



Effects of Labor Market Institutions on Business Cycle Synchronization

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OUTLINE



- Intro and interest
- Theoretical Assumptions and causal mechanism
- Research design
- Econometric model
- Results

INTRO AND MOTIVATION



- **What drives business cycle synchronization?**

I am interested in the link between similarity in labor market institutions (LMI hereafter) and business-cycle synchronization.

I study the impact of similarity in labor market institutions on GDP cross-country correlations.

- **The goal is to investigate the effects of labor market institutions on business cycle fluctuations.**

INTRO II



- International macroeconomic theory highlights the impact of LMI on cross-country correlations. How does similarity in labor market regulations affect business cycle comovement?
- I provide some of the most important findings next

THEORETICAL STANDPOINT



LMI holds an importance for business cycle dynamics for several reasons.

- Search and matching processes between employers and workers determine the dynamics of job and **worker flows over the business cycle**. (Andolfatto 1996, Merz, 1995)
- Stricter employment protection legislation makes firing more costly and its therefore expected to **dampen output volatility** (Calmfors 1998).
- **Shock absorber**: unions that internalize the macroeconomic consequences of their wage claims can reduce the impact of disturbances on the economy. (Clar, 2007)
- Unions in coordinated systems may ensure the appropriate degree of real wage flexibility to promote macroeconomic adjustment. (Clar, 2007)

THEORETICAL STANDPOINT



- Increase in firing costs decreases output volatility and increase the volatility of inflation. The reason is that firing costs make the adjustment of employment costlier than the adjustment of prices and so **output fluctuations are damped**. (Zanetti, 2006)
- Firing taxes have significant consequences on business cycle fluctuations. The largest effects are on aggregate employment, which becomes less variable and more persistent. (Veracierto, 2008)

THEORETICAL STANDPOINT. VOC



- **Scholarship on Varieties of Capitalism** (VoC) explores the ways in which the institutions structuring the political economy **affect patterns of economic performance** or policy making and the distribution of well-being (*Hall, 2009*). Framework puts emphasis on firms as actors and their need to resolve coordination problems in the political economy (*Kuokštis, 2015*).
- **Theory asks:** 1) what are the routes to efficient economic performance? 2) what are the most consequential institutional differences across the economies? 3) what effects follow from them?
- **Institution** - the rules influencing how the economy works and the incentives that motivate people (*Acemoglu, Robinson, 2012*).

THEORETICAL STANDPOINT. VOC AND LABOR MARKET



LME: decentralised, high labour mobility and flexibility.

CME: centralised, very low mobility, strong unions.

- Higher unemployment benefits mean that to be unemployed is a much of a stress to individuals, so that they are less likely to drastically decrease their wage bargain expectation (which feature into the inflation rate) when hit by a shock in unemployment.
- In booms firms which know they will be able to dismiss workers once the boom ends will be less reluctant to hire new employees right away.
- Tight labor market regulations become especially visible in a recession where firms might not be able to decrease employment as much as they would desire due to legislative constraints.

Varieties of Capitalism	
Liberal Market Economy	Coordinated Market Economy
Growth model	
Consumption-led	Export-led
Political system	
Majoritarian (single-party, Two-party)	Consensus (multi-party, coalition)
Welfare state	
Very weak	Very strong
Workers and firms unions	
Very limited	Many strong unions, associations
Aggregate demand management regime	
Lax budget and accommodating monetary policy	Conservative monetary and non accomodating fiscal policy
Firm coordination	
Through competitive markets as a response to price signals of supply and demand	Business association, trade unions, regulatory systems, strategic interaction
Industrial involvement	
Low-wage services and high-tech sectors engaged in radical product innovation	Incremental innovation in manufacturing and diversified quality production
Financial system	
High-medium deregulation	Strictly regulated
Education and vocation training	
Low investments, general skills required	High investments, industry specific skills

RESEARCH DESIGN: HYPOTHESIS



- **H1: Labour market institutions have a statistically significant impact on business cycle synchronization**
- **H2: Business cycle synchronization will be higher in liberal and coordinated market economies than on average in the EU**
- **H3: The EU integration together with monetary union had improved the BCS**

RESEARCH DESIGN: SAMPLE



Liberal market economy (10): Estonia, Ireland, Latvia, Lithuania, Slovenia, Bulgaria, Poland, Romania, Slovakia, UK.

Coordinated market economy (10): Austria, Belgium, Denmark, Finland, France, Germany, Hungary, Luxembourg, Netherlands, Sweden.

