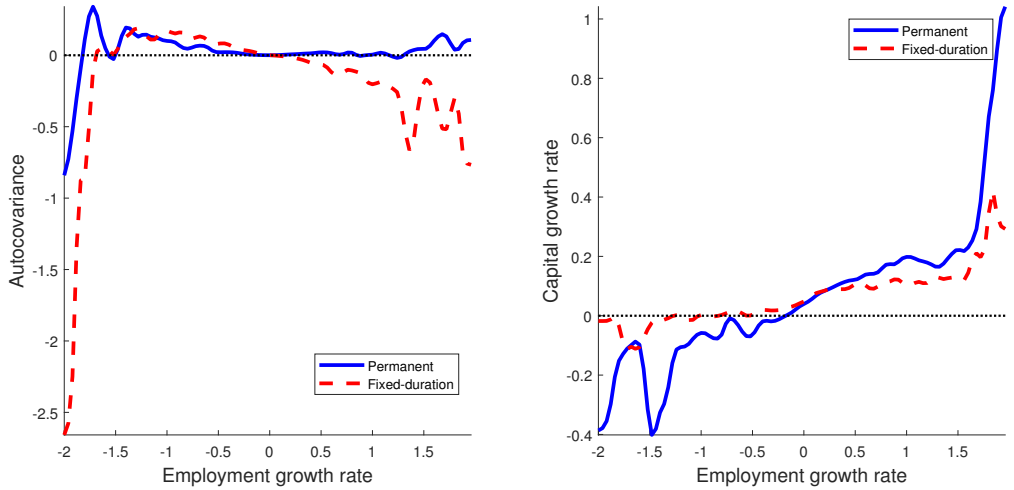
As previewed above, differences in the employment growth rate distributions again provide an explanation. That is, the cross-sectional dispersion of employment growth is higher for small firms than large firms. Again, also the productivity growth dispersion is higher for those firms. Second, differences in the cyclical changes in the shape of the employment growth dispersion across small and large firms contribute to the higher conditional cyclicality of small firms. In particular, positive skewness becomes smaller for small firms and negative skewness becomes smaller for large firms during the Great Recessions.

5 Job flows and job characteristics

The Spanish data allows us to identify workers with different levels of employment-adjustment-costs which we use to provide further evidence for the importance of such adjustment costs in understanding differences in firms' employment cyclicalities and the overall high volatility of employment over the business cycle in Spain. In particular, just below 25% of Spanish workers are employed under fixed-duration contracts. These worker can be terminated at the end of the contract with zero costs. As the average length of these contracts is less than a quarter, they provide firms with jobs with close to zero firing costs. In contrast, Spanish workers with permanent contracts benefit from strong employment protection stemming from

Figure 3: Contract types and business decisions

(A) Autocovariance employment growth (B) Capital and employment growth



Notes: The left panel displays Gaussian kernel estimates of the first order autocovariance of employment growth for permanent and fixed-duration jobs as functions of permanent and fixed-duration employment growth rates. The right panel displays Gaussian kernel estimates of the growth rate of capital as a function of permanent and fixed-duration employment growth rates. Source: Central de Balances Integrada.

severance payments and legal uncertainty in case the worker challenges the dismissal in labor court (see Bentolila, Cahuc, Dolado, and Le Barbanchon, 2012, for a thorough discussion).

We provide two pieces of evidence from firm dynamics that are consistent with permanent jobs imply higher employment-adjustment costs than fixed-duration jobs: changes in permanent employment levels are more persistent than changes in fixed-duration job levels, and firms concentrate job destruction at fixed-duration jobs when shrinking moderately. Given the higher employment-adjustment-costs of permanent contracts, one would expect that when adjusting its workforce in that dimension, a firm would also be more likely to make other persistent business decisions compared to when adjusting the more flexible fixed-duration workforce. We show that this is, indeed, the case in two dimensions: physical capital growth and the growth of opening new establishments are more strongly related to permanent job growth compared to growth in fixed-duration jobs.

