

## WHY LABOR MARKET RESPONSE DIFFERED IN THE GREAT RECESSION: THE IMPACT OF INSTITUTIONS AND POLICY

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### Abstract

This paper investigates the performance of labor markets during the recent crisis for 28 industrialized countries, specifically the reaction of employment and unemployment indicators relative to output changes. We construct a composite indicator for output as well as labor market performance. The determinants of cross-country differences we chose are regulation, flexicurity elements and contracts. We find robust positive impact from labor market regulation, while the impact of flexicurity strategies and contracts are difficult to pin down econometrically. Finally, we venture a tentative look at the ongoing recovery.

### Keywords

Financial Crisis, Great Recession, Labor Market, Short-Time Work Agreements, Flexicurity, Okun's Law.

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### I. Introduction

The recent crisis has been the deepest crisis industrialized economies have seen since the Great Depression in the nineteen thirties. While the crisis was rather synchronized across countries during its first months<sup>2</sup>, the performance of individual countries now – more than four years after the start and more than three years after “Lehmann Brothers” – looks very heterogeneous. Output in some countries is higher than at the start of the crisis, in a few countries it never declined, in other countries it is far below its pre-crisis level.

The focus of this paper is to explain the reaction of labor markets *relative* to output markets. Labor market reaction was more heterogeneous than in past crises and the correlation between cross country variation of output and unemployment declined to  $-0.35$  in this crisis as compared to  $-0.70$  in the 1990–1993 recession<sup>3</sup>. The output market decline was deeper in Germany than in the US in 2009. But the employment impact was much stronger in the US, with unemployment jumping up from 5% to 10%. In Germany, unemployment dropped from 9% to 7%.

A specific innovation of this paper is that we do not use a single variable for output performance, but information about changes of GDP over different periods (years, quarters) as

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<sup>2</sup>This is indicated by the sharp and simultaneous fall in exports, industrial production and stock prices in the first three quarters; see Aiginger (2010).

<sup>3</sup>OECD (2010). See also IMF (2010).

well as a trend change, and that we assess labor market performance by looking at changes in employment and unemployment, as well as changes in the participation rate (plus three “trend changes”). We could label this view as an analysis in the spirit of a “Generalized Okun’s law”, which relates one indicator on labor markets and one indicator on economic growth<sup>4</sup>.

As consensus for output markets, we consider that three pre-crisis conditions explain the bulk of the differences across countries. High output losses occurred in countries with high credit growth, with deficits in the current accounts and in countries with high pre-crisis growth of GDP (see Aiginger, 2011; Rose, Spiegel, 2009; Berkmen, Gelos, Rennhack, Walsh, 2009; Claessens, Dell’Ariccia, Igan, Laeven, 2010; Lane, Milesi-Ferretti, 2010; Barrell, Davis, Karim, Liadze, 2010). To carve out the impact of labor market reactions on top of output reaction, we include the output variable into the regressions explaining labor market performance.

The paper is structured as follows. Section 2 reviews hypotheses on the impact of labor market reactions to output decline. Section 3 describes the data set and variables we use and argues why we need comprehensive performance indicators (one for output markets, one for labor markets). Section 4 presents descriptive evidence on output and labor performance, while section 5 provides the main econometric results. Section 6 includes robustness tests and preliminary econometric evidence for the recovery period. Section 7 carves out common policy elements for best and worst performers not covered by econometrics and section 8 concludes.

## **II. Determinants of labor market reactions**

In general, labor demand is predicted to move in parallel with output. More specifically, Okun’s law suggests there is a statistical relationship between changes in unemployment and changes in real GDP. The effect of unemployment on output is expected to lag by some months and labor market volatility is assumed to be smaller than output volatility since productivity is pro cyclical.<sup>5</sup>

There are few elaborated hypotheses about how exactly labor markets should perform relative to output markets in a deep crisis. The long-run labor markets response patterns has been addressed in the literature on the benefits and shortcomings of strict labor market regulation, as shown in the OECD Jobs Study (1994). Other response patterns can be derived from the literature on the benefits of flexicurity regimes (see European Commis-

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<sup>4</sup>Okun’s law (Okun, 1962) describes a statistical relation between unemployment and economic growth. It is sometimes used in a “difference form” (change in unemployment is related to change in real GDP), sometimes in a “level form” (unemployment is related to the GDP-gap).

<sup>5</sup>Cyclical fluctuation in GDP growth translates into smaller fluctuation of the unemployment rate (or vice versa). The coefficient of the change in unemployment relative to GDP is shown empirically to be about 0.5 (OECD, 2010) and maybe rising over time (due to deregulation of the labor markets; IMF, 2010). The latter study (IMF, 2010) is the most explicit use of Okun’s law to assess the changes in unemployment in the recent crisis. It concludes that unemployment in Spain and in the US can be explained by Okun’s law (plus financial stress and housing bubble), but in many other countries unemployment increased far less than predicted (Germany, Italy, Japan, the Netherlands).

sion, 2007, but also later OECD Job Strategy Reviews). A third source is the literature on contractual agreements. Older versions stress the impact of the coverage of wage bargains and the role of trade unions (Nickell, 1999; Traxler, 2003); newer developments include contractual agreements which were introduced before the crisis (such as individual working time accounts) or during the crisis (such as negotiated part-time arrangements).

