Determinants of unemployment flows
Labour market institutions and macroeconomic policies

Ekkehard Ernst
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Abstract

The paper makes use of newly developed information on unemployment dynamics. On the basis of a matching model of the labour market the paper analyses the economic, institutional and policy determinants of unemployment in- and outflows. Standard determinants are found to be significant with the expected sign. In particular adverse productivity shocks, higher user costs of capital, stronger real wage growth, heavier tax burden, larger unionization rate and more stringent employment protection legislation can be shown to depress unemployment dynamics. Moreover, the impact of the degree of wage bargaining centralization confirms the original Calmfors-Driffill insight also in the flow context. The paper also identifies the impact of policy interventions through fiscal and labour market spending using a macroeconomic, simultaneous equation set-up. The paper assess the relative contribution of these policies in stimulating unemployment outflows and analyzes the effectiveness of different policy instruments at different time horizons, stressing the importance of passive labour market measures to stimulate unemployment outflows and to limit unemployment inflows.

Keywords: Unemployment in- and outflows, economic, institutional and policy determinants of labour market flows, fiscal and labour market policies

JEL-Codes: J64, J23

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Preface

The role of labour market policies in limiting employment losses resulting from the global crisis of 2008 has received considerable policy attention. As the labour market situation worsened, countries implemented unconventional measures to support job seekers and limit job losses such as extending unemployment benefits and expanding work sharing arrangements. Some of the instruments used had been discarded by earlier studies as ineffective or even counter-productive. This paper questions some of the earlier evidence presented and argues that in situations of substantial macroeconomic stress, unconventional interventions in the labour market may have significant favourable impacts on employment.

The paper makes use of a new database, looking at flow transitions in and out of employment, rather than employment and unemployment "stocks". In addition, macroeconomic interaction effects are taken into account by estimating a small macroeconomic model with a labour market. This new empirical methodology is based on theoretical considerations developed by recent Nobel prize winners Diamond, Mortensen and Pissarides and allows for a more detailed account of transmission mechanisms of different policy options. Most importantly, it will allow for a better understanding of the total – macro- and microeconomic – effects of labour market policies through various incentive and aggregate demand channels.

The analysis presented in this paper was undertaken as part of the World of Work Report 2010 and supported this report’s assessment of fiscal and labour market policy effectiveness. The paper has successfully paved the way for further research on the interactions between labour markets and macroeconomic policies.

Raymond Torres
Director
International Institute for Labour Studies
1 Introduction

The empirical analysis of the labour market has long concentrated on understanding the determinants of employment and unemployment levels, both in static and dynamic terms. With the onset and wide diffusion of labour market matching theories along the Diamond-Mortensen-Pissarides framework, however, the theoretical questions have shifted towards understanding the flows rather than the stocks on the labour market. These theoretical advancements are only gradually matched by corresponding empirical studies, mainly related to the lack of relevant data. While information on job vacancies has increasingly become available, other information related to gross worker flows or unemployment in- and outflows need to be constructed from scratch. In this respect, recent advancements by various researchers make the direct empirical analysis of the flow dynamics available for a wider community. The analysis of gross job and worker flows has been pushed forward by various authors, including Davis et al. (1998) and Davis et al. (2008), often, however, on the basis of individual country analysis. More recently, the construction of unemployment flows - in and out of the pool of unemployed - allows cross-country comparisons of labour market dynamics (see, for instance, Elsby et al. (2008), Shimer (2007) and Petrongolo and Pissarides (2008)).

In this paper, we want to exploit these newly available information on unemployment dynamics, trying to understand the economic policy and institutional determinants. Specifically, we want to consider whether typical determinants of unemployment stocks - such as those identified by Baccaro and Rei (2005), Baker et al. (2005), Bassanini and Duval (2006), Bassanini et al. (2010), Nickell et al. (2005) and Stockhammer and Klär (2008) - carry over to an analysis of unemployment flows. In particular, we are interested whether standard theories of labour market rigidities, such as wage bargaining systems and employment protection, can explain in an economically sensible way the information related to unemployment in- and outflows.

In addition, and motivated by recent policy interventions in relation with the global financial crisis, we aim at a more detailed understanding of the impact of fiscal and labour market policy interventions on the different margins of unemployment dynamics. To properly take the dynamics of the labour market adjustment into account, we have developed a new methodology to account for the macroeconomic effects of fiscal and labour market policies when analysing programme effectiveness. In particular, we account for economy-wide pecuniary externalities from these spending programmes through influences of long-term interest rates. This is in contrast to most microeconomic studies that analyse policy effectiveness ceteris paribus, i.e. assuming that aggregated demand is not being affected. This is often justified as many programmes are run on a relatively limited scale, with a clearly identified scope on a local or sectoral level. Often, these programmes are introduced at an experimental level and do not develop a large, fiscally relevant impacts. However, at the current juncture, with a large scale increase in spending on general government and specific labour market programmes, these will also have a macroeconomic effect, which needs to be taken into account when assessing the implications of these programmes for labour market dynamics. Moreover, by considering the programme impact on different flow margins rather than on an aggregate job/worker reallocation measure, our analysis of unemployment flows allows to assess to what extent different programmes will be useful in stimulating unemployment outflows, as compared to programmes that limit unemployment inflows. This will help in better designing programmes that better correspond to particular cyclical characteristics of an economy.

The main results of this paper can be summarised as follows:

- Standard economic determinants help explain a substantial part of the (within-country) variation of unemployment in- and outflows. Across specifications and depending on the particular specification used up to 40% of the sample variation are explained by such variables.
- Both demand (investment, disposable income, output gap) and supply (real wages, user cost of capital, productivity, terms of trade) factors are relevant to explain the data on the basis of a standard search and matching labour market model.
- Labour market institutions are related to unemployment flows with the expected sign: Employment protection legislation lowers outflows but does not lead to a significant decline in inflows. Unionization rates on the other hand do not seem to affect outflows but increase the rate of unemployment.
inflows. Finally, the relationship between wage bargaining centralization and outflows is U-shaped (as in the original Calmfors-Driffill hypothesis, see Calmfors and Driffill (1988)) whereas inflows are (only insignificantly) negatively related to this indicator (in both the linear and non-linear specification).

