UNIVERSITÀ CATTOLICA del Sacro Cuore

DIPARTIMENTO DI SCIENZE ECONOMICHE E SOCIALI

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Abstract

We discuss the relevance of the methodology adopted internationally to compare labor market flexibility, which is based on a two-state labor market model and uses stock data to derive transition rates. This model neglects inactivity, and thus it may crucially affect the results. Therefore, we compare these results with transition rates derived by using a three-state labor market model for France, Italy, Spain and the UK. These countries represent, respectively, the continental Europe and the Anglo-Saxon institutional settings. The implied transition rates are much higher even in continental Europe when inactivity is explicitly considered, thus suggesting that conclusions derived using an incomplete representation of the labor market are flawed.

Keywords: labour market flows, labour market transition matrices, inactivity, comparison across countries.
JEL classification codes: J60, J62, C14, C15

1 Introduction

Modeling labor market flows has always been a controversial issue in labor economics. Individual labor market statuses derived from labor force surveys are typically used to estimate employment, unemployment and inactivity. Additionally, labor flows are used to infer many other aspects of labor market conditions, i.e., unemployment duration, labor mobility and the cyclical fluctuations of ins and outs of employment and unemployment. Modeling these phenomena has involved different statistical and econometric techniques that, to different extents, present advantages and disadvantages. As pointed out by Akerlof (1981) the simple Markov model presents significant drawbacks, primarily related to the homogeneity and independence assumptions [1]. In other words, it is typically assumed that transition probabilities are constant over time and that there is no duration dependence. For these reasons, alternative models have been suggested to represent labor market dynamics, which also implies unemployment persistence and thus duration dependence. The mover-stayer model represents one of the widely used alternatives to Markov modelling. Other approaches, (Shimer, 2012) use, instead, a different representation of the labor market in which job finding and job loss probabilities are derived by taking into account the point-in-time measurement of worker status with an appropriate methodology that allow for calculating a continuous-time separation and job finding hazard rates.

This approach reassesses the issue of labor market dynamics and more specifically the cyclicality of labor market flows. This is indeed a development of the so called flow approach to labor market modeling that has gained attention since the seminal studies -among others- by Blanchard and Diamond (1992); Davis *et al.* (2006); Petrongolo and Pissarides (2008).

These studies renewed the stream of research pioneered by Kaitz (1970); Marston *et al.* (1976); Clark *et al.* (1979); Fujita and Ramey (2006) in which unemployment duration and unemployment differentials by gender and race were extensively estimated. Following this line of investigation, labor market flows have been used in different countries to analyze unemployment dynamics and the contribution of individual, sectoral and regional characteristics to the determinants of labor mobility.

In particular, Elsby *et al.* (2013), hereafter (EHS), adopt the methodology suggested by Shimer (2012) to estimate transition rates between labor market

[1] Indeed, the title of our article borrow from this article.

states in the UK and in other OECD countries to ascertain the contribution of unemployment inflows and outflows to unemployment variation. At first sight, this study confirms previous observations that European labour markets are typically inflexible with respect to the US, showing a much lower rates of reallocation of labour (Blanchard and Wolfers, 2000; Blanchard and Portugal, 2001).

These studies are based on a common wisdom that the European labour markets are inflexible and affected by sclerosis that does not enable unemployment to adjust quickly to aggregate demand or supply shocks. However, even continental labour markets are more flexible than expected as documented by Burda and Wyplosz (1994) and Baussola and Mussida (2014).

In addition the availability of recent data from the Statistical Office of the European Communities (EUROSTAT) shows that labour market flows in Europe are relevant and that the level of mobility even in continental Europe is not negligible. This observation is significant as the stylized facts suggested by EHS are based on estimates of transition rates derived from aggregate unemployment stock data, thus not directly derived from labour force surveys that may include information of changes in individual occupational status and therefore on labour market flows.

Thus, their evidence is based on crucial assumptions on aggregate stock data that enable them to provide estimates of transition rates that in our opinion are misleading, as they typically underestimate the true pattern of workers' flows.

Another relevant issue deals with the representation of the labour market, i.e., the inclusion of inactivity as a labour market state. Flows involving inactivity are significant and crucially affect inflows and outflows rate from and to unemployment. However, EHS adopted a two-state representation, thus considering only unemployment and employment for their calculation of the equilibrium (steady-state) unemployment rate and the implied hazard rates. For these reasons, their conclusion that flow hazard rates in continental Europe are on average less than half of those prevailing in Anglo-Saxon countries, thereby reinforcing the idea that European labour markets are sclerotic, is misleading.

In fact, this conclusion is based on calculations derived from methodological hypothesis and data (unemployment stocks) not representing labour market conditions in Europe fully.

The aim of this paper is therefore twofold. On the one hand, we aim at stressing the relevance of the flow approach to labour market modelling and to critically discuss the main methodological hypothesis on which the analysis of workers' flows is based, to emphasize both advantages and disadvantages of such methodologies.

On the other hand, we extend the investigation by focusing on the difference across different economies and using a three-state labour market representation, with a specific emphasis on gender differences.

In particular, we analyze four countries, France, Italy, Spain and the UK as we aim at pinpointing differences between the so called continental and Anglo-Saxon labour market framework. The former, which in our analysis includes France, Italy and Spain, is typically supposed to represent a sticky labour market framework dominated by institutional settings that do not encourage labour market transitions. The latter, which includes the UK, is viewed - on the contrary - as an example of an institutional framework in which high labour market flexibility guarantees higher employment growth rates and therefore quick unemployment adjustments.

It is worth highlighting that gender differentials may be better analyzed by using the adopted three state representation, as non-labor force flows represent a substantial component of the female workers' flows. In addition, despite the rise in educational attainment and labor force participation of women over the last decades has contributed to a relative decrease of the male-female unemployment gap, gender differences still persist and their size varies considerably across countries OECD (2008).

Also, we want to emphasize that the use of stock data for comparative analysis of labor market transitions rates, is misleading, as this approach underestimate unemployment inflows and outflows and, in general, the overall labor mobility. Therefore, policy implication should be correctly derived by analyzing this latter representation that fully account for the whole labor mobility in a given institutional framework.

Section 2 describes the data and discusses the methodology proposed by EHS, whereas Section 3 underlines strength and weakness of such an approach. We apply this methodology to new data available for the European labor market and discuss the implication, in particular with respect to the exclusion of the non-labor force condition. Section 4 presents the implied inflows and outflows rates also comparing this evidence with standard Markovian transition rates. We draw conclusions and implications in Section 5.

2 Using labour markets stocks to derive transition rates

2.1 Data

The empirical investigation presented in this study uses data from two sources, the annual stock from the OECD and quarterly flows from EUROSTAT.

The annual stock from the OECD are used to derive and estimate transition rates by following the same methodology proposed by Elsby et al. (2013). In this latter work, as explained in the Introduction, the estimates of transition rates are derived from aggregate employment and unemployment stock data since a two state labour market representation is adopted. By using the OECD stock data we replicate the methodology using updated data up to 2014. In detail, we use stock OECD data for the period 1995-2014.[2]. The estimates will be compared with the results obtained by using directly flow data from the second source, i.e., EUROSTAT.

