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Why labor market performance differed across countries: the impact of institutions and labor market policy*

Abstract

This paper investigates the performance of labor markets during the recent crisis. While the crisis had started rather simultaneously across regions and countries, the length and deepness finally proved very heterogeneous. Some countries still have not rebounded, in others inflationary pressure has become a severe problem after output had surpassed pre-crisis level by far. The same holds for labor markets. In some countries employment is now above its pre-crisis peak and unemployment stable or falling, in others unemployment is persistently near or above 10%. This paper investigates to which extent labor market performance during the crisis depended on (i) macroeconomic conditions prevailing at the start of the crisis, (ii) structural characteristics of the economies, and (iii) labor market institutions and policy. Labor Market Performance (LMP) is analyzed against these determinants alone and relative to output performance. Specifically emphasis is given to cases in which cross country differentials in labor market performance do not go in parallel to output performance. The growth performance in the US was better than average, the labor market was deeply affected and has still not rebounded. On the other side Germany experienced a steeper output loss, but had a better labor market performance. Output performance as well as labor market performance are each measured by a composite indicator summarizing several output respectively labor indicators. It was derived by Principal Component analyses.

JEL No: E20, E30, E32, E44, E60, G18, G28

Keywords: financial crisis, cross country performance differences, predictors for crises

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1. Introduction and motivation

The recent crisis has been the deepest crisis the industrialized economies have seen since the Great Depression in the nineteen thirties. While the crisis was rather synchronized across regions and countries during its first months[1], the performance of individual countries now – more than three years after the start and more than two years after "Lehmann Brothers" - looks very heterogeneous. This paper analyses to what extent the differences in country performance of labor markets can be explained by the pre-crisis macroeconomic development, by structural characteristics of the economies with and without taking output performance into account. Specifically interest is raised by differences in labor performance in the crisis and differences in output market.

The paper builds on *Aiginger* (2011), which explained cross country growth performance by (i) initial conditions and (ii) structural characteristics of economies. The Output Market Performance (OPM) of countries varied widely during the recent crisis: In some countries output growth stagnated while others had to face double digit losses in real GDP. Principal component analysis was used to derive a single indicator on growth performance. As initial conditions at the start of the crisis the fiscal situation, trade competitiveness, output, and credit growth were investigated. Country size, openness, share of sectors and per capita income are tested as structural characteristics. Three indicators end up as the best predictors for the depth of the crisis. They are correlated with one another and thus difficult to disentangle, jointly they are highly significant.

The Labor Market Performance (LMP) is expected to depend on the one hand on the growth performance and its determinants as explained above. The specific focus of this paper is to investigate whether it separately or additionally depended on labor market structures, institutions or policies. Specific emphasis will be given to the causes why the experience of countries according to growth performance and to labor market performance differed, most strikingly between the US and Germany. Labor market performance is again measured by a composite indicator derived by principal component analyses combining different sub indicators on employment, unemployment and participation. Finally, we are interested to find first evidence about possible repercussions between labor performance during the crisis and GDP-growth and unemployment in the recovery.

2. Measuring output and labor performance by a composite indicator

Output performance is defined by combining four indicators on economic growth (or decline) into a single indicator, namely

[1] This is indicated by the sharp and simultaneous fall in exports, industrial production and stock prices in the first three quarters see *Aiginger* (2010A, http://www.economics-ejournal.org/economics/journalarticles/2010-18).

- The rate of change of GDP in 2009 ("in crisis decline"); in 32 countries real GDP was lower in 2009 relative to 2008. An increase in GDP in the year 2009 occurred in China, India, Poland, Australia, and Korea.
- The cumulated change in the three years 2008, 2009, 2010 to indicate the status of the economy several quarters before the climax of the crisis and the speed of recovery after it ("three years performance"). This measure yields a decrease for 24 counties and an increase in 13 countries.
- The decrease of quarterly GDP from the pre-crisis peak to its trough: this indicator should describe the potential severity of the crisis not revealed by annual figures ("steepness of the crisis").
- The actual growth in the three years 2008, 2009, 2010 ("three years performance") relative to the "pre-crisis" trend growth from 2000 to 2007 ("trend change")[2].

We define labor market performance by combining six indicators on unemployment and employment namely:

- the change in employment, unemployment and labor market participation rates in 2009.
- the change in employment during the crisis (2008 to 2010) relative to the change in employment in the years before the crisis (2000 to 2007).
- changes in unemployment and labor force participation rates during the crisis (2008 to 2009) relative to the change in unemployment and labor force participation rates in the years before the crisis (2000 to 2007).[3]

We think that each of the indicators demonstrates some element of "the depth of a crisis" and of course, they are highly correlated. Therefore we combine the information by extracting a principal component (PC), one for the set of output series, one for the labor market series. The weights of the composite "growth performance" index 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. Table 1 shows the output performance of each country in our sample according the measures presented above together with the composite indicator derived via principal component analysis. Additionally we show the ranking of the ordinal principal component in the last column of table 1 (PC-rank).

[2] Additionally we could measure the length of the crisis by counting the number of quarters in which GDP decreased; in rare cases these were one to two quarters, on average five quarters. In a few countries we cannot say yet how many quarters the crisis lasted, since GDP is still declining.

[3] Thus we have three indicators on "in crisis change" of the labor market plus three indicators on "trend change".

Table 1: Output performance and ranking according to PCA (Aiginger, 2011)

	GDP performance					
	2009	2010/2007	Trough 2009/ peak 2008	2010/2007 minus 2000/2007		
		p.a.	Percentage change	Trend change	PC-value	PC-rank
	Annual data, percentage change		Quarterly data			
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
Ireland	-7.6	-3.8	-12.5	-9.3	0.0	29

Source: Eurostat (AMECO, November 2010).

Table 2 shows the results for labor market performance in terms of the six variables listed above as well as by the composite indicator derived by PCA. The final column shows the ranking of each country according to the PCA. On the top of the list are five European countries, Poland, Germany, Switzerland, Austria and Netherlands. These are the countries with the best labor market performance. Out of these five countries Poland and Switzerland were among the best performers in output development too (rank 1 resp. 5th), while Germany, Netherlands and Austria had average or even slightly below average performance in output (ranks 16, 13, and 12). The low performers on the labor market were Ireland, Spain, Iceland the US and Portugal. While Ireland and Iceland had rapidly decreasing output too, USA and Portugal had a rather smaller output loss (rank 10 and 8). This indicates that we first have to explain why output performance was different across countries thus inducing labor market performance and second how labor markets performed relative to output.

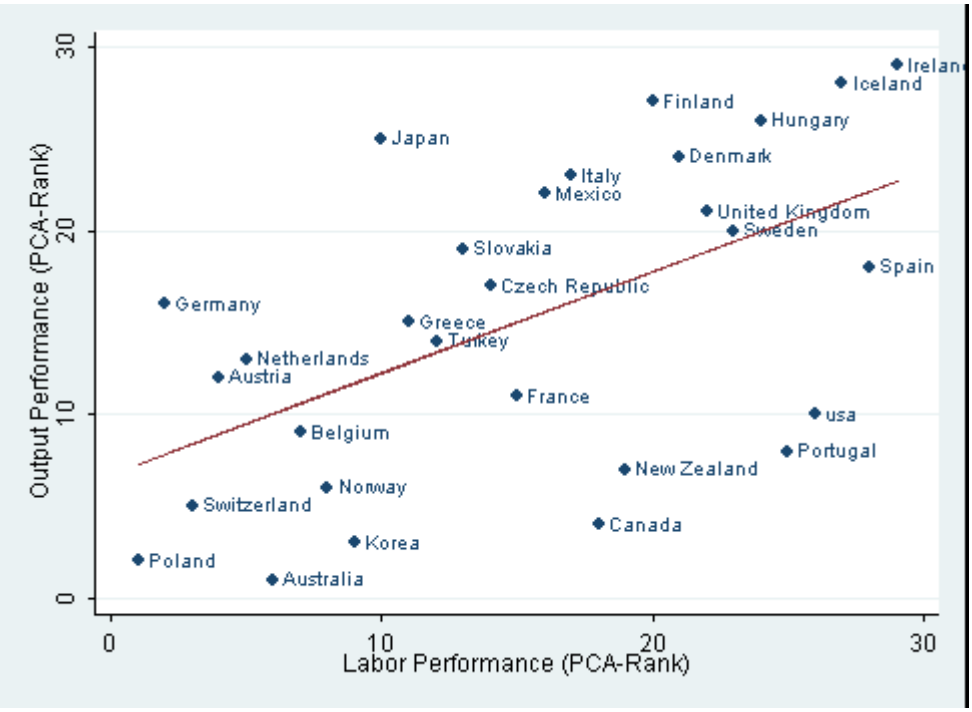
Table 2: Labor performance and ranking of countries according to PCA

