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Labor market reforms and unemployment dynamics☆

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ABSTRACT

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 in 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).

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 focussing 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]

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[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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Table 1
Unemployment and turnover cycle - descriptive statistics.

	Period	Unemployment				Job destruction rate			Job finding rate		
		Mean	Std	Std		Mean	Std		Mean	Std	
				Trend	Cycle		Trend	Cycle		Trend	Cycle
Australia	1979Q1–2009Q4	5.69	2.62	1.19	1.10	3.78	0.36	0.23	47.74	6.62	5.69
Germany	1984Q1–2010Q1	6.09	2.72	1.27	1.06	1.81	0.06	0.52	18.71	0.88	2.71
Spain	1978Q1–2010Q2	12.76	4.10	1.94	2.78	3.88	0.73	0.16	21.67	8.04	5.55
France	1976Q1–2010Q1	6.18	3.33	1.58	0.77	2.41	0.43	0.16	22.59	3.64	2.78
UK	1967Q2–2010Q1	6.25	2.74	1.86	1.29	3.06	0.48	0.60	43.87	15.22	5.35
Japan	1978Q1–2007Q4	2.65	1.31	0.92	0.49	1.51	0.27	0.22	42.78	4.21	4.83
Portugal	1987Q1–2010Q2	5.70	2.29	0.84	1.22	1.45	0.20	0.42	20.58	0.99	3.55
Sweden	1972Q1–2010Q1	4.81	3.03	2.20	1.85	2.84	0.75	0.27	56.06	10.14	6.31
US	1960Q1–2010Q2	5.95	1.54	0.75	1.14	4.82	0.68	0.66	76.59	6.03	5.21

Notes: All figures are in percent. Series were detrended using the HP-filter with smoothing parameter 10^5.

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 residuals for the series of actual unemployment rates (i.e. trend plus cycle), unemployment flows 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.[2] However, his argument was recently contested by Pissarides (2009), who presented empirical evidence that the volatility of wages in new jobs, those that proceed from new vacancies, is large compared to the volatility of ongoing wages. Finally, Hagedorn and Manovskii's (2008) solution to the puzzle does not require wage rigidity but assumes a very large value of non-market time (some 95% of productivity).

Our model extends the model of Robin (2011) by endogenizing labor demand through a matching function and vacancy creation. It has two main ingredients that make it distinct from the MP model, namely heterogenous worker abilities[3] and a different wage setting mechanism. First, workers differ in ability. In good states of the economy, all matches are profitable and all workers are employable. In bad states, low-skill workers fail to generate positive surplus and are thus laid off or stay unemployed longer. With a thick left tail of the ability distribution, small adverse shocks to the economy lead a disproportionately high number of low-skill workers into the negative surplus region and into unemployment. We show that this amplification mechanism fits unemployment volatility well in all nine major OECD countries used in the empirical analysis.

We also assume that wage contracts are long term contracts that can only be renegotiated by mutual agreement (see Postel-Vinay and Robin, 2002). Wage renegotiation is either induced by on-the-job search and Bertrand competition between employers, or by aggregate shocks big enough to threaten match disruption. As a consequence, wages in new jobs are more volatile than ongoing wages.[4] This assumption also simplifies the form of the Bellman equation defining the surplus of a match with a worker of a given type in a given state of the economy, and it thus makes the dynamic stochastic equilibrium very easy to solve.

We use our model to assess the impact of labor market reforms on the actual (i.e. not American detrended) rate of unemployment by way of counterfactual simulations. We find that placement services, unemployment benefits and product market regulation are the main policy tools significantly influencing unemployment over the 1985–2007 period. These by all means classical policies are accountable for close to one, or more than one percentage point change in unemployment. The other policies yielded, on average, only between 20% and a third of a percentage point. Specifically, Australia and France reduced (or prevented a rise of) unemployment by increasing expenditure on placement services and deregulating product markets. Germany deregulated. Spain massively reduced unemployment benefits, deregulated and reduced employment protection. The UK reduced unemployment benefit, 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 $y_t \in \{y_1 < ... < y_N\}$ with transition matrix $\Pi = (\pi_{ij})$. We use y_t to denote the random variable and y_i or y_j to denote one of the N possible realizations. There are M types of workers and ℓ_m workers of each type, with $\ell_1 + ... + \ell_M = 1$. Workers of type m have ability x_m and $x_m < x_{m+1}$. 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_i is denoted as $y_i(m)$.

[2] See also Hall and Milgrom (2008) and Gertler 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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