This latter publishes quarterly labour market flows, based on seasonally unadjusted data derived from the European Union Labour Force Surveys (EU-LFS). Quarterly flows are available from 2010q2 to 2016q1[3].

Labour market flows show individual movements between employment, unemployment, and inactivity and allow for a more detailed analysis of changes occurring in the labour market, in that it is then possible to set up transition matrices showing labour mobility in different economies.

Data for the European Union (EU) presented in the current release cover 26 out of the 28 Member States. However, in this study we focus on France, Italy, Spain and the UK as we aim at highlighting differences between the so called continental and Anglo-Saxon states of the labour market.

The former are typically supposed to represent a sticky labor market framework dominated by institutional settings that do not encourage employment adjustments; the latter, on the contrary, is viewed as an example of an institutional framework in which high labor flexibility guarantees higher employment growth rates and therefore quick unemployment adjustments.

We aim to challenge this view that is based on empirical evidence derived from (aggregate stock) data that are inconsistent with the real patterns of the labour markets.

[2]Stock data are available in Internet at http://stats.oecd.org/-Index.aspx?DatasetCode=STLABOUR.

[3]Data are available in Internet at http://ec.europa.eu.eurostat/data/database.

2.2 *Estimation with Stock Data*

2.2.1 *Unemployment Inflows and outflows s_t and f_t*

Unemployment inflow and outflow rates are actually defined as hazard rates associated respectively to the Not-unemployed[4] and Unemployed states. The *hazard rate* or *function* is typically used for survival analysis and represents the instantaneous mortality rate at time t, calculated on the subset of individuals survived until t (for a detailed explanation, see Kiefer (1988)). From the labour market's point of view, the outflow rate f_t can be explained as the instantaneous rate of workers leaving the unemployment state, given the fact that they was unemployed until t. Likewise, s_t can be considered as the conditional instantaneous inflow rate of workers moving from not in unemployment to unemployment. It follows that the contribution of both outflow and inflow rates to the evolution over time of the unemployment rate can be written as:

$$\frac{du_t}{dt} = s_t(1-u_t) - f_t u_t, \tag{1}$$

where s_t and f_t are respectively the inflow and outflow rates from unemployment at time t[5]. As mentioned above, the data that we use in the remainder of the paper allow us to infer unemployment flows at an annual frequency. It is worthwhile to note that Eq. 1 abstracts from inflows into unemployment from nonparticipation/inactivity since, as explained above, Elsby *et al.* (2013) adopt a two-state labour market representation which neglects inactivity. The authors claim that results calculated taking inactivity into consideration were very similar to those not allowing for nonparticipation. In what follows (see Section 3.2), we will show that inactivity matters, especially for continental European labour markets.

In this light, we can say that f_t is strictly related to the amount of flows out from unemployment with respect to the current stock u_t of unemployed individuals. Consequently, having at disposal flow data and considering a two-state representation of labour market, f_t is usually estimated by $ue/(uu+ue)$, where ue is the amount of transitions from unemployment to employment, and $uu+ue$ corresponds with the current stock of unemployment (see for

[4]Non-unemployment coincides with Employment in a two-states representation of labor market. When three states are considered, it instead means that workers are employed OR inactive.

[5]In EHS these are monthly rates to allow for comparison with the United States studies of unemployment flows.

example Gomes (2012)). Formulas shown in the following section are instead more complicated, because we need to obtain flow's measures from pure stock data. Besides, short-term duration unemployment data are used, to estimate $f_t^{<d}$, that is in turn an approximation for f_t, as pinted out by EHS.

2.2.2 *Flows estimation with stock data*

In this section we present and discuss the methodology adopted by Elsby *et al.* (2013). The estimation of inflow and outflow rates for the t-th year under study (resp. s_t and f_t) is based on the following equation for the change in the unemployment stock between t and $t+1$, where t indexes months:

$$u_{t+1} = u_t + u_{t+1}^{<1} - F_t^{<1} \cdot u_t, \tag{2}$$

in which u_t is the stock (fraction of the labour force) of unemployed in the t-th month, $F_t^{<1}$ is the probability for an unemployed worker to find a job in the current month, i.e., outflow probability, and $u_{t+1}^{<1}$ is the stock of *short-term* unemployment, that is the fraction of workers experiencing an unemployment spell shorter than one month. Eq. 2 describes variations in the unemployment stock after one month, instead instantaneous variations as in Eq. 1.

Consequently, we can estimate the outflow probability

$$F_t^{<1} = 1 - \frac{u_{t+1} - u_{t+1}^{<1}}{u_t}, \tag{3}$$

and the corresponding hazard rate:

$$f_t^{<1} = -ln(1 - F_t^{<1}). \tag{4}$$

Analogously, when we consider short-term unemployment's spells shorter than d months, the associated hazard rate is

$$f_t^{<d} = -\frac{1}{d} ln(1 - F_t^{<d}) = -\frac{1}{d} ln\left(\frac{u_{t+d} - u_{t+d}^{<d}}{u_t}\right), \tag{5}$$

defined in the previous section.

The calculated value of $f_t^{<1}$ can be used as estimated value of f_t. Nevertheless, having at disposal the observed short-term unemployment stocks $u_t^{<3}$, $u_t^{<6}$ and $u_t^{<12}$, the estimated $f_t^{<3}$, $f_t^{<6}$ and $f_t^{<12}$ can be used to improve, when possible[6], the estimation of the global outflow rate f_t provided by $f_t^{<1}$. For more details on this technique, we refer to Elsby *et al.* (2013). It is worth noting that Eq. 5 is based on the assumption that f is constant for at least d months (authors of the aforementioned paper suppose that flow hazard rates f and s are constant within 12 months).

Having estimated f_t with $f_t^{<1}$ or with a (weighted) average of $f_t^{<d}$, $d = 1,3,6,12$, the corresponding inflow rate s_t is obtained considering that the solution u_t of Eq. 1 has the following form:

$$u_t = \lambda_t \cdot u_t^* + (1-\lambda_t)u_{t-12}, \tag{6}$$

where $u_t^* = \frac{s_t}{s_t+f_t}$ is the steady-state unemployment rate and $\lambda_t = 1 - e^{-12(s_t+f_t)}$ is the annual rate of convergence to steady state. The estimated inflow rate is then obtained solving Eq. 6 with respect to s_t.

