Worker churning during the financial crisis: the role of firm quality[*]

Mário Centeno
Banco de Portugal & ISEG – U. Técnica & IZA
mcenteno@bportugal.pt

Álvaro A. Novo
Banco de Portugal & U. Lusófona & IZA
anovo@bportugal.pt

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Abstract

This paper studies the behavior of hirings and separations in Portugal before and during the recent crisis. The most distinctive feature of the impact of the current crisis on the labor market is the reduction in hirings. Portuguese firms reduced the number of new hires in 45%. Contrary to what could be expected separations also decreased, although by less, -8%. We show that churning, the replacement of departing workers with new ones, has decreased substantially during the crisis. This was concentrated in expanding firms, that before the crisis were responsible for the vast majority of churning. We also show, both with aggregate and firm-level data, that hirings have a larger contribution to the Portuguese business cycle than separations. Furthermore, larger firms dominate the reaction of the labor market to the economic conditions.

Keywords: Rotation; Churning; Job creation and destruction; Separations and hirings

JEL Codes: E24; J21; J63.

1 Introduction

Hirings occur when firms need to expand their workforce or to replace workers who leave the firm, either voluntarily or following a dismissal. In the first case, the hiring is related to the firm's growth. The second case happens whenever the company wants to avoid a reduction in the number of employees – firms *churn* workers as hirings and separations occur without a change in employment. In both cases, firms and workers decide on the single most important investment: the choice of the best usage of human capital.

Stopping the process of hiring and churning in the economy is a structural symptom of a country's economic decline. As with any investment, the hiring decision leads the economic cycle and, therefore, a detailed analysis of this process is important. This is the subject of this article.

Churning is crucial to the ability of companies to renew its workforce and, therefore, an important part of the dynamics of employment. Also for workers,nger-causes churning promotes the use of human capital in its most productive application, generating a vacancy chain that improves resource allocation in the economy (Akerlof, Rose and Yellen 1988).

In itself, this type of rotation does not lead to employment growth and it is almost invisible to the outsider. However, the labor market cycle – employment and unemployment – and the promotion of more productive allocations of resources are closely related to churning.

We show that in Portugal the evolution of employment is predominantly determined by the hiring decisions of firms (a result similar to the one obtained in Hairault, Le Barbanchon and Soprasseuth (2012) for France or Kahn and McEntarfer (2013) for the US). According to the Social Security data, the employment reduction observed since 2007 is associated with a drop in hirings, which happened in all industries. Note that the lower level of hiring is mainly due to reduced rotation of workers in expanding firms. This relationship is similar to the one observed in other advanced economies, in particular in the U.S. (Lazear and Spletzer 2012)

The strong reduction in the rotation of workers has a negative impact on the evolution of productivity because it represents a decrease in the investment, by workers and firms, in the search of more productive matches. At an aggregate level, we show that hirings Granger-causes fluctuations in economic activity, contrary to worker separations, that are pretty much unrelated with the GDP growth rate. Using firm-level data we also show that this association between GDP and hirings is explained by the behavior of the largest firms. These firms (namely

those in the upper-quartile of the firm size distribution), react more strongly to changes in GDP, shrinking their workforce more strongly in recessions and leading the employment pick up in booms. This result has an important consequence for policy and to the evolution of productivity across the business cycle. Larger firms are on average more productive and their stronger sensitivity to the business cycle may help to explain the cyclical behavior of productivity. This issue deserves attention in the future.

2   Labor market flows: Definitions

Employment is the result of entry and exit flows of workers in firms. These flows occur simultaneously in most firms. Also, at any moment, there is a number of firms expanding employment, another sheding jobs and still another with stable employment. We measure these flows following the concepts introduced in the seminal work of Davis, Haltiwanger and Schuh (1996).

Formally, we define the following flows:

Hirings: the set of workers who work in the firm in the last month of a given quarter, but were not part of the firm's labor force in the last month of the previous quarter. This definition ignores all the hirings that occurrs during the quarter that do not reach the final month of that quarter.

Separations: the set of workers in the firm in the last month of a given quarter who were not part of the firm's labor force in the last month of the following quarter. This definition ignores all workers who separate from the firm during the quarter and return to the job before the last month of that quarter.

Job creation: is the sum of job gains in firms that increase employment between two consecutive quarters (expanding firms).

