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December 2007

The analyses, opinions and findings of these papers represent the views of the authors, they are not necessarily those of the Banco de Portugal.

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Do labor market policies affect employment composition? Lessons from European countries*

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Abstract

We study the effects of different labor market policies on employment composition in a matching model with salaried work and self-employment. We empirically assess some of the model's predictions using micro data from the European Union Household Panel. Policies such as employment protection legislation and compulsory social security contributions of the self-employed, and their interactions, are relevant to explain the composition of employment in the European labor market. One major policy implication of this result is the need for a convenient policy mix definition.

Keywords: Employment composition, employment protection, social security contributions

JEL: J23

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1 Introduction

Over recent years, the composition of employment has received a great deal of attention, both from academic researchers and policy makers. This is in part explained by the growth of the proportion of workers who are self-employed observed in several countries in the 90s — during which it was the most significant source of job growth in some OECD economies, notably Germany, Canada and Portugal — but also by the important role that entrepreneurship plays in the debate over the performance of the European Union labor markets and its employment guidelines.

A set of overlapping reasons has been put forward to explain the observed changes in employment composition. Traditionally, economists relate self-employment growth with the deterioration of labor market conditions (Blanchflower, 2004). In that sense, self-employment is seen as a source of jobs for the unemployed, most papers analyzing the relationship between unemployment and self-employment rates. More recently, researchers have been stressing out other reasons such as the market reaction to overly rigid labor and product markets and the high level of taxation; changes in industrial organization; the availability of new employment opportunities in OECD economies; and special policies directed to foster self-employment entry. These studies include both micro and aggregate level analyses by Evans and Leighton (1989), Meager (1992), Blanchflower and Meyer (1994), and, more recently, Borjas (1999), Carrasco (1999), and Blanchflower (2000).

In this paper we analyze the impact on employment composition of different labor market policies that affect the opportunity cost of self-employment versus salaried work. These policies include the degree of salaried employment protection and different regimes of compulsory contributions to the social security system made by the self-employed vis a vis the one in place to salaried workers.

As a start, we develop a matching model of employment determination in which firms and workers jointly sort their employment decisions between the salaried and self-employment sectors. In the spirit of Pissarides (2000), we model the impact on employment composition of the interaction between labor market rigidity and the direct cost of being self-employed. On the one hand, firms hiring salaried workers must comply with specific labor legislation that limits their ability to freely adjust the number of workers, namely through firing restrictions imposed by employment protection legislation. On the other hand, workers willing to become self-employed must comply with mandatory payments to the government, not necessarily under the form of taxes, that limit their ability to enter self-employment. For example, a large number of countries require the payment of minimum social security contributions regardless of the amount of income raised by the self-employment activities.

We show that these policies have opposite impacts on employment composition. On the one hand, higher costs of being self-employed discourage workers to enter this sector, and, other things being equal, one should observe a lower probability of transition from unemployment to self-employment, a higher unemployment rate, and fewer vacancies per unemployed. The probability of transition to a salaried position should increase. On the other hand, higher firing costs should result in a larger probability of transition to self-employment and fewer vacancies per unemployed; we should also observe a lower probability of transition to salaried work out of unemployment.

We empirically test the model propositions using individual-level data from a set of 13 European countries collected by the European Union Household Panel survey (EUHP) from 1994–1999. The data on labor market flexibility are collected by the World Competitiveness Report and the cost of self-employment entry is proxied with the ratio of social security contributions per self-employed to the nominal GDP *per capita*, from the OECD Revenue Statistics. In accordance with the model predictions, the empirical results indicate that the positive relationship between labor market rigidity and the probability of transition to self-employment or salaried work is sensitive to the inclusion of a variable capturing the cost of entering (and remaining in) self-employment. We find a non-linear relationship between our measures of flexibility and social security costs, and these transition probabilities. Higher social security contributions paid by the self-employed reduce the ability of labor market rigidity to explain transitions out of unemployment. Therefore, the role of self-employment in making labor market rigidities less severe depends on the barriers to self-employment placed by these mandatory contributions, which have a direct impact on the income formation of self-employed workers.

This illustrates a key drawback of previous empirical research, which is the failure to identify the broad effect of labor market policies on the patterns of transitions, and hence on the employment composition. To analyze the total effect of these policies or outcomes (for example, firing costs, compulsory contributions, unemployment, and inequality), one needs to think carefully about how salaried work and self-employment (and other labor market variables) are going to respond to these policies or outcomes. If, somehow, one makes more expensive to operate a business, this will crowd out the effect of labor market rigidities on self-employment entry, and eventually magnify their impact on different labor market outcomes, such as the unemployment rate.

The rest of the paper is organized as follows. Section 2 presents a search model of employment determination with salaried and self-employment sectors. Section 3 discusses the indicators used as measures of our key policy variables and briefly describes the data sources. Section 4 outlines the empirical strategy, and section 5 presents the econometric results. Section 6 concludes.

2 A matching model of employment composition

This section presents a matching model with two sectors: the salaried sector and the self-employment sector. Firms and workers jointly sort their employment decisions between the two sectors. Firms hiring salaried workers must comply with specific labor legislation that limits their ability to freely adjust the number of workers, namely through firing restrictions imposed by employment protection legislation. Workers entering self-employment must comply with mandatory payments to the government that otherwise would have been supported by the employer. One such requirement, in place in a large number of OECD countries, is the payment of minimum social security contributions, regardless of the amount of income raised by self-employment activities.

2.1 The economy

The economy consists of a continuum of infinitely-lived individuals in the unit interval. Each individual can work either as a salaried or self-employed worker. All agents have linear utility functions and capital markets are perfect and characterized by a safe interest rate. Agents decide to become employed or remain unemployed by maximizing utility under rational expectations over their horizon. They are identical in all respects.

There is also a continuum of firms, each offering one job, which sort themselves between the salaried and self-employment sectors. Firms hiring salaried workers must comply with labor legislation that imposes a fixed cost in case a job is eliminated. By hiring self-employed workers firms avoid this cost if the worker is to be laid-off. However, productivity of self-employed workers is lower due to their lower attachment to firms, caused by lower investment in firm-specific human capital, for example. Each occupied job produces a constant flow of output and continues producing this output until the relationship breaks down. We assume that there are no productivity shocks and the only reason for the interruption of production is an exogenous process that separates workers from jobs. Agents are separated at constant Poisson rate. After separation, the job is re-advertised as a vacancy and the worker becomes unemployed to search for another job. Unemployed workers enjoy income flow b but job vacancies produce and cost nothing.

The allocation of jobs to workers follows the simple framework in Pissarides (2000). At time t there are $n + v$ jobs, with n of them occupied and v of them vacant. There are $n + u$ workers in the market, one in each occupied job, and u unemployed. The v vacant jobs and the u unemployed workers engage in a process of search and matching governed by an aggregate matching function with constant returns to scale. Firms advertise jobs either as salaried or self-employment positions.

As shown in Pissarides (2000), the arrival process can be summarized by a single parameter, the tightness of the market: $\theta \equiv v/u$, where v is the number of vacancies and u is the number of unemployed workers. Workers arrive to jobs according to a Poisson rate

$q(\theta)$, which has elasticity in the interval $(-1, 0)$, and jobs arrive to unemployed workers according to a related Poisson rate $\theta q(\theta)$, with elasticity in the interval $(0, 1)$ and

$$\lim_{\theta\to\infty} q(\theta) = \lim_{\theta\to 0} \theta q(\theta) = 0$$
$$\lim_{\theta\to 0} q(\theta) = \lim_{\theta\to\infty} \theta q(\theta) = \infty\,.$$

There is a matching function, $m(u, v)$, that depends on the tightness of the labor market. The rate of arrival of workers can be expressed in terms of the matching function as follows:

$$q(\theta) = m\left(\frac{1}{\theta}, 1\right).$$

The value of production is a function of a firm idiosyncratic component and of a match-quality component. The firm idiosyncratic component accounts for the firm's ability at providing on-the-job training and qualifications to its employees. Let us assume that firm-specific productivity is A, a stochastic variable with support $[0, \overline{A}]$ and distribution $F(A)$. Depending on A, the firm then chooses to advertise the job vacancy either as salaried work (SW) or self-employment (SE). Job searchers find vacancies randomly, then learn the type of contract offered (SW or SE). After hiring the worker, the quality of the match worker-job, γ, taken from distribution $G(\gamma)$, is observed. This distribution is independent of the job type and we normalize its support to interval $[0, 1]$. Total productivity of a firm hiring in sector $j = \mathrm{SE}, \mathrm{SW}$ is the sum of job-specific productivity and match quality, $y_j = A - a\mathcal{I}_{j=\mathrm{SE}} + \gamma$, where $\mathcal{I}_{j=\mathrm{SE}}$ is the indicator function of sector SE. Due to the lower attachment of self-employed workers to firms, we make the assumption that, for the same realization of firm-specific productivity, a job offered in the self-employment sector has lower productivity than in the salaried work sector. This is modeled by use of constant $a \geq 0$. The firm and the worker then decide if they want to continue the match. At this stage, ending the match does not have any associated cost.

If the match continues, the worker and the firm Nash-bargain wages with equal distribution of surplus. For salaried positions, the firm incurs a cost k in case the job breaks down, which occurs at rate λ. For self-employment positions, the worker incurs a flow cost c. Self-employment matches also break down at rate λ. Each worker supplies a constant flow of one unit of working time. There is free entry in the entrepreneurial sector.

The value of a vacant job, V, is

$$rV = -d + q(\theta)(F - V),$$

where F is the expected value of a filled job, d is the cost of searching workers per unit of time, and r is the exogenous interest rate. The value of a filled type j job is

$$rJ_j = y_j - w_j + \lambda(V - J_j - k\mathcal{I}_{j=\text{SW}}),$$

where y_j is output, w_j work compensation, and λ the rate at which the work relationship breaks down, $j = \text{SW}, \text{SE}$. Notice that J_j depends on the realization of the match quality, which is unknown when the firm decides the type of job it will offer to the worker. Since there is free entry in the entrepreneurial sector, $V = 0$. These equations yield

$$F = [q(\theta)]^{-1} d \tag{1}$$

$$J_j = (r + \lambda)^{-1} (y_j - w_j - \lambda k\mathcal{I}_{j=\text{SW}}) . \tag{2}$$

The value of being unemployed, U, satisfies

$$rU = b + \theta q(\theta)(E - U),$$

where E is the expected value of being employed and b the level of unemployment protection.