- Fiscal and labour market policies have significant effects on both unemployment in- and outflows but effects wear off over the long-run. Typically, the effects are stronger on stimulating unemployment outflows than on preventing unemployment inflows. Unemployment benefits and hiring incentives seem to have particularly strong effects both in the long and the short run whereas spending on training programmes and public employment services seem to have (small) positive effects only in the long run.

The paper is organised as follows: In the following section, a simple model of labour market flows is introduced on the basis of a standard search and matching framework, extended by a more general description of shocks and taking into account capital accumulation at the firm level. In section 3, the data and methodology employed in this paper are introduced and discussed. Section 4 presents the main results and examines the relative contribution of individual factors to the overall variation in our sample. A final section concludes.

2 What drives unemployment dynamics?

This section presents the empirical model underlying our analysis of unemployment dynamics. The section starts by discussing the determinants of unemployment in- and outflows as they arise from current theoretical search and matching models, including indications to possible institutional variables that influence the dynamics. In a second part, macro-economic feedback loops of fiscal and labour market policies are analysed. Finally, this section finishes by deriving the steady state solution of the dynamic empirical model.

2.1 The base model

In order to study the dynamics of unemployment flows, we first need to link our observables - unemployment in- and outflows - to typical determinants identified in the labour market search and matching literature, the current industry standard for labour market analysis. In the analysis below, we concentrate on labour market flows related to flows of unemployed in \((\text{IN}_t)\) and out of \((\text{OUT}_t)\) the unemployment pool. These flows can be linked to (absolute) changes in the number of unemployed as follows:

\[
\Delta U_t = \Delta L_t - \Delta E_T = \text{IN}_t - \text{OUT}_t
\]

i.e. the level of unemployment increases with the increase in the labour force, \(L_T\), and decreases with the rise in (total) employment, \(E_T\). Alternatively, unemployment increases when inflows into the unemployment, \(IN_t\) pool exceed outflows, \(OUT_t\).

In order to be operational for our purposes, this flow equation needs to be further refined, taking into account the job creation and destruction process that affects the total amount of jobs available:

\[
\Delta E_T = \text{JobCreation}_t - \text{JobDestruction}_t
\]

i.e. changes in the employment level result from the difference between created vs. destroyed jobs. Following standard labour market matching models (see Pissarides, 2000, for a classical reference in this area, and Carlsson et al., 2006), the extensive margin of labour demand\(^1\) is determined by a mix of the following factors:

\[
\text{JobCreation}_t = \alpha_1 + \beta_{11}E_{T-1} + \beta_{12}W_t + \beta_{13}AD_t + \beta_{14}U_t + \beta_{15}V_t + \beta_{16}r_{t-1}
\]

where \(E_{T-1}\) : past employment, \(W_t\) : real wages, \(AD_t\) : aggregate demand, \(U_t\) : unemployment, \(V_t\) : unfilled vacancies and \(r_{t-1}\) : (lagged) real long-term interest rates.

---

\(^1\)In this set-up, we abstract from changes in working hours.
Similarly, job destruction will be affected by the rate of technological progress, the real interest rate (through the discounted future benefits of an ongoing relationship), import competition, wages and aggregate demand:

\[
\text{JobDestruction}_t = \alpha_2 + \beta_{21} TFP_t + \beta_{22} r_t + \beta_{23} \varepsilon_t + \beta_{24} \text{IMP}_t + \beta_{25} w_t + \beta_{26} AD_t
\] (4)

where \( TFP_t \): an indicator for total factor productivity, \( r_t \): the real (long-term) interest rate, \( \varepsilon_t \): the real effective exchange rate, \( \text{IMP}_t \): a measure of either import penetration (i.e. imports relative to GDP) or real import growth.

Finally, unemployment dynamics are also affected by changes in the labour force. We reflect standard theories about the determinants of labour supply by considering the following equation for changes in labour supply (see, for instance, Burniaux et al., 2003):

\[
\Delta L_t = \alpha_3 + \beta_{31} \Delta L_{t-1} + \beta_{32} \Delta u_{t-1} + \beta_{33} \text{Tax}_t
\] (5)

where \( \beta_{32} \) represents the discouraged worker effect which depresses labour force growth (with an expected negative sign).

Wages in equations (3) and (4) are endogenous to job creation and destruction and, therefore, need to be instrumented. This can be done using the following wage-equation, which is based on a wage-curve approach (à la Blanchflower and Oswald, 1994):

\[
w_t = \alpha_4 + \beta_{41} K_t + \beta_{42} \text{CB}_t + \beta_{43} \Delta u_{t-1} + \beta_{44} \text{Tax}_t
\] (6)

where \( K_t \): the capital stock, \( \text{CB}_t \): an indicator for the degree of centralization in collective bargaining system (either the degree of coordination or the union density), \( \Delta u_{t-1} \): lagged changes in the unemployment rate, \( \text{Tax}_t \): a measure for the tax burden (either average or marginal tax rates).²

The six equations (1)-(6) form the basis of our labour market flow model. Due to the lack of internationally comparable data on job creation and destruction rates, however, the model needs to be rewritten to match it with our data base. This can be done by bringing in accordance job creation rates and unemployment outflows on the one hand and job destruction and unemployment inflows on the other. This requires that the determinants of labour supply as specified in equation (5) are plugged into the appropriate unemployment flow equation. Indeed, unemployment inflows and outflows do not match exactly job destruction and job creation. Some unemployment inflow happens from inactivity (see chart) when the economy recovers while some people who are loosing their job might drop out immediately to inactivity if they do not qualify for any benefits. Similarly, job creation can happen out of inactivity (for instance through self-employment), while some people might “flow out of” unemployment at the end of their benefit period and into inactivity. As a consequence, using unemployment flows instead of job creation and destruction rates might overestimate employment dynamics due to the failure to take out flows back and forth from and to inactivity. It might also overestimate the variation of employment growth when the inactivity rate fluctuates with the business cycle (as is suggested by the discouraged worker effect).