Job destruction: is the sum of the job reductions in firms that decrease employment between two consecutive quarters (contracting firms).

Two hirings do not always give rise to an increase of two jobs in the firm. For example, if two workers decide to change job in the same period, there will be two hirings and two separations and no change in employment. In other cases, firms promote the simultaneous hiring and separation of workers in order to find the most appropriate worker for their duties.

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The idea that there could be more workers involved than the net employment gains is defined as excessive rotation of workers or churning. Formally,

Churning: is given by twice the number of separations for expanding firms; twice the number of hires for contracting firms; and the sum of hires and separations for firms with stable employment.

An example helps to understand the concept: if a firm increases its employment by 50 workers, but has 20 separations, overall it had to hire 70 workers. Entry and exit amount to 90 workers, of which 40 workers correspond to churning; the number of workers who did not contribute to the growth of employment in the company.

These flows occur in firms that remain active between two consecutive quarters. But there are also flows related with the birth of new firms and the death of existing firms. Our data do not identify in legal terms startups and closures. Nonetheless, we define these flows as:

Firm birth: corresponds to a firm that has workers in a given quarter, but not in the previous one.

Firm death: occurs when a firm with workers in a given job quarter fails to report employment in the following quarter.

Although these concepts do not meet the legal definitions, they capture closely the economic concepts of entry and exit of firms. Admittedly, some of these firm flows are seasonal closures, in periods in which the revenues do not cover variable costs, firms choose rationally to close temporarily. But even these are important for characterizing the flexibility in the economy and to measure the flows of job creation and destruction.

3 Data

This paper uses data from the Social Security Records to compute quarterly jobs and workers flows. This database covers all salaried labor relations with remuneration for the public social security system. The database excludes firms with private pension funds and public employees covered by the specific civil servants system. In the computations, we excluded firms in the primary sector (in which salaried work is not representative) and the financial, public administration, education and health sectors (because they have been gradually incorporated in the general Social Security system, distorting the computations of flows).

The nature of the information, mandatory firm-reported wage records and its monthly periodicity make these data a unique source of reliable information on the the labor market evolution. The data cover the period from January 2000 to December 2012.

4   The labor market: structural characteristics

There are two dominant characteristics of the Portuguese labor market. On the one hand, the continuous rise in the unemployment rate. This should be interpreted as a structural movement, along with the reduction in employment. On the other hand, the labor market is segmented. The Portuguese labor market is split, with a growing share of fixed-term contracts, a low conversion rate of temporary into permanent contracts and a significant wage premium for permanent contracts. These features are the result of a poor functioning of the labor market, with bad consequences on total factor productivity and, consequently, on the production level.

These characteristics are consistent with a significant turnover of workers. Rotation of fixed-term contracts is larger, even if nowadays it has spread to most groups of the economy. The share of long-term employment (workers over 45 years and with more than 20 years of tenure) decreased by 18 percentage points since the mid 90s. More than 90 percent of the unemployed who find a job are hired under a fixed-term contract. The rotation of workers in Portugal is one of the highest of the European Union and closer to the flows in USA than previous identified (Centeno and Novo 2012).

The recent crisis occurred in an adverse environment with many structural weaknesses. Ever since, the Portuguese economy has been unable to create jobs in a sustainable manner. The new jobs are overwhelmingly temporary, which hampers productivity growth and investment in human capital. The evolution of employment and turnover since the end of 2011 must be understood in this general framework.

5   Hires, separations and churning

The weak economic growth of the Portuguese economy in the last decade has naturally reflected itself in the behavior of the labor market. Until the outbreak of the financial crisis in 2008, employment gains were only marginal (Figure 1). The jobs created by expanding firms (the job creation flow) was approximately equal to those destroyed by contracting firms (the job destruction flow). Since 2008, there are systematic job losses, which cumulatively reached 14%.