2.2.3 *Additional formulas and assumptions*

In the OECD data-set, short-term statistics are annually gathered, then $u_{t+d}^{<d}$ is not available when $d = 1,3,6$ and t indicates the year under study. Then an approximation is made using the following formula:

$$f_t^{<d} = -\frac{1}{d} ln\left(\frac{u_t - u_t^{<d}}{u_{t-d}}\right).$$

A further approximation is required since unemployment stocks are available only for quarters. Let q_t^i be the unemployment rate for the i-th quarter in the t-th year. On one hand, with the aim of smoothing data, the annualized version of u_t, u_{t-3}, u_{t-6} and u_{t-12} is used according with the following formulas:

$$u_t = \frac{q_t^1 + q_t^2 + q_t^3 + q_t^4}{4}, \; u_{t-3} = \frac{q_{t-1}^4 + q_t^1 + q_t^2 + q_t^3}{4},$$

$$u_{t-6} = \frac{q_{t-1}^3 + q_{t-1}^4 + q_t^1 + q_t^2}{4}, \; u_{t-12} = \frac{q_{t-1}^1 + q_{t-1}^2 + q_{t-1}^3 + q_{t-1}^4}{4}.$$

On the other hand u_{t-1} is not available and it has to be interpolated. In Elsby *et al.* (2013) (online appendix) the assumption is made that $ln(u_\tau)$ is linear with respect of τ at least for $\tau \in [t-3, t]$. Substituting data about u_{t-3} and u_t, we obtain that $ln(u_{t-1}) = \frac{2}{3} ln(u_t) + \frac{1}{3} ln(u_{t-3})$.

[6] Authors clarify that $f_t^{<1}$, $f_t^{<3}$, $f_t^{<6}$ and $f_t^{<12}$ are all consistent estimates of the aggregate outflow rate f_t only if there is no duration dependence in the short-term outflow rates.

2.3 Estimation with Flow Data

As we have previously discussed, the methodology based on stock data enables one to derive transition rates in the absence of flow data. However, such a methodology implies two main significant drawbacks: 1) it requires a sequence of consecutive approximations (for example quarterly unemployment stocks are calculated as annualized means) and 2) it is based on strong economic assumptions (the flows regularity within years). We thus present the estimates of transitions rates when flow data are available, and then compare these results with those derived by applying the methodology described in Section 2.2.

When flow data are available, an alternative method for estimating f_t and s_t exists and is based on the observed number of transitions between employment and unemployment. Usually flow data contain information about inactive workers, which is an advantage in the estimation of f_t and s_t, as it will be clarified in the following. As in Baussola and Mussida (2014) we then consider three states E, U and I, and for every t the corresponding transition matrix

$$P_t = \begin{bmatrix} ee & eu & ei \\ ue & uu & ui \\ ie & iu & ii \end{bmatrix}.$$

Quarterly transition matrices are in this case extracted from the EUROSTAT data-set. Having no further information, we assume that hazard rates f_t and s_t are constant within quarters, which is a milder hypothesis with respect to suppose regularity within years. On such basis we can calculate the generator matrix Q_t such that $P_t = exp(Q_t)$, where $exp(\cdot)$ is in this case the *matrix exponential function*[7]. Q_t allows us to estimate the flow hazard rate with a continuity correction as in Shimer (2012): we suppose indeed that, within the t-th quarter, transitions are ruled by a continuous-time Markov chain with generator matrix Q_t, which has to satisfy $Q_{lj} > 0$ for every $l \neq j$ and $Q_{ll} = -\sum_{j\neq l} Q_{lj}$ (the subscript t is avoided for shortness). It is then known that

1. Q_{lj} represents the istantaneous rate of transitions from l to j for every $l \neq j \in \{e,u,i\}$;
2. the *persistence time* in the l-th state is an exponentially distributed random variable with parameter $-Q_{ll}$.

[7]Given a $k \times k$ matrix A, the exponential of A is defined by $exp(A) = \sum_{n=0}^{\infty} \frac{1}{n!} A^n$.

In consequence of that, the hazard rate for the l-state corresponds to the same value $-Q_{ll}$ (Kiefer, 1988).
On such basis we can estimate the inflow and outflow rates as follows:

- the outflow rate f_t corresponds to $-Q_{uu}$, the hazard rate related to the unemployment state;
- the inflow rate s_t corresponds to the hazard rate towards the unemployment state. In this case we suggest to introduce an alternative state S (the above-mentioned Not-unemployed state), which coincides with E if we decide to consider only employment/unemployment and with $E+I$ if we choose to include inactive workers. The inflow rate is then evaluated as $-Q_{ss}$.

3 *Strength and weakness of flow rates estimation with stock data*

3.1 *Strength: international comparisons when flow data are unavailable*

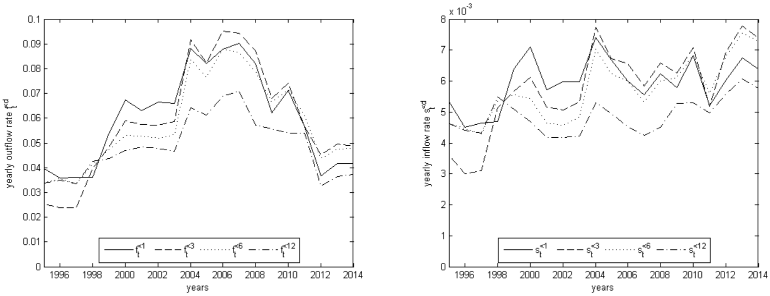
In this section we aim at pinpointing the advantage provided by using aggregate stock data to derive transition rates. This enable us to compare such an analysis with the corresponding disadvantages and then to derive conclusions and suggestions for future research.

As a first step, we use OECD stock data as in Sect. 2.2 to estimate the Italian flow rates.[8] Fig. 1 displays the comparison between the estimated $f_t^{<d}$ and $s_t^{<d}$, $d = 1,3,6,12$ as defined in the previous section, obtained using updated yearly OECD data from 1995 to 2014 (we cut away the earlier years because a break in the data is signaled in 1993 - 1994, whole results with the corresponding estimated steady-state unemployment rates are presented in Tab. 4, Appendix A).

The estimated short-term outflow rates are *yearly* hazard rates: for this reason we remind that it is assumed that flow rates are constant within years. Then, for example, $f_t^{<1}$ is the estimated rate of workers being unemployed in any point of time within the t-th year and leaving the unemployment state

[8]Here we use data for Italy only as an example to underline the advantage of using stock data when flow data are not available by following Elsby *et al.* (2013) and by using updated data with respect to the author. The estimates are coherent to the previous one from Elsby *et al.* (2013) also for the other countries examined. For the sake of brevity we only report Italian estimates. Nonetheless, estimates for the other three countries are available upon request.

Figure 1: Estimated short-term outflow rates $f_t^{<d}$ (left) and inflow rates $s_t^{<d}$ (right) with $d = 1, 3, 6, 12$ for Italy, 1995 - 2014.



Source: Authors' calculations on OECD data.

within the subsequent month. Consequently, f_t^d and s_t^d tend to decrease when d increases, because smaller values of d allow us to catch the high-frequency movements in and out the unemployment state.
At a first look, we can see that all the estimated short-term outflow rates show the same ascending trend until 2006-2007 followed by a decline which corresponds to the economic crisis. The evolution of both outflows and inflows follows the evolution of the overall Italian unemployment and highlights the double dip nature of the latest Italian crisis (Bruno *et al.*, 2014). Unemployment rose in 2008–2009 and we see in Fig. 1 corresponding and contemporaneous decrease of the outflow (left panel) and increase of the inflow rates (right panel). At the end of 2009 and in the first months of 2010 there were signals of a recovery, but at the end of that year the second dip of the crisis hit and unemployment started to grow again (decrease in outflow and increase of the inflow rates in Fig. 1), reaching a historical high in 2013. In addition, the short-term inflows seems to increase during the whole considered span of time. In is also worth noting the difference of scale between f_t^d and s_t^d: on average, $f_t^{<d}$ is in fact ten times bigger than the corresponding $s_t^{<d}$.
The methodology proposed by EHS, therefore, seems to capture the dynamics of the labor market flows, although - as we will describe in the next section - the magnitude of these flows is significantly higher when inactivity is taken into account.