In our specification, we consider that the discouraged worker effect will create additional unemployment outflows. On the other hand, increasing supply in the available workforce will show up as additional unemployment inflows. Tax-related changes in labour supply are considered to affect both unemployment inflows and outflows. Besides these adjustments to our specification, we consider both unemployment inflows and outflows to follow dynamic adjustment processes, instead of estimating them in levels. This way, we cope with systematic under- or overestimation of flows over the cycle that are due to these linkages between unemployment and inactivity. In addition, by considering contemporaneous interactions between the two flow directions, we also take care of the possibility that we are overestimating the impact of unemployment flows on employment variation: Higher contemporaneous inflows will also increase outflows as part of it goes into inactivity. Similarly, higher outflows might partly imply an increase in inactivity that will show up in increased inflow rates. We will therefore estimate the following two equations related to

²In a further extension we might consider estimating a separate wage inflation Phillips curve.
unemployment dynamics:

\[
\begin{align*}
OUT_t &= \alpha_{OUT} + \beta_{11}OUT_{t-1} + \beta_{12}IN_t + \beta_{13}X_{t}^{JobCreation} + \beta_{14}\Delta u_{t-1} + \beta_{15}Tax_{t-1} \\
IN_t &= \alpha_{IN} + \beta_{21}IN_{t-1} + \beta_{22}OUT_t + \beta_{23}X_{t}^{JobDestruction} + \beta_{24}\Delta L_{t-1} + \beta_{25}Tax_{t-1}
\end{align*}
\]

where \(X_{t}^{JobCreation}\) and \(X_{t}^{JobDestruction}\) correspond to the different explanatory variables in equations (3) and (4) respectively. This will form the base model for the following extensions of our labour flow model.

### 2.2 Macro-economic interactions

In addition to the variables considered in equations (3), (4) and (6), policy makers also have instruments at their disposal to influence directly the rate at which jobs are being created or destroyed. On the one hand, they can generically affect aggregate demand, thereby slowing down job destruction and speeding up job creation. This can be done either through purchases of goods and services (non-wage government spending) or by expanding the public work force (wage government spending).

On the other hand, they can more finely try to influence labour market dynamics through active and passive labour market measures. For instance, policy makers can set up hiring incentives for firms, reduce labour costs via wage subsidies or strengthen the matching process through training expenditures and spending on public employment services that help job seekers in finding adequate job vacancies.

In either case, however, macro-economic feedback loops are likely to influence the impact of these policies. In the following, we want to consider two such loops: First, we take the feedback from automatic stabilization into account, whereby both general government spending and labour market policies react to the state of the labour market. In particular, we expect higher unemployment outflows to be correlated with less spending and higher unemployment inflows with more spending. Second, higher public spending will act on the long interest rates to the extent that it increases government net lending. This may happen as government lending will crowd out private borrowers but also because of higher risk premia on sovereign debt that will carry over to private investors as well. In either case, higher long-term interest rates will have an adverse effect on unemployment dynamics by both lowering unemployment outflows and increasing unemployment inflows. Taking such feedback mechanisms into account when assessing the effectiveness of government interventions on the labour market is essential for countries to properly assess the long-run implications of their spending programs.

Taking such feedback mechanisms into account when estimating the effect of policy interventions requires setting up a simultaneous equation model such as the following:

\[
\begin{align*}
OUT_t &= \alpha_{OUT} + \beta_{11}OUT_{t-1} + \beta_{12}IN_t + \beta_{13}X_{t}^{JobCreation} + \beta_{14}\Delta u_{t-1} + \beta_{15}POL_t \\
IN_t &= \alpha_{IN} + \beta_{21}IN_{t-1} + \beta_{22}OUT_t + \beta_{23}X_{t}^{JobDestruction} + \beta_{24}\Delta L_{t-1} + \beta_{25}POL_t \\
POL_t &= \alpha_{POL} + \beta_{31}OUT_t + \beta_{32}IN_t \\
RIRL_t &= \alpha_R + \beta_{41}NLG_t + \beta_{42}LLGDP_t
\end{align*}
\]

The system is based upon the basic in- and outflow equations (7a) and (7b) but contains additional policy variables, \(POL_t\), that refer to (fiscally relevant) policy interventions (including taxes, as indicated above). All spending items are measured in terms of spending on particular programmes with respect to GDP, so as to properly account for the budgetary burden that is implied by different fiscal and labour market policy options. As discussed before, the policy equation is based on feedback effects resulting from automatic stabilization; no other influences are considered here. Regarding the long-term feedback effects, an aggregate supply curve has been added to the model by means of a forth equation that takes the effect of government spending dynamics on (long-term) real interest rates, \(RIRL_t\), into account. In this equation, the interest rate is supposed to be influenced by government net lending, \(NLG_t\), - itself a function of government spending - and the availability of savings as measured by the amount of liquid liabilities in the economy, \(LLGDP_t\).
2.3 Solving for the steady state

The above system of equations given by (8a)-(8d) can be solved for a steady state solution, effectively giving the long-run impact of policies on unemployment out- and inflows in contrast to the estimated coefficients $\tilde{\beta}_{15}$ and $\tilde{\beta}_{22}$ the only indicate the effect on impact:

\[
\begin{align*}
OUT_t &= \frac{1}{(1-\beta_{11})(1-\beta_{31})-\beta_{12}\beta_{22}} \left[ a_{OUT} \left( 1-\tilde{\beta}_{21} \right) + a_{IN} \tilde{\beta}_{12} + \tilde{\beta}_{13} \left( 1-\tilde{\beta}_{21} \right) x^{JobCreation} + \tilde{\beta}_{12} \tilde{\beta}_{23} x^{JobDestruction} \right] \\
IN_t &= \frac{1}{(1-\beta_{11})(1-\beta_{31})-\beta_{12}\beta_{22}} \left[ a_{IN} \left( 1-\tilde{\beta}_{11} \right) + a_{OUT} \tilde{\beta}_{22} + \tilde{\beta}_{23} \tilde{\beta}_{24} x^{JobCreation} + \tilde{\beta}_{23} \left( 1-\tilde{\beta}_{23} \right) x^{JobDestruction} \right]
\end{align*}
\]

(9a)

(9b)

In the following, we will compare the effects of institutional and policy variables both on impact (i.e. at $t+1$) and in steady state. As can be seen from the formula, signs for different policy variables may differ between short-run and steady state effects, depending on the size of (some) of the estimated parameters. We will see in the next section that this is indeed the case for some of the policy variables that we consider.