However, this decline does not result from an increase in the rate of workers separations, but reflects instead a pronounced drop in the firms' hiring rates. Between 2007 and 2012, the quarterly hiring flows decreased 42%, from an average of 240,000 new contracts to only 140 000 (Table 1). The number of firms that hired workers in each quarter decreased from 65 thousand to 40 thousand, and the average number of hires per firm fell from 3.7 in 2007 to 3.5 in 2012.
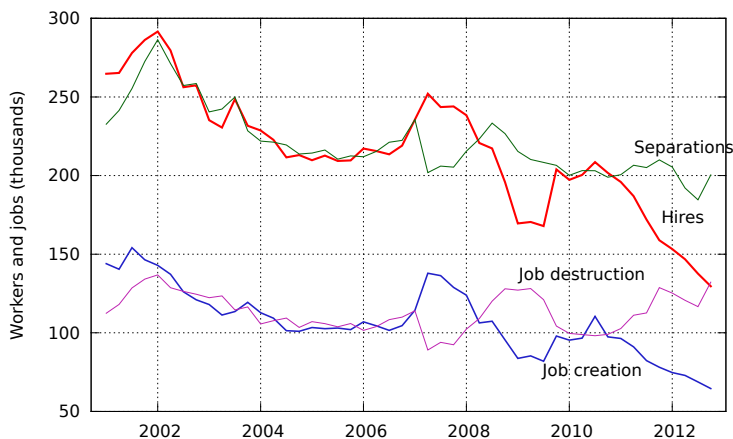
[TABLE 1 HERE; SEE PAGE 14]

Figure 1: Hires, separations, creation and job destruction rates. Social Security data, 2001-2012.

The evolution of separations is quite diverse from that of hires. Contrary to the common wisdom, in firms with separations the average number of exits remains stable, 3.4 employees per firm, despite the recessionary phase of the economy. Also, the share of firms that separate from workers remained also stable between 2007 and 2012, about a quarter of all firms. Given the reduction in the number of firms, there was a reduction in the number of separations in the Portuguese labor market.

In 2007, employment gained 30,000 jobs; in 2012, 54,000 jobs were lost. This is explained by the different dynamics of job creation and destruction. Two thirds of this difference origins in a lower dynamics of expanding firms. These companies created 130,000 jobs in 2007 and only 71,000 in 2012. The remaining third is justified by a further reduction of employment in contracting firms, from 98,000 job losses to 125,000.

As mentioned above, the churning of workers plays a role in the allocation of resources in the economy. Typically, firms involved in this process churn about 8 workers per quarter. The dynamics of hires and separations resulted in a fall in churning of 38%. This result points to a greater difficulty of workers and firms to form more productive matches. There are

two behaviors explaining this trend: workers reduce voluntary quits, common in downturns (Anderson and Meyer 1994) and firms do not promote the substitution of voluntary quits or redundancies.

This reduction is particularly important because it focuses on expanding firms, whose churning of workers fell 58%. In contracting firms, churning remained constant. As a result, the rotation in expanding firms represented 56% of the total in 2007 and only 37% in 2012.

An important dimension of the dynamics of Schumpeterian creative destruction is based on the entry and exit of firms. In 2012, this adjustment process resulted in a net reduction of 2,500 firms, in contrast with the increasing number of firms in 2007. There was a reduction of 33% in the creation of new firms and an increase in firm's closures of 23%.

Sectoral analysis

The growing importance of the services sector is not peculiar of the Portuguese economy, but instead a secular trend in developed economies. The last few years have not been an exception, but the overall dimension and idiosyncratic behavior of sectors, particularly construction, were exacerbated by the financial crisis. Between 2007 and 2012, all sectors lost jobs, but these losses were more pronounced in the construction and manufacturing. It was also in these sectors that the reduction in hirings and separations was more pronounced.

In the construction sector, the loss of 132,000 jobs, 37.5% of employment in 2007, is the result of a reduction in public and private investment (residential and business). In manufacturing, albeit smaller, the loss is around 17%, which corresponds to a reduction of 120 thousand jobs. Despite the export dynamics in 2011 and part of 2012, the dependence on the internal demand of manufacturing firms and their structural weaknesses induced a net loss in employment. In 2012, the services sector lost 75,000 workers workers compared with 2007, -6%. The resilience of employment in the services sector reflects its lower sensitivity to the economic cycle, despite the greater weight of temporary employment and the largest rotation of workers.

Structurally, the services sector is the sector where there is more churning. On average, this process involves 10 workers per firm. During the period under analysis, the churning of workers fell in all sectors, but more intensively in expanding firms of the construction and services sectors.