	Change in Employment	Change in unemployment rates	Change in LF-Particip. Rates	2010/2010 minus 2000/2007 Employ-ment	Average UR08/09 - Average UR2000/07	Average PR08/09- Average PR2000/07	PCValue	PC Rang
Poland	0.4	1.0	0.09	0.9	-9.1	5.5	100.0	1
Germany	-0.1	0.2	0.28	0.3	-1.6	4.6	84.9	2
Switzerland	2.4	0.7	-0.18	1.2	0.2	1.5	81.4	3
Austria	-0.9	1	-0.38	-0.4	-0.1	3.4	73.4	4
Netherlands	-1.1	0.7	-0.15	-1.1	-0.3	3.4	73.1	5
Australia	0.3	1.3	-1.03	-0.6	-0.7	2.6	72.9	6
Belgium	-0.3	0.9	-0.81	-0.4	-0.3	1.5	70.8	7
Norway	-0.5	0.6	-1.44	-0.5	-0.9	1.2	70.2	8
Korea	-0.3	0.5	-0.84	-0.9	-0.3	1	69.8	9
Japan	-1.6	1.1	-0.51	-0.7	-0.2	2.3	68.7	10
Greece	-0.7	1.7	-0.62	-2.8	-1.6	2.8	68.1	11
Turkey	2	3.1	-0.63	2.8	2.8	-1.5	67.5	12
Slovakia	-2.8	2.5	-2.13	-2.5	-5.8	3.4	67.0	13
Czech Republic	-0.7	2.3	-1.11	-1.1	-2.1	1.0	66.7	14
France	-1.2	1.8	-0.44	-1.0	-0.1	1.6	66.1	15
Mexico	0.5	1.7	-1.95	0.0	1.3	0.6	64.6	16
Italy	-1.6	1.1	-1.3	-2.1	-1	1.6	64.1	17
Canada	0.0	2.1	-2.05	-1.5	0.3	1.1	61.7	18
New Zealand	-1.1	2.0	-1.66	-2	0.5	1.8	60.0	19
Finland	-3.1	1.9	-2.84	-1.7	-1.3	1.6	56.5	20
Denmark	-2.9	2.7	-2.19	-1.5	-0.1	1.1	53.8	21

United Kingdom	-1.6	2.4	-1.96	-1.2	1.5	-0.4	53.3	22
Sweden	-2.0	2.1	-3.43	-0.8	1.1	-0.2	51.7	23
Hungary	-2.8	2.2	-1.25	-1.4	2.4	-0.6	50.5	24
Portugal	-2.6	1.9	-1.99	-1.3	2.4	-0.9	49.5	25
USA	-3.7	3.5	-3.21	-2.5	2.5	-2.3	35.2	26
Iceland	-6.0	4.3	-5.24	-3.8	2.4	-2.8	19.5	27
Spain	-6.7	6.7	-4.67	-6.5	4.2	1.1	11.8	28
Ireland	-8.2	6.4	-5.67	-7.7	4.4	-1.0	0.0	29

Figure 1 plots the rankings of the countries in our sample with respect to output and labor performance. The figure reveals some considerable variation in labor performance between countries with similar output performance.

Figure 1: the relation between output performance and labor market performance (ranks)



Output performance is explained in *Aiginger* (2011) with reference to initial condition and to structural characteristics. He finds that a cluster of three variables can explain about one third of the actual country variance (and jointly with an Asian proxy up to nearly one half):

- the current account balance in 2007 is positively related with growth performance, as is the change of the balance between 2000 and 2007 and the average for this longer period;
- countries which experienced a very high growth of real GDP between 2000 and 2007 were more severely hit by the crisis; a significant proxy for Asia indicates that this does not hold for high-growth Asian countries;
- growth of credits between 2000 and 2007 is negatively related to performance during the crisis.

Surprisingly performance differences across countries are not related to the fiscal position in 2007. The negative result holds if we take the budget position for a longer pre-crisis period, the change in the position between 2000 and 2007 or the debt/GDP relation. The impact of the budget position at the start of the crisis might be finally somewhat larger than seen today, since some of the countries with large deficits have not restarted to grow up to now. The negative finding is however very robust and supported by Barrel et al. (2010). An influence of deficits on performance was found in *Berkmen et al.* (2009), a study which focuses on low-income countries.

The next section of the paper discusses the link between labor performance, output performance and structural characteristics of the labor markets. Section 3 deals with the data used. Section 4 presents results on determinates of labor performance during the crisis. In Section 5 we move one step further and present evidence on the link between labor performance and future (post-crisis) output growth. Section 6 summarizes and concludes.

3. Labor Market Performance

Economic performance of countries is the driving force behind labor market responses to the crisis. The correlation between output market performance and labor market performance is significantly positive. The correlation between both performance measures is 0.55 if ranks are used and 0.64 if principal component values are applied. Nevertheless, labor market outcomes vary considerably across countries (*OECD*, 2010) with similar economic performances (see figure 1 and 2).

The OECD Job Strategy (*OECD*, 2006) as well as the Flexicurity Strategy suggested by the European Commission base on the supposition that labor market flexibility counteracts labor marked rigidities and long term displacement from employment participation, eases economic adjustment and thereby enhances productivity growth. *Martin and 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, some elements of protection may impact negatively on long-run growth, other elements will

be beneficial at least for the short time. Empirical analyses will show which impact dominated during the crisis and – finally – in the course of the recovery.

Latest evidence of labor market developments during and after the crisis shows large differences between OECD countries regarding the role of (temporary) reductions in productivity per employee (labor hording), partly caused by a reduction in average working hours. In *OECD* (2011) it is argued, that "work-sharing agreements and short-time work schemes can cushion the impact of output shocks on employment". Since labor hoarding is to be defined as a reduction in average productivity, lower employment losses and rises in unemployment during the crisis do not come as a surprise (this is investigated in section 5 of this paper).

Questions remain (1) concerning the role of labor market related policies and institutional settings for a stabilization of the labor market during the crisis and (2) if flexible adjustment of labor markets to changes in the output levels is useful in the phase of recovery or if a stabilization of employment – which of course improves labor market performance during the crisis – reveals as an advantage also during recovery.

A flexible adjustment of the labor market would imply lower productivity losses and would – following the above flexibility argument – facilitate labor market adjustment to structural change following the crisis. Stabilisation of employment and unemployment during the crisis might – at the cost of at least temporary productivity losses – allow better maintenance of human capital and reduce risks of high levels of unemployment (e.g. hysteresis phenomenon, depreciation of human capital).

To get first evidence on these questions, we try to explain labor performance during the crisis not only with output performance in this period but also with structural characteristics and institutional features of labor markets. We relate therefore as a first step labor performance to pre-crisis conditions, general economic structure and the labor market characteristics. In a second step we include output performance, thus investigating whether labor market characteristics influence labor market performance additionally to the output response.

In a final step, we then relate labor market performance during the crisis to economic performance (GDP-growth) after the crisis. Since GDP-growth after the crisis is not observable yet, we apply this part of the analysis on the OECD GDP-forecasts.

Figure 2 plots labor performance against output performance according to their principal component values. The horizontal and vertical lines indicate above and below average performance respectively. The four resulting squares divide our sample into four groups of countries: those with good output and good labor performance (Poland, Australia, Korea, Switzerland, Norway, Belgium, Austrian, the Netherlands, France, and quite at the average Canada and New Zealand), those with bad output and bad labor performance (Ireland, Iceland, Spain, Hungary, Finland, Sweden, Denmark und the UK), those with good output but bad labor performance (USA and Portugal) and finally those with bad output but good labor performance (Germany Greece, Mexico, Italy, Japan, Slovakia and the Czech Republic).

Figure 2: the relation between output performance and labor market performance (PCA-values)

The graph also reveals that the US show (besides Spain, Iceland and Ireland) the weakest labor performance, but also Nordic countries have rather weak labor market as well as economic performance. Other Anglo-American-model countries (Australia, Canada, New Zealand) show weak labor performance compared to rather good output performance. Germany, Austria, Switzerland, Belgium, Netherlands and also Japan show good labor market performance compared to economic performance.

4. Data construction

Pre-crisis conditions

Aiginger (2011) lists pre-crisis conditions that are likely to affect a country's growth performance during the crisis. These reflect the fiscal situation on the one hand, trade competitiveness and pre-crisis dynamics of output, credits and inflation on the other.

The fiscal situation is represented by the budget surplus or deficit and public debt. Both variables affect a country's potential performance by limiting the room for maneuvering. "Low deficits and debt signal the possibility to react quickly after a crisis started" (*Aiginger*, 2011).

Trade competitiveness is measured by current accounts. A relation between performance in the crisis and pre-crisis current accounts may come via four channels. The first could be that

debts of government and private firms are seen as an interrelated problem by financial markets in rating "country risk". A second might be that weak trade competitiveness is seen by financial market as a barrier for further growth and therefore makes borrowing more expensive. A third would be that losing currency reserves via current account deficits increases the risk premium for a country if either the government or firms want to raise money. A fourth reason would be that countries with weak external position in good times might be marginal suppliers which are able to sell on the world markets if demand is strong, but are squeezed out of the markets, if more competitive producers have free capacities (*Aiginger*, 2011).

General economic structure

We separately analyze the effects of the "general" economic structure and the labor market structure. The general economic structure reflects among others a country's openness, government size and its shares of the manufacturing and the financial sector. A higher degree of openness may affect a country by its higher exposure to trade and capital fluctuations. While larger governments are expected to limit the crisis, larger shares of manufacturing and financial sectors might increase the crisis' impact on performance.