Beginning with the evidence on the persistence of job flows, first, the left panel of Figure 3 displays kernel estimates for the one-year forward autocovariance functions of permanent and fixed-duration employment growth rates as a function of today's' growth rates. Regarding permanent-employment growth rates, except for firms that are close to exiting, the autocovariance is small and positive, possibly suggesting convex employment-adjustment costs when increasing the workforce. In contrast, for fixed-duration jobs, again abstracting to those nearly exiting, the autocovariance function is positive at negative employment growth rates but strongly negative at positive employment growth rates, i.e., firms show strong mean reversion in fixed-duration employment growth from year-to-year. Second, we compute the share of total jobs destroyed that come from permanent-job destruction. When computing

the share, we have to take into account that the share may be larger than 1 (smaller than zero), as a shrinking firm may have fixed-duration (permanent) job creation. Irrespective of how we account for this, we find that firms contracting by more than -0.4 achieve this employment contraction by destroying about 68% of their total jobs in form of permanent jobs. Firms shrinking less than that rely on only 58% (when restricting the share to be between 0 and 1 at the firm level) or 29% (when not restricting the share at the firm level). This is the pattern one would, indeed, expect, when permanent-jobs carry higher job destruction costs. Firms reducing their employment by moderate amounts are going to try avoid paying these costs.

Turning to the link between permanent business decisions and the type of job adjustments, the right panel of Figure 3 displays kernel estimates for the growth rate in the firm-level capital stock as a function of the growth rates of fixed-duration and permanent-employment growth. For both types of employment growth rates, as one may expect, we find that a higher employment growth rates is associated with a higher capital stock growth rate. However, the relationship is much stronger for employment growth in permanent employment compared to fixed-duration employment. Put differently, when firms adjust their levels of permanent employment, they tend to couple those also with long-term physical capital adjustments while adjustments in fixed-duration employment are more associated around a fixed level of physical capital.

One particular form of capital adjustment is a change in the number of establishments a firm operates. As one would expect, we find that shrinking firms ob average reduce the number of establishments, and growing firms increase the number of establishments. Importantly, we find that this gradient is stronger in the growth rate of permanent employment growth.

5.1 Aggregate job flows

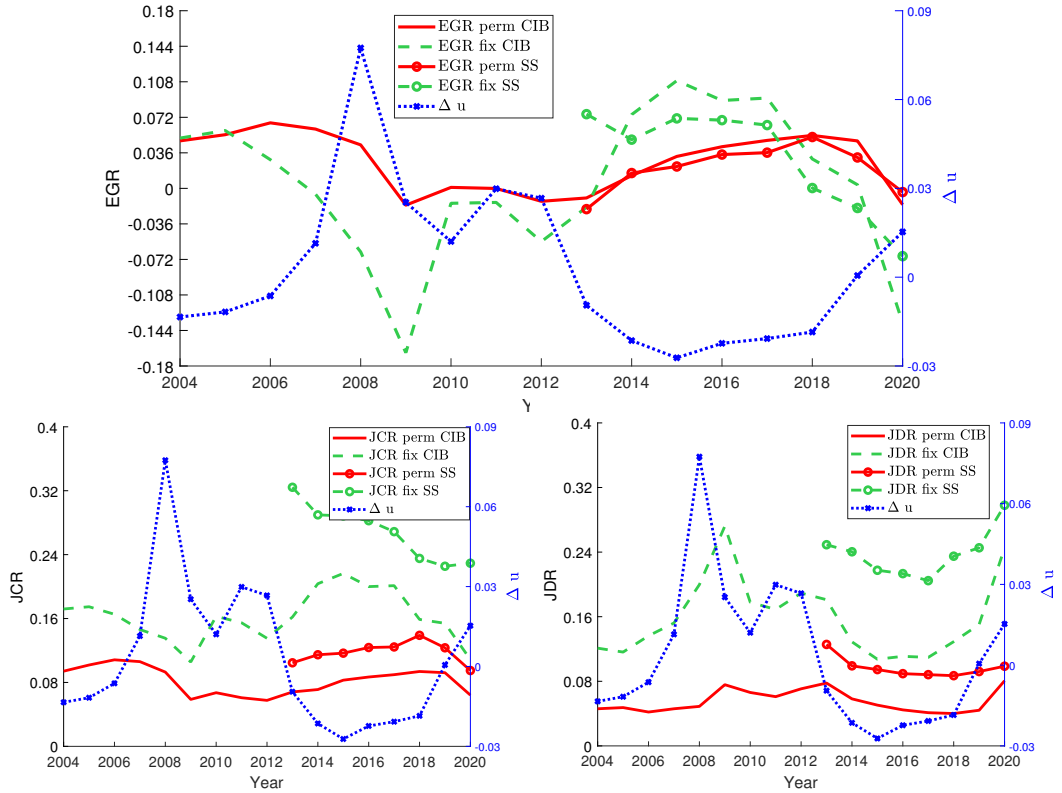
We begin again by describing the aggregate dynamics of job flows, now differentiating by contract type. The top panel of Figure 4 shows that the employment growth rate of both types of contracts is generally high in booms and low during recessions, however, the growth rate of fixed-duration contracts varies by a factor of 2.5 more than that of permanent contracts over the business cycle.[11] At a recession peak, more than 12 percent of fixed-duration employment is lost in a single year. What is more, employment growth of temporary contracts is concentrated early in booms and slows down considerably late in booms and even turns negative. In contrast, employment growth of permanent contracts peaks late in booms.[12]