6 The business cycle and labor market flows

In the following two subsections, we analyze the relationship between the business cycle and labor market flows. We start with at the aggregate level by establishing a Granger-causality between GDP growth and conventional measures of labor market flows. Then, at the firm level, we study the relationship between firms' choices of hires, separations, and churning with the business cycle.

6.1 The chicken or the egg: GDP and aggregate labor market flows

The motivation to study labor market flows and the business cycle are illustrated in Figure 2. The left panel plots the hiring rate along with the quarterly GDP growth rates. These two seem to mimic each other. The right panel show the relationship for the separation rate. The level of association is lower.
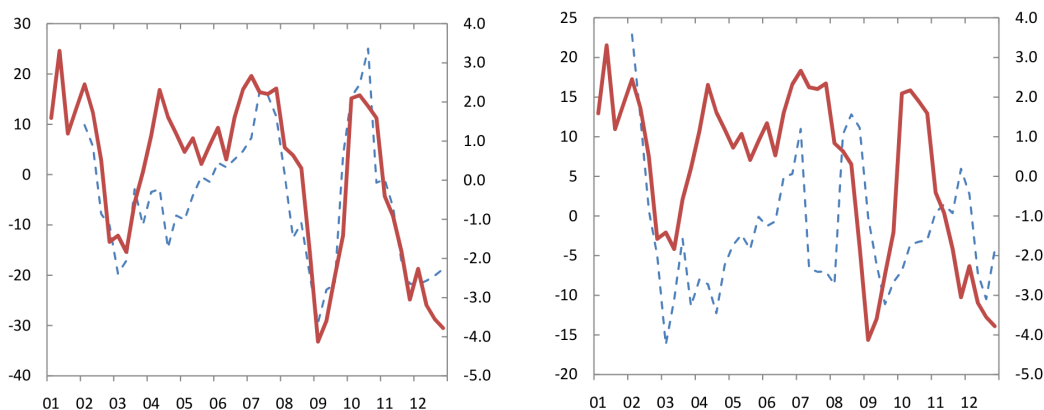
Figure 2: Hires (dashed line in the left panel), separations (dashed line in the right panel), and GDP growth (solid lines, right scale), Social Security data and National Accounts, 2001-2012.

But which came first, the chicken or the egg? Hires or GDP growth? Separations or GDP decline? Both causalities are possible, but the economic interpretation is different. For instance, labor hoarding is compatible with a situation where only after a downturn (upturn) on GDP firms separate from (hire) workers. On the other hand, if firms hire workers to increase their productive capacity, then the causality flows from the labor market into production. We entertain these two hypotheses in a standard Granger-causality setup. Formally, we estimate separately the following two models:

$$LMF_t \quad = \beta_0 + \sum_{i=1}^{L} \beta_i LMF_{t-i} + \sum_{j=1}^{K} \psi_j GDP_{t-i} + \varepsilon_t \qquad (1)$$

$$GDP_t \quad = \phi_0 + \sum_{i=1}^{L} \phi_i GDP_{t-i} + \sum_{j=1}^{K} \lambda_j LMF_{t-i} + \nu_t, \qquad (2)$$

where LMF_t is one of four labor market flows: hiring, separation, job creation, and job destruction rates; GDP_t is the quarter-on-quarter GDP growth rate. Both variables are corrected for quarterly seasonality. In equation (1), if the ψ_j's are jointly statistically significant, then GDP fluctuation Granger-cause labor market flows. However, if the joint significance is that of the λ_j's in equation (2), then labor market flows Granger-cause GDP fluctuations.

Table 3 presents the estimates of the coefficients of equation (1) in columns (1)-(4) and of equation (2) in columns (5)-(6). The estimation process allowed for up to four lags of the dependent and of the driving variable. However, the estimates presented correspond to the best models as selected by the Schwarz Information Criterion.

Before concentrating on "which came first," lets consider how these variables correlate. A clear pattern emerges: GDP correlates with hires and job creation (odd-numbered columns), but it has a weak association with the measures of worker separations and job destruction (even-numbered columns). This finding is compatible with those found for other economies, for example in the United States in Shimer (2007), which emphasizes the importance of hires and job creation decisions for the fluctuations of employment and unemployment and, therefore, output.