### **Regulation**

According to the OECD (1994), the persistence of high unemployment in many European countries can at least partly be traced back to Employment Protection Legislation (EPL). This would imply that regulation can have a negative impact on employment. Subsequent policy recommendations would be to remove regulatory obstacles, to decrease replacement ratios, job protection, and to increase external mobility (hire and fire). If we try to derive a testable hypothesis for the current crisis, it could be that at least in the medium run (from the start of the crisis up to normalization) there is a negative impact of strict employment protection on labor demand. Even if employment protection decelerates the decline in labor demand at the start of the crisis, eventually the disadvantages of protection outweigh the advantages, and the recovery of employment and probably also GDP growth is delayed<sup>6</sup>. The negative effect during a recovery could actually outweigh the dampening effect on unemployment at the start of the crisis. The whole pattern implied by this view is difficult to test, but at least the sign of the EPL variable as well as that of the replacement ratio would be expected to be negative. If this is not seen for “in-crisis performance” at least a separate analysis of the recovery phase should definitely reveal lower employment dynamics for countries with stronger employment protection.

### **Flexicurity**

The hard-line view of a negative long-term effect of employment protection has been criticized, e.g. by Nickell (1999) and Howell, Baker, Glyn, Schmitt (2007), on both the theoretical and empirical level.<sup>7</sup> The “flexicurity model” (European Commission, 2007; Maselli, 2010; Anderson, 2011)<sup>8</sup> asserts that not all forms of protection are negative, and

<sup>6</sup>The NAIRU or any other concept of the “long-term” rate of unemployment will be increased by regulation.

<sup>7</sup>Howell et al. (2007) find “little evidence to suggest that 1990s reforms of core protective labor market institutions can explain much of either the success of ‘success stories’ or the continued high unemployment of the large continental European countries. We conclude that the evidence is consistent with a more complex reality, in which a variety of labor market models can be consistent with good employment performance.”

<sup>8</sup>Flexicurity is a crucial element of the Employment Guidelines and the European Employment Strategy (European Commission, 2011), and specifically the flagship initiative: “An Agenda for new skills and jobs” of the Europe 2020 strategy (European Commission, 2010). The OECD has gradually changed its view on regulation, see e.g. Barbier, Colomb, Madsen (2009). Martin, Scarpetta (2011) conclude that “employment protection has a sizeable effect on labor market flows and these flows, in turn, have significant impacts on productivity growth”. At the same time, the evidence also shows that, while greater labor market reallocation benefits many workers through higher real wages and better careers, some displaced workers lose out via longer unemployment durations and/or lower real wages in post-displacement jobs. Consequently, while some elements of protection may impact negatively on long-run growth, other elements will be beneficial, at least in the short term. Empirical analyses are expected to show which impact ultimately dominated during this crisis and during the recovery.

specifically that elements of flexibility for firms combined with elements of security for employees could be beneficial for employment as well as competitiveness. The model was derived mainly from the Danish example but it extends to other Nordic European countries and is partially copied by small countries in continental Europe. The flexicurity model combines elements of labor market flexibility, active labor market policy and generous unemployment benefits. This could lower costs for firms by enabling them to adjust labor costs specifically in periods of sluggish demand, while employees do not lose too much in their income, especially if they participate in learning, education, retraining and other active labor market programs. A set of common flexicurity principles contains (European COMMISSION, 2007): (i) flexible and reliable contractual arrangements, (ii) lifelong learning, (iii) active labor market policies, and (iv) modern social security systems.

### **New contractual agreements promoting internal flexibility**

More recently, flexible working arrangements have been used. In many countries, individual “working time accounts” were introduced, in which overtime hours are accumulated. For firms this has the advantage that they can adjust labor input to output fluctuations in booms without paying the usual overtime surcharge and they can reduce labor costs without layoffs in troughs. Employees “use” (write down) the hours individually if they want a shorter working time for personal reasons (work life balance) or collectively by agreements on the firm level.

Reducing overtime and surpluses on employee time accounts were heavily used during the crisis. In some cases, their use became mandatory as a result of contracts between trade unions and firm representatives either on the firm or industry level, if management and employees agreed on periods with shorter working weeks. These forms of internal flexibility were partially assisted by public subsidies conditional on short-term working arrangements. If employees accepted shorter working times, and firms avoided layoffs, the government compensated a substantial part of the income loss for the workers due to reduced working hours (Crimmann, Wiessner, Bellmann, 2010).

Such contracts do not easily fit into the argument of high regulation vs. low regulation, neither do they fit properly into the flexicurity model because they favor internal flexibility above external flexibility through social partner bargaining or tripartite contracts. They may reflect some elements of the literature on bargaining and corporate relations<sup>9</sup>. The new contracts definitely reflect the ability of social partners – be it on the industry or firm level – to negotiate flexible arrangements, as well as the willingness of governments to support bargaining through the use of temporary subsidies.

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<sup>9</sup>E.g. Driscoll’s hypothesis that a medium degree of bargaining is worse than a high as well as a low one; see also Traxler (2003).

### III. Data set and variables on labor and output markets

#### The Sample

Our sample covers European and non European industrialized countries, including Turkey and Mexico. We define the “in-crisis period” as 2008 to 2010, and for the “recovery period” we use data for 2011 plus a forecast for 2012. Both choices reflect courageous and partly arbitrary decisions, since in some countries recovery was already rather strong in 2010, whereas in other countries, output did not even reach pre-crisis levels in 2011. Furthermore, the possibility of a second dip still cannot be excluded (in fact, forecasts for 2012 include the probability of a minor recession specifically in Europe).

#### Performance measurement

Output performance, as well as labor market performance, is not easy to measure, and different studies in the literature either use a single arbitrarily chosen GDP variable (e.g. annual decline in 2009), cumulate different annual or quarterly GDP changes or even run regressions for several variables<sup>10</sup>. We follow Aiginger (2011) to extract a single variable for output performance from four different GDP indicators and a single variable for labor performance out of employment, unemployment and participation data. Each composite indicator is derived by the Principal Component Technique<sup>11</sup>, maximizing the informational content of the indicators while keeping the analysis simple.