The bottom two panels turn to the gross flows that explain those dynamics. Early in a boom, the job-creation rate of fixed-duration jobs is high. As the boom progresses, the creation rate of those jobs starts to fall, though the unemployment rate still keeps falling. In

[11] The time series stops in 2020 because of a legislative reform that converted a large number of fixed-duration contracts into permanent contracts as shown by Conde-Ruiz et al. (2025).

[12] Conde-Ruiz et al. (2019) show that job creation and job destruction of fixed-duration employment exacerbates by the end of expansions in daily flow data. By aggregating to the quarter level, our employment flows abstract from these very short-duration, high-frequency employment contracts.

Figure 4: Job flows and contract types



Notes: The figure displays yearly aggregate job flows in Spain for permanent and fixed-duration jobs. EGR: employment growth rate; JCR: job creation rate; JDR: job destruction rate; Δu: change in the unemployment rate. Sources: Central de Balances Integrada (CBI), Spanish Social Security (SS), and INE.

contrast, the creation rate of permanent jobs is relatively low early in a boom but increases throughout the boom and stays high until late in the boom when the creation rate of fixed-duration jobs is already well below its boom peak. At the onset of a recession, the job creation rate of fixed-duration contracts falls quickly while that of permanent contracts shows a delayed response that is also quantitatively smaller. Given the delayed response in the creation rate of permanent contracts over the cycle, its correlation with leads of the growth rate of the unemployment rate (-0.65) is substantially higher than the contemporaneous correlation (-0.26). The job destruction rates of both permanent and fixed-duration contracts are relatively low during booms. Again, the job-destruction rate of permanent contracts remains low late in a boom while the job-destruction rate of fixed-duration contracts already starts rising at that stage of the cycle. Both types of contracts contribute to the spike in job destruction early in a recession. Mirroring their behaviors during a boom, late in a recession, the job-destruction of permanent contracts remains elevated but the rate of fixed-duration contracts falls already.

Though fixed-duration flow rates are much more volatile than permanent-employment flow rates, we find that the latter contribute slightly more to aggregate flow rates because of the three-timer higher stock of permanent employment relative to fixed-duration employment. Particularly for the job creation rate, changes in the permanent-employment job

creation rate dominate.

5.2 Job flows and firm characteristics over time

The role of productivity for different job flows The relationship between the cyclicality of permanent employment growth and productivity follow those of the cyclicality of overall employment growth, as the top panel of Table **??** shows. That is, for both size categories and both recessions, we observe that low-productivity firms decrease their permanent-employment growth by more during recessions than high-productivity firms.