In which direction does the Granger-causality flow? The results indicate that GDP growth in the previous quarter is statistically associated with increases in contemporaneous hires and job creation (columns (1) and (3)). When the role of the variables is reversed, the statistically associations are weaker (columns (5) and (7)). The joint tests reported at the bottom of Table (3) have somewhat stronger evidence that the (Granger) causality goes from GDP to hires and job creation. This would be compatible with the hypothesis of labor hoarding. The reverse causality suggests that, after firms increase hires and job creation, GDP growth increases. As with the chicken and the egg, the puzzle remains.

The evidence is clearer in terms of the separation and job destruction rates. There is no statistical association between lagged GDP and the subsequent behavior of separations and job destruction (columns (2) and (4)). For the reverse associations (columns (6) and (8)),

contemporaneous GDP growth is not associated with lagged separations and individually with lagged job destruction rates, although jointly the association is significant. As stated earlier, separations and job destruction do not Granger-cause business cycle fluctuations or vice-versa.

6.2 Firm-level analysis: Hires, separations, churning and the business cycle

Now, we explore the patterns exhibited in the Granger-causality framework using a firm-level regression framework, where we can control for additional potentially confounding factors. We are particularly interested to know which firms lead the process of employment adjustment over the cycle. We measure firm quality using the size of firms. Large firms tend to be more productive, a larger fall in churning, hires and separations for larger firms will have a negative impact on productivity and economic growth.

In equation (3), we regress LMF_{tq} – hires, separations, churning, or net job creation – among firms of quality (size) q, in time period t, on (i) GDP growth, (ii) a vector of firm quality indicators (F_q) corresponding to the deciles of firm size, and (iii) their interactions, using the highest quality group (largest firms) as the reference group. Additionally, in X_t, we control for industry fixed effects, time effects and seasonality.

$$LMF_{tq} = \alpha_0 + \alpha_1 GDP_t + \alpha_2 F_q + \alpha_3 GDP_t \times F_q + \alpha_4 X_t + \epsilon_{tq}. \tag{3}$$

We acknowledge that our panel covers a period in which the Portuguese business cycle has a quite negative evolution. This implies that we only have limited business cycle variation as well as a limited ability to control for other factors in the time series dimension.

Table 4 summarizes the coefficients on GDP growth and their interactions with the firm size dummies. In column (1), the dependent variable is the hiring level (in logs). The main effect of GDP growth is positive for the largest deciles of the firm size distribution and is statistically different between the top decile and the all other deciles. The impact grows from small to large firms: but it is not statistically different from zero below the 6th decile, and increasing to 4.3% for each additional percentage increase in GDP at the highest decile. These results show that larger firms fare better in times of high GDP growth (and fare also much worse in bad times, of negative GDP growth); their hirings increase by more (decrease by more).

In column (2) we study the separation behavior. As in the Granger-causality, separations do not react to GDP. The main effect of GDP is not statistically significant at the 1%-level for

any firm size decile. Though firms are more likely to make layoffs in a recession, our findings are consistent with a more-than-offsetting decline in voluntary quits (evidence for this is available for the US in Shimer 2005 and Hall 2005). This behavior of the composition of separations makes them not responsive to output. In fact, if the composition of separations change over the business cycle, the impact on output is expected to be reduced as the impact on productivity of the two movements is quite diverse.

The impact of economic activity on churning is shown in column (3). We conclude that churning in larger firms is more sensitive to the business cycle, but also that it has a different impact along the firm size distribution. For larger firms, good economic times are associated with larger excessive worker rotation (there is a significant recomposition of the workforce). For smaller firm the opposite occurs, they reduce churning in good times and increase it in bad times. This can be seen as the result of large firms being more attractive to workers and offering better matches in booms, which leads to an intense reallocation of workers with positive impact on productivity.

The business cycle reduces hirings by markedly more at the highest deciles of the firm size distributions and is neutral for separations. The impact on employment growth (column 4) of the business cycle reflects these two opposing reactions. The employment growth effect must be accounted for by the larger impact on hirings, not by a larger reduction in separations. Relatively speaking, smaller firms grow during times of low growth because they have a smaller reduction in hirings. Figure 3 exhibits these effects more clearly, plotting the main effect of GDP as a function of the firm size decile (along with the 95% confidence interval). The graph represents the total impact of a one percentage point increase in GDP growth rate on firm employment growth. The employment growth effect is positive and increases steadily across firm size deciles. This pattern is justified by the behavior of hirings, whose impact increase steadily across size deciles.