3 Data, methodology and hypotheses

3.1 Data: Unemployment flows and labour market institutions

The paper brings together three new (or updated) databases: Unemployment in- and outflows, general macroeconomic data and institutional indicators covering labour market regulation and policies. The resulting database covers 15 OECD countries over most of the period between 1970 and 2005 on an annual basis (time coverage changes depending on the particular specification used).

Unemployment flows come from Elsby et al. (2008). The data is constructed on the basis of OECD information regarding unemployment stocks and unemployment duration at different duration lengths. In contrast to similar information provided by Shimer (2007) or Petrongolo and Pissarides (2008), the data by Elsby et al. (2008) allow for a systematic cross-country analysis and a larger variety of determinants of unemployment flows to be included.

Information on labour market policies has been taken from the OECD Labour Market Spending database. The data has been complemented with information taken from the OECD Economic Outlook database and the OECD Main Economic Indicators. In particular, data regarding vacancy rates, total employment and labour force developments, capital stock estimates and interest rates are taken from there. In addition, an indicator of real share price increases has been developed on the basis of OECD information, using the GDP deflator to deflate nominal share prices. Finally, information regarding unionization rates, the degree of wage bargaining coordination and employment protection legislation is taken from the OECD Employment Outlook.

3.2 Methodology and hypotheses

3.2.1 Empirical methodology

To exploit the cross-country nature of our data, we apply standard panel data techniques. The theoretical equations developed in section 2 are both formulated in level terms. It, therefore, appears straightforward to use simple OLS to test the different determinants of unemployment flows. Three issues arise, however, in this respect:
Country-specific information is not always available for all variables over the entire time period. Moreover, especially the institutional variables, such as employment protection legislation, suffer from very limited time-variability within country panels, making them almost undistinguishable from country fixed effects.

Both unemployment in- and outflows are highly persistent within countries, introducing problems of autocorrelation.

Some of the right-hand side variables are endogenous to the dependent variable (in- and outflows).

In principle, these three problems could be addressed using the Arellano-Bond system GMM estimator. However, in the context of this paper, the number of available observations per country is relatively high (in comparison to the number of panels), which typically leads to a rejection of the overidentification tests. Given that - a part from auto-correlation - other forms of clustering of the error terms (see Nichols and Schaffer (2007) for an overview) are unlikely to arise in this sample, different versions of auto-correlation corrected panel estimators were used instead. In addition, in order to take into account endogeneity of left-hand-side variables, a panel-specific version of a 3SLS estimator has been used.

3.2.2 Hypotheses

The labour market literature has identified an abundance of economic and institutional determinants of labour market stocks and flows. In this paper, we want to restrict ourselves to these factors compatible with the search and matching labour flow model developed in the previous section. On the basis of this model we expect the following:

1. Wages should slow down outflow, i.e. \( \tilde{\beta}_{12} < 0 \). Wages, in turn, depend positively on installed capital, wage bargaining power and taxes, and negatively on the unemployment gap (or changes in the unemployment rate), i.e. \( \beta_{41}, \beta_{42}, \beta_{44} > 0; \beta_{43} < 0 \).

2. Mean reversal of unemployment flows implies \( \tilde{\beta}_{11} < 0 \) while the matching process is expected to yield \( \tilde{\beta}_{14} > 0 \).

3. Aggregate demand should strengthen outflows, i.e. \( \tilde{\beta}_{13} > 0 \).

4. Institutional variables:

   (a) Employment protection should be negatively related to outflows, either directly (when firms hire less as they anticipate higher barriers to firing) or indirectly (when EPL increases bargaining power).

   (b) A higher degree of unionization is linked to more bargaining power and hence higher wages. This should, ceteris paribus, lead to higher unemployment inflows and lower outflows.

   (c) The degree of wage bargaining centralization, \( CB_t \), is not monotonically linked to unemployment out- and inflows. At lower levels an increase is likely to strengthen wage growth, whereas at higher levels, an increase might lower the wage-interest rate ratio.

5. Fiscal and labour market policies:

   (a) General government spending should strengthen outflows and limit inflows, i.e. \( \tilde{\beta}_{15} > 0; \tilde{\beta}_{25} < 0 \). Spending on public employment can be expected to have a stronger effect on limiting inflows than on stimulating outflows given the stability of even slight decline in public employment across the sample.
(b) Labour market policies are expected to increase unemployment outflows, i.e. $\tilde{\beta}_{15} > 0$. Unemployment inflows may increase - at least in the short-run - for some of the programmes due to compositional changes: Public employment services ($PES$) and training programmes ($TRN$), for instance, require registration of participants, some of whom come from inactivity, i.e. $\tilde{\beta}_{25}^{PES, TRN} > 0$. In the long-run, however, all labour market policies are expected to reduce unemployment inflows, i.e. $(\tilde{\beta}_{25} \cdot (1 - \tilde{\beta}_{11}) + \tilde{\beta}_{15} \cdot \tilde{\beta}_{22}) < 0$ (see (9b)).

4 Determinants of unemployment flows

On the basis of this empirical strategy, the determinants of unemployment in- and outflows are estimated. We first proceed at identifying the relevant contributing factors in single equation models, estimating (7a) and (7b) separately and assess the relative contribution of the different factors to the overall variation of unemployment flows in our sample (see next section). On the basis of these estimates, we then introduce the macro-economic set-up, (8a)-(8d), to evaluate the importance of different fiscal and labour market policies in explaining the unemployment dynamics. We conclude by differentiating between short- and long-term effects of the different policies.

4.1 Labour market dynamics: Economic and institutional determinants

The following four tables summarise the evidence on the economic and (labour market) institutional determinants of unemployment in- and outflows.