Output market performance (OPM) is derived from the following four GDP indicators:

- the rate of change of GDP in 2009;
- the cumulated annual change over the three years 2008, 2009, 2010;
- the decrease of quarterly GDP from the pre-crisis peak to its trough;
- the actual cumulated change in the three years 2008, 2009, 2010 relative to the “pre-crisis” trend growth from 2000 to 2007 (“trend change”).

The choice of the four indicators is partly reflecting the literature which takes one of these indicators as dependent variable. 2009 is the dependent variable usually if one year is chosen. However GDP dropped in several countries already in 2008, and continued to decline in 2010. In some countries the drop was specifically sharp but concentrated in a few quarters, therefore some studies use quarterly data. Last but not least the drop looked small in some countries as measured by the relative fall of GDP, but was dramatically benchmarked against a high growth trend.

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<sup>10</sup>See Claessens et al. (2010), Barrel (2010), Aiginger (2011).

<sup>11</sup>The weights of the inputs into the two composite “performance” indexes (one for output, one for labor) are based on factor loadings on the first component of the principal component analysis (PCA). The first component explains 90% of the common variance across the indicators. The resulting ordinal indicator (PC-value) is the main performance indicator we will use in the following analysis.

Labor market performance (LMP) is measured by combining seven indicators on unemployment, employment and labor force participation:

- the rate of change in employment in 2009;
- the change in unemployment rates in 2009;
- the change in unemployment rates in 2010;
- the change in labor market participation rates in 2009;
- the change in employment during the crisis (2007 to 2010) relative to the change in employment in the years before the crisis (2000 to 2007);
- the change in unemployment rates during the crisis (2008 and 2009) relative to the change before the crisis (2000 to 2007);
- the change in labor force participation rates during the crisis (2008 and 2009) relative to the change before the crisis (2000 to 2007).

Using more than one indicator to get a good assessment of performance is even more important for labor markets. Unemployment was in some countries dampened if labor supply decreased in the crisis, in other countries contractual agreements like unemployment insurance prevented exits from the labor force. Therefore to obtain a complete picture on labor market performance we need to look at the change in employment, labor participation and unemployment rates.

### **Labor market policy indicators**

Given the complexity of the theoretical models, it is not possible to test which labor market policy proved superior, but we can hope to find some stylized facts.

Regulation is measured by the OECD Index on labor market regulation (EPL). The unemployment replacement ratio is, on the one hand, part of the regulatory indicators, while on the other hand it constitutes an element of a flexicurity model. Active labor market policies (ALMP), formal or non-formal education (secondary education) and training constitutes other components of a flexicurity strategy and positive signs are to be expected. The share of employment in secondary education might also indicate the importance of human capital (which might induce firms specifically to prevent layoffs due to the expected employee shortage in the recovery phase). Tenure reveals the importance of long-term employment relationships; part-time employment is an indicator of labor flexibility. The importance of collective agreements (bargaining) is measured by the coverage ratio (indicating how many employees are covered by collective agreements) and by the share of persons in short-term working agreements.

#### IV. Descriptive results on the relationship between output and labor market performance

Table 1 shows the output market performance (OMP) of each country in our sample according to the four sub-indicators together with the composite indicator (PC-value) derived via principal component analysis. Additionally, we show the ranking of the ordinal principal component in the last column of table 1 (PC-rank). Table 2 shows the same information (using seven sub-indicators) for labor market performance (LMP).

The best labor market performance is shown by three European countries: Poland, Germany and Switzerland. Out of these three countries, Poland and Switzerland were among the best performers in output development too (rank 2 and rank 5, respectively), while Germany had an average or even slightly below average performance in output (rank 16). The low performers with regard to the labor market were Spain, Iceland, the US, Hungary and Portugal. While Iceland and Hungary had rapidly decreasing output too, the US and Portugal had a slightly above average output loss (rank 10 and 8), so that these countries had the worst “relative” performance of the labor market in the crisis. The best “relative” performance of labor markets are shown by Japan, Germany and Finland. The labor market reaction in these countries was much better than expected according to output indicators.

Table 1 Output market performance (OMP) and ranking according to PCA

Changes in GDP	2009	2010/2007	Trough 2009/ peak 2008	2010/2007 minus 2000/2007	PC-value Output	PC-rank Output
	Annual data, percentage change		Cumulated quarterly change	Trend change		
Australia	3.0	2.4	3.0	-1.1	100.0	1
Poland	1.7	3.4	1.7	-0.6	96.8	2
Korea	0.2	2.8	0.2	-1.8	85.2	3
Canada	-2.7	0.2	1.4	-2.4	73.1	4
Switzerland	-1.9	0.8	-2.4	-1.1	69.9	5
Norway	-1.4	0.4	-2.4	-1.9	68.3	6
New Zealand	-1.6	-0.1	-1.6	-3.5	65.1	7
Portugal	-2.6	-0.4	-4.0	-1.6	60.0	8
Belgium	-2.8	0.1	-4.1	-1.9	59.8	9
USA	-2.7	0.0	-3.8	-2.4	59.5	10
France	-2.6	-0.3	-3.9	-2.1	59.2	11
Austria	-3.9	0.1	-4.6	-2.1	55.0	12
Netherlands	-3.9	-0.1	-5.2	-2.1	53.0	13
Turkey	-4.7	1.0	-4.7	-3.9	50.9	14
Greece	-2.3	-1.8	-3.2	-5.9	49.7	15
Germany	-4.7	-0.1	-6.7	-1.4	49.1	16
Czech Republic	-4.1	0.2	-5.0	-4.3	48.7	17
Spain	-3.7	-1.1	-4.6	-4.5	47.4	18
Slovakia	-4.8	1.6	-7.3	-4.6	44.3	19
Sweden	-5.1	-0.3	-7.2	-3.3	41.8	20
United Kingdom	-5.0	-1.1	-6.2	-3.7	41.7	21
Mexico	-6.5	-0.2	-6.5	-2.7	41.7	22
Italy	-5.0	-1.8	-6.8	-2.9	40.4	23
Denmark	-5.2	-1.4	-7.0	-3.0	40.1	24
Japan	-5.2	-1.0	-8.4	-2.6	38.3	25
Hungary	-6.7	-1.7	-7.9	-5.1	28.6	26
Finland	-8.0	-1.5	-9.1	-4.8	23.2	27
Iceland	-6.8	-3.2	-6.3	-7.7	22.8	28

Source: Eurostat (AMECO).