Time span (80 quarters): 1999Q1-2018Q4.

Three time periods: full, 1999Q1-2009Q4, 2010Q1-2018Q4.

RESEARCH DESIGN: BUSINESS CYCLE INDICATORS



- **Quarterly real GDP per capita**
- **Quarterly unemployment** (unemployed as a percentage of labour force)
- **Quarterly employment** (total full and part time employment in thousands)
- **Quarterly inflation** (measured using GDP deflator)
- All time series seasonally adjusted
- From OECD and Eurostat

BUSINESS CYCLE DETRENDED



- HP, BK, CF.
- Applying all three.
- Works as **checks for robustness**.
- In the literature common to filter out long/short frequency fluctuations and concentrate on fluctuations 2 to 6 years.
- Measurement error ☹️. May artificially increase the volatility of macro variables and reduce the power of analysis. But comparing alternative de-trending procedures should help to quantify the levels and importance of measurement error (*Gnocchi, Pappa, 2012*).

RESEARCH DESIGN: DATA



Dataset: Institutional characteristics of trade unions, wage setting, state intervention and social pacts (ICTWSS).

Compiled by: OECD, University of Amsterdam (Institute for advanced labour studies), J. Visser.

Contains: 234 variables organized in 11 groups for 55 countries (full EU included) from 1960 to 2018 (last version – 6.1, 2019 November).

Dataset: Employment protection database (till 2013 ☹)

Compiled by: OECD.

RESEARCH DESIGN: EXPLANATORY VARIABLES



I consider 7 labour market indicators:

- **The strictness of employment protection legislation** (the 21 items used to compile a synthetic indicator) Data range from 0 to 6 with higher scores representing stricter regulation.
- **Union density** (measured as the percentage of workers affiliated to a union)
- **Replacement rates** (It denotes the net replacement rate (NRR) as the ratio between net income while out of work and net income while in work. (Merkl, Schmitz, 2009)

RESEARCH DESIGN: EXPLANATORY VARIABLES



- **Wage setting, bargaining: 1)** degree of coordination in the bargaining process on both sides, 0-5 scale; **2)** the degree of bargaining centralization, 0-5 scale (firm level, industry level, nation wide); **3)** the role of the government in wage bargaining, 0-5 scale.
- **Tax wedge** (The average tax wedge measures the extent to which tax on labour income discourages employment. This indicator is measured in percentage of labour cost)

LABOR MARKET INSTITUTIONS. A RATIONAL



- I have chosen these indicators since they account for rigidities that can affect both quantities and price adjustments. The variable strictness of employment protection legislation is regarded as the most important determinant and driver of job creation, destruction and labour market adjustments (*Fonseca, Patureau, Sopraseuth, 2007*).
- Coordination is defined as “the degree to which minor players deliberately follow along with what major players decide” (Kenworthy 2001a:75) and has been widely used as an indicator to assess wage bargaining behaviour and explain wage developments (Soskice 1990; Nickell 1997; OECD 1997, 2004; Traxler and Brandl 2012).
- Stricter employment protection legislation by making it more costly to fire workers induces firms to absorb shocks through price changes. (Abbritti, Weber, 2018).

CONTROLS



Krzysztof Beck (2019) investigates 43 potential determinants of BCS and finds that these are the robust ones:

- **Similarity of production and economic structures.**
- **Bilateral trade.**
- **Capital and labour market mobility.**
- **Fiscal policy similarity and financial openness**

Thus, I select these variables as controlling ones.

PROXY FOR CONTROLS



- **Economic structure: industrial similarity** as bilateral sectoral specialization (calculated as the share of sector X in total GDP) (proposed by Krugman)
- **Trade intensity** by export/import of global trade (Frankel and Rose, 1998).

$$wt_{ijt} = (X_{ijt} + M_{ijt}) / (X_{i,t} + X_{j,t} + M_{i,t} + M_{j,t})$$

- **Fiscal divergence:** cross-country difference in the general government budget surplus or deficit, measured as the percentage of national GDP.
- **Eurozone:** dummy variable, depending on when country joined.