We find that smaller firms fare relatively better in times of high unemployment in terms of their employment growth. We believe we have identified an economically important phenomenon at a macro-level. Large firms explain most of the business cycle variation of employment.
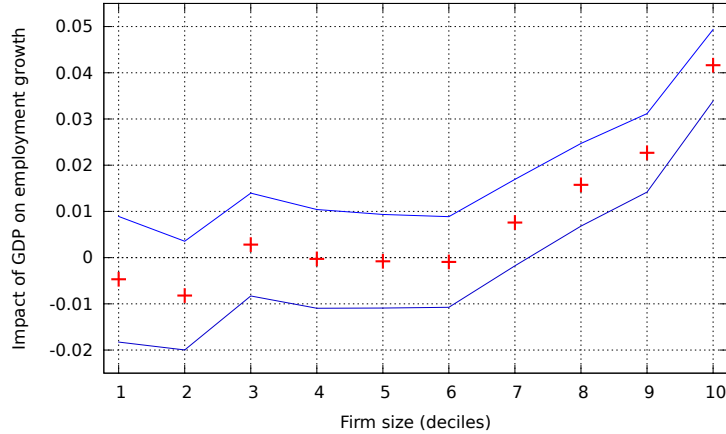
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Figure 3: Business impact on net job creation by firm size (deciles)

7   Conclusions

The economic and financial crisis has stalled the Portuguese labor market. There is less churning, much less hirings and yet surprisingly, fewer separations. These developments are negative for firms productivity because they reflect the absence of new investment.

In Portugal, the business cycle is largely correlated with the hiring rate, not so much with separations. By not investing in new relations, firms shutdown their biggest engine of growth, human capital. Without access to new jobs, workers' return to their investments in human capital is reduced, which generates under-investment in education and training.

Using employer-employee matched data, we find that smaller firms fare relatively better in the recessions; their employment growth shrinks by less. This is because the hires at larger firms fall more. It looks as though larger firms are more likely to make layoffs in an economic downturn and to freeze expansion-hires by even more, even if they still keep a modest amount of hiring. This set of results is consistent with the need for small firms to continually replenish their stock of workers in boomtimes when they lose their workforce to larger firms, while in busts they can grow, relative to large firms. In contrast, large firms grow relatively faster in boomtimes and experience relatively more separation/less hires in busts.

This set of facts is suggestive of two important implications for workers matching in recessions. First, smaller firms may have an easier time attracting and retaining high-quality workers in a recession. Second, smaller firms have a relatively easier time retaining workers in recessions, because they shrink less quickly. Therefore a worker matching to a low-quality firm in a recession is likely to stay there for longer; he or she will have less of an opportunity to

make a job-to-job transition to a larger firm.

Following Schumpeter (1939), economists advanced the notion that recessions serve a cleansing mechanism, reallocating resources from least to most productive firms. Our results on employment growth may question this prediction, because resources flow to smaller firms in recessions. This relative ability of smaller firms to retain their workforce in recessions could be labor supply driven if the decline in voluntary quits in recessions has a larger impact in small firms. Alternatively, it could be labor demand driven if large firms have a greater need to layoff workers. Unfortunately, our data does not identify whether a separation was voluntary or involuntary, but it is a path worth exploring in other studies.

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Tables and Figures

Table 1: Labor market flows in 2007 and 2012

| | Total economy | | | |
	2007	2012	$\Delta(12-07)$	% change
Employment	2,427,401	2,093,135	-334,266	-13.8%
Hires	244,174	142,178	-101,996	-41.8%
Number of firms with hires	65,118	40,546	-24,572	-37.7%
Average hires per firm	3.7	3.5		
Separations	213,100	196,114	-16,986	-8.0%
Number of firms with separations	63,477	57,363	-6,114	-9.6%
Average separations per firm	3.4	3.4		
Job creation	129,294	70,605	-58,689	-45.4%
Number of firms with job creation	46,581	27,111	-19,470	-41.8%
Average job creation per firm	2.8	2.6		
Job destruction	98,220	124,541	26,322	26.8%
Number of firms with job destruction	41,687	44,770	3,084	7.4%
Average job destruction per firm	2.4	2.8		
Churning	229,761	143,146	-86,615	-37.7%
Number of firms with churn	29,163	18,638	-10,525	-36.1%
Workers churned per firm	7.9	7.7		
Churning in expanding firms	128,019	-58.2%		
Expanding firms with churn	10,626	5,203	-5,423	-51.0%
Workers churned in expanding firm	12.0	10.3		
Churning in contracting firms	69,665	68,896	-769	-1.1%
Contracting firms with churn	7,373	6,046	-1,327	-18.0%
Workers churned in contracting firm	9.4	11.4		
Churning in stable firms	32,077	20,737	-11,340	-35.4%
Stable firms with churn	11,164	7,389	-3,775	-33.8%
Workers churned in stable firm	2.9	2.8		