Table 2 Labor market performance (LMP) and ranking according to PCA

	Employment 2009	Unemployment rates 2009	Unemployment rates 2010	Participation Rates 2009	Employment 2010/2007	Unemployment rate 2008/09	Participation rates 2008/09	PC-value labor	Rank
	Changes to last year				Change to 2000/2007				
Poland	0,4	1,0	1,4	0,1	0,9	-9,1	5,5	100,0	1
Germany	-0,1	0,2	-0,6	0,3	0,3	-1,6	4,6	95,9	2
Switzerland	2,4	0,7	0,2	-0,2	1,2	0,2	1,5	94,3	3
Turkey	2,0	3,1	-2,0	-0,6	2,8	2,8	-1,5	89,4	4
Australia	0,3	1,3	-0,4	-1,0	-0,6	-0,7	2,6	84,8	5
Austria	-0,9	1,0	-0,4	-0,4	-0,4	-0,1	3,4	83,7	6
Korea	-0,3	0,5	0,1	-0,8	-0,9	-0,3	1,0	80,9	7
Norway	-0,5	0,6	0,4	-1,4	-0,5	-0,9	1,2	80,0	8
Belgium	-0,3	0,9	0,4	-0,8	-0,4	-0,3	1,5	79,6	9
Netherlands	-1,1	0,7	0,7	-0,1	-1,1	-0,3	3,4	78,2	10
Mexico	0,5	1,7	-0,1	-2,0	0,0	1,3	0,6	78,0	11
Japan	-1,6	1,1	0,0	-0,5	-0,7	-0,2	2,3	75,1	12
France	-1,2	1,8	0,3	-0,4	-1,0	-0,1	1,6	72,0	13
Canada	0,0	2,1	-0,3	-2,0	-1,5	0,3	1,1	70,8	14
Czech Republic	-0,7	2,3	0,6	-1,1	-1,1	-2,1	1,0	70,0	15
Italy	-1,6	1,1	0,6	-1,3	-2,1	-1,0	1,6	69,3	16
New Zealand	-1,1	2,0	0,3	-1,7	-2,0	0,5	1,8	68,0	17
Finland	-3,1	1,9	0,1	-2,8	-1,7	-1,3	1,6	62,2	18
Greece	-0,7	1,7	3,0	-0,6	-2,8	-1,6	2,8	61,3	19
United Kingdom	-1,6	2,4	0,3	-2,0	-1,2	1,5	-0,4	61,2	20
Sweden	-2,0	2,1	0,1	-3,4	-0,8	1,1	-0,2	60,4	21
Slovakia	-2,8	2,5	2,3	-2,1	-2,5	-5,8	3,4	59,8	22
Denmark	-2,9	2,7	1,3	-2,2	-1,5	-0,1	1,1	53,9	23
Portugal	-2,6	1,9	1,3	-2,0	-1,3	2,4	-0,9	53,2	24
Hungary	-2,8	2,2	1,1	-1,2	-1,4	2,4	-0,6	52,6	25
USA	-3,7	3,5	0,3	-3,2	-2,5	2,5	-2,3	39,3	26
Iceland	-6,0	4,3	0,3	-5,2	-3,8	2,4	-2,8	22,4	27
Spain	-6,7	6,7	2,1	-4,7	-6,5	4,2	1,1	0,0	28

Source: Eurostat (AMECO).

Figure 1 correlates the output performance index with the labor performance index (using ranks) across countries. The correlation between the performance measures is 0.55 if PC-ranks are used and 0.64 if PC-values are applied. Both coefficients indicate that output is important for explaining labor market developments, but there still remains a part of the variation which could be explained by labor market characteristics and structural determinants.

In figure 2, the OECD indicator for employment protection legislation is related to the residuals of a regression of labor market performance (LMP) on output performance (OMP). The residuals indicate that part of the variation in LMP which is not explained by output performance. The figure suggests a positive relation between the relative labor market performance and the degree of labor market regulation.



Figure 1 The relation between output and labor market performance (PC-ranks)

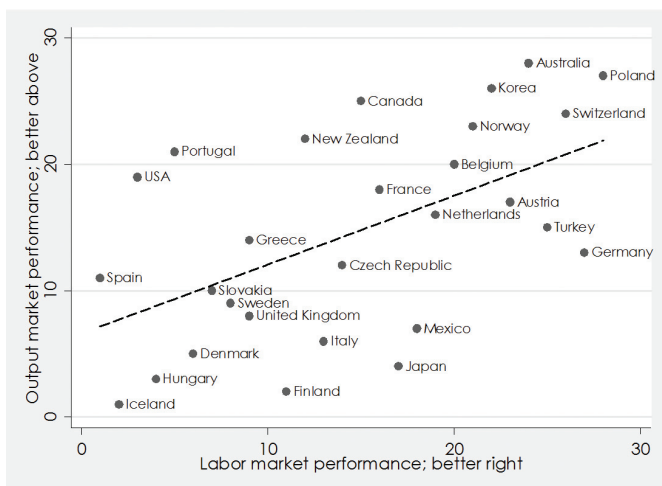
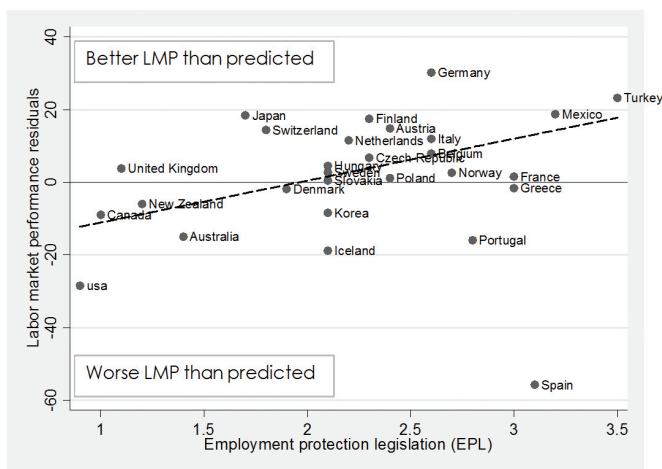