Table 1: Economic determinants of unemployment inflows

<table>
<thead>
<tr>
<th></th>
<th>Dependent variable: Unemployment inflows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Lagged inflows</td>
<td>0.98*** (9.2e-3)</td>
</tr>
<tr>
<td>Output gap</td>
<td>-1.7e-4*** (4.1e-5)</td>
</tr>
<tr>
<td>TFP growth</td>
<td>2.0e-3** (8.6e-4)</td>
</tr>
<tr>
<td>Labour force growth</td>
<td>1.8e-2** (7.2e-3)</td>
</tr>
<tr>
<td>Changes in terms of trade</td>
<td>-2.8e-3** (1.4e-3)</td>
</tr>
<tr>
<td>Real interest rate</td>
<td>3.9e-5** (1.7e-5)</td>
</tr>
<tr>
<td>Changes in import penetration</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>309</td>
</tr>
<tr>
<td>Number of countries</td>
<td>12</td>
</tr>
<tr>
<td>R-squared</td>
<td>98.9%</td>
</tr>
</tbody>
</table>
Regarding the institutional determinants of unemployment inflows, most indicators are not significantly related to inflow dynamics, even when applying vector decomposition techniques, as described in section 3, to account for slow-moving policy indicators. The only significant effect in our sample relates to changes in unionization rates that are positively related to unemployment inflows, an indication for potentially higher job destruction rates when the degree of unionization increases. Most interesting is the absence of any effect of the strictness of employment protection legislation on inflow dynamics, quite in contrast to theoretical priors. Further tests will be necessary to determine whether this result is robust to changes in the estimation methodology and the sample size. Finally, the degree of wage bargaining centralization does not seem to be related in any way possible with unemployment inflow dynamics.

Table 2: Economic determinants of unemployment outflows

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagged outflows</td>
<td>0.96***</td>
<td>0.98***</td>
<td>0.97***</td>
<td>0.94***</td>
</tr>
<tr>
<td></td>
<td>(2.5e-2)</td>
<td>(2.4e-2)</td>
<td>(2.4e-2)</td>
<td>(2.5e-2)</td>
</tr>
<tr>
<td>Lagged employment</td>
<td>-4.5e-2*</td>
<td>-0.155</td>
<td>-0.26**</td>
<td>-0.0534</td>
</tr>
<tr>
<td></td>
<td>(2.5e-2)</td>
<td>(9.8e-2)</td>
<td>(1.1e-1)</td>
<td>(3.7e-2)</td>
</tr>
<tr>
<td>Output gap</td>
<td>2.8e-3***</td>
<td>3.7e-3***</td>
<td>3.2e-3***</td>
<td>3.0e-3</td>
</tr>
<tr>
<td></td>
<td>(1.1e-3)</td>
<td>(1.2e-3)</td>
<td>(1.1e-3)</td>
<td>(1.9e-3)</td>
</tr>
<tr>
<td>User cost of capital</td>
<td>-1.5e-3**</td>
<td>-1.2e-3**</td>
<td>-1.5e-3***</td>
<td>-1.9e-3**</td>
</tr>
<tr>
<td></td>
<td>(6.0e-4)</td>
<td>(5.2e-4)</td>
<td>(5.1e-4)</td>
<td>(8.0e-4)</td>
</tr>
<tr>
<td>Real wage growth</td>
<td>-2.7e-2***</td>
<td>-2.7e-2***</td>
<td>-2.7e-2***</td>
<td>-2.4e-2***</td>
</tr>
<tr>
<td></td>
<td>(6.6e-3)</td>
<td>(6.6e-3)</td>
<td>(6.4e-3)</td>
<td>(7.8e-3)</td>
</tr>
<tr>
<td>Real share price increase</td>
<td>2.1e-2***</td>
<td>1.9e-2**</td>
<td>2.2e-2**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(8.0e-3)</td>
<td>(7.8e-3)</td>
<td>(1.0e-2)</td>
<td></td>
</tr>
<tr>
<td>Capital stock growth</td>
<td>0.29**</td>
<td></td>
<td></td>
<td>0.332</td>
</tr>
<tr>
<td></td>
<td>(1.4e-1)</td>
<td></td>
<td>(2.2e-1)</td>
<td></td>
</tr>
<tr>
<td>Real disposable income growth</td>
<td></td>
<td></td>
<td></td>
<td>0.32**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1.4e-1)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>272</td>
<td>262</td>
<td>262</td>
<td>194</td>
</tr>
<tr>
<td>Number of countries</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>R-squared</td>
<td>95.8%</td>
<td>95.3%</td>
<td>95.3%</td>
<td>96.1%</td>
</tr>
</tbody>
</table>

Table 3: Institutional determinants of unemployment inflows

<table>
<thead>
<tr>
<th></th>
<th>Dependent variable: Unemployment inflows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Lagged inflows</td>
<td>0.97***</td>
</tr>
<tr>
<td></td>
<td>(1.2e-2)</td>
</tr>
<tr>
<td>Output gap</td>
<td>-1.1e-4**</td>
</tr>
<tr>
<td></td>
<td>(4.6e-5)</td>
</tr>
<tr>
<td>TFP growth</td>
<td>1.8e-3*</td>
</tr>
<tr>
<td></td>
<td>(1.0e-3)</td>
</tr>
<tr>
<td>Labour force growth</td>
<td>8.4e-3</td>
</tr>
<tr>
<td></td>
<td>(7.4e-3)</td>
</tr>
<tr>
<td>Changes in terms of trade</td>
<td>-1.86e-3</td>
</tr>
<tr>
<td></td>
<td>(1.8e-3)</td>
</tr>
<tr>
<td>Real interest rate</td>
<td>3.5e-5*</td>
</tr>
<tr>
<td></td>
<td>(2.1e-5)</td>
</tr>
<tr>
<td>Employment protection</td>
<td>-5.0e-05</td>
</tr>
<tr>
<td></td>
<td>(7.8e-5)</td>
</tr>
<tr>
<td>Changes in unionization</td>
<td>2.2e-4***</td>
</tr>
<tr>
<td></td>
<td>(7.1e-5)</td>
</tr>
<tr>
<td>Degree of wage bargaining</td>
<td>-9.4e-05</td>
</tr>
<tr>
<td>centralization</td>
<td>(8.7e-5)</td>
</tr>
<tr>
<td>Centralization (squared)</td>
<td>-2.4e-05</td>
</tr>
<tr>
<td></td>
<td>(1.5e-4)</td>
</tr>
<tr>
<td>Observations</td>
<td>248</td>
</tr>
<tr>
<td>Number of countries</td>
<td>12</td>
</tr>
<tr>
<td>R-squared</td>
<td>99.1%</td>
</tr>
</tbody>
</table>

In the case of unemployment outflows, main institutional determinants related to the strictness of employment protection legislation (EPL) and the degree of wage bargaining centralization. As expected, EPL is negatively related to outflows. Together with the absence of any significant impact of EPL on unemployment inflows, the net effect seem to be largely negative for employment dynamics.