As a second step, we analyze the outflow and the inflow rates in three countries pertaining to Continental Europe (France, Italy and Spain) and in the UK. We select these countries which are also compared since they have different institutional frameworks, with different labour institutions and regulations. France, Italy and Spain have a typically continental European labour markets, composed of segments characterized by significantly different levels of employment protection, and therefore different labour costs, while the United Kingdom has a typically Anglo-Saxon labour market characterized by less employment protection legislation Theodossiou and Zangelidis (2009). Despite these intrinsic differences, both labour markets have high labour mobility overall, but this mobility characterizes the labour market flows (here inflows and outflows) in each country in different ways. We aim at emphasizing how the average inflow and outflow rates react in these countries to the use of EHS technique, i.e., if the technique captures the differences in the labour markets of these countries.

With this aim, we have to use OECD data for the period from 2006 to 2014, since UK data have a break in 2005. Our scope is to analyze the relationship between the average outflow and inflow rates, for the years covering the economic crisis. Then we estimate f_t as explained in Sect. 2.2, and consequently we calculate s_t as in Eq. 6.

Tab. 1 contains the average flow rates (that is, the mean on the nine considered years of the estimated f_t and s_t, which are displayed in Tab. 5 in Appendix A), in comparison with results from Elsby *et al.* (2013).

Table 1: Comparison between average outflow and inflow rates obtained with EHS and updated OECD yearly data.

Country	**Elsby's inflow rate**	**Elsby's outflow rate**	**updated inflow rate**	**updated outflow rate**
France	0.67%	7.72%	0.73% *(8.5%)*	7.21% *(-6.7%)*
Italy	0.45%	4.30%	0.50% *(+12.9%)*	5.07% *(+18.1%)*
Spain	1.06%	6.27%	1.72% *(+62.4%)*	8.38% *(+33.6%)*
UK	1.05%	13.91%	1.00% *(-4.6%)*	14.09% *(+1.3%)*

Source: Elsby *et al.* (2013, Tab. 2) and Authors' calculation on 2006-2014 OECD data

In detail, the first two columns of Tab. 1 display EHS results obtained with data up to 2009. In columns three and four, we use updated OECD data from 2006 to 2014. We therefore have the opportunity to update EHS analysis and to show if there is any impacts of the economic recession on the estimated (average) outflow and inflow. Tab. 1 shows also the percentage differences between the updated series and those used by EHS in all the countries analyzed, i.e., France, Italy, Spain and the UK. These changes might be partly be due to the crisis which affected all the economies. The highest impact is found in Spain, where both the average inflow and average outflow increases (resp. +33.6% and +62.4%). The same impact, a positive change (increase) in both outflow and inflow is found in Italy with a lower extent (+18.1% and +12.9%). Finally, France and UK show different effects on both the flows, even if with a lesser extent (lower magnitude) compared to Italy and Spain: in France outflow decreases and inflow increases (-6.7% and +8.5%, respectively), in UK the opposite behavior is detected (+8.5% and -4.6%, respectively).

To sum up, the extension of the EHS technique to the most recent years is very interesting at least twofold. First, there is an impact of the crisis on all the indicators in all countries. Second, there are differences among countries both in the relevance and in the sign of those impacts and interestingly also between countries pertaining to the same labour market framework, i.e., Continental European framework. While in Spain and Italy there is an increase of the movements between the two labour market states of employment and unemployment (due partly to the crisis) and especially in Spain, in France we find a different impact, i.e., decrease in outflow and increase in inflow. There are therefore differences between countries pertaining to the (same) Continental European framework. Finally, in the UK which pertains to the Anglo-Saxon framework, we find low changes of both outflows and inflows, i.e., an increase of outflow and a decrease in inflow rates. EHS technique therefore captures the differences in the labour markets among countries.

3.2 Weakness: Does inactivity matter?

The estimation technique based on stock data represents an important tool to obtain flow rates when flow data are not available. Nevertheless it has a weakness due to the strong assumption that inflow and outflow rates are constant with years. The method proposed in Sect. 2.3 is based on a similar assumption but it regards shorter periods (quarters instead of years).

Estimation with flow data has an other important feature: when data about inactive workers are available, the same method can be easily adapted to choose of estimating flow rates with or without the state I. Thank to this feature, we are allowed to evaluate the impact of inactivity on the estimation of flow rates. We have at disposal quarterly EUROSTAT flow data from 2010q2 to 2016q1 for France, Italy, Spain and the United Kingdom. Due to data availability we therefore have to restrict the analysis with flow data to the post crisis period, whereas the analysis with stock data, as explained above, covers a wider period also well before the latest recession (1995–2014). Tab. 2 shows the estimated average inflow and outflow rates obtained firstly excluding inactive workers from the sample under study, as in Elsby *et al.* (2013), and secondly re-including them (which means that inflows towards unemployment may happen both from employment and inactivity).

Table 2: Comparison between average inflow and outflow rates estimated with and without Inactive workers, EUROSTAT quarterly data.

Country	**2-states inflow rate**	**2-states outflow rate**	**3-states inflow rate**	**3-states outflow rate**
France	0.57%	7.54%	0.81% *(+41.90%)*	12.42% *(+64.64%)*
Italy	0.46%	6.79%	1.22% *(+163.14%)*	10.14% *(+181.93%)*
Spain	1.28%	5.29%	1.62% *(+26.66%)*	9.04% *(+70.74%)*
UK	0.27%	6.03%	0.46% *(+68.96%)*	9.54% *(+58.17%)*

Source: Authors' calculations on EUROSTAT data, 2010q2-2016q1.

Results based only on E - U states are similar to the values shown in Tab. 1 (data are adjusted for temporal aggregation[9]), except for UK.

In all countries considering inactivity is important and there is a relevant increase in both inflow and outflow rates (Italic font columns in Tab. 2 contain the percentage differences between two-states and three-states estimated flow rates). It is worth noting that whereas in EHS, as explained above, no role for nonparticipation/inactivity was found in their results for unemployment fluctuations, the relevance and cyclical fluctuations of transitions between unemployment and nonparticipation on unemployment itself

[9]It is worth noting a main difference between OECD and EUROSTAT time unit: in the first case data are yearly collected, and the time unit is $\Delta_y = 1$ year (12 months). In the second case the time unit is $\Delta_q = 1$ quarter (3 months). To make instantaneous rates comparable, we then need to divide EUROSTAT results by four.