MODEL



$$y_{it} = \alpha + \beta' LMI_{it} + \gamma' X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

y_{it} – deviation from the filter trend of variable x

LMI – vector of labor market indicators

X – vector of control variables

μ_i – country fixed effects

λ_t – time fixed effects

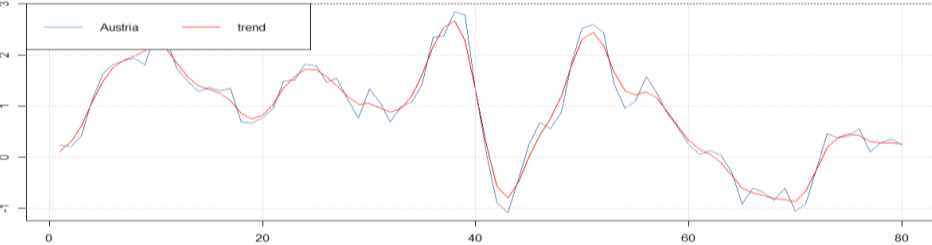
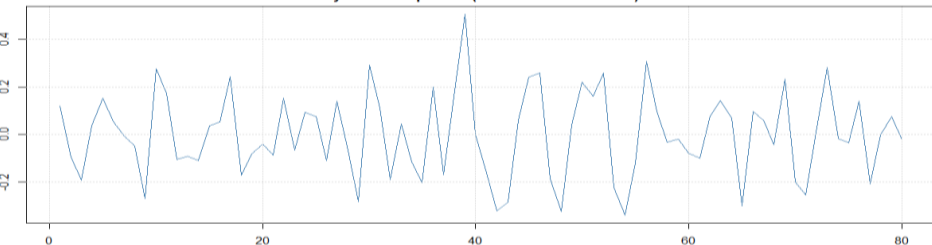
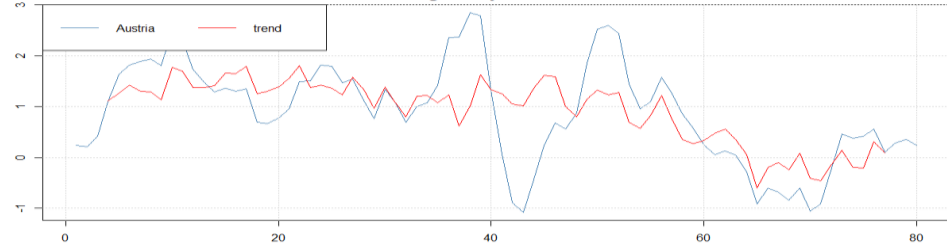
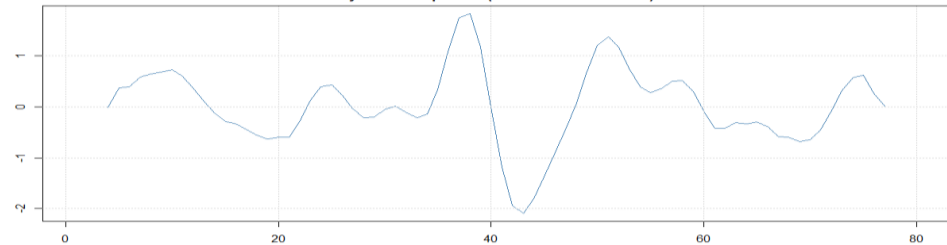
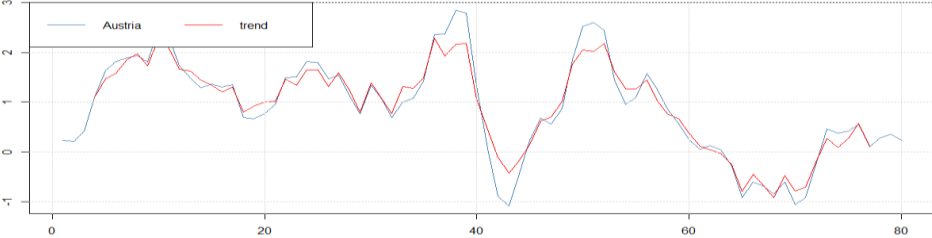
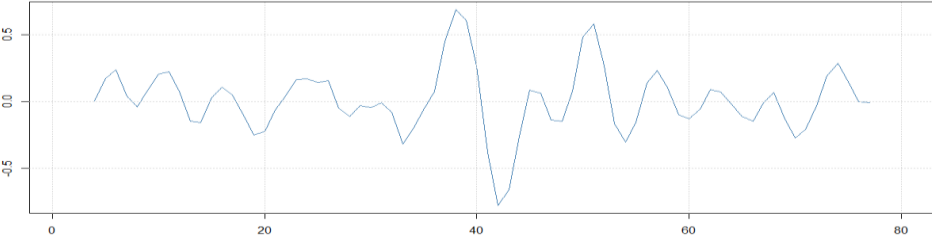
Descriptive Statistics Over the Period