Figure 2 Employment protection vs. “relative” labor market performance



Note: predictions are derived from the equation  $LMP = f(OMP)$ .

### V. The main econometric results

Our econometric strategy will include three sets of variables. We regress labor market performance (LMP) to output market performance (OMP), secondly to labor market policy variables and thirdly to structural variables. Output market performance – using PC-value Output – will be included in all equations. For labor market variables, we test different combinations (since there might be some multi-collinearity). The structural variables we

include are per capita GDP and the share of manufacturing. In the robustness section we test further combinations of variables and additional structural variables. And in a final step, we then correlate economic performance (GDP as well as employment growth) after the crisis with labor market performance during the crisis. Since GDP-growth after the crisis is not yet fully discernable, we use the preliminary figures for 2011 and forecasts for 2012 for this part of the analysis. The endogeneity of employment protection is discussed in an annex.

Table 3 Explaining the labor market performance: main results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PC-Value Output	0.46*** (3.605)	0.62*** (4.282)	0.54*** (3.493)	0.59*** (4.554)	0.59*** (4.199)	0.57*** (3.996)	0.67*** (7.664)	0.59*** (4.249)	0.67*** (4.540)
EPL		12.83** (2.757)	16.40** (2.685)	14.95** (2.843)	14.64** (2.503)	21.89*** (3.315)	15.41*** (4.243)	19.54*** (3.292)	11.74** (2.498)
ALMP		-1.19 (-0.131)	-5.53 (-0.533)	-1.96 (-0.222)	-2.27 (-0.233)	1.32 (0.117)	12.64* (1.961)		-0.04 (-0.005)
Training		0.19 (0.790)	0.21 (0.825)	0.38* (1.725)	0.38 (1.620)	0.26 (1.133)		0.34 (1.615)	0.21 (0.841)
Replacement Rate		0.12 (0.369)	0.10 (0.291)	0.20 (0.735)	0.22 (0.736)	0.02 (0.072)	-0.24 (-1.408)	0.12 (0.470)	0.17 (0.529)
Secondary education		0.40 (1.002)	0.53 (1.251)	0.90** (2.305)	0.89* (2.010)	0.43 (1.121)	-0.16 (-1.196)	0.31 (1.442)	
Employment tenure			0.28 (1.226)	0.41** (2.103)	0.41* (1.976)	0.32 (1.584)	-4.87** (-2.662)	0.08 (0.030)	
Part-time work					0.40 (0.129)	1.93 (0.644)	0.84*** (3.411)	0.88** (2.207)	
Bargaining coverage						-0.35 (-1.653)	-0.14 (-1.231)	-0.25 (-1.590)	
Manufacturing share							2.66*** (6.026)	0.74 (1.019)	
GDP p.c. 2007				-1.01** (-2.187)	-1.00* (-1.942)		0.10 (0.321)	-0.65 (-1.244)	
Short-time arrangement									-1.53 (-0.468)
Constant	48.60*** (6.797)	-9.09 (-0.354)	-32.20 (-0.890)	-36.35 (-1.185)	-40.48 (-0.972)	-44.07 (-1.065)	25.75 (1.082)	-38.10 (-1.186)	-6.67 (-0.263)
R-squared adj.	0.300	0.452	0.392	0.609	0.571	0.557	0.817	0.640	0.554

Note: number of observations = 28; dependent variable: PC-value labor.

Source: Eurostat (AMECO).

Table 3 shows the multivariate regression explaining labor market performance by using robust regression models and applying a specific to general approach.

The most robust result is that the employment protection index is positive and highly significant in all tested specifications. Thus at least in the time period considered as the period primarily effected by the financial crisis (from 2008 to 2010), short-term labor market performance was better in countries with more regulated labor markets.

The variables which could signal the main pillars of flexicurity show ambiguous results. The replacement rate always has a positive sign, the same holds for tenure and training but no single coefficient is significant. The share of part-time workers has positive coefficients (but they are significant only in two equations including per capita GDP).

The coefficient of ALMP is negative in most equations. This could indicate the impact of persistence of labor market problems; countries which had high unemployment rates

in the period prior to the crisis might have tried to increase active labor market policy before.<sup>12</sup>

The coverage of bargaining is negative but nowhere significant; the share of workers in short-term agreements is far from significant.

Labor market performance has been significantly better in countries with high per capita GDP. The inclusion of this variable raises the coefficient of determination up to  $R^2 = 0.61$ , for output performance alone it is 0.30; if we include labor market characteristics, the coefficient of determination ranges between 0.20 and 0.50.

## VI. Robustness and recovery phase

In this section we investigate whether the results change for different specifications of the equations. Then we look at the performance of the labor markets in the recovery phase, since better performance during the crisis could be coupled with worse performance after the trough. We also present non-econometric evidence on countries with the best and the worst “relative” performing labor markets.