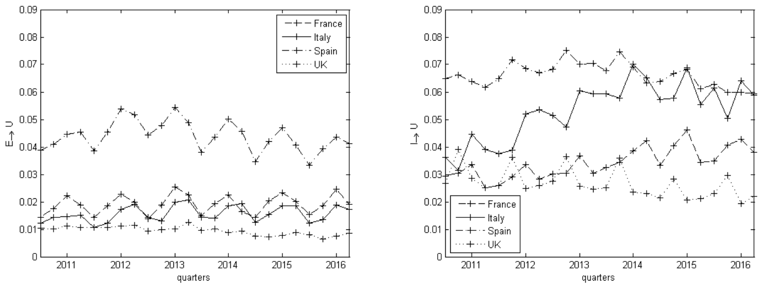
was instead pinpointed in a more recent work again by Elsby (Elsby *et al.*, 2015) on the US labour market. During recessions, as in the latest Great Recession, inflows into unemployment from nonparticipation rise and the rate at which unemployed/jobseekers exit the labour force falls. These fluctuations at the participation margin account on average for one-third of cyclical unemployment movements.

The relevant result regards Italy, when inactivity is considered. In this case it has the highest outflow rate (19%), with the highest percentage increase (+182%). At first sight it could appear as a positive result; however, it implies very high transitions from unemployment to inactivity thereby posing the issue related to the ability of the Italian economy to create an adequate number of jobs thus enabling employment to grow and unemployment to be reduced not just because of a discouragement effect (see Fig. 3, right panel).

A similar pattern is also observed for Spain, where the unemployment rate is however systematically higher. In this country, there is also an increase of the inflow and outflow rates when inactivity is not neglected. France also shows increase in both inflow and outflow rates. For the UK the impact on the inflows and outflows rates is milder in comparison with the two-state representation. This fact suggests that such a representation is more suitable for those institutional frameworks (e.g, Anglo-Saxon) in which the reciprocal flows from and to inactivity are less relevant.

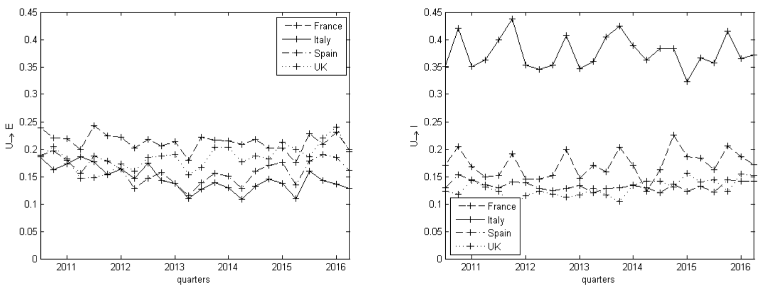
In addition, whereas in Continental Europe there is a higher impact on outflow compared to inflow when moving from a two- to a three-state representation, in the UK the opposite is true. In any case, the proposed evidence suggests that inactivity is relevant and neglecting it leads to a significant and therefore not negligible underestimation of the overall/average inflows and outflows. In detail, this is especially the case of Continental European countries - particularly Italy - where the inclusion of inactivity leads to a significant increase in transition rates. Thus, policy suggestions based on a two-state representation are flawed, as they do not take into consideration the true representation - and therefore the true flexibility - of the labour market.

Figure 2: Conditioned transition probabilities towards Unemployment, from Employment (left) and from Inactivity (right).



Source: Authors' calculations on EUROSTAT data.

Figure 3: Conditioned transition probabilities from Unemployment, towards Employment (left) and towards Inactivity (right).



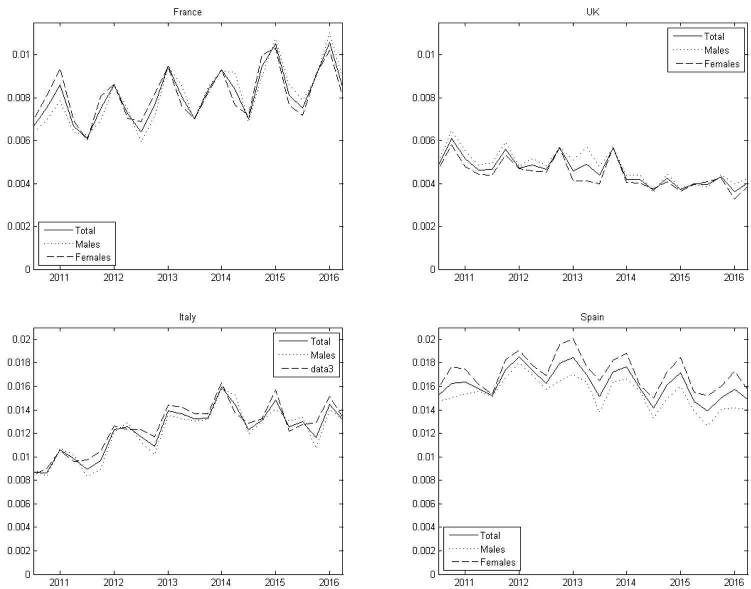
Source: Authors' calculations on EUROSTAT data.

4 *Inflows and Outflows by gender*

In the previous sections we stress the evidences in favor of the flows estimation with flow data in a three-state representation of the labour market. Here we conclude this work applying this method for an additional and relevant analysis about the labour market transition rates when gender is considered.

For the four considered countries, we extract data on the labour market transitions of males and females, for the same quarters 2010q2 - 2016q1. Estimated inflow and outflow rates are shown in Figg. 4 and 5.

Figure 4: Inflow rates by gender.

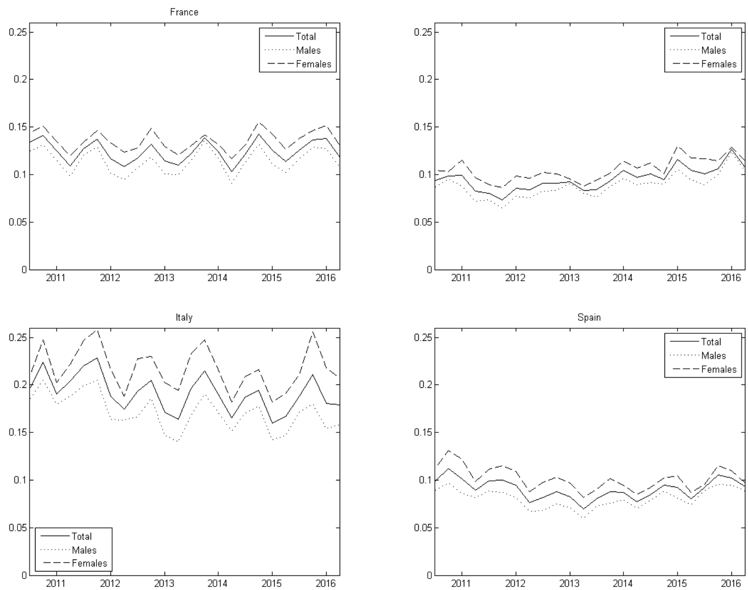


Source: Authors' calculations on EUROSTAT data.

Firstly we note the difference of scale between inflows and outflows, the latter being always higher (Spanish outflows are on average six times higher than the corresponding inflows, for UK outflows are even 20 times higher).

Examining in depth the differences between males and female, we note

Figure 5: Outflow rates by gender.