Notes: Social Security wage records cover all salaried relations with remunerations subject to contributions to the public social security system; the data excludes firms with private pension funds and public employees covered by specific civil servant systems. Furthermore, for comparability reasons and relevance, our analysis excludes firms in the primary, financial, public administration, education, and health sectors.

Table 2: Labor market flows by economic sector in 2007 and 2012

	Manufacturing				Construction				Services			
	2007	2012	Changes		2007	2012	Changes		2007	2012	Changes	
Employment	722,179	598,657	-123,523	-17.1%	353,215	217,979	-135,236	-38.3%	1,352,007	1,276,500	-75,507	-5.6%
Hires	39,938	23,367	-16,571	-41.5%	46,812	18,168	-28,643	-61.2%	157,425	100,643	-56,782	-36.1%
Number of firms with hires	12,526	7,782	-4,744	-37.9%	13,316	5,948	-7,368	-55.3%	39,276	26,816	-12,460	-31.7%
Average hires per firm	3.2	3.0			3.5	3.1			4.0	3.8		
Separations	37,469	33,543	-3,926	-10.5%	40,811	32,043	-8,768	-21.5%	134,820	130,528	-4,292	-3.2%
Number of firms with separations	12,898	10,703	-2,195	-17.0%	13,177	10,232	-2,945	-22.4%	37,402	36,428	-974	-2.6%
Average separations per firm	2.9	3.1			3.1	3.1			3.6	3.6		
Job creation	23,964	13,962	-10,002	-41.7%	27,554	10,243	-17,311	-62.8%	77,777	46,400	-31,377	-40.3%
Number of firms with job creation	8,580	4,986	-3,594	-41.9%	9,351	3,740	-5,611	-60.0%	28,651	18,385	-10,265	-35.8%
Average job creation per firm	2.8	2.8			2.9	2.7			2.7	2.5		
Job destruction	21,495	24,138	2,643	12.3%	21,553	24,118	2,565	11.9%	55,172	76,286	21,114	38.3%
Number of firms with job destruction	8,192	7,955	-237	-2.9%	8,551	8,356	-195	-2.3%	24,944	28,459	3,515	14.1%
Average job destruction per firm	2.6	3.0			2.5	2.9			2.2	2.7		
Churning	31,948	18,811	-13,138	-41.1%	38,516	15,851	-22,666	-58.8%	159,297	108,485	-50,812	-31.9%
Number of firms with churn	6,478	4,102	-2,376	-36.7%	6,510	3,070	-3,440	-52.8%	16,176	11,466	-4,709	-29.1%
Workers churned per firm	4.9	4.6			5.9	5.2			9.8	9.5		
Churning in expanding firms	15,435	7,268	-8,167	-52.9%	19,314	5,907	-13,407	-69.4%	93,271	40,339	-52,932	-56.8%
Expanding firms with churn	2,531	1,306	-1,226	-48.4%	2,544	862	-1,683	-66.1%	5,551	3,036	-2,515	-45.3%
Workers churned in expanding firm	6.1	5.6			7.6	6.9			16.8	13.3		
Churning in contracting firms	9,932	7,404	-2,528	-25.5%	12,891	6,998	-5,894	-45.7%	46,842	54,495	7,653	16.3%
Contracting firms with churn	1,772	1,355	-417	-23.5%	1,884	1,195	-689	-36.6%	3,718	3,497	-221	-5.9%
Workers churned in contracting firm	5.6	5.5			6.8	5.9			12.6	15.6		
Churning in stable firms	6,582	4,139	-2,443	-37.1%	6,312	2,947	-3,365	-53.3%	19,184	13,652	-5,533	-28.8%
Stable firms with churn	2,175	1,442	-733	-33.7%	2,082	1,014	-1,068	-51.3%	6,907	4,934	-1,974	-28.6%
Workers churned in stable firm	3.0	2.9			3.0	2.9			2.8	2.8		

Notes: Social Security wage records cover all salaried relations with remunerations subject to contributions to the public social security system; the data excludes firms with private pension funds and public employees covered by specific civil servant systems. Furthermore, for comparability reasons and relevance, our analysis excludes firms in the primary, financial, public administration, education, and health sectors.