### Robustness

There are at least two reasons why robustness has to be checked. Firstly, two of the determinants of LMP are dominant (OMP and EPL), and most other indicators are on the verge of being significant. And secondly, some of the determinants are correlated or overlapping (like tenure and employment protection). We therefore tested the impact if we omitted the dominant variables. Then we ran different combinations of the other variables, dropping candidates for multi-collinearity. In principle, the results did not change; none of the less dominant variables changed sign, and seldom did one actually then become significant. Adding more structural variables (such as financial risk evaluation, or current account balance, pre-crisis credit or GDP growth – all these were found to impact on OMP in Aiginger, 2011) failed to change the coefficients and proved insignificant. In some cases, the share of manufacturing got a positive and significant sign. This may hint that countries with a more competitive manufacturing base performed better in the crisis. This result is far from trivial since cyclical amplitudes are larger in manufacturing. All our tests indicate that the presented results seem to be very robust.

Since employment regulation itself is a composite indicator, we tested which component of it was responsible for mitigating the employment reaction. We find that the regulation of temporary contracts is the decisive element. It is this part of the regulatory framework which is highly significant in all equations. The protection of permanent workers against individual dismissal is insignificant and changes signs in different equations. The specific requirements for collective dismissals are positive but never significant.

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<sup>12</sup>The coefficient is positive if the training variable is deleted.

### Post crisis performance: early econometric evidence

If regulation lowers the employment reaction in the crisis, it could also retard the labor market reaction in the recovery phase or even the output recovery. As a first test of this “mirror image” of regulation, we regress economic performance in the recovery phase on labor market performance during the crisis and labor market regulation (and the other determinants in our main equations). As a measure of “recovery”, we use the cumulated GDP growth for two years, first for real GDP, then for employment.

The effect of labor performance during the crisis on GDP growth in 2011/2012 is positive in all tested specifications and significant in one specification. Output performance during the crisis improves post-crisis performance: significantly in the output equations; insignificantly in the employment equation. The main result is that EPL is not significant and for GDP has a positive sign also in the recovery phase, while it is insignificantly negative for employment<sup>13</sup>. Additionally, we correlated the post-crisis dynamics with the “residual” of the function explaining LMP by OMP. There is again no sign that the post-crisis recovery was negatively affected by measures to mitigate labor market reaction relative to output in the crisis.

Econometric evidence therefore tentatively indicates that better labor performance during the crisis does not trigger adverse effects in the economic performance in the early recovery phase. This is a preliminary result since the evidence available up to now is too short to completely reflect the long-run effect of labor market regulation on employment or trend GDP.

Table 4 The impact of labor market policy on recovery

	PC-value labor	PC-value output	EPL	ALMP	Short-time arrangements	Residual	Constant	R-squared
GDP growth 2011/2012	0.0154 (1.493)						0.7172 (0.962)	0.076
GDP growth 2011/2012		0.0181* (1.719)					0.8195 (1.385)	0.099
GDP growth 2011/2012			0.1997 (0.544)				1.3612 (1.618)	0.011
GDP growth 2011/2012				-1.1247* (-1.822)			2.3884*** (6.229)	0.109
GDP growth 2011/2012	0.0300* (1.963)		0.2981 (0.855)	-1.1566* (-1.888)	-0.0400 (-1.325)	-0.0207 (-1.068)	0.3652 (0.266)	0.360
Change in Employment 2011/2012	0.0075 (0.733)						-0.0747 (-0.101)	0.020
Change in Employment 2011/2012		0.0154 (1.355)					-0.3810 (-0.588)	0.066
Change in Employment 2011/2012			-0.1275 (-0.363)				0.7166 (0.889)	0.005
Change in Employment 2011/2012				0.2621 (0.396)			0.3090 (0.765)	0.006
Change in Employment 2011/2012	0.0232 (1.286)		-0.1147 (-0.300)	0.3323 (0.478)	-0.0762 (-0.282)	-0.0246 (-1.023)	-0.9880 (-0.619)	0.082

Note: number of observations = 28.

Source: Eurostat (AMECO).

<sup>13</sup>We tested several specifications including EPL and different sets of control variables. EPL never turned significant.

## VII. Best and worst performers: common elements

The relationship between output and labor performance – as suggested by Okun's law – has never been perfect, and there is evidence that it was even less perfect in the recent financial crisis than in other crises. We have tested which indicators can explain the "relative" labor market performance. We have also seen that many features of modern labor market policy, from flexicurity to bargaining and short-time agreements cannot be reflected by indicators. Therefore, we now take a closer qualitative look at the countries with the relatively best and the relatively worst performance and try to identify what they have in common.

### Country strategies: best performers

The relative best performing labor markets (in relation to the output decline) are Japan, Germany and Finland.

These countries have rather strict employment protection in common. There are less formal rules in Japan but high implicit seniority principles. Germany used to have rather strict regulation, but underwent a period of radical labor market reform in the years before the crisis. Tenure is high and there are few part-time contracts in all three countries. All three countries also have a specific high share of workers with a secondary education (and good qualifications in general). Collective bargaining coverage is highest in Finland, and lowest in Japan. During the crisis, all three countries made heavy use of short-time work schemes: they jumped from practically zero to 3.2% in Germany, 2.7% in Japan and to 1.7% in Finland. Japan saved about 400,000 jobs by reducing hours per worker (OECD, 2010, p. 18); one third of the reduction occurred through less overtime hours, and about half through the reduction of "standard hours" (OECD, 2010, p. 44). Two other common features of the three countries with the relatively best labor market performance are a strong trend of an ageing population and a large industrial base. Ageing populations lead to present or future labor shortages, specifically of qualified labor. In Germany and Japan, the population is already declining, in Japan and in Finland there are also restrictive immigration policies.