Source: Authors' calculations on EUROSTAT data.

that females flows are always higher than males, except for UK's outflows. Tab. 3 displays the average flows for males and females (the average is evaluated on the estimated values for the 24 considered quarters, shown in Appendix B.

The last column of Tab. 3 contains the percentage difference between males and females flows, evaluated as $\frac{\text{female flow}}{\text{male flow}} - 1$. The gender gap is higher for outflows compared to inflows. The gap is similar and high in Italy and Spain (+26.8% and +25.8%, respectively) and high even if with a lower magnitude in Spain and the UK (+18.9% and +19.5%, respectively. These differences across countries in gender relevance confirm that this methodology is able to capture heterogeneity across countries. In Italy and Spain, both pertaining to continental Europe, the gap is similar. In France, instead, the gender difference (in unemployment outflows) looks more similar to the UK (Anglo-Saxon labour market framework). Gender difference in inflows are positive and relatively high in Spain (+11.8%), positive but lower in Italy (+3.9%) and negligible in France (+0.6%), while these differences are negative in the UK, i.e., females have lower probability of getting unemployed compared to males.

Table 3: Comparison between average inflow and outflow rates for Males and Females.

		M	F	Percentage difference
France	In	0.81%	0.81%	*0.56%*
	Out	11.41%	13.57%	*18.91%*
Italy	In	1.21%	1.25%	*3.88%*
	Out	17.13%	21.73%	*26.84%*
Spain	In	1.54%	1.72%	*11.79%*
	Out	8.09%	10.18%	*25.81%*
UK	In	0.48%	0.44%	*-8.43%*
	Out	8.82%	10.54%	*19.51%*

Source: Authors' calculations on EUROSTAT data, 2010q2-2016q1.

5 *Conclusions*

Flexibility in the labour market is recognized as a requisite for enabling employment to grow steadily. In particular, it has been emphasized that higher unemployment inflows are also associated with corresponding higher unemployment outflows that bring about an increase in employment.

The Anglo-Saxon institutional framework is adopted as a benchmark for this representation, and aggregate data seem to be coherent with such a statement.

In addition, international comparisons of aggregate inflow and outflow rates derived from aggregate unemployment stocks reinforce this wisdom.

We discuss this evidence by reproducing labour mobility in three different economies representing, on the on hand, the so called continental European framework (e.g., France, Italy and Spain), and on the other hand, the Anglo-Saxon framework (UK).

We show that the two-labour-market-state representation (employment and unemployment) typically used for such international comparisons is flawed, as it systematically underestimates the inflow and especially outflows rates. Inactivity plays a crucial role and, when included, provides a different picture of labour mobility, in that transition rates are much higher even in continental Europe.

Thus the steady growth of employment depends more on structural characteristics of the economy (industry specializations, firm size, internationalization, relevance of multinational groups) rather than on labour flexibility per-se, which is -in any case- high even in continental Europe.

We also consider gender differences in inflows and outflows rates, which are important and structural characteristics in some European countries, as also debated in the literature. We indeed find relevant gender differences in the outflows rates of all the countries examined. These differences are higher in Italy and Spain, compared to France and the UK. In detail, gender gaps are positive and higher in Spain, whilst these are negative in the UK.

The inclusion of inactivity and the disaggregation by gender, therefore, provides a comprehensive representation of a labor market, particularly in countries where flows between unemployment and inactivity are relevant (e.g., continental Europe) and where the female disadvantage is more important (Italy and Spain.

Thus, policy recommendations should be derived on the grounds of these modeling strategy, that highlights the role of inactivity inflows and outflows, thereby suggesting the need of policy aiming at reducing employment instability.

A Estimated flows based on OECD data

Table 4: Yearly steady state for Italy, in comparison with the observed percentage of Unemployment.

Year	**Estimated f_t**	**Estimated s_t**	**Steady state $\frac{s_t}{f_t+s_t}$**	**Observed OECD u_t**
1995	0.0332	0.0046	0.1205	0.117
1996	0.0326	0.0041	0.1115	0.117
1997	0.0317	0.0041	0.1141	0.118
1998	0.0399	0.0052	0.1146	0.119
1999	0.0483	0.0057	0.1051	0.115
2000	0.0566	0.0058	0.0935	0.107
2001	0.0554	0.0049	0.0816	0.096
2002	0.0558	0.0049	0.0815	0.091
2003	0.0562	0.0051	0.0830	0.088
2004	0.0819	0.0069	0.0774	0.081
2005	0.0755	0.0061	0.0753	0.078
2006	0.0850	0.0058	0.0635	0.068
2007	0.0855	0.0052	0.0578	0.061
2008	0.0763	0.0058	0.0710	0.068
2009	0.0631	0.0059	0.0849	0.078
2010	0.0676	0.0065	0.0877	0.085
2011	0.0570	0.0052	0.0842	0.084
2012	0.0396	0.0063	0.1380	0.108
2013	0.0438	0.0070	0.1385	0.123
2014	0.0439	0.0067	0.1326	0.128

Source: Authors' calculations on OECD data.

B Estimated flows based on EUROSTAT data

Table 5: Estimated yearly flow rates with updated OECD's data.

	France		**Italy**		**Spain**		**UK**	
	f_t	s_t	f_t	s_t	f_t	s_t	f_t	s_t
2006	6.94%	0.67%	6.68%	0.44%	12.86%	1.17%	18.71%	1.07%
2007	8.09%	0.66%	6.91%	0.41%	12.93%	1.16%	18.58%	1.03%
2008	8.52%	0.66%	5.54%	0.44%	11.28%	1.55%	16.33%	0.98%
2009	6.74%	0.77%	5.49%	0.52%	7.95%	2.07%	11.72%	1.03%
2010	7.19%	0.74%	5.28%	0.52%	7.33%	1.93%	10.85%	0.93%
2011	7.14%	0.72%	5.39%	0.50%	6.59%	1.89%	10.54%	0.93%
2012	6.82%	0.77%	3.17%	0.55%	5.42%	2.02%	12.17%	1.04%
2013	6.81%	0.81%	3.56%	0.60%	5.30%	1.96%	12.33%	0.99%
2014	6.60%	0.76%	3.64%	0.57%	5.72%	1.74%	15.60%	0.98%
Mean	**7.21%**	**0.73%**	**5.07%**	**0.50%**	**8.38%**	**1.72%**	**14.09%**	**1.00%**

Table 6: Estimated flow rates for the two-state labour market representation.