The value of being a type j employee is

$$rW_j = w_j - c\mathcal{I}_{j=\text{SE}} + \lambda(U - W_j),$$

where c is the cost associated with being self-employed. These equations yield

$$E = [\theta q(\theta)]^{-1} ((r + \theta q(\theta)) U - b) \tag{3}$$

$$W_j = (r + \lambda)^{-1} (w_j - c_j\mathcal{I}_{j=\text{SE}} + \lambda U) . \tag{4}$$

2.2 Wage determination and the acceptance/dismissal decision

We solve the model by backward induction. Let us first obtain the wage rate for each match. Suppose a firm decides to keep a worker after having offered him a contract of type SW and having observed the match quality. Wage bargaining with equal share of surplus then corresponds to solving $J_{\text{SW}} - V = W_{\text{SW}} - U$. Using (2) and (4) yields the wage rate

$$w_{\text{SW}} = \frac{1}{2} (A + \gamma - k\lambda + rU) . \tag{5}$$

Using the same procedure for type SE contracts leads to

$$w_{\text{SE}} = \frac{1}{2} (A - a + \gamma + c + rU) . \tag{6}$$

Wages increase with total productivity. The wage rate for the self-employed also increases with c since the worker requires partial compensation for having higher costs. Given that, after observing the match quality, the immediate dismissal of a worker costs nothing, firms hiring in sector j do not destroy a job such that $J_j \geq V$, $j = \text{SW}, \text{SE}$. This implies a limit match quality under which firms dismiss the worker. To calculate it, let us compute J_j as a function of the stochastic variables. Taking (2), substituting $y_j = A - a\mathcal{I}_{j=\text{SE}} + \gamma$, and replacing w_j by (5) and (6), $j = \text{SW}, \text{SE}$, yields

$$J_{\text{SW}} = \frac{1}{2}(r+\lambda)^{-1}(A+\gamma-k\lambda-rU) \tag{7}$$

$$J_{\text{SE}} = \frac{1}{2}(r+\lambda)^{-1}(A-a+\gamma-c-rU). \tag{8}$$

The limit match quality under which the firm dismisses the worker is thus defined by

$$\gamma_{\text{SW}} = -A + k\lambda + rU \tag{9}$$

$$\gamma_{\text{SE}} = -A + a + c + rU. \tag{10}$$

Workers do not leave the job if $W_j \geq U$, $j = \text{SW}, \text{SE}$; the critical values are the same as above.

2.3 Choice of contract by firms

Given A, selection between sectors depends on whether the expected value of offering a SW contract is higher or lower than offering an SE contract. The expected value of offering SW or SE contracts is

$$F_j = \int_{\gamma_j}^{1} J_j \, dG(\gamma), \qquad j = \text{SE}, \text{SW}. \tag{11}$$

Firms choose to offer a SW or an SE contract depending on whether $\Delta = F_{\text{SW}} - F_{\text{SE}}$ is positive or negative. We can prove the following:

Proposition 1 *For all A, $\frac{\partial \Delta}{\partial A} > 0$ if and only if $\lambda k < c + a$.*

Proof. See appendix B, section B.1. ■

The above result implies that if $\lambda k < c + a$ and both sectors exist, there is some A_c such that the firm prefers to hire in the SW sector if $A \geq A_c$, and prefers to hire in the SE sector if $A < A_c$. (If $\lambda k > c + a$, the opposite happens.) Thus, firms self-sort into sectors based on the realization of firm-specific productivity A.

There is some empirical evidence that more productive firms tend to offer salaried positions. In the EUHP data used in section 3, for instance, the wages of self-employed workers are roughly 30 percent lower than those of salaried employees. We therefore assume that $\lambda k < c + a$ holds; the results of section 2.5 would not change, however, if $\lambda k > c + a$ were true.

2.4 Closing the model

As pointed out before, free entry in the entrepreneurial sector drives the value of a vacant job, V, to zero. It remains to determine U and the equilibrium value of θ. The expected value of being unemployed, U, is determined by equating the expected value of being employed, E, given by

$$\begin{aligned} E = & \int_{A_c}^{\overline{A}} \int_{\gamma_{\text{SW}}}^{1} W_{\text{SW}} \, dG(\gamma) dF(A) + U \int_{A_c}^{\overline{A}} \int_{0}^{\gamma_{\text{SW}}} dG(\gamma) dF(A) \\ & + \int_{0}^{A_c} \int_{\gamma_{\text{SE}}}^{1} W_{\text{SE}} \, dG(\gamma) dF(A) + U \int_{0}^{A_c} \int_{0}^{\gamma_{\text{SE}}} dG(\gamma) dF(A), \end{aligned} \tag{12}$$

where

$$W_{\text{SW}} = \frac{1}{2} (r + \lambda)^{-1} (A + \gamma - k\lambda + U (r + 2\lambda)) \tag{13}$$

$$W_{\text{SE}} = \frac{1}{2} (r + \lambda)^{-1} (A - a + \gamma - c + U (r + 2\lambda)), \tag{14}$$

to expression (3). Since $W_j \geq U$ for the worker to keep a job, it follows from the expression above that $E \geq U$. Finally, market tightness is obtained by solving (1) for θ, with the expected value of a filled job given by

$$F = \int_{A_c}^{\overline{A}} \int_{\gamma_{\text{SW}}}^{1} J_{\text{SW}} \, dG(\gamma) dF(A) + \int_{0}^{A_c} \int_{\gamma_{\text{SE}}}^{1} J_{\text{SE}} \, dG(\gamma) dF(A). \tag{15}$$

2.5 Policy and type of contract

In order to investigate the effects of policy decisions on self-employment, we perform the derivatives of θ and U with respect to k, c and b. We then use this information to study the impact of policies on transition probabilities from unemployment to the SE and SW sectors. To simplify the analysis, let us suppose that the idiosyncratic productivity has a binary distribution. It assumes the constant, positive level $\overline{A}$ with probability p, and zero with probability $1-p$. In the spirit of proposition 1, let us suppose that A_c lies somewhere between 0 and $\overline{A}$. The proposition then implies that a SW contract is offered whenever job-specific productivity is $\overline{A}$, and an SE contract is offered whenever the job-specific productivity is 0. We can prove the following proposition:

Proposition 2 *Suppose that firm-specific productivity can be either $\overline{A} > 0$ or 0, with probability p or $1 - p$, respectively. In equilibrium, $\frac{\partial \theta}{\partial c}$, $\frac{\partial \theta}{\partial k}$, $\frac{\partial U}{\partial c}$, $\frac{\partial U}{\partial k}$ and $\frac{\partial \theta}{\partial b}$ are all negative, and $\frac{\partial U}{\partial b}$ is positive.*

Proof. See appendix B, section B.2. ∎

These results are expected. Tightness decreases with the cost of being self-employed because jobs retained after the match in the SE sector decrease as γ_{SE} increases, which decreases flows out of unemployment (and into self-employment). The effect of a higher SW job destruction cost is to decrease job creation in the SW sector, which leads to fewer jobs created and decreased tightness. Unemployment compensation decreases tightness due to the increase in unemployment permanent income. The reservation wage, rU, decreases both with c and k. A higher cost of self-employment implies a lower productivity in that sector. This affects the reservation wage, since U also depends on future prospects of being employed. Finally, a higher cost of job elimination implies a lower reservation wage.

At each moment, fraction $p(1 - G(\gamma_{\mathrm{SW}}))$ of the newly created jobs are filled with salaried workers, and fraction $(1 - p)(1 - G(\gamma_{\mathrm{SE}}))$ of jobs are filled with self-employed workers. The remaining matches are costlessly destroyed. In order to study the impact of changes in c, k and b on these probabilities, we have to study the impact of those parameters on γ_{SW} and γ_{SE}.[1] Proposition 3 summarizes our findings .

Proposition 3 *Under the assumptions of proposition 2, $\frac{\partial \gamma_{\mathrm{SW}}}{\partial k}$ is positive, whereas $\frac{\partial \gamma_{\mathrm{SW}}}{\partial b}$, $\frac{\partial \gamma_{\mathrm{SE}}}{\partial b}$, $\frac{\partial \gamma_{\mathrm{SE}}}{\partial k}$ are $\frac{\partial \gamma_{\mathrm{SW}}}{\partial c}$ are negative. For p sufficiently close to 1, $\frac{\partial \gamma_{\mathrm{SE}}}{\partial c}$ is positive.*

Proof. See appendix B, section 3. ∎

In the case of derivative $\frac{\partial \gamma_{\mathrm{SE}}}{\partial c}$, there is a positive direct effect through c, and a negative indirect effect through U. The first effect dominates when the SE sector is relatively small: changes in c, which have a direct impact only on workers in sector SE, do not have a strong impact on unemployment permanent income. It follows that $\frac{\partial U}{\partial c}$ is " small" and the direct effect on γ_{SE} dominates. We view this as the most plausible case.[2]

The results in proposition 3 imply that, everything else constant and for economies with a relatively small self-employment share, higher firing costs imply lower probability of transition from unemployment to salaried work, and higher probability of transition from unemployment to self-employment. Higher costs of self-employment originate higher probability of transition from unemployment to salaried work, and lower probability of transition from unemployment to self-employment. In the remaining of the paper we present the data to empirically test these predictions.

[1]Notice that, since the job destruction rate λ is the same for both sectors, the impact of the parameters on the steady-state shares of the two sectors in total employment is similar to that on transition probabilities (flows).

[2]The average share of self-employed workers in OECD countries is just over one tenth of total employment (see table 1).

3 Data

The composition of total employment has shifted in a large number of countries towards self-employment. The evolution of self-employment in the OECD countries over the last twenty years has been empirically documented in a number of recent papers (see, for instance, Blanchflower, 2004). If we consider the period between 1986 and 2002 it has increased in 13 out of the 20 OECD countries included in table 1. This general trend, however, hides a great deal of variability among national experiences. Whereas in Portugal self-employment has a procyclical behavior, in Spain it is mainly countercyclical. In some countries it is quite important for net job creation in recent booms, as is the case of Canada and Portugal, while in other countries it is responsible for only a small fraction of net total employment growth, as is the case of the U.S.