Labor market structure

The labor market structure is measured by several indicators that reflect the degree of labor market flexibility on the one hand and the degree of (un)employment security on the other. Labor market flexibility is measured by OECD's employment protection legislation index (EPL). (Un)employment security is captured by the net replacement rate of the unemployment insurance, the percentage of GDP used for active labor market policies and the percentage of workers participating in formal or non-formal education.

A higher degree of employment protection implies lower labor market flexibility. On the other hand a higher share of workers in training implies a higher degree of general human capital which should enhance transitions of workers into new employments. Spending on active labor market policies also facilitate the placement of workers into jobs e.g. by providing more resources for trainings.

The share of part time and temporary employment is also expected to benefit labor performance as higher shares of these imply less rigid labor markets that might be able to adapt faster to changes in the economic environment.

5. Results

Pre-crisis conditions

Pre-crisis conditions affect labor performance in a similar way as output performance. We find that trade competitiveness (measured by current account) has a strong and significantly

positive effect on labor performance. This holds for current accounts in 2007 as well as in the longer run (2000-2007).

The country's fiscal condition as measured by its budget surplus or deficit on the other hand has no significant effect on labor performance.

Credit growth during the pre-crisis period has a negative effect on labor performance. This also holds if we use the ranks of credit growth.

These results are similar to Aiginger's results of pre-crisis conditions on output performance.

Table 3: The effect of pre-crisis conditions on labor performance

	Coefficient	t-value	R^2
Budget surplus/deficit (relative to GDP) 2007	-0.2569	(-0.295)	0.003
Budget surplus/deficit (relative to GDP) 2000 -2007; absolute change	1.0196	(1.004)	0.036
Budget surplus/deficit (relative to GDP) 2000 -2007; average	-0.7754	(-0.764)	0.021
Public debt (relative to GDP) 2007	0.1271	(1.090)	0.042
Public debt (relative to GDP) 2010-2007; absolute change	0.2364	(0.997)	0.035
Public debt (relative to GDP) 2010-2007; average	0.1215	(1.011)	0.036
Current account (relative to GDP) 2007	1.2687**	(2.588)	0.199
Current account (relative to GDP) 2007; rank	**1.1227****	**(2.645)**	**0.206**
Current account (relative to GDP) 2000 - 2007; absolute change	3.1049***	(2.987)	0.248
Current account (relative to GDP) 2000 - 2007; average	1.1682*	(1.957)	0.124
Foreign exchange reserves (relative to GDP); growth 2000-2007	-0.0025	(-0.093)	0.000
Foreign exchange reserves (relative to GDP); 2007	0.1249	(0.576)	0.012
Foreign exchange reserves (relative to GDP); 2000-2007 absolute change	0.0801	(0.184)	0.001
Foreign exchange reserves (relative to GDP); 2000-2007 average	0.0761	(0.593)	0.013
Domestic credits; growth 2001/2007	-0.1362***	(-3.581)	0.322
Domestic credits; growth 2001/2007 rank	**-1.1252****	**(-2.655)**	**0.207**
Domestic credits (relative to GDP); 2007	-0.0057	(-0.406)	0.006
Domestic credits (relative to GDP); 2001 - 2007 absolute change	-0.1538***	(-2.953)	0.244
Growth of real GDP 2000/ 2007	-4.0010	(-1.389)	0.067
Consumer prices; 2000-2007; average	-0.1002	(-0.119)	0.001

General economic structure

Labor performance is merely unrelated to openness and government size. The share of manufacturing sector is positively and the share of the financial sector is negatively related to labor performance. High per capita GDP in 2007 is associated with lower labor performance. Overall the measures of the general economic structure show only weak associations to labor performance.

Table 4: The effect of general economic structure on labor performance

Structural characteristics	coefficient	t-stat	R^2
openess 2007	0.0452	(0.435)	0.007
government size 2007	-0.1052	(-0.306)	0.003
share of manufacturing 2007	0.8531	(1.002)	0.036
share of financial sector2007	-1.9183	(-1.207)	0.051
GDP 2007	-0.0015	(-0.728)	0.019
GDP per capita 2007	-0.6401	(-1.312)	0.060
country risk evaluation	0.2962	(0.840)	0.025

Labor market structure

Table 5 shows the estimated impact of labor market indicators on labor performance using univariate regression models (applying robust regression). The average employment tenure before the crisis (as measure for labor market turn-over rates) and output performance have positive (and significant) effects on labor performance. The index of employment protection legislation and the share of part-time employees also increase labor performance (although the effects are not significant). The change in unemployment rates in 2007 – before the crisis – is significantly negative.

In a second step we also include the output performance measure derived in *Aiginger* (2011) to control for differences regarding the deepness of the downturn. The most stable results we find are the positive effects of employment protection legislation and output performance on labor market performance during the crisis. Additionally, the share of GDP spent on active labor market policy seems to have a positive impact on labor performance. Since active labor market policy in many countries has to react flexibly to new requirements, higher funding of active labor market policy may increase the range for discretionary policies towards labor market consequences of the crisis.

Table 5: The effect of labor market structure on labor performance

	coefficient	t-stat	R^2 adj.
Employment protection legislation	5.0336	(1.360)	0.030
Active labor market policy	-0.2704	(-0.040)	-0.037
participation in (non) formal education	-0.1540	(-0.777)	-0.018
Replacement rate	-0.1354	(-0.545)	-0.026
Share secondary education	0.1030	(0.683)	-0.020
Average tenure	8.0523*	(2.048)	0.151
Share part time	0.4322	(1.427)	0.036
Bargaining coverage	0.1092	(0.730)	-0.025
Change in unemployment rate 2007	-8.5622***	(-3.368)	0.270
PC value output performance	0.5298***	(3.789)	0.323

Table 6 shows the multivariate regression models of the effect of labor market variables on labor performance using robust regression models. Employment protection legislation turns highly significant as we additionally control for output performance. In some specifications we also find positive effects of active labor market policy on labor performance. The replacement rate of unemployment insurance and participation in (non)-formal education do not appear to have any significant effect on labor performance.

Controlling for output performance reveals a strong effect of employment protection on labor performance. The negative effect of changes in unemployment rates before the crisis remains highly significant after controlling (among others) for differences in output performance. The positive effect of employment tenure turns insignificant if we control for differences in output performances or employment protection (employment protection and average employment tenure are of course highly correlated (0.6)). Overall the explanatory power of our regression models increases steeply when including output performance.

Table 6: The effect of labor market structure on labor performance (multivariate models)

empl. Prot.	active labor market policy	part. In (non) formal education	replace- ment rate	share secondary	average tenure	share part time	bargain- ing cover- age	change in unem- ployment rate 2007	pcvalue output perf.	R^2 adj.
10.3264**									0.5940***	0.486
(2.666)									(4.763)	
2.7647					2.7917					0.168
(0.702)					(1.157)					
4.1921								-8.4390***		0.274
(1.187)								(-3.150)		
11.5397***						0.4118			0.5590***	0.490
(2.878)						(1.191)			(4.398)	
15.7994**						0.7345	-0.2010		0.3661**	0.369
(2.552)						(1.556)	(-1.089)		(2.201)	
11.2466**	3.9408					0.3649			0.5802***	0.480
(2.703)	(0.513)					(0.985)			(4.413)	
6.8068**	-2.2621					0.4519*		-7.1408***	0.2491***	0.586
(2.673)	(-0.474)					(1.933)		(-3.558)	(2.883)	
6.5524	2.6244	-0.0217	-0.2836		0.6352				6.5089	-0.216
(0.916)	(0.188)	(-0.079)	(-0.553)		(0.169)				(0.173)	
12.5973***	1.8272	0.1520	0.2351						0.4066***	0.468
(3.089)	(0.185)	(0.822)	(0.815)						(2.968)	
8.3077**	12.0401					0.1781			0.3364**	0.455
(2.266)	(1.606)					(0.537)			(2.697)	
	-0.9146					0.4421				-0.003
	(-0.129)					(1.365)				
7.3088	9.4345	0.0898	-0.2351							-0.019
(1.330)	(0.711)	(0.356)	(-0.623)							
11.3427**	15.0791**		-0.2798	0.3627**						0.482
(2.796)	(2.112)		(-1.209)	(2.281)						
8.4117*	2.5913				2.8499				0.5844***	0.448
(1.833)	(0.239)				(0.925)				(3.989)	

Employment protection and labor hoarding

The clearly positive influence of employment protection on labor performance during the crisis may be surprising in the light of the flexicurity debate. Therefore, we take a closer look at potential endogeneity of this indicator. 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 now employment protection legislation was correlated to labor hoarding, endogeneity would be a serious problem (they are weakly negatively correlated (-0.13)).

The following table 7 shows uni- and 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 strong negative effect of active labor market policy on the change in labor productivity. Since labor productivity is defined as output per hours worked a reduction in labor productivity implies an increase in labor hoarding.

The most important result we obtain is the insignificance of the employment protection legislation index.