The second panel show that the cyclical behaviors of the permanent-employment job destruction rates also mirror those of the aggregate rates. That is, permanent-job destruction rates rise by less at high-productivity compared to low-productivity firms. Differences are very pronounced during the Great Recession with large, high-productivity firms almost not increasing permanent-job destruction. The differences are relatively small during the COVID Recession. The third panel shows that the pattern of the aggregate job-creation rate also holds for the permanent job-creation rate: High-productivity firms, with the exception of small firms during the COVID Recession, decrease permanent job creation by less during a recession.

Finally, as is the case with overall employment growth, conditional on productivity, small firms decrease their permanent-employment growth by more than large firms during recessions. Again mirroring overall employment growth, this larger conditional permanent-employment cyclicality of small firms results from permanent-job destruction rising by more at small firms during the Great Recession and permanent-job creation rates falling by more during the COVID Recession.

Turning to the cyclicality of fixed-duration employment growth, the table shows that productivity plays a very different role. Among large firms, if any, the most productive firms are those reducing their growth in fixed-duration employment contracts the most during recessions. For small firms, we find that low-productivity firms decreases fixed-duration employment growth more during the Great Recession but we find no systematic relationship during the COVID Recession. That is not to say that fixed-duration employment growth is not cyclical. In fact, fixed-duration employment growth declines by more than permanent-employment growth for almost all firm categories with differences being particularly large during the COVID Recession. That is, firms across the entire productivity distribution decrease fixed-duration employment growth by large amounts during recessions.

Considering again the two gross job flow rates, during the Great Recession, we observe that high-productivity firms increase the destruction of fixed-duration jobs by somewhat less than low-productivity firms. However, the fixed-duration job creation rate fell most at high-productivity firms. In fact, low-productivity firms decreased the creation rate of fixed-duration jobs by little. During the COVID Recession, if any, the most productive firms increased most their fixed-duration job destruction.

Firm-level productivity being more important in understanding permanent-job flows relative to fixed-duration-job flows is exactly what one would expect when cyclical differences

Table 4: Contract types, job flows, productivity, and size

Size		Q1	Q2	Q3	Q4
		Employment growth rate in %			
Large	GR permanent	-7.0	-5.4	-4.6	-2.5
Small		-9.3	-5.4	-4.5	-4.5
Large	COVID permanent	-6.2	-6.2	-5.6	-5.7
Small		-7.7	-9.3	-7.5	-6.8
Large	GR fixed	-9.4	-5.2	-4.3	-11.2
Small		-17.3	-14.0	-14.2	-14.6
Large	COVID fixed	-12.7	-18.6	-25.4	-30.6
Small		-28.7	-29.0	-29.3	-27.8
		Job destruction rate in %			
Large	GR permanent	2.6	1.2	1.3	0.3
Small		4.4	2.5	2.2	1.5
Large	COVID permanent	4.7	3.2	5.1	4.9
Small		3.6	3.9	3.2	2.5
Large	GR fixed	6.7	3.9	3.7	3.4
Small		16.4	14.7	14.7	12.6
Large	COVID fixed	9.6	10.2	16.5	18.8
Small		15.7	16.3	16.6	16.3
		Job creation rate in %			
Large	GR permanent	-4.3	-4.2	-3.3	-2.2
Small		-5.0	-2.9	-2.3	-2.9
Large	COVID permanent	-1.6	-3.0	-0.6	-0.8
Small		-4.1	-4.4	-4.3	-4.2
Large	GR fixed	-2.7	-1.3	-0.7	-7.8
Small		-0.9	0.6	0.5	-2.0
Large	COVID fixed	-3.1	-8.3	-8.8	-11.8
Small		-13.0	-12.7	-12.7	-11.5

Notes: The table displays the estimated effect of moving from a boom to a recession on job flows for different quartiles of the firms' value-added distribution as well as large and small firms. Job flows are separated by permanent and fixed-duration job flows. Results are based on regression (3).

in the aggregate job flows are driven by differences in the dispersion of idiosyncratic shocks coupled with fixed employment-adjustment costs. As discussed above, changes in fixed-duration jobs is associated with lower employment-adjustment costs and lower fixed costs associated with changing a firm's business model. Hence, idiosyncratic shocks are relatively less important in triggering fixed-duration employment adjustment compared to permanent-employment adjustment leading firms across the productivity distribution adjusting their fixed-duration employment to a similar degree to aggregate shocks. In contrast, permanent-employment adjustment carries with it higher fixed costs and firms, are going to be more likely to adjust employment to the aggregate shock when adjusting anyhow because of large idiosyncratic shocks.