	Inflow rates				Outflow rates			
	FR	IT	SP	UK	FR	IT	SP	UK
2010q2	1.74%	1.48%	4.59%	1.20%	34.31%	33.97%	25.00%	23.98%
2010q3	2.13%	1.76%	4.95%	1.18%	32.78%	33.25%	27.12%	26.57%
2010q4	2.68%	1.78%	5.33%	1.28%	30.95%	31.35%	24.30%	23.99%
2011q1	2.22%	1.85%	5.28%	1.20%	27.07%	34.76%	20.49%	18.57%
2011q2	1.73%	1.31%	4.55%	1.18%	33.98%	35.31%	24.91%	18.58%
2011q3	2.25%	1.49%	5.40%	1.19%	32.99%	31.93%	23.85%	18.95%
2011q4	2.73%	2.07%	6.38%	1.29%	30.53%	29.46%	21.93%	21.83%
2012q1	2.34%	2.26%	5.92%	1.31%	27.35%	25.56%	16.40%	20.33%
2012q2	1.62%	1.72%	5.08%	1.07%	29.95%	31.73%	18.74%	23.58%
2012q3	2.25%	1.55%	5.58%	1.13%	30.07%	27.74%	20.43%	23.93%
2012q4	3.05%	2.34%	6.31%	1.16%	29.27%	23.99%	17.93%	24.41%
2013q1	2.64%	2.39%	5.51%	1.41%	24.73%	19.05%	14.39%	19.51%
2013q2	1.78%	1.68%	4.35%	1.08%	30.86%	24.20%	17.75%	20.92%
2013q3	2.34%	1.67%	5.08%	1.17%	32.05%	27.81%	20.35%	25.91%
2013q4	2.71%	2.18%	5.84%	1.03%	30.36%	24.15%	19.68%	26.97%
2014q1	1.92%	2.22%	5.19%	1.06%	27.51%	18.90%	16.38%	23.26%
2014q2	1.70%	1.44%	3.96%	0.85%	30.31%	24.28%	20.49%	24.73%
2014q3	2.46%	1.83%	4.92%	0.82%	30.70%	27.21%	22.55%	23.69%
2014q4	2.78%	2.18%	5.54%	0.90%	29.01%	23.02%	23.03%	29.19%
2015q1	2.33%	2.13%	4.62%	1.03%	24.60%	19.28%	17.29%	26.50%
2015q2	1.85%	1.45%	3.88%	0.91%	32.22%	28.94%	23.22%	24.66%
2015q3	2.22%	1.61%	4.70%	0.75%	30.78%	28.28%	25.68%	29.10%
2015q4	3.03%	2.21%	5.20%	0.90%	33.84%	24.52%	24.89%	33.50%
2016q1	2.24%	2.01%	4.77%	1.00%	27.83%	23.10%	21.26%	26.33%
Mean	**2.28%**	**1.86%**	**5.12%**	**1.09%**	**30.17%**	**27.16%**	**21.17%**	**24.13%**

Source: Authors' calculations on EUROSTAT data.

Table 7: Estimated inflow rates based on the three-states representation of labour market.

	France			Italy			Spain			UK		
	TOT	MAL	FEM	TOT	MAL	FEM	TOT	MAL	FEM	TOT	MAL	FEM
2010q2	0.67%	0.64%	0.69%	0.87%	0.90%	0.84%	1.53%	1.47%	1.59%	0.48%	0.50%	0.46%
2010q3	0.75%	0.69%	0.81%	0.86%	0.83%	0.90%	1.62%	1.50%	1.77%	0.61%	0.65%	0.58%
2010q4	0.86%	0.78%	0.94%	1.06%	1.07%	1.05%	1.63%	1.54%	1.75%	0.51%	0.55%	0.48%
2011q1	0.67%	0.64%	0.70%	0.99%	1.02%	0.96%	1.58%	1.56%	1.62%	0.46%	0.49%	0.44%
2011q2	0.61%	0.62%	0.60%	0.90%	0.83%	0.97%	1.52%	1.52%	1.53%	0.46%	0.50%	0.44%
2011q3	0.75%	0.69%	0.80%	0.97%	0.90%	1.05%	1.74%	1.67%	1.83%	0.56%	0.59%	0.53%
2011q4	0.86%	0.86%	0.86%	1.23%	1.21%	1.26%	1.85%	1.80%	1.91%	0.47%	0.48%	0.47%
2012q1	0.73%	0.75%	0.71%	1.26%	1.29%	1.23%	1.73%	1.69%	1.78%	0.49%	0.52%	0.46%
2012q2	0.64%	0.59%	0.69%	1.17%	1.13%	1.23%	1.63%	1.57%	1.69%	0.47%	0.48%	0.45%
2012q3	0.76%	0.71%	0.82%	1.09%	1.02%	1.17%	1.80%	1.65%	1.96%	0.57%	0.57%	0.57%
2012q4	0.95%	0.95%	0.94%	1.39%	1.36%	1.44%	1.84%	1.70%	2.00%	0.46%	0.51%	0.41%
2013q1	0.81%	0.86%	0.76%	1.36%	1.32%	1.42%	1.70%	1.64%	1.77%	0.49%	0.57%	0.41%
2013q2	0.70%	0.70%	0.70%	1.33%	1.31%	1.36%	1.51%	1.38%	1.65%	0.44%	0.48%	0.40%
2013q3	0.84%	0.85%	0.82%	1.33%	1.32%	1.36%	1.72%	1.63%	1.82%	0.57%	0.57%	0.57%
2013q4	0.93%	0.93%	0.93%	1.59%	1.58%	1.63%	1.77%	1.66%	1.88%	0.42%	0.44%	0.40%
2014q1	0.84%	0.92%	0.76%	1.44%	1.53%	1.37%	1.58%	1.56%	1.61%	0.42%	0.44%	0.40%
2014q2	0.70%	0.69%	0.72%	1.23%	1.19%	1.28%	1.41%	1.33%	1.50%	0.37%	0.36%	0.38%
2014q3	0.95%	0.90%	1.00%	1.31%	1.30%	1.33%	1.61%	1.50%	1.72%	0.43%	0.44%	0.41%
2014q4	1.05%	1.07%	1.03%	1.48%	1.41%	1.57%	1.72%	1.60%	1.85%	0.37%	0.38%	0.37%
2015q1	0.81%	0.86%	0.77%	1.26%	1.31%	1.22%	1.47%	1.39%	1.55%	0.40%	0.40%	0.40%
2015q2	0.75%	0.79%	0.72%	1.30%	1.34%	1.28%	1.39%	1.26%	1.52%	0.39%	0.38%	0.41%
2015q3	0.90%	0.90%	0.91%	1.16%	1.07%	1.29%	1.50%	1.40%	1.60%	0.43%	0.44%	0.43%
2015q4	1.06%	1.10%	1.02%	1.45%	1.40%	1.52%	1.57%	1.42%	1.73%	0.36%	0.40%	0.33%
2016q1	0.85%	0.90%	0.81%	1.32%	1.32%	1.34%	1.49%	1.40%	1.58%	0.40%	0.42%	0.38%
mean	**0.81%**	**0.81%**	**0.81%**	**1.22%**	**1.21%**	**1.25%**	**1.62%**	**1.54%**	**1.72%**	**0.46%**	**0.48%**	**0.44%**

Source: Authors' calculations on EUROSTAT data.

Table 8: Estimated outflow rates based on the three-states representation of labour market.