Table 7: The effect of labor market structure on labor productivity changes (labor hoarding)

employment protection	active labor market policy	part time	temporary employment	replacement rate	participation in education	union density	R^2
-0.4988							0.018
(-0.698)							
-0.0305	-2.9171**						0.196
(-0.045)	(-2.402)						
-0.7288		-0.0832					0.092
(-1.004)		(-1.405)					
-0.6749			0.0352				0.026
(-0.808)			(0.450)				
-0.2154	-1.7565			-0.0932*	-0.0284		0.298
(-0.261)	(-1.324)			(-1.905)	(-0.871)		
-1.0091		-0.0949	0.0517			-0.0238	0.145
(-1.195)		(-1.565)	(0.667)			(-1.094)	
-1.0476	-2.5111**	-0.0819*	0.0975	-0.0734*	-0.0755**		0.592
(-1.364)	(-2.331)	(-1.752)	(1.615)	(-1.853)	(-2.820)		
	-2.9252**						0.200
	(-2.549)						
	-2.8380**	-0.0543					0.245
	(-2.444)	(-1.021)					
	-2.9165**		0.0139				0.196
	(-2.471)		(0.225)				
	-3.1755**					0.0073	0.204
	(-2.427)					(0.330)	

6. Outlook on future research

Effect of labor performance on after crisis economic development

As a first attempt to assess the potential "feedback" effect of good labor performance on overall economic performance we regress our measure of labor performance on forecasted post-crisis growth in GDP. These forecasts are taken from the most recent OECD's Economic Outlook.

The following table shows the effect of labor performance during the crisis on post-crisis GDP growth rates in 2011 and 2012 (OECD forecasts).

Table 8: The effect of labor performance on post-crisis GDP growth rates

	pc value labor	pc value output	epl	Almp	part time	Constant	R^2
GDP growth 2011	0.0287**					0.8643	0.173
	(2.377)					(1.131)	
GDP growth 2011	0.0281*	0.0009				0.8546	0.168
	(1.739)	(0.059)				(1.039)	
GDP growth 2011	0.0209	0.0075	0.5788			-0.3013	0.192
	(1.099)	(0.406)	(1.274)			(-0.234)	
GDP growth 2011	0.0326**	0.0012	0.4328	-1.2668*	-0.0322	0.8350	0.442
	(2.212)	(0.087)	(1.177)	(-1.974)	(-1.020)	(0.761)	
GDP growth 2012	0.0101					2.2076***	0.031
	(0.930)					(3.210)	
GDP growth 2012	-0.0032	0.0195				2.0054***	0.104
	(-0.238)	(1.482)				(2.964)	
GDP growth 2012	-0.0003	0.0173	-0.1754			2.3048**	0.109
	(-0.023)	(1.250)	(-0.517)			(2.403)	
GDP growth 2012	0.0053	0.0169	-0.1531	-0.9451*	-0.0513*	3.2464***	0.375
	(0.431)	(1.439)	(-0.501)	(-1.772)	(-1.958)	(3.560)	

The effect of labor performance during the crisis on GDP growth in 2011 is positive in all tested specifications and significantly positive in three out of four specifications. Output performance during the crisis on the other hand does not appear to increase post-crisis performance. For growth rates in 2012 the significance of labor performance vanishes but remains positive. It therefore seems that higher labor performance during the crisis does not trigger any adverse effects in future economic performance.

Another simple exercise to take a glimpse on the effects of labor market performance (including possible labor hoarding) on post-crisis developments is to look on the performance of the best three countries according to LMP in 2011 and in the predictions of 2012. The three best in-crisis performers according to LMP relative to OMP (Germany, Austria, the Netherlands) could further decrease (low) unemployment rates in 2011 and 2012 (to 4.7%) and enjoy a (predicted) growth of 2.1% in 2011/12. The three countries with low LMP in the crisis (US, Portugal, Spain; average 2010 13.6%) are forecast not to be able to reduce their high unemployment rate up to 2012 and will experience an anemic growth of 0.6%.

Table 9: The effect of labor performance on post-crisis GDP growth rates

	Unemployment rate						GDP growth				
	2009	2010	2011	2012	2010-2008	2012-2010	2009	2010	2011	2012	∅ 2011/2012
Germany	7,8	7,1	6,4	6,0	-0,4	-1,1	-4,7	3,6	2,6	1,9	2,3
Austria	4,8	4,4	4,3	4,2	0,6	-0,2	-3,9	2,0	2,4	2,0	2,2
Netherlands	3,7	4,5	4,2	4,0	1,4	-0,5	-3,9	1,8	1,9	1,7	1,8
Average Top 3	5,4	5,3	5,0	4,7	0,5	-0,6	-4,2	2,5	2,3	1,9	2,1
USA	9,3	9,6	8,6	8,1	3,8	-1,5	-2,7	2,9	2,6	2,7	2,6
Portugal	9,6	11,0	12,3	13,0	3,3	2,0	-2,5	1,3	-2,2	-1,8	-2,0
Spain	18,0	20,1	20,6	20,2	8,8	0,1	-3,7	-0,1	0,8	1,5	1,1
Average Low 3	12,3	13,6	13,8	13,8	5,3	0,2	-3,0	1,3	0,4	0,8	0,6

7. Conclusions

The goal of this paper has been twofold, first to find out to which extent and why labor market performance differed in the recent crisis, and secondly and specifically why the reaction of the labor markets differed relative to output performance (i.e. the output elasticity of labor market reaction).

We measure output performance in the crisis as well as labor market performance not by a single indicator (change in one variable over a specific time) but by a set of indicators (short run, three years, some capturing trend changes) and use principal component analysis to arrive at a single indicator on output performance and labor market performance respectively. Our sample contains 29 countries, mainly industrialized countries but also Turkey and Mexico.

We follow *Aiginger* (2011) to distinguish pre-crisis conditions (like trade position, public budgets, financial sector trends which built up in the years preceding the crisis), and structural characteristic of the countries (size, openness of economies), which do not change quickly. We specifically add labor market characteristics which are assumed to influence growth and employment of economies in general and during the crisis, namely tenure, bargaining coverage, active labor market policy, training efforts, part time.

In explaining the performance of labor markets without reference to output we confirm Aiginger's results (for output performance). Cross country labor market performance can be "explained" by the current account position (in 2007 and its change 2000/2007), by high GDP as well as credit growth in the building-up period (both negatively). Labor market performance was rather independent from the fiscal position and its change, and – a little bit differently from Aiginger – independent from structural characteristics of the output market (size, openness, share of manufacturing). If we investigate the impact of labor market structures and institutions (single regression) we find that labor market performance is significantly positive correlated with average employment tenure and changes in unemployment rate before the crisis (from 2006 to 2007). It is also positively (but in single equations not significantly) related to the Employment Protection Index (EPL) and to the share of part-time work.

In taking "output performance" into account – which then impacts on labor performance – we can first compare output and labor market performance directly. While these two indicators are highly correlated, two interesting groups with considerable differences

concerning labor market performance emerge: there are countries which had better performance of labor market, together with average or weak output performance: Germany combined a strong output loss but a resilient labor market, similar pattern holds for Austria and the Netherlands which share the lowest unemployment rates in Europe. The opposite group, which experiences a medium or small output loss but a strong labor market reaction are US, Portugal, New Zealand and Canada. These differences in labor market reaction for a given output loss (the labor market elasticity of output) are highlighted if we explain labor market performance taking output performance explicitly into account.

Labor market performance (LMP) during the crisis is significantly explained in multivariate regressions by employment protection, by active labor market policy, by educational variables and by the share of part-time workers at the start of the crisis. If output performance is included in the equation employment protection is clearly the strongest variable (highly significant), in several equations part time as well as education are significant, too. This indicates that in this severe crisis – while employment protection is often seen as a drag on long-term growth and in good times – labor protection had a positive influence on the labor market reaction. The same seems to be true for part time and active labor market policy in general. Replacement ratios get sometimes positive sometimes negative coefficients.

The positive impact of labor market policy, specifically a good combination of protection and flexibility in large crises, constitutes a tentative result of our research to be further investigated. It will have to be shown how the longer term recovery will develop and whether countries in which labor market reaction was smoothed in the crisis, will lag in recovery. Some very preliminary results do not hint into this direction: countries in which the labor market reaction was specifically smoothed, namely Germany, Austria and the Netherlands, have higher GDP growth in 2010, and better GDP-growth forecasts for 2011. Employment in all three countries is predicted to be above the pre-crisis level in 2012, unemployment rate is predicted to be decreasing towards 4.7% (2012). In the group of countries with stronger than average labor market reaction occurred (US, Portugal, Spain) unemployment is above pre-crisis level in 2011 and expected to be at 14% in 2012. GDP forecasts for the "low 3" in LMP are 0.6%, for the "top 3" it is 2.1% (cumulative 2010/12). If future data confirm these stylized facts, a very "Keynesian" tentative hypothesis could be ventured: lowering unemployment in the recession stabilizes expectations and reduces uncertainty; this allows economies to rebound quicker after a large crisis. But this has to be supported by the future development of output and employment in a large sample of countries and by rigorous econometrics.

As preliminary result we can conclude, that in the sudden and unpredicted downturn in the course of the financial crisis starting in the second half of 2008, labor performance was improved not only by better output performance, but also by long-term contracts, employment protection, active labor market policy and negotiated part-time agreements. First evidence suggests that these strategies might not be harmful for the later upswing or even supporting the rebound by stabilizing expectations.