[Table 1 about here.]

In order to empirically test the model propositions regarding the impact of policy variables in self-employment entry and exit, one needs to define two key variables: a measure of the degree of employment protection; and a measure of the cost of being self-employed. This paper uses data on labor market flexibility and social security contributions paid by the self-employed to explain the observed diversity in the pattern of self-employment flows across countries. Next, we discuss how to measure these two variables.

3.1 Labor market flexibility

There is a fairly large number of papers studying the impact of labor market flexibility on employment performance, starting with the seminal paper by Lazear (1990). So far, however, the empirical research has focused mainly on the effect of labor market flexibility on the rate and structure of unemployment (see, for example, Nickell, 1997), and on the determinants of labor force participation. Recently, Di Tella and MacCulloch (2005) performed a detailed study covering the 1984-1991 period, which extends the one by Lazear using a panel of OECD countries. Their main findings are that increasing the flexibility of the labor market increases the employment rate, the duration of unemployment, and the rate of participation in the labor force.

In this paper, we argue that the impact of labor market flexibility is not restricted to the salaried sector, and in general affects the overall structure of employment, namely the rate of self-employment. Recently, Robson (2003) addresses explicitly the relationship between a measure of employment protection legislation and the share of self-employment. He reports evidence of a positive, and in some cases significant, correlation between these two variables. However, this conclusion is sensitive to the measure of self-employment share used, namely to the inclusion of agricultural self-employment. Robson (2003) uses the OECD index of employment protection, which has several important drawbacks. The first is its lack of time series pattern, which does not allow a longitudinal analysis of cross-country data. A second one is its lack of information on the enforceability of labor laws across countries.

We follow Di Tella and MacCulloch (2005) and use data on labor market flexibility from the World Competitiveness Report (WCR). This is an annual survey that requests the opinion of managers on, among many other questions, the flexibility of firms to adjust employment levels to economic realities in their countries (see the Appendix for a detailed description of the survey question). Di Tella and MacCulloch (2005) compare these data with other measures of labor market flexibility. The WCR data are highly correlated with the cross sectional measures computed by the OECD. Also, the time series validation shows that the data capture most changes in employment protection legislation occurred in European countries and coded in Saint-Paul (1996). Table 2 presents summary statistics by country. As in virtually every employment protection ranking, the U.S. has the highest degree of labor market flexibility, whereas Italy and Spain have the lowest.

[Table 2 about here.]

3.2 Cost of self-employment

The explanation put forward for the relationship between labor market flexibility and self-employment is that employers may attempt to circumvent the effects of regulations on their ability to hire and fire employees by contracting-out self-employed workers. Besides addressing the firm's incentives for hiring self-employed workers, this argument also relates to the worker's opportunity cost of entering self-employment. In fact, while reducing the flows into salaried work, employment protection regulation also reduces the expected income stream of future salaried work matches. This reduction will be particularly severe among those who fare worst in the labor market, and thus face lower prospects of being offered a salaried work position. This, in turn, implies that the flexibility enhancing effects of self-employment can be easily crowded-out by policies that, having impact in income formation of the self-employed, decrease the likelihood of transitions by low income workers into this type of employment.

In the empirical application made in this paper, we proxy the direct costs of being (entering and remaining) self-employed by the differences across time and countries in social security contributions paid by the self-employed. Since the 80's, European countries have introduced compulsory social security contribution systems to the self-employed (see Schoukens, 1999). While these systems were aimed at insuring self-employed workers, they introduced an additional barrier to self-employment entry, specially for low income workers.[3]

[3]One should stress, however, that cross country comparisons of the financing of social security systems for the self-employed is an extremely hard task. This is both because of differences in the mechanisms

In a number of different studies other variables were used to measure the cost of being self-employed, namely income tax rates and interest rates. In cross-country studies, there are obvious advantages of using social security contributions over income tax rates due to differences in tax evasion patterns across countries and over time. Indeed, most European countries implemented mandatory contributory systems that stipulate minimum levels of contributions, thus eroding the evasion dimension of most income tax systems. Also, using interest rates is not quite appropriate to capture the the costs associated with the type of self-employment matches being created in recent years termed by Pfeiffer and Reize (2000) as "false self-employment", as they are much closer to salaried employment. These are low income matches that involve a low level of capital investment, and are not limited by capital market constraints as one usually thinks of entrepreneurial activities.

The cost of entering and remaining self-employed is measured by the ratio of the social security contributions paid per self-employed to the GDP *per capita*. This is obtained dividing the level of total contributions paid by the self-employed by the number of self-employed workers, and computing its ratio to the nominal GDP *per capita*. This gives us a measure of the financial burden imposed on the self-employed by the social security contributory system.[4]

Over the last decade and a half, there have been dramatic changes in the level of contributions paid by the self-employed in some countries. Figure 1 shows the variable for four Southern European countries (with high levels of self-employment, but different trends). The more significant developments were the rapid increase in contributions observed in Spain (and to some extent in Italy), where the share of contributions per self-employed in *per capita* GDP almost doubled in the period considered. Meanwhile, in other countries (for example, in Portugal) one observes the same upward trend, but with contributions remaining at a very low level relatively to *per capita* GDP. We should note that a similar trend was not observed in salaried workers contributions for the social security system, which remained roughly constant over the same period.

[Figure 1 about here.]

3.3 Micro-level data

We test the model predictions using individual-level data. We use information from six waves of the European Union Household Panel (EUHP) from 1994–1999. This is a survey

used to determine the income basis and because benefits offered are never completely the same, which makes the comparison of percentages of contributions of little use. However, in most cases the recent trend represented a substantial increase in self-employed contributions in some countries since, to prevent income under-report, the minimum compulsory levels of contributions were defined independently of the workers' activity level and differ significantly across countries. See Schoukens (1999) for a detailed description of all the European systems.

[4]It is important to note that during the sample period we did not observe any relevant change in social security contribution for salaried work.

carried out in all 15 countries of the European Union and covers, in a standardized way, the labor force behavior in these countries. The target population of the EUHP consists of all individuals living in private households within the EU. The actual data cover the interval January 1993 through December 1998. The EUHP survey interviews individuals once a year, and asks them a broad set of questions relating to their labor market experience during the preceding calendar year. In its first wave (1994), the EUHP covered about 60,000 households and 130,000 individuals aged 16+ in twelve countries. The survey also covers demographics, income, education and training, and housing, among other individual and household level variables.

This unique survey is the only source of comparable micro-level data across countries and over time in the EU countries. We use data from 13 out of the 15 EU countries prior to the 2004 enlargement, namely, Germany, Denmark, the Netherlands, Belgium, France, United Kingdom, Ireland, Italy, Greece, Spain, Portugal, Austria (entered in 1995) and Finland (entered in 1996). We excluded Luxembourg and Sweden because their data do not allow us to follow individuals over time.

The labor force status (employed, unemployed and out of the labor force) of each individual is recorded. We classify employed workers as either salaried or self-employed, and only consider non-agricultural jobs. Since we are able to follow individuals over time we observe transitions between different states. In table 3 we present all the transitions observed between salaried work, self-employment and unemployment. The empirical exercise focuses on some of the off-diagonal transitions.

[Table 3 about here.]

In the EUHP each respondent is asked a number of demographic questions that we use in our regression models. This information includes age, schooling, and family size. These variables were previously found to influence self-employment transitions in a number of European countries, including Spain, Finland and the UK. Additionally, we have information on financial variables that are also proven to shape self-employment transitions. These variables include "Other sources of non-work income", "Home ownership", "Outstanding mortgage" and "Lottery amount". All monetary variables in the different countries were transformed in a single currency unit using the Purchasing Power Parities (PPP) published by Eurostat and are at 1994 prices.

The degree of government efficiency and its impact on employment creation can be measured by the burden imposed on business activity by the bureaucratic machine. In order to account for factors that affect product market competition, we also include a measure of the bureaucratic efficiency of each country.

Summary statistics for the variables used in this study are presented in table 4 for the three relevant samples: salaried, self-employed or unemployed workers.

[Table 4 about here.]

4 The econometric procedure

To study the effect of policy, economic and demographic variables in transitions between labor market status we use a discrete choice model, in the context of a random utility approach. This approach is suggested by our theoretical model in the following way: a given worker will switch state if the expected utility of the destination state exceeds the expected utility of the origin state.

The usage of a probit model to estimate the probability of transitions along with country-year level variables induces the presence of structural group effects. We expect part of the error term in the underlying choice equation to be common across all observations from a country-year pair, in part because there are unobserved characteristics of these pairs that we cannot control in the regression. Due to this country-year level error component, we estimate a random effects probit regression to obtain efficient estimates and corrected standard errors following the two-stage approach set up by Borjas and Sueyoshi (1994). In fact, individuals within a group (defined by country-year pair) share a common component in the specification of conditional means. This is well suited for the data set at hand. Individuals are characterized by idiosyncratic features, like age or school attainment, but share a common environment within a group, like labor market regulations, which differ across countries and over time. Fairlie and Meyer (2003) use a similar approach to estimate the impact of immigration on native individual self-employment rates between 1980 and 1990 across metropolitan areas in the United States.

The approach in Borjas and Sueyoshi (1994) consists of two steps. The first stage is a probit regression model using individual-level data:

$$\Pr\{Y_{imt} = 1 | X_{imt}\} = F\left(X'_{imt}\beta + \alpha_{mt}\right) \tag{16}$$

where $Y_{imt} = 1$ if the individual i in country m and year t changes labor market status, F is the standard normal cumulative distribution function, X_{imt} is a K-dimensional vector of individual characteristics, and α_{mt} is a fixed country-year effect. We include individual-level covariates that previous studies of labor market transitions have considered: education, age, marital status and gender dummies, and the size of the household. Additionally, we include variables aimed at capturing the financial situation of the household, such as home ownership and lottery (or inheritance) recipiency. In the case of transitions out of unemployment, we include a dummy variable for unemployment insurance recipiency status, as it has been found to be an important factor in explaining transitions out of unemployment (Katz and Meyer, 1990).