	France			Italy			Spain			UK		
	TOT	MAL	FEM	TOT	MAL	FEM	TOT	MAL	FEM	TOT	MAL	FEM
2010q2	13.38%	12.50%	14.42%	19.66%	18.53%	21.00%	9.90%	8.88%	11.23%	9.34%	8.66%	10.44%
2010q3	14.07%	13.12%	15.12%	22.38%	20.46%	24.76%	11.19%	9.68%	13.14%	9.86%	9.56%	10.29%
2010q4	12.47%	11.50%	13.53%	19.05%	18.00%	20.30%	10.17%	8.60%	12.17%	9.91%	8.80%	11.49%
2011q1	10.89%	9.86%	11.94%	20.39%	18.85%	22.19%	8.90%	8.14%	9.84%	8.21%	7.19%	9.72%
2011q2	12.72%	12.06%	13.40%	22.04%	19.94%	24.65%	9.89%	8.84%	11.17%	8.00%	7.33%	8.96%
2011q3	13.71%	12.88%	14.61%	22.88%	20.45%	25.84%	9.96%	8.73%	11.51%	7.32%	6.42%	8.61%
2011q4	11.69%	10.14%	13.33%	18.78%	16.40%	21.63%	9.43%	8.20%	10.94%	8.57%	7.68%	9.82%
2012q1	10.84%	9.48%	12.37%	17.45%	16.30%	18.82%	7.68%	6.76%	8.79%	8.41%	7.55%	9.62%
2012q2	11.71%	10.78%	12.83%	19.33%	16.66%	22.74%	8.15%	6.83%	9.80%	9.08%	8.25%	10.24%
2012q3	13.22%	11.80%	14.86%	20.51%	18.55%	23.01%	8.75%	7.52%	10.30%	9.05%	8.31%	10.09%
2012q4	11.42%	10.05%	13.00%	17.17%	14.70%	20.28%	8.27%	7.09%	9.72%	9.26%	9.05%	9.54%
2013q1	10.95%	10.00%	12.06%	16.42%	14.05%	19.46%	6.96%	5.97%	8.14%	8.35%	8.00%	8.82%
2013q2	12.16%	11.46%	13.02%	19.63%	16.86%	23.28%	8.04%	7.25%	8.99%	8.37%	7.67%	9.37%
2013q3	13.86%	13.61%	14.16%	21.44%	19.04%	24.78%	8.77%	7.60%	10.17%	9.32%	8.72%	10.17%
2013q4	12.41%	11.72%	13.19%	19.03%	17.14%	21.63%	8.67%	7.97%	9.48%	10.43%	9.63%	11.47%
2014q1	10.28%	9.07%	11.63%	16.51%	15.17%	18.18%	7.72%	7.06%	8.47%	9.69%	8.95%	10.68%
2014q2	12.14%	11.31%	13.15%	18.70%	17.05%	20.87%	8.50%	7.86%	9.24%	10.05%	9.16%	11.21%
2014q3	14.28%	13.21%	15.57%	19.46%	17.76%	21.63%	9.47%	8.84%	10.20%	9.50%	9.03%	10.10%
2014q4	12.60%	11.12%	14.28%	16.01%	14.25%	18.25%	9.21%	8.06%	10.48%	11.61%	10.51%	13.01%
2015q1	11.36%	10.23%	12.69%	16.70%	14.72%	19.14%	8.03%	7.40%	8.71%	10.46%	9.48%	11.76%
2015q2	12.61%	11.69%	13.76%	18.83%	17.12%	21.11%	9.20%	8.90%	9.51%	10.10%	8.94%	11.69%
2015q3	13.64%	12.86%	14.63%	21.09%	17.97%	25.59%	10.50%	9.54%	11.51%	10.63%	9.98%	11.44%
2015q4	13.81%	12.70%	15.14%	18.05%	15.38%	21.75%	10.20%	9.48%	10.97%	12.64%	12.46%	12.90%
2016q1	11.80%	10.79%	13.04%	17.91%	15.85%	20.68%	9.31%	8.89%	9.72%	10.78%	10.26%	11.44%
mean	**12.42%**	**11.41%**	**13.57%**	**19.14%**	**17.13%**	**21.73%**	**9.04%**	**8.09%**	**10.18%**	**9.54%**	**8.82%**	**10.54%**

Source: Authors' calculations on EUROSTAT data.

References

Akerlof, G. A. (1981). Pitfalls in markov modeling of labor market stocks and flows. *The Journal of Human Resources*, **16**(1), 141– 151.

Baussola, M. and Mussida, C. (2014). Transitions in the labour market: Discouragement effect and individual characteristics. *Labour*, **28**(2), 209–232.

Blanchard, O. and Portugal, P. (2001). What hides behind an unemployment rate: comparing Portuguese and US labor markets. *American Economic Review*, pages 187– 207.

Blanchard, O. and Wolfers, J. (2000). The role of shocks and institutions in the rise of European unemployment: the aggregate evidence. *The Economic Journal*, **110**(462), 1– 33.

Blanchard, O. J. and Diamond, P. (1992). The flow approach to labor markets. Technical report, National Bureau of Economic Research.

Bruno, G., Marelli, P., and Signorelli, M. (2014). The Rise of NEET and Youth Unemployment in EU Regions after the Crisis. *Comparative Economic Studies*, **56**(4), 592– 615.

Burda, M. and Wyplosz, C. (1994). Gross worker and job flows in Europe. *European economic review*, **38**(6), 1287– 1315.

Clark, K. B., Summers, L. H., Holt, C. C., Hall, R. E., Baily, M. N., and Clark, K. B. (1979). Labor market dynamics and unemployment: a reconsideration. *Brookings Papers on Economic Activity*, **1979**(1), 13– 72.

Davis, S. J., Faberman, R. J., and Haltiwanger, J. (2006). The flow approach to labor markets: New data sources and micro-macro links. Technical report, National Bureau of Economic Research.

Elsby, M. W., Hobijn, B., Şahin, A., *et al.* (2013). Unemployment Dynamics in the OECD. *The Review of Economics and Statistics*, **95**(2), 530– 548.

Elsby, M. W., Hobijn, B., and Şahin, A. (2015). On the importance of the participation margin for labor market fluctuations. *Journal of Monetary Economics*, **72**, 64– 82.

Fujita, S. and Ramey, G. (2006). The cyclicality of job loss and hiring. Technical report, Working Papers 06-17, Federal Reserve Bank of Philadelphia.

Gomes, P. (2012). Labour market flows: Facts from the United Kingdom. *Labour Economics*, **19**(2), 165 – 175.

Kaitz, H. (1970). Analyzing the lenght spells on unemployment. *Monthly Labor Review*, **93**(11), 11– 20.

Kiefer, N. M. (1988). Economic Duration data and Hazard Functions. *Journal of Economic Literature*, **26**(2), 646 – 679.

Marston, S. T., Feldstein, M., and Hymans, S. H. (1976). Employment instability and high unemployment rates. *Brookings Papers on Economic Activity*, **1976**(1), 169– 210.

OECD (2008). Employment outlook 2008. Technical report, OECD Publishing, Paris.

Petrongolo, B. and Pissarides, C. (2008). The ins and outs of European unemployment. *American Economic Review*, **97**(2), 256 – 262.

Shimer, R. (2012). Reassessing the ins and outs of unemployment. *Review of Economic Dynamics*, **15**(2), 127– 148.

Theodossiou, I. and Zangelidis, A. (2009). Should I stay or should I go? The effect of gender, education and unemployment on labour market transitions. *Labour Economics*, **16**(5), 566– 577.

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