If these results will find support in further research with more reliable data background, this would highlight the role of employment protection policies from a different perspective. Particularly in deep downturns companies might tend to dismiss too many of their workers maybe due to high uncertainty about time and extent of a following recovery. Consequently, the loss of human capital (and eventually also the problems to bring down unemployment after a crisis) may even exceed the potential (and maybe more long term) costs of delayed adaption to structural change. Policies to stabilize the labor market may therefore help to

overcome severe downturns faster and with less social costs. General conclusions cannot be drawn from this still rudimentary analysis on a single downturn. The strong upswing after the crises – at least in some continental European countries like Germany –– may have contributed to these specific results. Nevertheless, it may be worth rethinking general recommendations for more flexible labor markets. It seems that employment protection can gain an important role to stabilize the labor market in deep and not too long-lasting slump.

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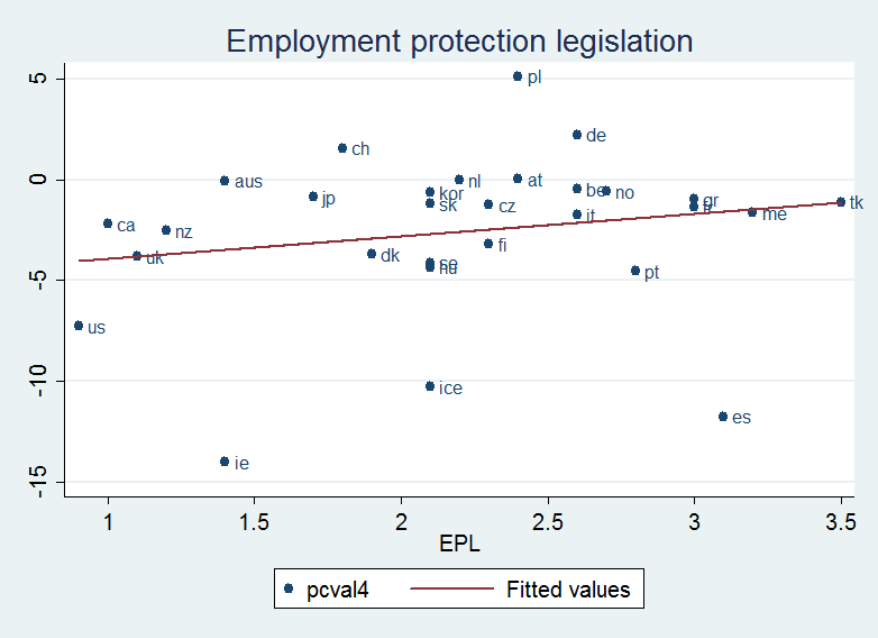
Appendix: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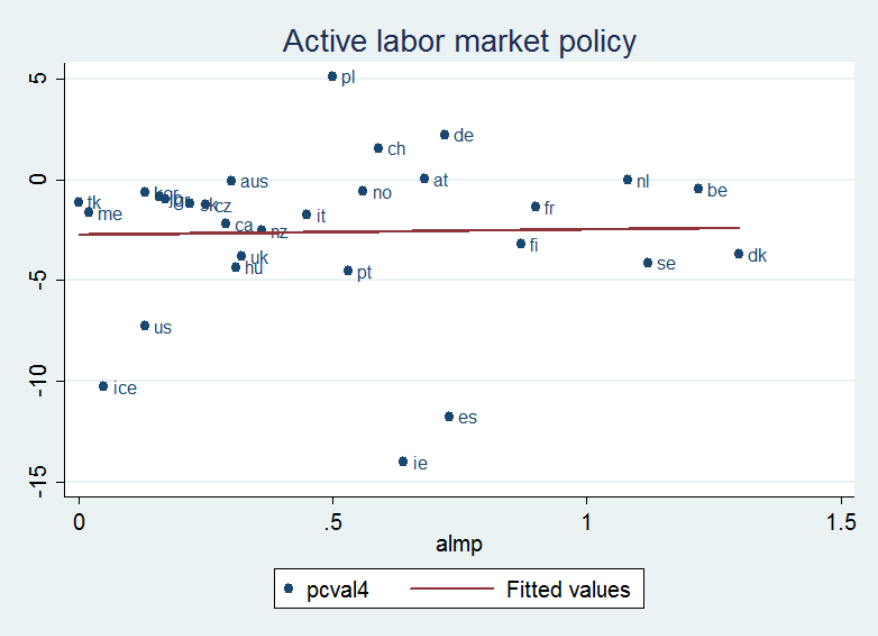
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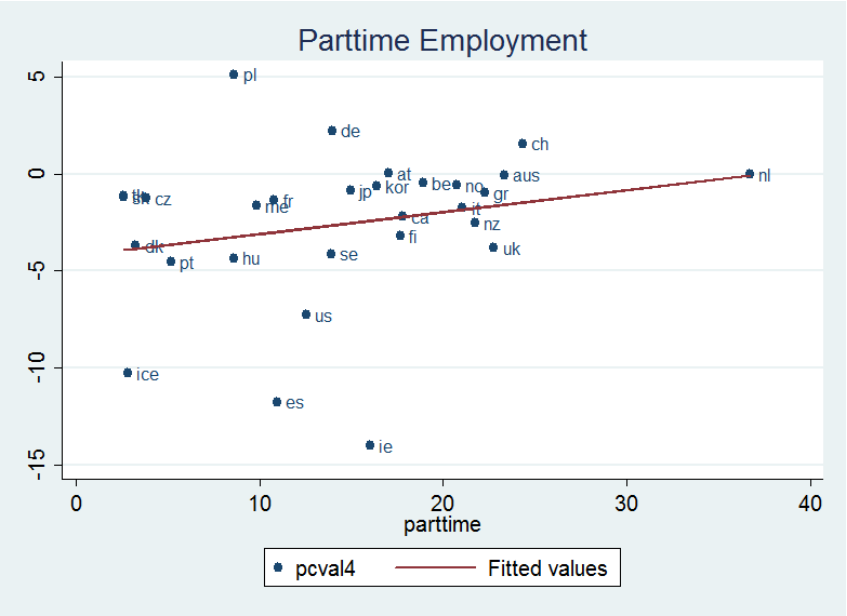
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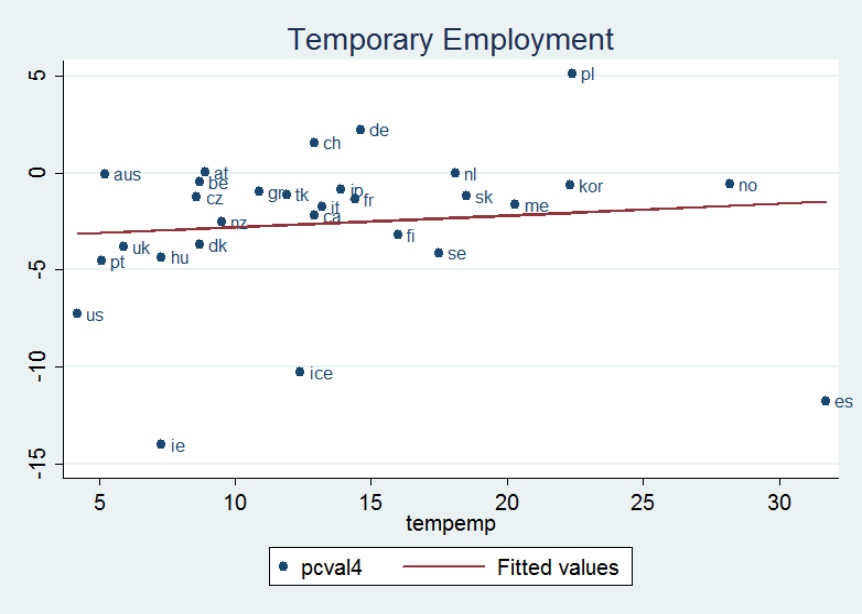
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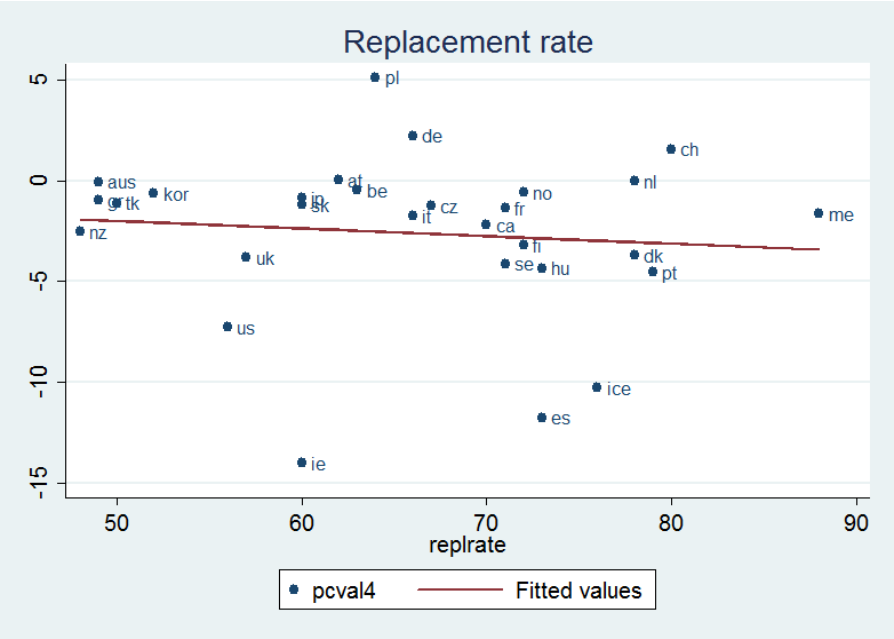
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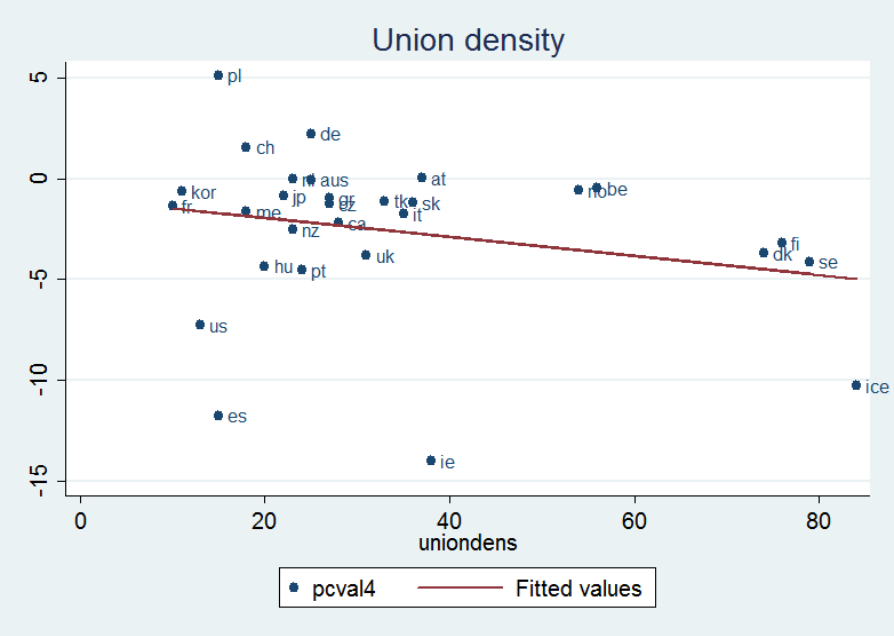