The duration dependence of labor market transitions has been pointed out in a large number of studies (Bover, Arellano, and Bentolila, 2002). We are able to tackle this issue by conditioning transitions in the duration of the ongoing spell. We do this in our unemployment transition equations by including the duration of the unemployment spell. For workers moving out of self-employment we include tenure as self-employed. The inclusion of these variables makes it possible to interpret the results of both models as a transition hazard. In fact, not only the formulation of a duration model has a similar interpretation (since it is a binary model), but also the estimation of a proportional hazard model of the transition events yield similar qualitative results (Bover, Arellano, and Bentolila, 2002).

The second stage of Borjas and Sueyoshi's approach consists of a linear regression model of the estimates of α_{mt} on the country-year-level variables:

$$\hat{\alpha}_{mt} = Z'_{mt}\gamma + u_{mt} \tag{17}$$

where Z_{mt} is a vector of country-year-level policy and economic variables. The second-stage coefficient estimates from (17) are in the same metric as the probit coefficients, and their standard errors account for the group-level component in the error term.

As suggested by Borjas and Sueyoshi (1994), we estimate the second-stage regression using generalized least squares. The weighting matrix is $\hat{\Omega} = \hat{\sigma}^2_{\tilde{u}} I_J + V_{\alpha\alpha}$, where $V_{\alpha\alpha}$ is the portion of the first-stage variance matrix corresponding to the dummy variables and J is the number of country-year combinations. In this expression, $\hat{\sigma}^2_{\tilde{u}} = \tilde{\sigma}^2 - \sum_{j=1}^{J} \hat{\sigma}^2_j/(J - M)$. Here, $\hat{\sigma}^2_j$ is the variance of the jth dummy of the first-stage estimation, and $\tilde{\sigma}^2 = \sum_{j=1}^{J} \tilde{w}^2_j/(J - M)$, where the $\tilde{w}_j$ are the residuals of the second-stage regression. Parameter γ is then estimated using $\tilde{\gamma} = (Z'\hat{\Omega}^{-1}Z)^{-1}Z'\hat{\Omega}^{-1}\hat{\alpha}$, with variance matrix given by $\Sigma_{\tilde{\gamma}} = (Z'\hat{\Omega}^{-1}Z)^{-1}$.

In our application, the variables included in the second-stage vector Z_{mt} were the index of labor market flexibility, the level of social security contributions paid by the self-employed, an index of bureaucracy costs, the logarithm of the country's average income in PPP, and the unemployment rate. In addition, we tested several interactions between some of the policy variables.

The policy variables are motivated by the model and capture the role of the two mechanisms identified in the model that affect employment decisions: firing costs and the costs of being self-employed. The interaction term between these two variables captures possible non-linearities in the impact of labor market flexibility and social security contributions on transitions between states. As stated above, it is likely that, since the first variable is directed at demand for self-employment and the second one is directed at the supply side of the market, their full impact on self-employment cannot be captured if they enter only in levels.[5] In order to control for the regulatory level on creating businesses we

[5] Also note that the force of labor market rigidities may be non-linear (Lazear, 1990, first pointed out this possibility). It can be argued that, for a given firm, once labor market rigidities get large enough, no firing occurs and self-employment becomes more important, which implies a non-linear rigidity effect. Thus, one might include the square of labor market flexibility in the specification. This turned out to be non-significant in the regressions performed.

include an index of bureaucracy taken from the IMD survey (see appendix A for a more detailed description of the variable and survey question).

The estimated model includes other country-level variables known to significantly influence the decision to enter or leave self-employment, such as the unemployment rate and the log of GDP *per capita* (Evans and Leighton, 1989).

In the results reported, a “state transition” is either the event that an unemployed person moves to self-employment or salaried work, or the event that a self-employed worker enters a salaried job or unemployment.

5 Empirical results

The model of employment sorting decisions developed in this paper predicts that transitions between labor market states will be affected by labor market policy variables. In particular, we will test the validity of these predictions with regard to labor market flexibility, i.e. the ability of employers to adjust their work-force to their needs, and the cost of being self-employed, proxied by the burden in income formation imposed by social security compulsory contributions.

We test the model results using a discrete choice model of employment decision. We apply a probit model to analyze the transition from unemployment to salaried work and self-employment and from self-employment to unemployment and salaried work. We control for spell duration in our transition models in order to capture the effect of duration dependence on labor market state changes.

5.1 First-stage regression results

The first stage of our empirical model consists of a probit regression model using individual-level data. We estimate this model for the pool of individuals in the EUHP. The four transitions considered were from unemployment to salaried work and self-employment, and from self-employment to unemployment and salaried work. In table 5 we present the results obtained for each of these transitions. Overall, the results were as expected, given what is known from previous studies on labor market transitions.

Workers with a higher level of education are more likely to leave unemployment, both for salaried work or self-employment. The education level also decreases transitions from self-employment to unemployment. These results point to much better employment prospects for the more educated workers. Note that, in the data, prime-aged unemployed workers (in the age range 35-45) are more likely to enter self-employment; this probability decreases when one moves either to the younger or to the older tails. On the contrary, the probability of moving from unemployment to salaried work monotonically decreases with age, young individuals being the more likely to move into this type of employment.

A similar pattern is found in both transitions out of self-employment. Younger workers are more likely to leave this sector regardless of the destination state.

The data show a negative impact on the probability of transition out of self-employment and unemployment of labor market status duration. In fact, longer tenure as self-employed decreases the likelihood of moving out of self-employment either to unemployment or salaried work. Perhaps more interestingly, longer unemployment duration is associated with lower transition probabilities for both employment states, except for persons that have been unemployed for 1 to 5 years. This result is somewhat at odds with the view of self-employment as an alternative to long periods of unemployment.As expected, recipiency of unemployment insurance benefits has a negative impact in the likelihood of transitions out of unemployment and the impact is much stronger in changes into self-employment. Other demographic characteristics also have a clear impact on transitions. Married unemployed workers have a higher probability of moving into employment, but married self-employed are less likely to leave the sector. Men are also more likely to leave unemployment and less likely to leave self-employment. The two variables used to measure the impact of wealth on transitions also have interesting results. Home ownership has a clear positive impact on unemployment transitions. Finally, the indicator of lottery or inheritance recipiency has a positive impact in transitions into self-employment, but no impact in transitions into salaried work. As expected, this variable has no impact on transitions out of self-employment, but home ownership has a clear negative impact.

[Table 5 about here.]

5.2 Second-stage results

The second-stage, country-level variables for transitions out of unemployment and out of self-employment are presented in tables 6 and 7. The linear model regresses coefficients of the year-country dummies from the first-stage regression on a set of country-level variables that control for policy and aggregate effects.

5.2.1 Transitions out of unemployment

The primary focus of our model is on transitions from unemployment into salaried work and self-employment. According to the model predictions, transitions from unemployment to self-employment should decrease with the degree of labor market flexibility and the level of social security contributions. Conversely, transitions to salaried work are expected to increase when labor market flexibility and the level of social security contributions increase, thus changing the composition of employment. The reported empirical evidence generally confirms these predictions. Labor market flexibility and social security contributions paid by the self-employed have an estimated positive impact in transitions to salaried work (column (1)), but the indicator of flexibility is not statistically different from zero. As expected, in transitions into self-employment the coefficient on social security contributions is negative (column (2)), while the one on labor market flexibility impact is positive but again not statistically different from zero. The level of state efficiency, captured by the bureaucracy index variable, is positively associated with transitions into salaried work and negatively associated with transitions into self-employment. Thus, in our data, a more efficiently working government favors the creation of salaried employment. The prevalence of self-employment is associated with a more inefficient bureaucratic environment.

The model also predicts that the probability of entering self-employment or salaried work from unemployment is affected by the interaction between the two main policy variables. This is captured by the interaction term of columns (3) and (4). The estimated coefficient for transitions into self-employment is positive (column (4)). This means that higher social security contributions significantly reduce de ability of flexibility to explain the probability that a worker enters self-employment. The impact is symmetric when considering transitions into salaried work. This highlights the important trade-off that labor market policies induce in the decisions of agents when sorting into different employment sectors. The two policies considered crowd-out each other's effects.

The empirical model also includes some macroeconomic variables. In column (1), the unemployment rate has some ability to predict transitions out of unemployment to salaried work; higher level of unemployment decreases transitions into regular employment. Contrary to what has been found in other studies (Carrasco, 1999), the unemployment rate does not explain transitions into self-employment. The business cycle can have some effect on the ability of labor market flexibility to explain transitions, as this variable measures the adjustment of employment to economic realities. Thus, we also interacted the unemployment rate with the labor market flexibility index. Again, it proved statistically different from zero when analyzing transitions into salaried work. The interaction term is negative, meaning that higher unemployment reduces the ability of flexibility to explain these transitions. In labor markets with larger flexibility, the role of the unemployment rate is stronger, as one would expect, given that in these economies salaried work is more exposed to the vagaries of the business cycle; this increases the variance of employment creation and destruction over the cycle (Davis and Haltiwanger, 1999).

[Table 6 about here.]

5.2.2 Transitions out of self-employment

We also study the ability of agents to remain in self-employment.[6] We present the results of probit regressions applied to transitions from self-employment to unemployment and

[6] Note that in the model self-employed jobs break up at an exogenous rate.

paid-employment in table 7. Labor market flexibility increases transitions out of self-employment, in particular to salaried work. The same is true for higher social security contributions, but interestingly this has a larger impact in driving workers into unemployment. This result points out to the importance of income formation mechanisms to explain the composition of self-employment prevailing in European countries. In columns (3) and (4) we added the interactions with labor market flexibility. The interaction coefficient of labor market flexibility with social security contributions is positive but imprecisely estimated. Nevertheless, the positive impact suggests that both variables reinforce each other when shaping transitions out of self-employment. As expected, higher unemployment rate increases the transitions from self-employment to unemployment, showing some procylicality in the rate of self-employment. This impact is, however, reduced in countries with more flexible labor markets, specially in transitions into salaried work. Again, as in these markets the adjustment is made through regular employment, the role of self-employment is reduced.

Overall, the results confirm those obtained for transitions into unemployment, although weaker in statistical terms. The policy variables considered in our analysis seem relevant in shaping labor market adjustments through their impact on employment composition.

