Labor market reforms and unemployment dynamics☆

Fabrice Murtin a,b, Jean-Marc Robin c,d,⁎

a OECD, Statistics Directorate, France  
b Sciences Po, France  
c Sciences-Po, France  
d University College London, United Kingdom

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We quantify the contribution of labor market reforms to unemployment dynamics in nine OECD countries (Australia, France, Germany, Japan, Portugal, Spain, Sweden, UK, US). We estimate a dynamic stochastic search-matching model with heterogeneous workers and aggregate productivity shocks. The heterogeneous-worker mechanism proposed by Robin (2011) explains unemployment volatility by productivity shocks well across all countries. Placement and employment services, UI benefit reduction and product market deregulation are found to be the most prominent policy levers for unemployment reduction. Business cycle shocks and LMPs explain about the same share of unemployment volatility (except for Japan, Portugal and the US).

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1. Introduction

A large number of studies have sought the source of persistent differences in European and American labor market outcomes in different labor market institutions. Following Bruno and Sachs (1985), research looked for the most effective labor market policies by running pooled cross-country time-series regressions of unemployment rates on various macroeconomic indicators (like GDP growth) and a battery of labor market institutional indices (see British Nickell and Layard, 1999, for a survey), Blanchard and Wolfers (2000) and Bertola et al. (2007) thus showed that different policy mixes induce different responses of unemployment to world-wide shocks (like an oil shock) and country-specific productivity shocks; and Bassanini and Duval (2009) emphasized the existence of complementarities between labor market policies. In parallel, in order to understand the mechanisms of these interactions, research spawned a collection of small dynamic stochastic equilibrium models focusing on one particular labor market policy at a time. For example, the influential work of Ljungqvist and Sargent (1998) emphasized the link between long-term unemployment and welfare policies, while Prescott (2004) and Rogerson (2008) emphasized the role of labor taxes.

In this paper we will try to incorporate the rich reduced forms of the former approach into a small equilibrium model of the latter kind. The idea is to identify a small set of parameters of the dynamic equilibrium model governing the responses to aggregate shocks of unemployment and turnover, and channeling a wide range of labor market policies at the same time. The number of policies simultaneously examined is potentially large, yet the number of parameters through which they impact the economy should be kept small for the model to be identified. Identification is indeed likely to fail if the number of intervention channels is greater than the number of independent series used in the analysis. Specifically, if we use series of unemployment stocks and flows, and vacancies, as labor market variables, it will be difficult to identify more than three separate channels for policy intervention.1

1 The change in unemployment is the difference between the inflow and the outflow. So stocks and flows are not independent series.

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⁎ Corresponding author at: Science Po, Economics, 28 rue des St Peres, Paris, France.  
E-mail addresses: fabrice.murtin@oecd.org (F. Murtin), jeanmarc.robin@sciences-po.fr (J.-M. Robin).

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We develop a dynamic stochastic search-matching model with heterogeneous workers, where aggregate shocks to productivity fuel up the cycle, and unanticipated policy interventions displace the stationary stochastic equilibrium by shifting structural turnover parameters. This model is estimated for nine different countries (Australia, France, Germany, Japan, Portugal, Spain, Sweden, the United Kingdom and the United States), over the period 1985–2007, in two ways. First, a version without policy interventions is estimated on detrended series by the Simulated Method of Moments. Second, policy effects are introduced into the model, and estimated by minimizing the sum of squared errors and job vacancies.