Different from productivity, we do find that firm size remains a relevant determinant in understanding the cyclicality of fixed-duration jobs. The conditional employment growth decline is again particularly pronounced at small firms compared to large firms. This stronger cyclicality is driven by a more cyclical fixed-duration job-destruction rate during the Great Recession and a more cyclical fixed-duration job-creation rate during the COVID Recession.

A possible explanation for this difference across recessions is the large governmental support for maintaining all jobs during the COVID Recession. This support created incentives to not adjust employment through higher job destruction but rather through lower job creation.

The role of leverage for different job flows The relationships between the cyclicality of permanent-employment growth and leverage follow a similar pattern as those of the cyclicality of overall employment growth, as the top panel of Table 5 shows. That is, for both size classes during the Great Recession, high-leveraged firms reduce their permanent-employment growth by more than low-leveraged firms with the pattern being particularly strong among small firms. The second and third panel show that this more negative permanent-employment growth at high-leveraged firms results from both a larger rise in the job-destruction rate as well as a larger fall in the job-creation rate. Somewhat different from total job flows, during the COVID Recession, we do find that high-leveraged firms decrease their permanent-employment growth by more than low-leveraged firms which is driven by a higher job-destruction rate at the former.

Finally, as is the case with overall employment growth, conditional on leverage, small firms decrease their permanent-employment growth by more than large firms during recessions. Mirroring permanent-employment growth conditional on productivity, this larger cyclicality of small firms results from permanent-job destruction rising by more at small firms during the Great Recession and permanent-job creation rates falling by more during the COVID Recession.

The picture is again very different for the cyclicality of fixed-duration employment growth. During the Great Recession, we find no relationship between firm leverage and the cyclicality of fixed-duration employment growth. During the COVID Recession, we even find that high-leveraged firms decrease their fixed-duration employment growth by less than low-leveraged firms. The latter results from the fixed-duration job-creation rate falling by less at high-leveraged firms during the COVID Recession.

Finally, as with firm-level productivity, we do find that also conditional on firm leverage, small firms display more negative conditional fixed-duration employment growth than large firms during recessions. Again mirroring the conditional flows on productivity, this stronger cyclicality is driven by a more cyclical fixed-duration job-destruction rate during the Great Recession and a more cyclical fixed-duration job-creation rate during the COVID Recession.

6 The timing of job flows

As discussed above, recessions are typically associated with a large initial spike in the job-destruction rate which occurred in our data in 2009 for the Great Recession. Comparing the top panel of Table 6 with Tables 2 and 3 shows that the job-destruction rate rises by about twice as much during this initial spike compare to the Great Recession average effect even conditional on firm characteristics. At the same time, the same relationship between cyclical changes in the job-destruction rate and firm characteristics holds already during this initial spike as during the entire recession: The job-destruction rate rises most at low-productivity