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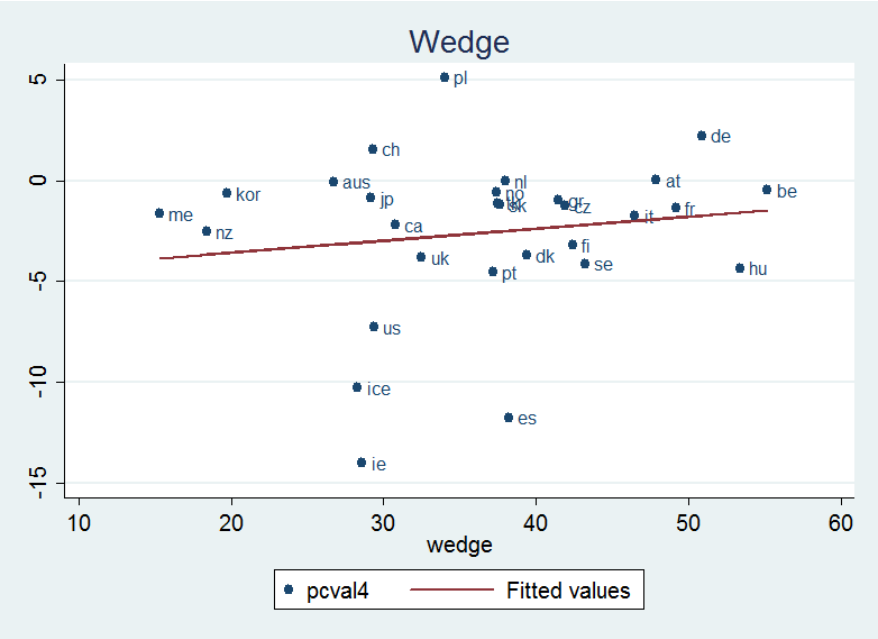
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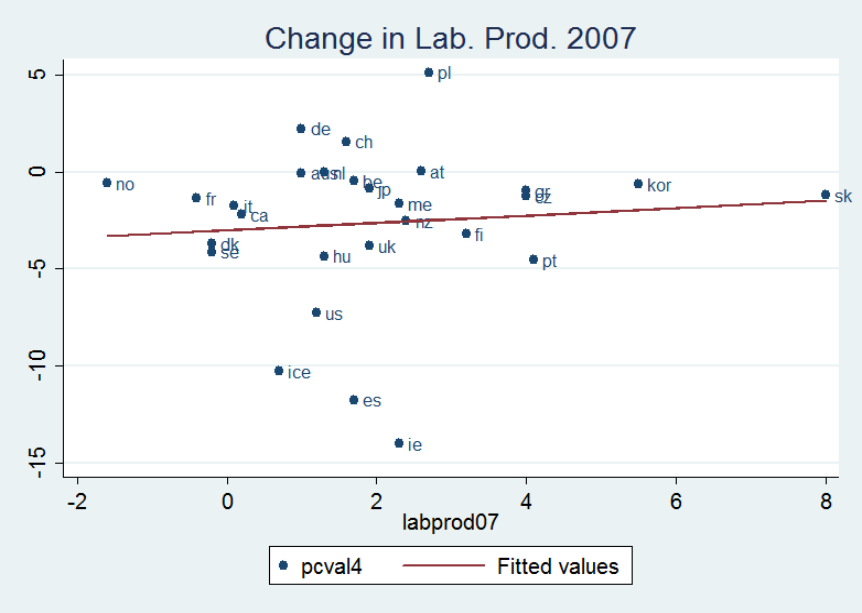
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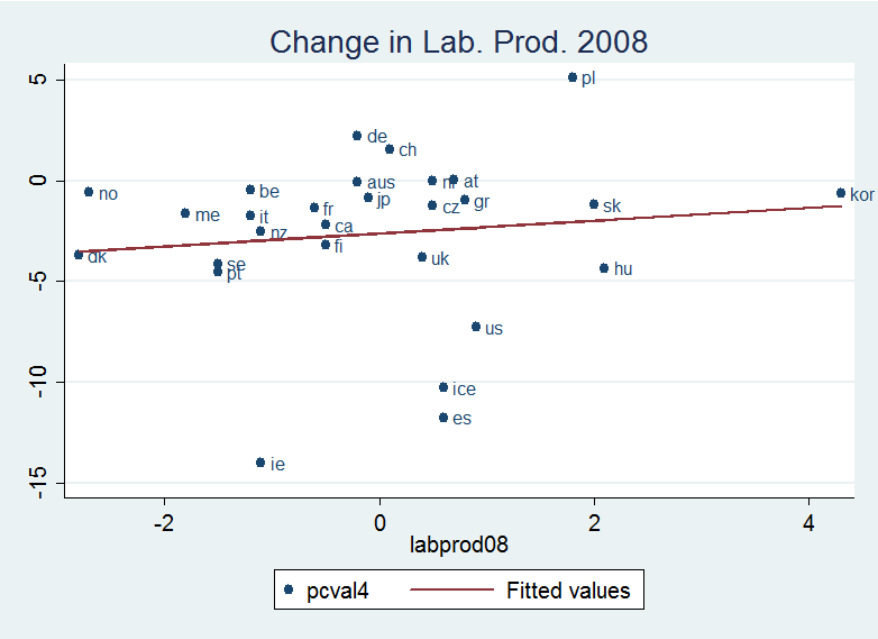
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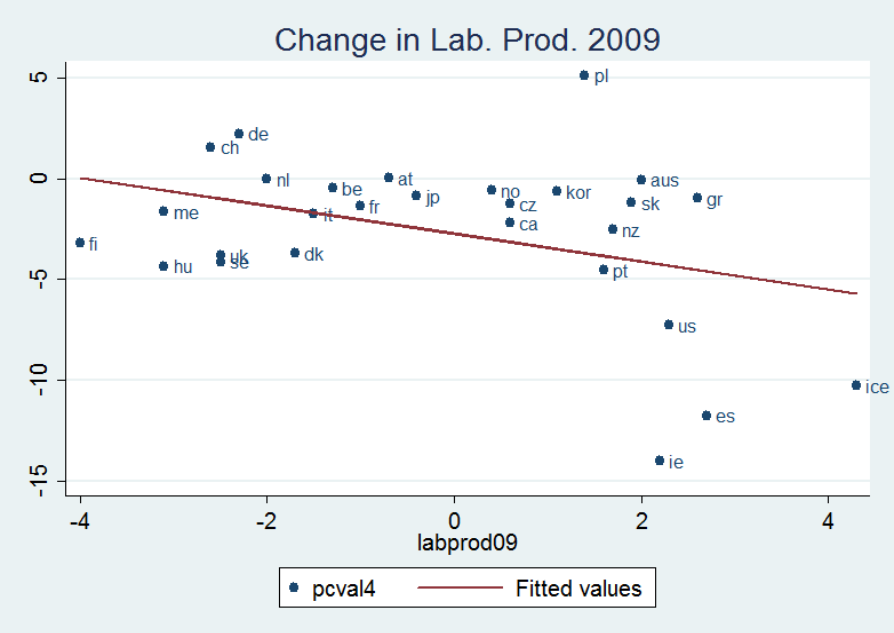
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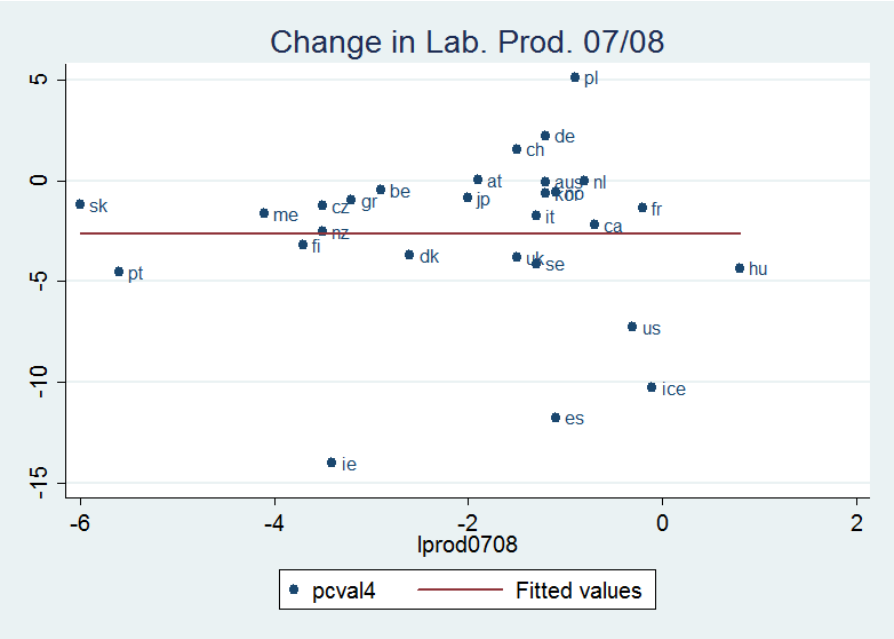
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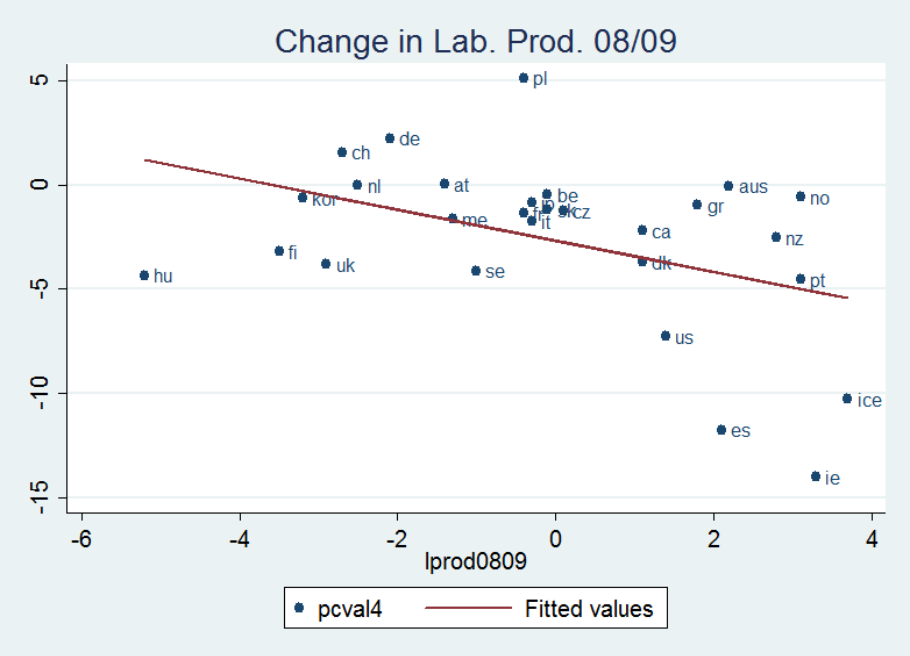
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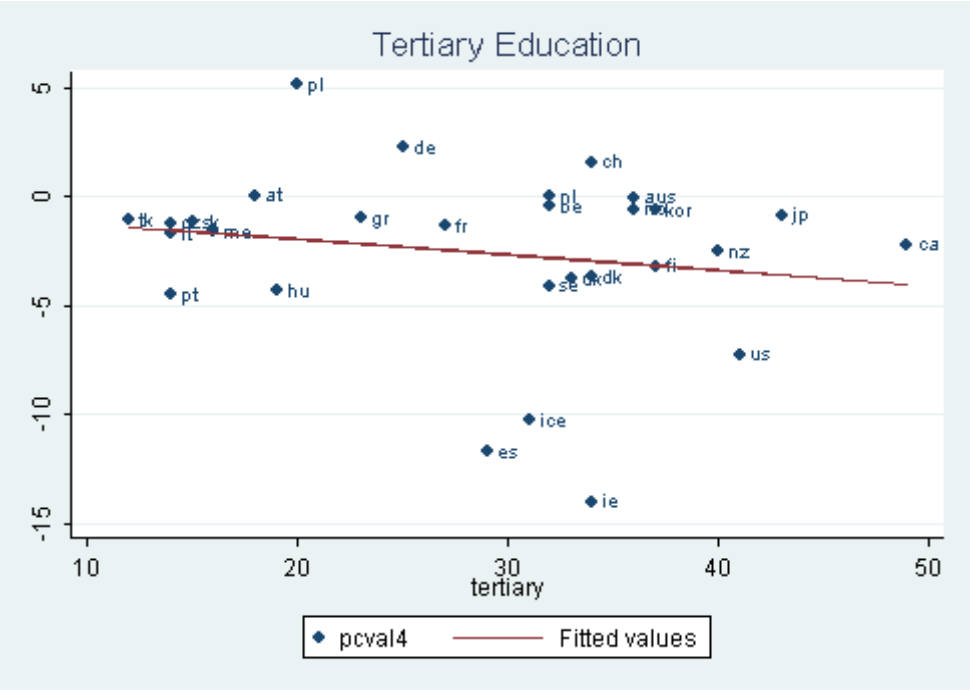
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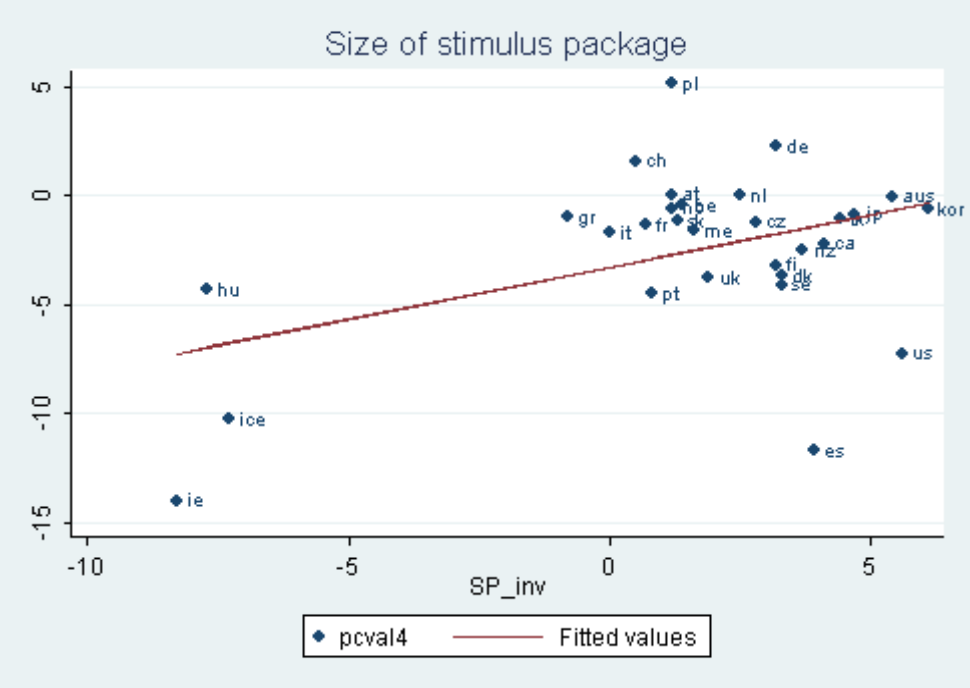
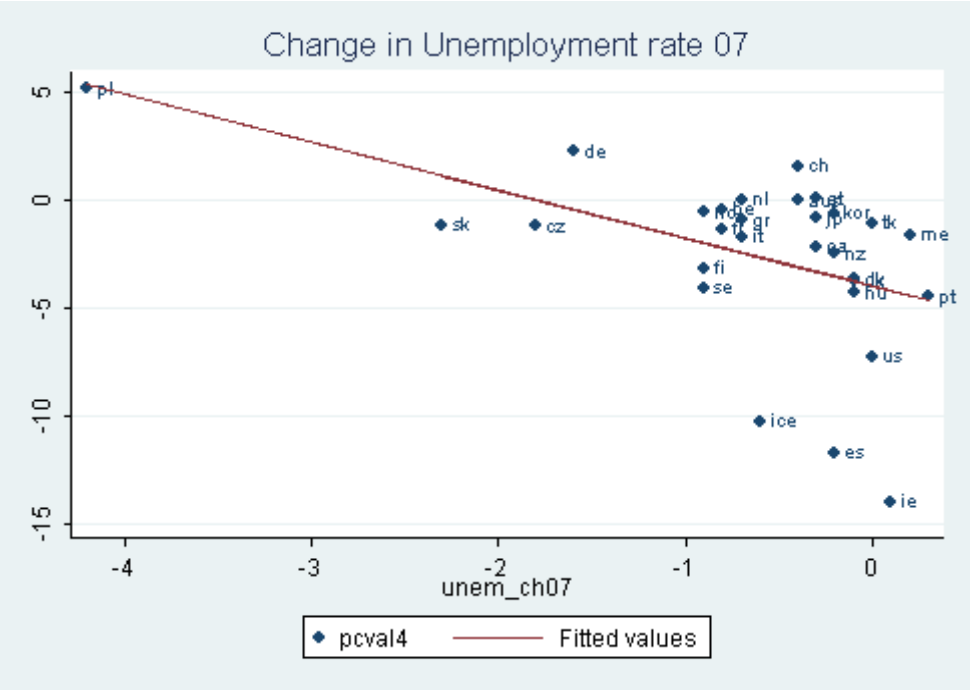
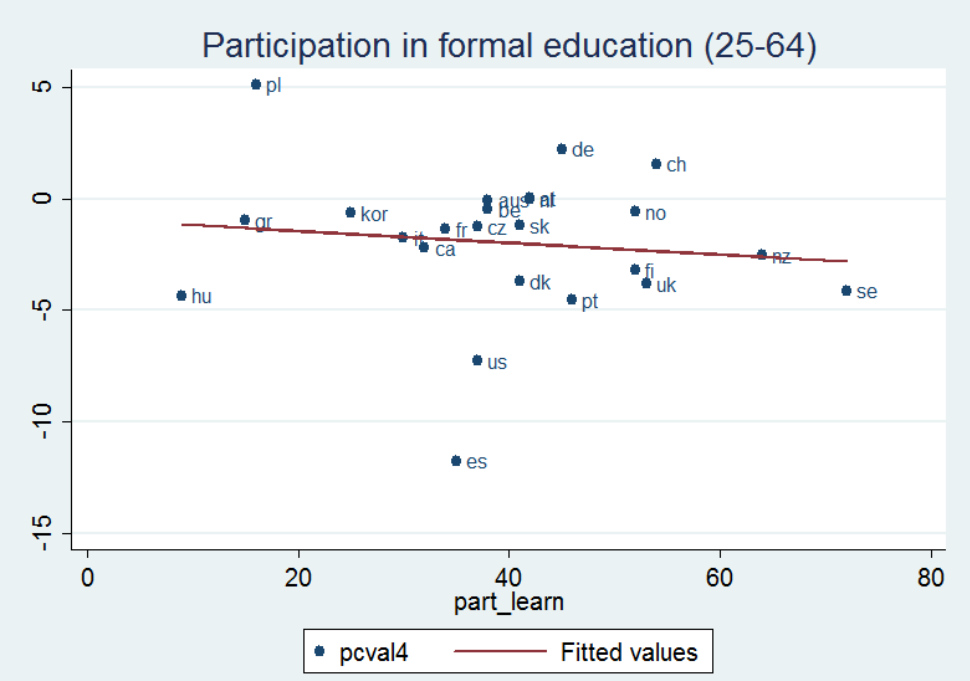
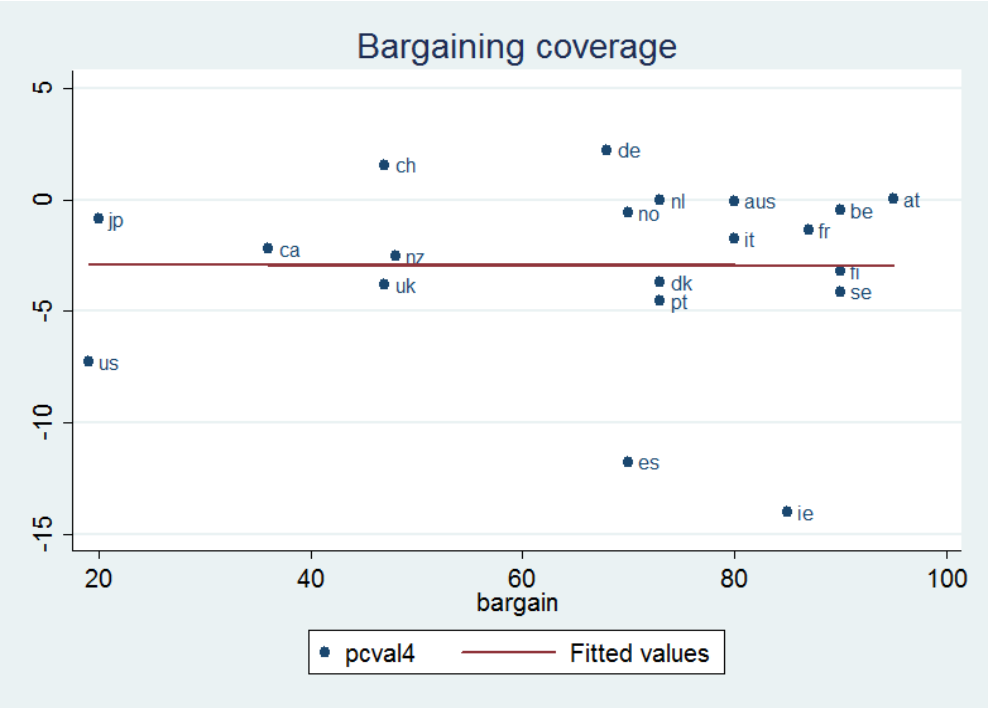
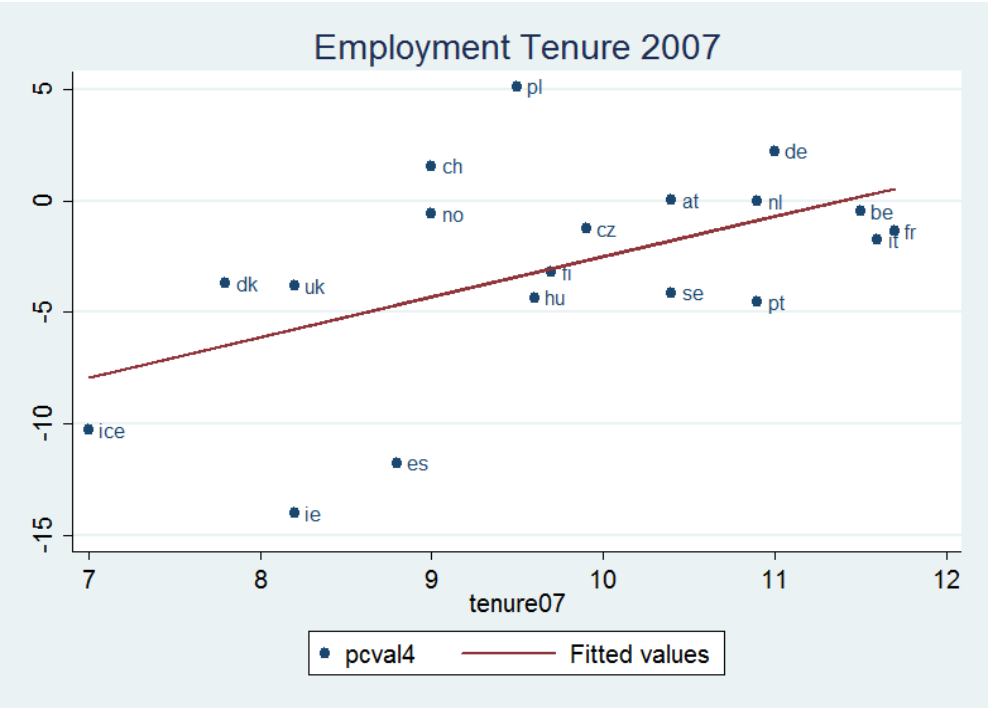