[Table 7 about here.]

5.3 Heterogeneous impact in the labor market

The results presented in the previous sections pooled all the observations in our sample, but the behavior of the labor market differs considerably along the demographic characteristics of some individuals, most notably gender differences in terms of labor market attachment. In fact, female employment decisions are often shaped by household decisions and might end up being more sensitive to the institucional features analyzed in this paper. If this is the case, the impact of the sorting mechanisms described in section 5.2 above may be different in the two groups. To test for this possibility, we estimate the same set of models in the two sub-samples of males and females and present the results in table 8. The results do not show a clear pattern distinguishing male and female behavior. The female sub-sample presents reactions more in accordance with the model predictions. It is interesting that female transitions into and out of self-employment are quite strongly associated with the level of social security contributions paid by the self-employed. Given their lower attachment to the labor force, policy variables appear to act primarily at the incentive levels of the agents. The results in table 8 place female individuals much more exposed to changes in policy. This is reinforced by the interaction term between flexibility and contributions in transitions out of unemployment, which is also larger for female than for male workers.

[Table 8 about here.]

5.4 Some policy experiments

A consequence of the previous results is that governments need to be careful when designing employment-enhancing policies, as the impact of different measures varies across recruiting sectors. For instance, increasing labor market flexibility encourages hiring in the salaried work sector, but this effect is smaller for larger mandatory social security contributions paid by the self-employed. An interesting experiment is to use the model and investigate changes when measures in place in different countries are applied to the country under study. This exercise has obvious limitations but provides us with an assessment of the magnitudes involved(for a similar exercise, see Di Tella and MacCulloch, 2005).

Table 9 contains the levels of the variables used in this exercise for selected countries in 1999, and figure 2 depicts labor market flexibility against social security contributions as of 1999, for the countries in the panel. We want to address three types of questions (everything else constant): how would the probability of transition to a salaried work position change if the labor market flexibility or social security contributions (or both) changed? How is this reaction affected by the level of the unemployment rate? What is the role of bureaucracy in shaping labor market transitions?

[Table 9 about here.]

[Figure 2 about here.]

Table 10 presents the results of the experiment. The choice of countries for this comparison was motivated by the fact that Portugal in 1999 had roughly the same labor market flexibility as Spain, and the same social security contributions as the UK. Italy and Finland share the same level of social contributions but not the same degree of flexibility, and have a high level of unemployment rate. We see from the table that if social security contributions change from the Portuguese to the Spanish level (from 2.8 to 15.9 percent of output per capita, holding labor market flexibility roughly constant) the probability of transition from unemployment to salaried work increases 11 percent, while that of the transition to self-employment decreases 13 percent. The odds of transition to a salaried work position vis-à-vis transition to self-employment increase 28 percent. This is in accordance with the model of section 2.

[Table 10 about here.]

We also document the situation where labor market flexibility is changed while social security contributions are kept roughly constant. From the table we see that if, instead of the Portuguese levels, the UK levels were in place in 1999, the probability of transition from unemployment to salaried work would increase 30 percent. The transition to self-employment would also increase by 18 or 17 percent, depending on whether social security contributions are also changed or not. The odds of transition to salaried work vis-à-vis self-employment therefore increase when the labor market is more flexible. The model of section 2 does not predict that transitions to self-employment also increase when labor market flexibility increases. Beyond the obvious limitations of the model, there are at least two potential explanations for this. First, the econometric model might be capturing effects that are not built into the model, such as the expansion of the participation rate or different break up frequencies for salaried or self-employment jobs. Second, the way labor market flexibility is modeled is a simplification of the complex realities across countries. The positive effects of labor market flexibility may operate through more complex channels than those outlined in the theoretical model.

The effects of labor market flexibility may be strongly influenced by the unemployment rate and social security contributions, as suggested by the coefficients of the interaction terms between unemployment and labor market flexibility, and between labor market flexibility and social security contributions, in transitions out of unemployment. Changing policy variables from the Italian to the Finnish levels (that is, increasing labor market flexibility while holding social security contributions roughly constant) under high unemployment yields different results. Transitions from unemployment to salaried work decrease, and transitions to self-employment increase. The odds of transition to salaried work relative to self-employment decrease 24 percent. This exercise suggests that, under high unemployment, the adjustment to higher labor market flexibility is made primarily through transitions to self-employment.

6 Conclusions

In this paper, we explore the role of labor market policies affecting the opportunity cost of two different job types (salaried work and self-employment) in explaining differences in employment composition across countries and overtime. The empirical evidence obtained using individual-level data from the European Union Household Panel survey shows that the positive relationship between labor market flexibility and the transition probabilities out of unemployment are sensitive to the inclusion of variables capturing the costs of entering (and remaining in) self-employment. Proxying these costs with the level of social security contributions paid by the self-employed as a fraction of *per capita* GDP, the results obtained document the existence of a non-linear relationship between labor market flexibility and transitions out of unemployment. More flexible labor markets are associated with a higher probability of transition to salaried work. This feature can, however, be crowded-out for sufficiently high levels of social security contributions. As for transitions to self-employment, they are less likely if social security contributions are higher. Again, this effect can be reduced in the event of a very flexible labor market for a given level of social security contributions.

These results are motivated by a model of unemployment and employment protection that includes a specific role for self-employment. In the model, self-employment and salaried work are set simultaneously, and that creates an extra channel of flexibility in the labor market, with an increase in the overall efficiency of the economy.

There are important policy implications of these results. Since two different policies affect self-employment in different ways, they can undo the effect of each other. Omitting one of the policies in the analysis may lead us wrongly to conclude that the other has no effect. Policies that act as a barrier to self-employment might prevent those that potentially foster self-employment to have perceivable effects. A second policy implication is the sensitivity of policy effects to unemployment, as it significantly affects the way transitions to salaried work and self-employment respond to changes in labor market flexibility and social security contributions.

References

Blanchflower, D. (2000): "Self-Employment in OECD Countries," *Labour Economics*, 7, 471–505.

——— (2004): "Self-employment: More may not be better," Working Paper 10286, NBER.

Blanchflower, D., and B. Meyer (1994): "A Longitudinal Analysis of the Young Self-Employed in Australia and the United States," *Small Business Economics*, 6, 1–20.

Borjas, G. (1999): "The Wage Structure and Self-Selection Into Self-Employment," NBER Summer Institute.

Borjas, G., and G. Sueyoshi (1994): "A Two-Stage Estimator for Probit Models with Structural Group Effects," *Journal of Econometrics*, 64(1-2), 165–182.

Bover, O., M. Arellano, and S. Bentolila (2002): "Unemployment Duration, Benefit Duration and the Business Cycle," *Economic Journal*, 112, 223–265.

Carrasco, R. (1999): "Transitions to and from Self-Employment in Spain: An Empirical Analysis," *Oxford Bulletin of Economic and Statistics*, 61, 315–341.

Davis, S., and J. Haltiwanger (1999): "Gross Job Flows," in *Handbook of Labor Economics*, vol. 3, chap. 41, pp. 2711–2805. North-Holland.

Di Tella, R., and R. MacCulloch (2005): "The Consequences of Labor Market Flexibility: Panel Evidence Based on Survey Data," *European Economic Review*, 49(5), 1225–1259.

Evans, D., and L. Leighton (1989): "Some Empirical Aspects of Entrepreneurship," *American Economic Review*, 79, 519–535.

Fairlie, R., and B. Meyer (2003): "The Effect of Immigration on Native Self-Employment," *Journal of Labor Economics*, 21(3), 619–650.

Katz, L., and B. Meyer (1990): "Unemployment Insurance, Recall Expectations and Unemployment Outcomes," *Quarterly Journal of Economics*, pp. 993–1002.

Lazear, E. (1990): "Job Security Provisions and Employment," *Quarterly Journal of Economics*, 105, 699–726.

Meager, N. (1992): "Does Unemployment Lead to Self-Employment?," *Small Business Economics*, 4, 87–103.

Nickell, S. (1997): "Unemployment and Labour Market Rigidities: Europe Vs. North America," *Journal of Economic Perspectives*, 11, 55–74.

Pfeiffer, F., and F. Reize (2000): "Business Start-Ups by the Unemployed — An Econometric Analysis Based on Firm Data," *Labour Economics*, 7, 629–663.

Pissarides, C. (2000): *Equilibrium Unemployment Theory*. MIT Press, Cambridge, MA.

Robson, M. (2003): "Does Stricter Employment Protection Legislation Promote Self-Employment?," *Small Business Economics*, 12(3), 309–319.

Saint-Paul, G. (1996): "Exploring the Political Economy of Labor Market Institutions," *Economic Policy*, 23, 265–315.

Schoukens, P. (1999): "Comparison of the Social Security Law for the Self-Employed Persons in the Member-States of the European Union," in *EweSS Yearbook 1999 — Work Patterns and Social Protection*, ed. by D. Pieters. Kluwer Law International, Amsterdam.

Appendix A Data

Sample of 13 countries

Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, United Kingdom.

Definition of variables

Unemployment rate

The unemployment rate from the OECD Main Economic indicators.

GDP per capita

The log of *per capita* GDP expressed in constant 1994 prices (millions of PPP $) from the OECD Main Economic Indicators.

Flexibility

The survey question that we use (classified as 2.17 Labor-Cost Flexibility in 1984) asked the respondents: "Flexibility of firms to adjust job security and compensation standards to economic realities: *0 = none at all, to 100 = a great deal*". This question was changed in 1990 to "Flexibility of management to adjust employment levels during difficult periods: *0 = low, to 100 = high*". Again in 1992 the question was changed to "Flexibility of hiring and fire practices by the government: *0 = are too restricted by government, to 100 = are flexible enough*". From the World Competitiveness Report, IMD Foundation, Geneva. This measure has been re-scaled to the [0,10] interval.

Bureaucracy index

The survey question that we use asked the respondents: "Bureaucracy: does not hinder business activity: *0 = none at all, to 100 = a great deal*". From the World Competitiveness Report, IMD Foundation, Geneva.

Self-employed Workers Social Security Contributions

Social security contributions paid by self-employed divided by nominal GDP *per capita*. Total social security contributions paid by the self-employed corresponds to code 2300 — total contributions paid by the self-employed, from the OECD Revenue Statistics.