Recovery has been strong in Germany in terms of GDP. Employed persons and employment rates have increased rather strongly after the crisis and the unemployment rate is definitely lower than at the start of the crisis. A strong recovery has started also in Finland. Germany and Finland both have relatively low budget deficits and debt positions and do not need a long period of heavy consolidation. Recovery in Japan had started, but was interrupted by the earthquake and the subsequent problems in the supply chain; public deficits and debt are high (albeit interest rates remain low since it is domestic debt).

The tentative finding that labor market protection, qualified workers plus working arrangements were key components for countries with better than predicted labor market performance is also underlined by Austria and the Netherlands, which enjoy the lowest unemployment rates in Europe.

### Country strategies: worst performers

The worst performing countries (again in relation to output decline) in the crisis were Portugal, the US, and Canada. It is less easy to find common elements between these countries. Portugal is a country with strict employment regulation, high tenure and a high unemployment replacement rate. Expenditure on active labor market policy and training is low, as is the share of workers with a secondary education. The share of the industrial sector is declining, and the current account deficit is high. Despite a history of collective bargaining, there were nearly no agreements for short-time arrangements and work sharing in the crisis. Since budget deficits and debt are high, the government could not subsidize agreements, neither on the firm nor industry level. The US and Canada had a strong labor market reaction in relation to moderate or average output decline. Regulation is low, the same holds for tenure and active labor market expenditure. The share of the workforce with a secondary education is high, and collective bargains are much less common than in Europe. Short-time agreements remained very low (0.22% and 0.34%). Unemployment benefits and eligibility were raised a little, and output stimuli were relatively high. All in all, both countries represent the Anglo-Saxon model of deregulated labor markets.

As far as the recovery is concerned, output in Portugal is still declining (due to the necessity of budget consolidation). In the US, recovery of output in 2012 looks stronger, but unemployment is still four percentage points higher than at the start of the crisis. Budget consolidation has not yet been tried, though the budget deficit is near 10% and debt is higher than GDP.

The countries next in line after these three countries, which also saw the labor market react relatively strongly during the crisis, underline the diversity of this group of low performers. On the one hand, Australia and New Zealand are both countries with low bargaining and low regulation, and on the other hand Spain, France and Korea have more regulated labor markets with a tradition of bargaining.

Table 5 The effect of relative LMP on post-crisis GDP growth and employment

	Growth of GDP			Growth of employment			Unemployment rate			
	2011	2012	2011/2012	2011	2012	2011/2012	2011	2012	2011/2012	2011/2012 vs. 2009/2010
Germany	2.9	0.7	1.8	1.3	0.4	0.8	6.1	5.9	6.0	-1.5
Japan	-0.5	1.5	0.5	-0.2	0.1	0.0	4.9	4.8	4.9	-0.3
Finland	3.1	1.4	2.2	1.0	0.3	0.7	7.8	7.7	7.8	-0.6
Top 3 relative LMP	1.8	1.2	1.5	0.7	0.3	0.5	6.3	6.1	6.2	-0.8
Portugal	-1.9	-3.0	-2.5	-1.1	-1.4	-1.2	12.6	13.6	13.1	1.8
USA	1.8	1.0	1.4	0.4	0.4	0.4	9.0	8.9	9.0	-0.5
Canada	2.1	1.8	2.0	1.7	1.6	1.6	7.5	7.0	7.2	-0.9
Low 3 relative LMP	0.7	-0.1	0.3	0.4	0.2	0.3	9.7	9.8	9.8	0.1

Source: Eurostat (AMECO).

### Post-crisis performance

Finally, we look at the growth rates of GDP and employment and the change in the unemployment rate for the three countries with the best relative performance and those with the worst. The best performers in the crisis enjoyed higher growth of GDP in the recovery period 2011 and 2012 (1.5% vs. 0.3%). The same holds for growth of employment

(0.5% vs. 0.3%); unemployment dropped by 0.8 percentage points for the top performers in the crisis, while it is marginally increasing for the low performers. This is again evidence that relative labor performance did not aggregate problems immediately after the crisis, and if anything supports recovery.

### **Further research needed**

Further evidence is needed to confirm our tentative findings, but the first results are more compatible with a positive effect on output of the stabilization of labor markets (via decreasing uncertainty or prevention of human capital losses), than with the assertion that employment protection in the crisis has been a drag in the first recovery phase.

Additional research is needed in several directions. Firstly, the variable “labor market regulation” should be further differentiated, to investigate which part of the regulation plays a positive role and which a negative one, as well as how “the level of” and “changes in” regulation interacted to explain labor market performance. Secondly, indicators on flexicurity as well as on contractual agreements should be further developed: to reflect new developments (like work sharing, time accounts or tripartite agreements trading off short-term wage cuts against long-term job security). Thirdly, we have made a cross-country investigation of a single, deep crisis. Panel research covering different crises could provide more general evidence (even if it will prove difficult to construct a panel for a period long enough to include several severe crises). Finally, the long-run effect of relative labor market performance can only be assessed if we have a longer time period after the climax of the crisis (than now, i.e. in March 2012) and if we know about the possibility of a second dip or a longer period of slower growth. Nevertheless, we think that the preliminary facts – more evidence-based stylized facts than actual proofs – are important for developing labor market policy in the meantime.

### **VIII. Conclusion**

The goal of this paper has been to find out why labor market performance differed across countries in the recent crisis, and specifically why the changes in employment and unemployment were different across countries despite similar output changes. The question is of specific interest since, firstly, the correlation between changes in output and unemployment was lower in this crisis than in previous ones, and, secondly, labor market reactions in the crisis could impact on the current recovery period (with subdued and unstable growth being the norm after big crises).