Table 3: Chickens or eggs: Granger-causality of labor market flows and GDP

Explanatory variables	H_t (1)	S_t (2)	JC_t (3)	JD_t (4)	GDP_t (5)	(6)	(7)	(8)
GDP_{t-1}	0.127	0.063	0.075	-0.017	-0.059	0.087	-0.096	-0.078
	(0.017)	(0.188)	(0.013)	(0.696)	(0.700)	(0.559)	(0.575)	(0.611)
H_{t-1}	0.967				0.799			
	(0.000)				(0.052)			
H_{t-2}					-0.615			
					(0.133)			
S_{t-1}		1.106				0.269		
		(0.000)				(0.579)		
S_{t-2}		-0.216				-0.323		
		(0.349)				(0.510)		
S_{t-3}		0.242						
		(0.301)						
S_{t-4}		-0.300						
		(0.052)						
JC_{t-1}			0.938				1.477	
			(0.000)				(0.045)	
JC_{t-2}							-1.040	
							(0.322)	
JC_{t-3}							1.054	
							(0.292)	
JC_{t-4}							-1.141	
							(0.092)	
JD_{t-1}				1.191				-0.851
				(0.000)				(0.132)
JD_{t-2}				-0.327				0.077
				(0.042)				(0.886)
Number of quarters	50	47	50	49	49	49	47	49
Adjusted-R^2	0.94	0.87	0.94	0.76	0.08	-0.04	0.12	0.09
F-test for Granger-causality	6.16	1.79	6.74	0.16	3.16	0.23	2.74	3.63
p-value	(0.017)	(0.188)	(0.013)	(0.696)	(0.052)	(0.797)	(0.041)	(0.035)

Notes: Selected regressions based on the Schwarz Information Criterium. Quarterly seasonally adjusted data, covering 2000:Q2 to 2012:Q4. GDP_t is the quarter-on-quarter GDP growth rate; H_t and S_t are the hires and separations rates; and JC_t and JD_t are the job creation and job destruction rates.

Table 4: Firm flows by firm characteristcs and economic conditions

	Hirings Coef	p-value	Separations Coef	p-value	Churning Coef	p-value	ΔEmployment Coef	p-value
Business cycle indicator	0.040	(0.000)	-0.002	(0.911)	0.037	(0.000)	0.041	(0.000)
$\times$ 1st decile of firm size	-0.042	(0.000)	0.010	(0.085)	-0.041	(0.000)	-0.045	(0.000)
$\times$ 2nd decile of firm size	-0.044	(0.000)	0.003	(0.740)	-0.047	(0.000)	-0.050	(0.000)
$\times$ 3rd decile of firm size	-0.040	(0.000)	-0.002	(0.336)	-0.044	(0.000)	-0.039	(0.000)
$\times$ 4th decile of firm size	-0.041	(0.000)	-0.003	(0.250)	-0.042	(0.000)	-0.042	(0.000)
$\times$ 5th decile of firm size	-0.040	(0.000)	0.002	(0.942)	-0.039	(0.000)	-0.041	(0.000)
$\times$ 6th decile of firm size	-0.040	(0.000)	-0.001	(0.445)	-0.041	(0.000)	-0.041	(0.000)
$\times$ 7th decile of firm size	-0.037	(0.000)	-0.003	(0.169)	-0.036	(0.000)	-0.033	(0.000)
$\times$ 8th decile of firm size	-0.025	(0.000)	-0.003	(0.150)	-0.028	(0.000)	-0.025	(0.000)
$\times$ 9th decile of firm size	-0.012	(0.005)	0.003	(0.906)	-0.014	(0.000)	-0.018	(0.002)
Number of observations	595548		630208		502449		502449	
Number of firms	38193		36845		36104		36104	