In contrast, variations in unionization rates do not seem to be significantly related to outflow dynamics. Finally, centralization indicators show non-linear effects, in line with the original Calmfors-Driffill hypothesis: Both high and low degrees of wage bargaining centralization are compatible with strong outflow dynamics whereas countries with intermediate levels of centralization experience lower levels of unemployment outflow dynamics.
On the basis of our preferred specification in table 1 and 2 (specification 4), the following two charts show the relative importance of different economic determinants in explaining the overall variance of in- and outflows. As can be seen from the charts, short-term demand factors play an important role in explaining unemployment inflows: Real short-term interest rates and the output gap together explain more than 40% of the sample variation. These factors also seem to be important in the case of unemployment outflows, albeit somewhat less as the output gap and the growth in real disposable income explain slightly more than 30%. In contrast, unemployment outflows are more driven by structural factors and long-term macroeconomic conditions such as the user cost of capital or the growth in gross fixed capital formation. In line with conjectures by Phelps (1998) and others, a firm’s financial conditions as reflected by the change in real share prices has a non-negligible effect on unemployment outflows (more than 10%), but does not seem to contribute in a statistically significant way to unemployment inflows.
4.2 Government spending and labour market programmes

The previous results allowed to identify a series of economic and institutional factors that influence unemployment dynamics. From a policy perspective, however, these factors are often only indirectly linked to specific government intervention (with the exception of employment protection legislation). In the following, therefore, we want to turn to more direct interventions on labour markets, either through generic public spending or through more targeted labour market measures. As argued above, this requires to take the

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3This sub-section follows the exposition in International Institute for Labour Studies, 2010, ch. 3.
state of the macroeconomic environment into account when estimating the determinants of unemployment dynamics.

The results of these estimations come at a timely moment. Indeed, looking at the state of their labour market, many (advanced) countries are currently wondering which policies to implement? And whether a generic approach does exist or whether it is necessary to identify concrete areas of policy intervention to reduce unemployment? At the current juncture of severely adverse macroeconomic conditions, the existing evidence on labour market programme effectiveness is only of limited help in selecting different policy options. Under more tranquil circumstances, some consensus has emerged in the past regarding the importance of certain policies such as job search assistance and training programmes for stimulating employment growth and bringing unemployed workers back to jobs, even though there is almost no cost-benefit evidence of these programmes available.\(^4\) In contrast, no in-depth study exists as to the effectiveness of these labour market policies under macroeconomic and financial sector crisis conditions. These conditions need to be taken into account, however, if countries want to select the right mix of policies at the current juncture as policy multipliers vary widely depending on the general macroeconomic environment. In the following a novel approach is being presented that is meant to overcome – at least partially – this missing link between labour market policies and the aggregate state of the economy and employment. In particular, on the basis of a new database on unemployment dynamics, the macro- and microeconomic implications of fiscal and labour market policies are analysed. In particular, the analysis presented below includes bi-directional effects between unemployment dynamics and fiscal variables to account for potential adverse effects from the costs of labour market policies at the macroeconomic level. This allows to take the fiscal implications of labour market policies explicitly into account and provides a more accurate picture of policy effectiveness under the current circumstances.

Distinguishing in more detail between different generic fiscal and specific labour market policies helps in the assessment of appropriate policy options that are necessary to the increasingly diverse challenges that countries face on their labour markets as a result of the crisis. In particular, it will allow assessing the timing when policies need to switch from income support policies to those that facilitate long-term adjustment processes on the labour market. In this regard, total government consumption (excluding interest payments) is split into wage and non-wage government spending, the former being principally related to spending on public employment whereas the latter relates to policies directly relevant to support consumption in the private sector. Within this category also fall various labour market programmes, which have been further detailed in the analysis. A first distinction of these labour market programmes has been made between active and passive measures. The active measures have further been differentiated into direct job creation, hiring incentives, training programmes and spending on public employment services. The passive measures, on the other hand, regroup all those pertaining to income maintenance, at least temporarily.

On the basis of this analysis, general government spending seems to have a strong impact on unemployment dynamics, increasing outflows and lowering inflows in an economically and statistically significant wage (see table 5, equation 1). The impact does not seem to be particularly affected by feedback effects resulting from higher real long-term interest rates (note that government net lending, NLG, takes positive values for surpluses). Looking at the components, public employment seems (weakly) related to lower unemployment inflows but not significantly to unemployment outflows, as expected by our hypothesis in section 3.2. In contrast, government non-wage consumption is significantly linked to both unemployment in- and outflows. As indicated above, the lack of public employment to influence job creation may have to do with the particular sample (period) used here during which public employment remained either stable or declined (sometimes substantially as in the case of Sweden) in comparison to private sector employment.

The analysis also allows to give a more detailed picture of various labour market programmes, including both passive and active measures. Moreover, the particular macroeconomic focus and the detailed analysis of competing labour market programmes provide a more detailed understanding of the different policy trade-offs that countries are currently facing. In particular, direct job creation outside the public sector seems to come with a high amount of deadweight costs as it only seem to have a statistically significant effect on unemployment inflows but not on unemployment outflows. In other words, the programmes often seem to benefit those already in a job or who would have been hired even in the absence of such policies.