Size of stimulus package
pl
de
ch
nl
aus
kor
gr
it
fr
cz
jp
ca
nz
fi
uk
hu
pt
us
ice
es
ie
5
0
-5
-10
-15
-10
-5
0
5
SP_inv
pcval4
Fitted values


Change in Unemployment rate 07
5
0
-5
-10
-15
-4
-3
-2
-1
0
unem_ch07
pcval4
Fitted values
pl
de
ch
nl
sk
cz
gr
it
fi
se
kor
jp
tk
me
nz
dk
hu
pt
us
ice
es
ie


Participation in formal education (25-64)
5
0
-5
-10
-15
0
20
40
60
80
part_learn
pcval4
Fitted values
pl
de
ch
kor
gr
no
fr
cz
sk
ca
nz
fi
uk
hu
dk
pt
se
us
es


Bargaining coverage
5
0
-5
-10
-15
20
40
60
80
100
bargain
de
ch
nl
aus
at
no
be
jp
fr
ca
it
nz
fi
dk
uk
se
pt
us
es
ie
pcval4
Fitted values


Employment Tenure 2007
5
0
-5
-10
-15
7
8
9
10
11
12
tenure07
pl
de
ch
at
nl
no
be
cz
fr
it
fi
dk
uk
hu
se
pt
ice
es
ie
pcval4
Fitted values