Table 5: Contract types, job flows, leverage, and size

Size		Q1	Q2	Q3	Q4
		Employment growth rate in %			
Large	GR permanent	-2.3	-4.5	-6.5	-4.8
Small		-5.4	-5.5	-6.4	-8.8
Large	COVID permanent	-2.7	-6.3	-8.0	-6.3
Small		-7.2	-7.7	-7.2	-8.5
Large	GR fixed	-8.1	-6.6	-9.4	-7.7
Small		-14.8	-14.3	-15.7	-16.9
Large	COVID fixed	-24.4	-23.7	-23.5	-19.9
Small		-30.4	-29.1	-28.1	-27.3
		Job destruction rate in %			
Large	GR permanent	0.1	1.7	2.0	1.0
Small		2.2	2.3	2.9	4.4
Large	COVID permanent	2.6	3.2	5.7	6.8
Small		3.3	3.0	3.2	4.1
Large	GR fixed	2.4	4.7	4.3	5.8
Small		14.3	13.9	15.1	16.4
Large	COVID fixed	14.6	12.3	14.8	16.7
Small		17.1	15.7	15.6	16.4
		Job creation rate in %			
Large	GR permanent	-2.2	-2.7	-4.5	-3.9
Small		-3.2	-3.1	-3.5	-4.4
Large	COVID permanent	-0.1	-3.1	-2.3	0.5
Small		-3.9	-4.7	-3.9	-4.4
Large	GR fixed	-5.7	-1.9	-5.2	-2.0
Small		-0.5	-0.4	-0.6	-0.5
Large	COVID fixed	-9.8	-11.4	-8.8	-3.2
Small		-13.3	-13.4	-12.5	-10.9

Notes: The table displays the estimated effect of moving from a boom to a recession on job flows for different quartiles of the firms' leverage distribution as well as large and small firms. Job flows are separated by permanent and fixed-duration job flows. Results are based on regression (3).

and high-leveraged firms, and even conditional on productivity and leverage, it rises more at small compared to large firms.

Above, we also point out that temporary job creation rates are relatively high early in a boom but start to fall before the unemployment rate starts to rise. On the flip side, permanent job creation rates stay low early in a boom but remain high late in a boom. Panels two and three of Table 6 relate these phenomena to firm characteristics. To that end, we employ a similar regression approach as (2). The regression compares observations on permanent (temporary) job creation rates from the early period of the post Great recession boom (2013–2014) to the end period (2018–2019) replacing the recession dummy in (2) by a dummy that is one when the year is from the latter (early) years. Two points are worth highlighting. First, neither firm-productivity, nor firm leverage are strong predictors for either high fixed-duration job creation rates early in a boom or high permanent-job creation late in booms. Second, the phenomena are principally driven by small firms across the productivity and leverage distributions increasing fixed-duration job creation early in a boom and large firms, across the distribution of firm observables increasing permanent-job

Table 6: The timing of job flows

Size		Q1	Q2	Q3	Q4
		Spike in 2009 job destruction rate in %			
Large	Productivity	7.3	4.4	4.2	2.7
Small		8.0	6.3	5.7	4.5
Large	Leverage	3.4	5.3	4.6	4.2
Small		5.7	6.0	6.3	8.2
		Late permanent job creation rate in %			
Large	Productivity	4.2	1.9	4.0	1.4
Small		0.7	0.4	0.7	-0.8
Large	Leverage	2.6	3.0	1.9	3.5
Small		0.3	-1.0	0.3	2.0
		Early temporary job creation rate in %			
Large	Productivity	2.0	1.3	-3.2	-1.8
Small		6.6	6.7	6.8	5.7
Large	Leverage	-1.2	-2.0	0.6	0.2
Small		6.1	8.4	7.0	4.1

Notes: The table displays the estimated effect of different events on job flows for different quartiles of the firms' value-added distribution, leverage distribution, as well as large and small firms.

creation late during booms.

7 Conclusion

We use novel administrative data for Spain which allow us to link job flows to the typical state space of modern firm decision problems: firms' size, age, productivity, and leverage. Moreover, we distinguish between permanent and fixed-duration job flows where the former has substantially higher employment-adjustment costs.

During recessions, employment growth is particularly negative for small, low-productivity, and high-leveraged firms, and these large declines in employment result from higher job destruction and lower job creation rates. This relatively high cyclicality is driven by more cyclical permanent-job flows and much less by differences in fixed-duration-job flows. Instead, all types of firms display strongly cyclical fixed-duration job flows.

We argue that we can rationalize those findings by a model where small, low-productivity, and high-leveraged firms face more idiosyncratic uncertainty in the presence of fixed employment adjustment costs. To support this interpretation, we show that those firm types have, indeed, more dispersed employment growth rate distributions compared to large, high-productivity, and low-leveraged firms.

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