Appendix B Proofs

B.1 Proof of Proposition 1

Define $\overline{\gamma}_j \equiv E[\gamma|\gamma \geq \gamma_j]$, $j = \text{SW}, \text{SE}$. This is the expected value of γ conditional on γ being higher than γ_j. Since J_j is affine in γ, it is straightforward to show that

$$\Delta = J_{\text{SW}}|_{\gamma=\overline{\gamma}_{\text{SW}}} (1 - G(\gamma_{\text{SW}})) - J_{\text{SE}}|_{\gamma=\overline{\gamma}_{\text{SE}}} (1 - G(\gamma_{\text{SE}}))\,.$$

When performing derivatives with respect to A, managers do not take into account their influence on U and V, which are economy-wide quantities. The derivative of $\overline{\gamma}_j$ with respect to A is

$$\frac{\partial \overline{\gamma}_j}{\partial A} = -\frac{g(\gamma_{\mathrm{SW}}) \left(\overline{\gamma}_j - \gamma_j \right)}{1 - G(\gamma_{\mathrm{SW}})}, \qquad j = \mathrm{SW}, \mathrm{SE}\,,$$

where g is the probability density function associated with G. Noting that $\frac{\partial \gamma_j}{\partial A} = -1$, the derivative of Δ with respect to A is therefore

$$\begin{aligned} \frac{\partial \Delta}{\partial A} &= \frac{1}{2}\,(r+\lambda)^{-1} \left(1 - \frac{g(\gamma_{\mathrm{SW}}) \left(\overline{\gamma}_{\mathrm{SW}} - \gamma_{\mathrm{SW}} \right)}{1 - G(\gamma_{\mathrm{SW}})} \right) (1 - G(\gamma_{\mathrm{SW}})) + g(\gamma_{\mathrm{SW}}) J_{\mathrm{SW}}|_{\gamma = \overline{\gamma}_{\mathrm{SW}}} \\ &- \frac{1}{2}\,(r+\lambda)^{-1} \left(1 - \frac{g(\gamma_{\mathrm{SE}}) \left(\overline{\gamma}_{\mathrm{SE}} - \gamma_{\mathrm{SE}} \right)}{1 - G(\gamma_{\mathrm{SE}})} \right) (1 - G(\gamma_{\mathrm{SE}})) \\ &- g(\gamma_{\mathrm{SE}}) J_{\mathrm{SE}}|_{\gamma = \overline{\gamma}_{\mathrm{SE}}}. \end{aligned} \tag{18}$$

Using the fact that $J_j|_{\gamma = \gamma_j} = V = 0$, the above expression can be written as

$$\begin{aligned} \frac{\partial \Delta}{\partial A} &= \frac{1}{2}\,(r+\lambda)^{-1} \left(1 - \frac{g(\gamma_{\mathrm{SW}}) \left(\overline{\gamma}_{\mathrm{SW}} - \gamma_{\mathrm{SW}} \right)}{1 - G(\gamma_{\mathrm{SW}})} \right) (1 - G(\gamma_{\mathrm{SW}})) \\ &+ \left(J_{\mathrm{SW}}|_{\gamma = \overline{\gamma}_{\mathrm{SW}}} - J_{\mathrm{SW}}|_{\gamma = \gamma_{\mathrm{SW}}} \right) g(\gamma_{\mathrm{SW}}) \\ &- \frac{1}{2}\,(r+\lambda)^{-1} \left(1 - \frac{g(\gamma_{\mathrm{SE}}) \left(\overline{\gamma}_{\mathrm{SE}} - \gamma_{\mathrm{SE}} \right)}{1 - G(\gamma_{\mathrm{SE}})} \right) (1 - G(\gamma_{\mathrm{SE}})) \\ &- \left(J_{\mathrm{SE}}|_{\gamma = \overline{\gamma}_{\mathrm{SE}}} - J_{\mathrm{SE}}|_{\gamma = \gamma_{\mathrm{SE}}} \right) g(\gamma_{\mathrm{SE}}). \end{aligned}$$

Using the expression for J_j, the first two terms on the right-hand side of this expression equal $\frac{1}{2}\,(r+\lambda)^{-1}\,(1 - G(\gamma_{\mathrm{SW}}))$, because J_j is affine in γ and several terms cancel out. The same goes for the third and fourth terms, yielding

$$\frac{\partial \Delta}{\partial A} = \frac{1}{2}\,(r+\lambda)^{-1}\,(1 - G(\gamma_{\mathrm{SW}}) - (1 - G(\gamma_{\mathrm{SE}})))\,.$$

Since $\gamma_{\mathrm{SE}} > \gamma_{\mathrm{SW}}$, $\frac{\partial \Delta}{\partial A}$ is positive.

B.2 Proof of proposition 2

Equations (12) and (15) are

$$\begin{aligned} E &= p \int_{\gamma_{\mathrm{SW}}}^{1} W_{\mathrm{SW}}|_{A=\overline{A}}\, dG(\gamma) + pG(\gamma_{\mathrm{SW}})U \\ &\quad + (1-p) \int_{\gamma_{\mathrm{SE}}}^{1} W_{\mathrm{SE}}|_{A=0}\, dG(\gamma) + (1-p)G(\gamma_{\mathrm{SE}})U \qquad (19) \\ F &= p \int_{\gamma_{\mathrm{SW}}}^{1} J_{\mathrm{SW}}|_{A=\overline{A}}\, dG(\gamma) + (1-p) \int_{\gamma_{\mathrm{SE}}}^{1} J_{\mathrm{SE}}|_{A=0}\, dG(\gamma), \qquad (20) \end{aligned}$$

where J_j and W_j, $j = \mathrm{SW}, \mathrm{SE}$, are given by (7), (8), (13) and (14). Using (19) and (20), we can substitute for E and F in equations (1) and (3). These two equations determine equilibrium quantities θ and U. Using the Implicit Function Theorem and Leibnitz's rule, we can compute the derivatives of θ and U with respect to k, c and b. The results are given by matrices

$$\begin{aligned} \frac{\partial(\theta, U)}{\partial k} &= -\frac{1}{\Lambda} \begin{bmatrix} -\frac{1}{2} q(\theta)\, rp\lambda \frac{1-G(\gamma_{\mathrm{SW}})}{r+\lambda} \\ -\frac{1}{2} p\lambda \left(1 - G(\gamma_{\mathrm{SW}})\right) \frac{-F \frac{\partial q(\theta)}{\partial \theta} z(\theta) + (E-U) \frac{\partial z(\theta)}{\partial \theta} q(\theta)}{r+\lambda} \end{bmatrix} \\ \frac{\partial(\theta, U)}{\partial c} &= -\frac{1}{\Lambda} \begin{bmatrix} -\frac{1}{2} q(\theta)\, r(1-p) \frac{1-G(\gamma_{\mathrm{SE}})}{r+\lambda} \\ -\frac{1}{2} (1-p) \left(1 - G(\gamma_{\mathrm{SE}})\right) \frac{-F \frac{\partial q(\theta)}{\partial \theta} z(\theta) + (E-U) \frac{\partial z(\theta)}{\partial \theta} q(\theta)}{r+\lambda} \end{bmatrix} \\ \frac{\partial(\theta, U)}{\partial b} &= -\frac{1}{\Lambda} \begin{bmatrix} -\frac{1}{2} q(\theta)\, r \frac{1-(1-p)G(\gamma_{\mathrm{SE}}) - pG(\gamma_{\mathrm{SW}})}{r+\lambda} \\ -F \frac{\partial q(\theta)}{\partial \theta} \end{bmatrix} \end{aligned}$$

where $z(\theta) \equiv \theta q(\theta)$ and Λ is defined as

$$\Lambda \equiv \frac{1}{2} r \frac{\left(1-(1-p)G(\gamma_{\mathrm{SE}}) - pG(\gamma_{\mathrm{SW}})\right)\left(-(E-U) \frac{\partial z(\theta)}{\partial \theta} q(\theta) + F \frac{\partial q(\theta)}{\partial \theta} z(\theta)\right)}{r+\lambda} + F \frac{\partial q(\theta)}{\partial \theta} r.$$

Since $q(\theta)$ has negative elasticity, $z(\theta)$ has positive elasticity, and the value of being unemployed is at least as high as the reservation wage ($E \geq U$), Λ is negative and all derivatives are negative except $\frac{\partial U}{\partial b}$.

B.3 Proof of proposition 3

We have that $\frac{\partial \gamma_{\mathrm{SE}}}{\partial k} = r \frac{\partial U}{\partial k}$ and $\frac{\partial \gamma_{\mathrm{SW}}}{\partial c} = r \frac{\partial U}{\partial c}$, which are negative by proposition 2. Also,