\(^4\)See Card et al. (2010) for a recent meta-analysis of existing studies in this area.
Determinants of unemployment flows

Note also that unemployment outflows do not seem to have a significant effect on spending for direct job creation, an indication that these programmes are set up largely unrelated to the cycle. In contrast to these programmes, hiring subsidies seem to have the expected effect on outflows but do not influence unemployment inflows (the estimated effect is statistically not significantly different from zero, see equation 5), an outcome to be expected in light of the particular set-up of these incentive schemes (that only kick in when a firm is planning to open a new vacancy).

Expenditures on training programmes and public employment services have the expected (positive) effects on unemployment outflows, confirming existing evidence in the literature. The estimated effects in table 5, equation 7, do not take into account the particular design of PES or training programs in the countries of this sample. Some countries may actually experience much better effects of these policies on unemployment dynamics by combining them with appropriately designed unemployment benefits. Nevertheless, it should be noted that these programs come with a strong increase in unemployment inflows as well: This seems to be an indication that measured unemployment rates depend significantly on program design in as much as that the participation in certain programs requires official inscription in the unemployment register. As such, these programs are not only an effective way of bringing unemployed workers back to employment they also seem to constitute a useful instrument to activate those that currently have very limited ties with the labour market or have dropped out of the labour force altogether. Moreover, as we will see in the following section, the steady state effects of these programs have a negative effect on inflows as much as other labour market policies, an indication as to their long-run effectiveness. Finally, unemployment benefit schemes come with highly significant effects on both unemployment in- and outflows in the expected direction (see equation 8).

4.3 Short vs. long run effects

Statistical significance and quantitative importance of different policy instruments are not necessarily related in the estimates presented above. In addition, as mentioned earlier, the short-run - “on-impact” - estimates are different from the steady state effects that arise when the dynamics of the model set up by equations (8a)-(8d) are allowed to play out fully. In the following, we, therefore, compare the contributions of the eight different policy instruments to the dynamics of unemployment flows (see figure 3, p. 19).

The contribution rates are calculated as the share of the panel variance of unemployment in- and outflows explained by the variance of each individual policy instrument weighted by its regression coefficient (using the estimates in equations 1-8 of table 5), i.e.

\[
\text{Contribution Rate} = \frac{\beta_{\text{Policy}} \cdot \text{Var(Policy)}}{\text{Var(Unemployment flow)}}
\]

where Policy stands for one of the eight policy instruments, Unemployment flow for unemployment in- or outflow, \(\beta_{\text{Policy}}\) for the estimated policy regression coefficient and Var for the panel-wide variance of the variable under consideration.

As the following figure demonstrates, contribution rates are typically very high regarding unemployment outflows and much lower regarding unemployment inflows. More importantly, short-run effects are often much larger than steady state effects. Some noticeable exceptions to this are the effects of policy interventions on unemployment inflows. In particular, spending on public employment services and training programmes have positive effects on inflows in the short-run but negative effects in steady state. This relates well with the hypothesis presented in section 3.2 regarding possible short-run programme design-related issues that push up measured unemployment rates. Finally, note the positive contribution of unemployment benefits on unemployment inflows that is even more important in the long- than in the short-run, a possible indication for the importance of aggregate demand stabilization that these programmes allow and that help maintain people in employment.

5As discussed above (see section 3), the rise in unemployment inflows following an increase in expenditures on public employment services and training can partly be considered a statistical artefact: These measures target particularly inactive people to return them to the labour market, causing measured unemployment rates to increase while inactivity rates decline.
<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Government consumption</strong></td>
<td><strong>Government wage consumption</strong></td>
<td><strong>Government non-wage consumption</strong></td>
<td><strong>Direct job creation</strong></td>
</tr>
<tr>
<td>IN$_{t-1}$</td>
<td>OUT$_{t}$</td>
<td>GovCon$_{t}$</td>
<td>RRL$_{t}$</td>
</tr>
<tr>
<td>0.94*** (0.076)</td>
<td>0.022*** (0.004)</td>
<td>0.729*** (0.900)</td>
<td>0.015** (0.003)</td>
</tr>
<tr>
<td>T$_{t-1}$</td>
<td>4.085*** (0.576)</td>
<td>4.022*** (0.585)</td>
<td>4.7*** (0.200)</td>
</tr>
<tr>
<td>ΔOPT$_{t-1}$</td>
<td>6.532*** (22.42)</td>
<td>7.35*** (22.89)</td>
<td>3.47** (2.359)</td>
</tr>
<tr>
<td>∆TFP$_{t}$</td>
<td>0.094 (0.086)</td>
<td>0.919*** (0.090)</td>
<td>0.025*** (0.045)</td>
</tr>
<tr>
<td>RIRL$_{t-1}$</td>
<td>1.719*** (0.520)</td>
<td>0.760* (0.441)</td>
<td>0.008</td>
</tr>
<tr>
<td>T IN$_{t-1}$</td>
<td>1.872** (0.843)</td>
<td>0.730 (0.752)</td>
<td>0.992</td>
</tr>
<tr>
<td>OUT$_{t}$</td>
<td>0.278*** (0.063)</td>
<td>0.487*** (0.067)</td>
<td>0.055</td>
</tr>
<tr>
<td>GovCon$_{t-1}$</td>
<td>-3.205*** (1.263)</td>
<td>4.711*** (1.125)</td>
<td></td>
</tr>
<tr>
<td>E PL$_{t-1}$</td>
<td>0.809 (0.086)</td>
<td>0.041 (0.082)</td>
<td>0.050</td>
</tr>
<tr>
<td>OUT$_{t-1}$</td>
<td>0.670** (0.050)</td>
<td>-0.024*** (0.003)</td>
<td>0.590*** (0.044)</td>
</tr>
<tr>
<td>E</td>
<td>4.707*** (0.073)</td>
<td>3.892** (0.050)</td>
<td>3.699*** (0.078)</td>
</tr>
<tr>
<td>UCC$_{t}$</td>
<td>0.007 (0.000)</td>
<td>0.007 (0.000)</td>
<td>0.007 (0.000)</td>
</tr>
<tr>
<td>W$_{t}$</td>
<td>0.000*** (0.001)</td>
<td>0.000*** (0.001)</td>
<td>0.000*** (0.001)</td>
</tr>
<tr>
<td>INV$_{t}$</td>
<td>3.934*** (0.066)</td>
<td>4.346*** (0.074)</td>
<td>4.403*** (0.085)</td>
</tr>
<tr>
<td>∆YDRIL$_{t}$</td>
<td>0.000 (0.465)</td>
<td>0.000 (0.486)</td>
<td>0.000 (0.486)</td>
</tr>
<tr>
<td>IN$_{t}$</td>
<td>0.007 (0.002)</td>
<td>0.006 (0.002)</td>
<td>0.006 (0.002)</td>
</tr>
<tr>
<td>NLG$_{t-1}$</td>
<td>-0.026*** (0.051)</td>
<td>-0.367*** (0.034)</td>
<td>-0.226*** (0.051)</td>
</tr>
<tr>
<td>LGDGDP$_{t-1}$</td>
<td>-0.436*** (1.253)</td>
<td>-0.240*** (0.643)</td>
<td>-0.268*** (0.771)</td>
</tr>
<tr>
<td>GovWCon$_{t-1}$</td>
<td>-2.717* (22.03)</td>
<td>1.938 (17.25)</td>
<td>-5.365*** (2.702)</td>
</tr>
<tr>
<td>GovNWCon$_{t-1}$</td>
<td>-5.90*** (13.590)</td>
<td>9.273 (14.762)</td>
<td>-2.279*** (13.590)</td>
</tr>
<tr>
<td>Jobs$_{t-1}$</td>
<td>0.972</td>
<td>0.019</td>
<td>0.029</td>
</tr>
<tr>
<td>HIR$_{t}$</td>
<td>0.972</td>
<td>0.019</td>
<td>0.029</td>
</tr>
<tr>
<td>T RN$_{t-1}$</td>
<td>0.972</td>
<td>0.019</td>
<td>0.029</td>
</tr>
<tr>
<td>PES$_{t-1}$</td>
<td>0.972</td>
<td>0.019</td>
<td>0.029</td>
</tr>
</tbody>
</table>