We measure output performance in the crisis as well as labor market performance using a single composite indicator, condensing information from four and seven sub-indicators (output and labor market, respectively). Since Okun’s law correlates a specific indicator on output performance (change in real GDP) with a specific indicator on labor market performance (change in unemployment), our approach could be labeled a test of a “Generalized Okun’s law”. Our sample contains 28 industrialized countries, the evidence

primarily covers the period from 2008 to 2010. The econometric test is therefore a cross section for a single crisis.

The main econometric finding is that countries with stricter employment regulation had less pronounced labor market responses for given output losses during the crisis. If we further subdivide labor market regulation into its sub-components, we find that the regulation of temporary contracts is the important component (not that of fixed contracts). Indicators for flexicurity strategies often have the expected sign. The same holds for benefit replacement ratios or expenditures in further education and training. But all the coefficients seldom reach significance. The available indicators on collective bargaining do not seem to be able to reflect the importance of social contracts or mutual trust, or the role of new tripartite agreements on work-sharing in the crisis. The labor market reaction was less pronounced in countries with higher per capita GDP and a larger share of manufacturing.

Looking qualitatively at the countries with the best-performing labor markets relative to output changes (Germany, Japan, Finland) and those with the worst performance (Portugal, US, Canada) we can see that the best performers heavily implemented short-time work arrangements (partly subsidized by governments), that they have a qualified and well-trained workforce, and the population is ageing. The worst performers are heterogeneous and could be subdivided into two groups. Some of these countries represent the Anglo-Saxon model and show stronger labor market reactions as a result of quick hiring and firing and less regulation. Other countries in the low-performing group represent the southern European countries (Spain, Greece), where both budget and trade deficits led to weak or no recovery.

Mitigating the downward effect in the crisis via regulation or work-sharing agreements raises the question as to whether this does not retard recovery. No cross-country econometric evidence can be found up to now (using data for 2011 and forecasts for 2012 available in March 2012) that those countries in which the performance of labor markets was better during the crisis or in which labor markets were more regulated had a specifically retarded recovery. Casual evidence for the top and bottom countries indicates, on the contrary, that growth was marginally stronger in the countries which had mitigated the labor market effects of the downturn. While there are some signs that employment growth is weak in the recovery and unemployment is persistent in general, this holds for countries with both good as well as bad relative performance of labor markets during the crisis.

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**Annex: Employment protection, labor hoarding, description of variables**

Employment protection legislation may increase labor hoarding through dismissal protection. Differences in labor hoarding (measured as change in labor productivity) are (and should be by definition) highly correlated to differences in labor market performance during the crisis (the correlation between both variables is  $-0.4$ ). If employment protection legislation was now correlated to labor hoarding, endogeneity would be a serious problem (they are weakly negatively correlated ( $-0.13$ )).

Table A1 shows multivariate estimates of the effects of our set of labor market variables on the change in labor productivity in the year 2009 (as a measure of the degree of labor hoarding). We find a slightly negative (but insignificant) effect of active labor market policy on the change in labor productivity. The most important result of this exercise is the insignificance of the employment protection legislation index. This leads us to conclude that there is no serious endogeneity problem.

Table A1 The effect of labor market structure on labor productivity (labor hoarding)

	(1)	(2)	(3)	(4)	(5)
EPL	-0.06 (-0.084)	-0.07 (-0.098)	0.5 -0.721	0.26 -0.395	0.36 -0.499
ALMP	-1.12 (-0.763)	-1.11 (-0.734)	-1.33 (-0.956)	-1.05 (-0.793)	-1.48 (-0.811)
Training	-0.01 (-0.565)	-0.01 (-0.533)	-0.04* (-1.765)	-0.04 (-1.717)	-0.04 (-1.645)
Replacement ratio	-0.10** (-2.167)	-0.10* (-2.058)	0.01 -0.165	-0.01 (-0.197)	0 (-0.075)
Secondary education			-0.04 (-1.509)	-0.04 (-1.715)	-0.04 (-1.198)
Employment tenure			-0.25* (-1.998)	-0.23* (-1.930)	-0.25* (-1.882)
Part-time work		-0.07 (-1.151)		-0.06 (-1.447)	-0.07 (-1.419)
Bargaining coverage					0.01 -0.372
Constant	7.81** -2.54	8.87** -2.545	5.45 -1.395	7.88* -1.952	6.99 -1.479
R-squared	0.299	0.318	0.559	0.625	0.616

*Note: number of observations = 28; dependent variable: Labor productivity (gross domestic product per hours worked) in 2009.*

*Source: OECD.*

Table A2 List of variables

<b>Variable</b>	<b>Definition</b>	<b>Source</b>	<b>Year</b>
PC-Value Output	Output market performance (OMP), Combined indicator of four GDP indicators (first component derived by principal component analysis); PC-Rank Output = Ranks of PC-Value output	own calculation	2008–2010
PC-Value Labor	Labor market performance (LMP), Combined indicator of seven employment/unemployment/participation indicators (first component derived by principal component analysis); PC-Rank Labor = Ranks of PC-Value Labor	own calculation	2008–2010
EPL	Employment Protection Legislation Index	OECD	2007
ALMP	Share of GDP spent on active labor market policies	OECD	2007
Training	Share of adults participating in education and learning at upper secondary and post-secondary non-tertiary level	OECD	2007
Replacement rate	Net income replacement roles for unemployment benefits (Percentage of earnings)	OECD	2007
Secondary education	Population aged 25 to 64 with at least upper secondary education	OECD	2007
Employment tenure	Average employment tenure in years	OECD	2007
Part-time work	Share of workers in part time employment	OECD	2007
Bargaining coverage	Share of workers covered by collective bargaining agreements	OECD	2003
Short-time arrangement	Annual average stock of employees participating in short-time work schemes as percentage of all employees	OECD	2009
Manufacturing share	Gross value added at current prices: manufacturing industry as a percentage of GDP	Eurostat (AMECO)	2007
GDP p.c. 2007	GDP per capita	OECD	2009