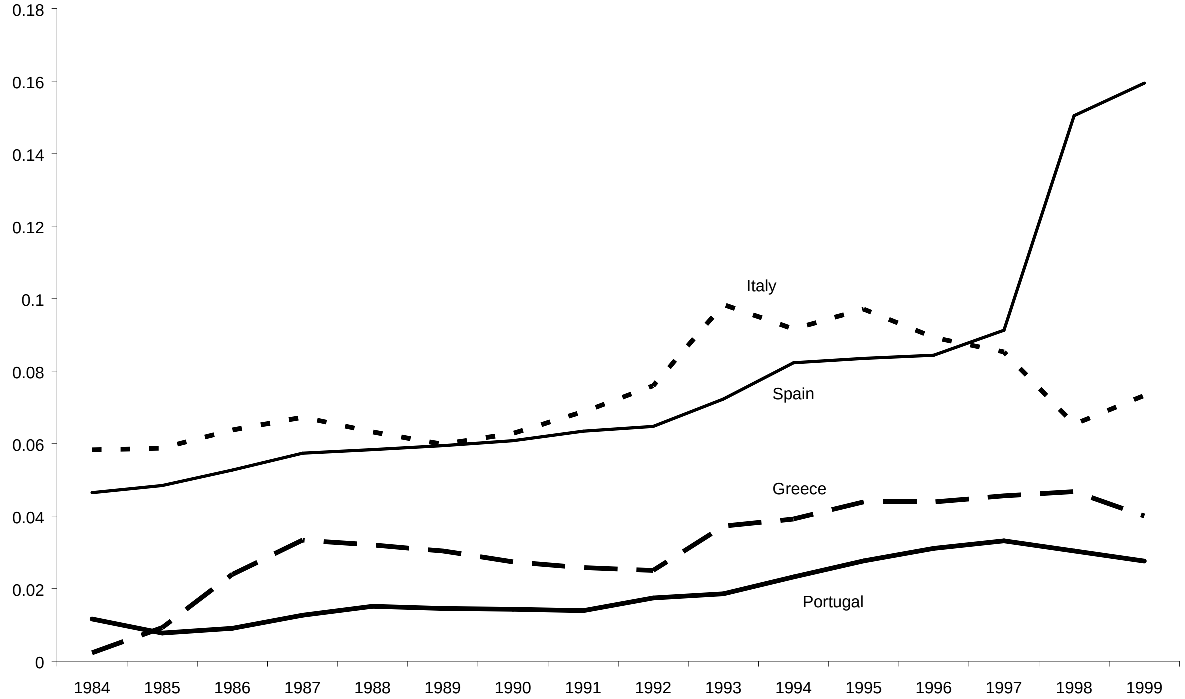
$$\begin{aligned} \frac{\partial \gamma_{\mathrm{SW}}}{\partial k} &= \lambda + r \frac{\partial U}{\partial k} \\ &= \lambda \frac{-2F \frac{\partial q(\theta)}{\partial \theta} + \overline{A}(1-p)\left(1 - G(\gamma_{\mathrm{SE}})\right)}{\left(1-(1-p)G(\gamma_{\mathrm{SE}}) - pG(\gamma_{\mathrm{SW}})\right)\overline{A} - 2F \frac{\partial q(\theta)}{\partial \theta}}, \end{aligned}$$

which is positive. Finally,

$$\frac{\partial \gamma_{\text{SE}}}{\partial c} = 1 + r\frac{\partial U}{\partial c}$$
$$= 1 - \frac{1}{2}\frac{r^2}{\lambda}\left(\frac{(1-(1-p)G(\gamma_{\text{SE}})-pG(\gamma_{\text{SW}}))\left((E-U)\frac{\partial z(\theta)}{\partial \theta}q(\theta)-F\frac{\partial q(\theta)}{\partial \theta}z(\theta)\right)}{r+\lambda} - 2F\frac{\partial q(\theta)}{\partial \theta}\right)$$
$$\frac{(1-p)\left(1-G\left(\gamma_{\text{SE}}\right)\right)}{p\left(1-G\left(\gamma_{\text{SW}}\right)\right)},$$

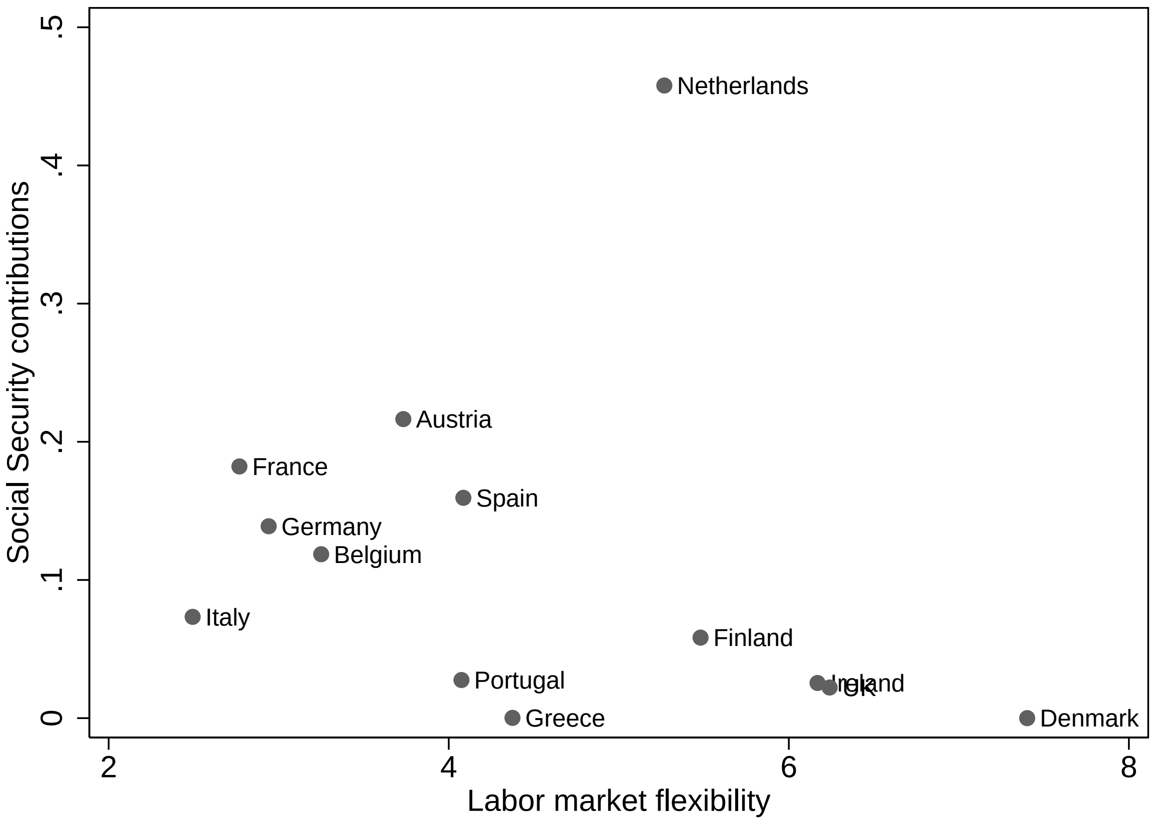
which approaches 1 as the share of self-employed relative to the share of salaried workers (the last multiplicative term in the expression) approaches 0. A sufficient condition for this to happen is that p is sufficiently close to 1.

Figure 1: Social security contributions of the self-employed as a fraction of per capita GDP, selected countries.



Note: Social security contributions from the OECD Revenue Statistics; GDP per capita from the OECD Main Economic Indicators.

Figure 2: Labor market flexibility vs. social security contributions for selected countries in 1999.



Note: Labor market flexibility is an index in interval [0,10]; social security contributions are expressed as the fraction of output per capita. See Appendix A for the definition of variables.

Table 1: Share of non-agricultural self-employment on civilian employment, 1976–2002.

	1976	1986	1996	2002
Australia	11.0	12.7	11.8	12.0
Austria	9.5	6.1	6.9	7.8
Belgium	11.1	12.6	14.0	13.7
Canada	6.1	7.2	9.2	8.7
Denmark	9.4	7.0	7.1	7.2
Finland	8.0	6.8	10.3	9.3
France	10.9	9.8	7.7	6.7
Germany	8.8	8.7	9.0	9.4
Greece	30.9	27.5	27.5	25.4
Ireland	10.5	11.1	12.8	12.6
Italy	22.5	21.6	23.3	22.2
Japan	13.6	12.7	9.7	8.8
Netherlands	8.9	8.2	9.8	9.8
New Zealand	9.5	13.4	16.4	15.7
Norway	7.0	6.5	5.5	4.9
Portugal	11.5	16.9	19.7	17.4
Spain	15.2	17.5	18.4	15.5
Sweden	4.4	4.2	9.1	8.5
UK	7.0	10.6	11.9	10.9
USA	6.7	7.4	7.3	6.4

Note: All values in percentage. Source: OECD Labour Force Statistics.

Table 2: Averages for 1994–1999 of several country-level variables.

	Flexibility	Self-employment share (perc.)	Social security contributions (fraction of GDP *per capita*)	GDP *per capita* (in millions of 1994 PPP $)	Unemployment rate (perc.)
Austria	4.40	6.6	0.158	0.030	5.3
Belgium	3.93	13.2	0.117	0.031	11.4
Canada	6.02	8.9	0.025	0.034	9.5
Finland	4.73	8.7	0.038	0.029	10.6
France	3.91	9.6	0.214	0.030	10.8
Germany	3.91	8.0	0.115	0.031	7.8
Greece	3.69	27.6	0.030	0.019	8.8
Ireland	5.15	12.8	0.015	0.025	13.6
Italy	3.21	22.2	0.074	0.027	10.3
Japan	5.45	11.3	0.065	0.031	2.9
Netherlands	3.9	8.60	0.461	0.029	6.8
Norway	4.48	6.2	0.058	0.033	4.1
Portugal	3.54	17.8	0.018	0.018	6.3
Spain	2.98	18.1	0.066	0.022	19.5
Sweden	3.85	7.2	0.073	0.030	4.7
Switzerland	6.91	9.9	0.076	0.037	2.4
UK	6.80	11.6	0.024	0.027	8.7
US	7.11	7.5	0.053	0.041	6.0

Note: See Appendix A for the definition of variables.

Table 3: Number of observations per transition.

	Destination state		
Source state	SE	SW	U
SE	42585	2784	705
SW	3104	193123	7180
U	1052	8724	17965

Note: SE is self-employment; SW is salaried work; U is unemployment. Data are composed of a panel of workers from the EUHP over the period 1994–1999. Variables are defined in section 3.

Table 4: Summary statistics for salaried workers, self-employed and unemployed.

	Salaried worker		Self-employed		Unemployed	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Household size / 100	0.034	0.014	0.035	0.014	0.037	0.016
First cycle completed *	0.360	0.480	0.468	0.499	0.508	0.500
Secondary cycle completed *	0.369	0.483	0.309	0.462	0.337	0.473
Tertiary cycle completed *	0.254	0.435	0.215	0.411	0.128	0.334
Age	39.489	10.691	44.393	11.169	35.516	12.029
Marital status *	0.668	0.471	0.781	0.414	0.437	0.496
Gender *	0.568	0.495	0.727	0.446	0.496	0.500
Lottery amount **	0.046	0.289	0.045	0.289	0.030	0.231
Own home *	0.719	0.449	0.808	0.394	0.626	0.484
Unemployment insurance recipient *					0.368	0.482
Labor market flexibility	4.082	1.615	3.863	1.458	3.739	1.418
Social security contributions	0.134	0.133	0.091	0.092	0.126	0.120
log of GDP *per* capita	0.030	0.005	0.028	0.005	0.029	0.005
Unemployment rate / 100	0.101	0.042	0.111	0.042	0.118	0.048
Bureaucracy index / 100	0.035	0.014	0.030	0.015	0.032	0.015
Observations	198996		33459		27281	

Note: Data are composed of a panel of workers from the EUHP over the period 1994–1999. Variables are defined in section 3. * and ** mean dummy and categorical variables, respectively.