Notes: All equation estimates are based on the full sample. All right-hand-side country fixed effects included. Robust errors in parentheses. ** p<0.01, * p<0.05, * p<0.1. Government wage consumption to GDP (i.e., public employment), GovCon$_{t}$; share of government non-wage consumption to GDP, GovWCon$_{t}$; share of government wage consumption to GDP (i.e., public employment), GovWCon$_{t}$; share of government non-wage consumption to GDP, GovNWCon$_{t}$; government net lending (positive values indicate surpluses), HIR$_{t}$; share of hiring subsidies to GDP, RN$_{t}$; share of unemployment benefits to GDP, PES$_{t}$; GDP share of spending on direct job creation, T RN$_{t}$; share of training expenditures to GDP, E PL$_{t}$; GDP share of spending on public employment services, E IR$_{t}$; share of unemployment benefits to GDP, E PL$_{t}$; strictness of employment protection legislation.
### Table 5: Policy contributions to unemployment dynamics (cont'd)

<table>
<thead>
<tr>
<th>Country</th>
<th>Policy</th>
<th>Effect Size</th>
<th>Standard Error</th>
<th>R-squared</th>
<th>Observations</th>
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<tbody>
<tr>
<td>A</td>
<td>EPL</td>
<td>0.972</td>
<td>0.051</td>
<td>0.985</td>
<td>140</td>
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<tr>
<td>B</td>
<td>UB</td>
<td>0.863</td>
<td>0.052</td>
<td>0.484</td>
<td>140</td>
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<tr>
<td>C</td>
<td>PES</td>
<td>0.972</td>
<td>0.051</td>
<td>0.986</td>
<td>128</td>
</tr>
<tr>
<td>D</td>
<td>T RN</td>
<td>0.855</td>
<td>0.053</td>
<td>0.481</td>
<td>128</td>
</tr>
<tr>
<td>E</td>
<td>HIR</td>
<td>0.972</td>
<td>0.051</td>
<td>0.976</td>
<td>140</td>
</tr>
<tr>
<td>F</td>
<td>NLG</td>
<td>0.815</td>
<td>0.054</td>
<td>0.545</td>
<td>140</td>
</tr>
<tr>
<td>G</td>
<td>T IND</td>
<td>0.545</td>
<td>0.057</td>
<td>0.971</td>
<td>140</td>
</tr>
</tbody>
</table>

Note: ET = employment-to-

OUT = unemployment outflows,

IN = unemployment inflows,

RIRL = real long-term interest rate,

GovWCons = government wage consumption to GDP (i.e. public employment),

GovNWCons = share of government non-wage consumption to GDP,

UCC = user cost of capital (i.e. real long-term interest rate minus
capital scrapping rate),

WI = wage-interest rate ratio,

GOV = government net lending (positive values indicate surpluses),

IP = annual change in gross fixed capital formation,

LB = capital scrapping rate,

WD = growth in total factor productivity,

POPT = growth in working-age population,

18 DETERMINANTS OF UNEMPLOYMENT FLOWS.
5 Conclusion

The paper presents evidence regarding the economic, institutional and policy determinants of unemployment in- and outflows. On the basis of considerations related to labour market search- and matching models, the paper identifies a number of factors that influence the flows in and out of the unemployment pool, including investment dynamics, productivity growth and interest rates but also employment protection legislation and the degree of wage bargaining centralization. The paper also argues that given the macroeconomic dimension of unemployment dynamics, parts of the analysis related to the impact of fiscal and labour market policies need to be estimated in a systemic manner, using simultaneous equation methods.

The macroeconomic estimates confirm the importance of passive income support measures both in the short- and the long-run to lower unemployment. Other measures, such as training measures and public employment services seem to develop lasting effects only in the long-run whereas in the short-run, their effects are either negligible or induce a further increase in measured unemployment rates due to the some design features of these programmes. Moreover, some active labour market policies seem to come with important deadweight costs, such as direct job which mainly seem to prevent further inflows into unemployment rather than a substantial increase in unemployment outflows.
References


Stockhammer, E.; Klär, E. 2008. *Capital accumulation, labour market institutions, and unemployment in the medium run*, Discussion Paper 834 (Berlin, German Institute for Economic Research (DIW)).


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