The model builds on Mortensen and Pissarides (1994, henceforth MP). Yet, it is immune to Shimer’s (2005) critique. Shimer showed that in the MP model Nash bargaining converts most of the cyclical volatility of aggregate productivity into wage volatility, leaving little room for change to the key variable driving unemployment, market tightness. In the same AER issue, Hall (2005) presented a calibration showing that the unemployment volatility puzzle could indeed be solved by wage rigidity. However, his argument was recently contested by Pissarides (2009), who presented empirical evidence that the volatility of wages in new jobs, namely heterogenous worker abilities and a different wage setting mechanism. First, workers differ in ability. In good states of the economy, matching services and deregulating product markets. Germany deregulated. Spain improved placement services and deregulated. The only countries implementing unemployment-augmenting policies are countries with low unemployment rates and hit by a deep and long-lasting recession at the end of the eighties or the beginning of the nineties. Thus, Japan and Sweden massively reduced ALMP expenditure. Lastly, Portugal and the US made no noticeable classical policy intervention. We do not find evidence of policy complementarity, as the sum of individual effects is similar in value to the Difference-in-Difference effect of the policy mix. Finally, we measure the relative contribution of LMPs and business cycle shocks to the long term variance of unemployment. In general, both contribute to about half of the total variance, with some exceptions: in Japan, business cycle shocks do not explain much unemployment volatility, and in Portugal and the US labor market policies seem to have little impact.

The paper is organized as follows. In Section 2, a dynamic sequential-auction model with heterogeneous workers and identical firms is developed. Section 3 describes the data and Section 4 the estimation procedure. In Section 5, the business cycle version of the model is estimated on nine OECD countries. In Section 6, labor market policy effects are estimated. The last section concludes.

2. The model

Time is discrete and indexed by \( t \in \mathbb{N} \). The global state of the economy is an ergodic Markov chain \( y_t \in \{ y_1, \ldots, y_N \} \) with transition matrix \( \Pi = (\pi_{ij}) \). We use \( y_t \) to denote the random variable and \( y_i \) to denote one of the \( N \) possible realizations. There are \( M \) types of workers and \( d_{im} \) workers of each type, with \( i_1 + \ldots + i_M = 1 \). Workers of type \( m \) have ability \( x_{m} \) and \( x_m \times x_m = 1 \). All firms are identical. Workers and firm are paired into productive units. The per-period output of a worker of ability \( x_m \) when aggregate productivity is \( y_t \) is denoted as \( y_t(m) \).

Notes: All figures are in percent. Series were detrended using the HP-filter with smoothing parameter 105.

### Table 1

<table>
<thead>
<tr>
<th>Period</th>
<th>Unemployment</th>
<th>Job destruction rate</th>
<th>Job finding rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std</td>
<td>Trend</td>
</tr>
<tr>
<td>Australia</td>
<td>1979Q1–2009Q4</td>
<td>5.69</td>
<td>2.62</td>
</tr>
<tr>
<td>Germany</td>
<td>1984Q1–2010Q1</td>
<td>6.09</td>
<td>2.72</td>
</tr>
<tr>
<td>Spain</td>
<td>1978Q1–2007Q2</td>
<td>12.76</td>
<td>4.10</td>
</tr>
<tr>
<td>France</td>
<td>1979Q1–2009Q1</td>
<td>6.18</td>
<td>3.33</td>
</tr>
<tr>
<td>UK</td>
<td>1967Q2–2001Q1</td>
<td>6.25</td>
<td>2.74</td>
</tr>
<tr>
<td>Japan</td>
<td>1978Q1–2007Q4</td>
<td>2.65</td>
<td>1.31</td>
</tr>
<tr>
<td>Portugal</td>
<td>1987Q1–2001Q2</td>
<td>5.70</td>
<td>2.29</td>
</tr>
<tr>
<td>Sweden</td>
<td>1972Q1–2001Q1</td>
<td>4.81</td>
<td>3.03</td>
</tr>
<tr>
<td>US</td>
<td>1960Q1–2001Q2</td>
<td>5.95</td>
<td>1.54</td>
</tr>
</tbody>
</table>

2 See also Hall and Miborg (2008) and Gerlert and Trigari (2009).

3 In this simple version of the model, we abstract from firm heterogeneity in production. For an extension of the model with heterogeneous firms, see Lise and Robin (2013).

4 Hall and Krueger (2012) emphasize the empirical relevance of on-the-job search to explain wage formation.
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