Table 5: Estimates for the first-stage regression of a random effects probit model. Dependent variable: Transition indicator between states.

	(1) U to SW	(2) U to SE	(3) SE to U	(4) SE to SW
Household size	-2.390	-0.053	4.205	1.221
	(4.02)	(0.05)	(3.47)	(1.49)
Secondary cycle completed	0.140	0.175	-0.127	-0.015
	(7.02)	(4.70)	(3.12)	(0.55)
Tertiary cycle completed	0.291	0.306	-0.326	0.047
	(10.84)	(6.53)	(6.28)	(1.57)
Aged 15–24	1.003	-0.072	0.370	0.658
	(22.53)	(0.88)	(4.11)	(10.70)
Aged 25–34	0.955	0.260	0.228	0.368
	(23.24)	(3.59)	(3.60)	(9.10)
Aged 35–44	0.828	0.324	0.124	0.214
	(20.06)	(4.47)	(2.08)	(5.67)
Aged 45–54	0.553	0.298	0.102	0.142
	(13.08)	(4.04)	(1.77)	(3.83)
Married	0.138	0.200	-0.315	-0.122
	(6.73)	(5.35)	(7.98)	(4.61)
Male	0.118	0.388	-0.105	-0.062
	(6.67)	(11.48)	(2.92)	(2.68)
Lottery 2,000 − 10,000 euros	0.031	0.272	0.044	-0.020
	(0.37)	(1.92)	(0.33)	(0.23)
Lottery 10,000 − 50,000 euros	0.054	-0.039	-0.066	0.074
	(0.59)	(0.20)	(0.36)	(0.73)
Lottery above 50,000 euros	-0.424	0.652	-0.137	-0.499
	(1.68)	(2.25)	(0.36)	(1.90)
Own home	0.101	0.059	-0.264	-0.175
	(5.39)	(1.68)	(6.84)	(6.77)
Unemp. insur. Recipient	-0.098	-0.280		
	(4.59)	(6.82)		
Unemp. durat. 1–5 years	-0.047	0.023		
	(2.48)	(0.64)		
Unemp. duration > 5 years	-0.975	-0.381		
	(35.88)	(7.76)		
Tenure between 1–3 years			-0.162	-0.143
			(2.64)	(3.44)
Tenure between 4–5 years			-0.332	-0.303
			(4.28)	(6.03)
Tenure between 6–10 years			-0.462	-0.364
			(6.52)	(8.11)
Tenure between 11–15 years			-0.514	-0.411
			(5.70)	(7.61)
Tenure > 15 years			-0.215	-0.277
			(3.53)	(6.72)
Constant	-1.308	-1.996	-1.628	-1.464
	(5.45)	(9.39)	(5.79)	(5.00)
Observations	27281	27281	33459	33459
Wald test	0.00	0.00	0.00	0.00

Note: Data are composed of a panel of workers from the EUHP over the period 1994–1999. Variables are defined in section 3. Year-country dummies omitted. Standard errors in parentheses. All variables are dichotomous except household size.

Table 6: The determinants of transitions from unemployment. Estimates for the second-stage linear regression model. Dependent variable: Country-year dummy estimates of the first-stage regression model.

	(1) U to SW	(2) U to SE	(3) U to SW	(4) U to SE
Labor market flexibility	0.026	0.032	0.145	0.037
	(1.05)	(1.61)	(2.75)	(0.85)
Social security contributions	0.401	-0.376	1.919	-2.119
	(1.86)	(2.06)	(2.27)	(2.60)
Bureaucracy index	8.631	-5.719	9.880	-6.114
	(3.29)	(2.72)	(3.94)	(2.90)
S. S. contrib. × Labor market flex.			-0.340	0.401
			(1.88)	(2.20)
Unemp. × Labor market flex.			-1.124	-0.301
			(2.19)	(0.78)
log of GDP per capita	-13.807	-12.003	-20.564	-9.285
	(2.46)	(2.84)	(3.49)	(2.05)
Unemployment rate	-2.584	0.156	1.317	1.297
	(4.05)	(0.38)	(0.68)	(0.94)
Observations	60	60	60	60

Note: Data are composed of a panel of workers from the EUHP over the period 1994–1999. Variables are defined in section 3. Standard errors in parentheses. The number of observations is equal to the number of pairs (country, year) for which we observe transitions between states.

Table 7: The determinants of transitions from self-employment. Estimates for the second-stage linear regression model. Dependent variable: Country-year dummy estimates of the first-stage regression model.

	(1) SE to U	(2) SE to SW	(3) SE to U	(4) SE to SW
Labor market flexibility	0.035	0.069	0.032	0.214
	(1.30)	(2.34)	(0.53)	(3.28)
Social security contributions	0.944	0.484	0.382	0.051
	(3.94)	(1.78)	(0.37)	(0.04)
Bureaucracy index	1.106	4.871	0.899	6.135
	(0.42)	(1.54)	(0.34)	(2.00)
S. S. contrib. × Labor market flex.			0.125	0.084
			(0.55)	(0.34)
Unemp. × Labor market flex.			-0.062	-1.771
			(0.11)	(2.75)
log of GDP per capita	-14.836	-22.843	-13.698	-26.077
	(2.48)	(3.30)	(2.16)	(3.53)
Unemployment rate	2.085	-0.612	2.347	5.819
	(3.33)	(0.78)	(1.12)	(2.41)
Observations	57	60	57	60

Note: Data are composed of a panel of workers from the EUHP over the period 1994–1999. Variables are defined in section 3. Standard errors in parentheses. The number of observations is equal to the number of pairs (country, year) for which we observe transitions between states.

Table 8: The determinants of transitions from unemployment and self-employment. Estimates for the second-stage linear regression model. Dependent variable: Country-year dummy estimates of the first-stage regression model.

Males				
	(1) U to SW	(2) U to SE	(3) SE to U	(4) SE to SW
Labor market flexibility	0.088	0.086	0.038	0.233
	(1.63)	(1.60)	(0.65)	(3.78)
Social security contributions	1.734	-1.861	-1.443	-0.318
	(1.90)	(1.43)	(1.01)	(0.28)
Bureaucracy index	8.197	-7.696	-4.557	5.925
	(3.24)	(2.95)	(1.83)	(2.03)
S. S. contrib. × Labor market flex.	-0.264	0.326	0.371	0.189
	(1.32)	(1.04)	(1.21)	(0.77)
Unemp. × Labor market flex.	-0.658	-0.650	0.048	-2.045
	(1.26)	(1.34)	(0.09)	(3.36)
log of GDP per capita	-19.679	-6.689	-1.681	-25.843
	(3.24)	(1.12)	(0.27)	(3.66)
Unemployment rate	0.270	2.424	3.051	7.237
	(0.14)	(1.42)	(1.67)	(3.20)
Observations	60	58	53	59

Females				
	(1) U to SW	(2) U to SE	(3) SE to U	(4) SE to SW
Labor market flexibility	0.214	-0.070	0.013	0.251
	(2.70)	(0.85)	(0.14)	(3.99)
Social security contributions	2.190	-2.237	2.492	2.740
	(1.77)	(1.89)	(1.99)	(2.18)
Bureaucracy index	10.092	0.150	6.184	7.488
	(2.68)	(0.04)	(1.80)	(2.70)
S. S. contrib. × Labor market flex.	-0.440	0.446	-0.256	-0.558
	(1.67)	(1.75)	(0.92)	(2.06)
Unemp. × Labor market flex.	-1.333	0.379	0.027	-1.927
	(1.73)	(0.54)	(0.03)	(3.02)
log of GDP per capita	-20.136	-13.703	-19.053	-28.227
	(2.32)	(1.83)	(2.25)	(3.99)
Unemployment rate	1.631	-1.876	0.399	6.119
	(0.56)	(0.73)	(0.13)	(2.67)
Observations	60	54	49	59

Note: Data are composed of a panel of workers from the EUHP over the period 1994–1999. Variables are defined in section 3. Standard errors in parentheses. The number of observations is equal to the number of pairs (country, year) for which we observe transitions between states.

Table 9: Summary statistics of labor market flexibility, social security contributions and unemployment for selected countries in 1999.

	Labor market flex.	S. S. contributions	Unemp. rate	Bureaucracy
Italy	2.5	7.0	11.6	1.5
Finland	5.5	5.8	10.1	7.0
Portugal	4.1	2.8	4.5	2.5
Spain	4.1	15.9	15.8	4.2
UK	6.2	2.2	6.1	3.8

Note: Data are composed of a panel of workers from the EUHP over the period 1994–1999. Variables are defined in section 3. Labor market flexibility is an index in interval [0,10]; social security contributions are expressed as the percentage of output per capita; unemployment rate is in percentage.

Table 10: Effects of changes in policy: labor market flexibility and social security contributions.

	Increase in:		
Transition/odds	Lab. mark. flex. only	S. sec. contrib. only	Both factors
	Portuguese to Spanish levels (increase in soc. sec. contributions)		
U→SW	100	111	111
U→SE	100	87	87
Odds U→SW vs. U→SE	0	28	28
	Portuguese to UK levels (increase in labor market flexib.)		
U→SW	130	100	130
U→SE	118	101	117
Odds U→SW vs. U→SE	10	-1	11
	Italian to Finnish levels (increase in labor market flexib., high unemp.)		
U→SW	94	97	94
U→SE	124	104	124
Odds U→SW vs. U→SE	-24	-7	-24

Note: Data are composed of a panel of workers from the EUHP over the period 1994–1999. Variables are defined in section 3. Except for the odds, all values are the percentage of the original country's levels as of 1999. At the individual level, the typical subject is the same as in table 5. The odds are expressed as the percentage change in the ratio of the transition probabilities U→SW and U→SE. Unemployment is kept at the origin country's level.

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