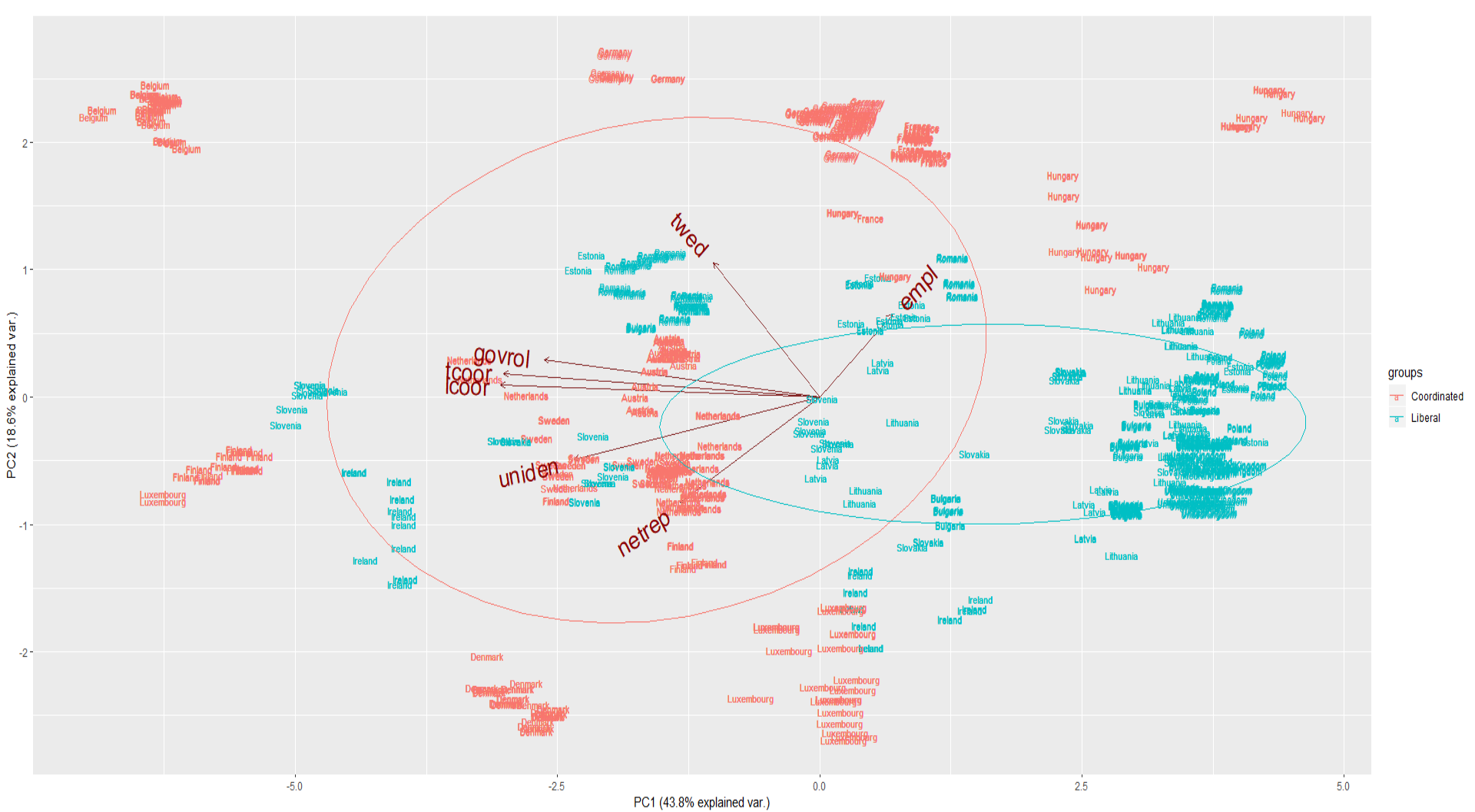
Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
tcoor	2,240	1.871	1.688	0	0	3	6
rgdpc	2,240	30,293.410	16,273.930	5,456.639	19,783.850	37,727.480	117,112.300
empleg	1,680	2.384	0.561	1.095	2.135	2.679	4.583
finop	2,240	1.822	0.966	-1.210	1.578	2.347	2.347
fisc	2,240	-2.457	3.499	-32.100	-4.125	-0.200	6.900
govrol	2,240	2.029	1.129	1	1	3	5
lcoor	2,240	2.409	1.306	1	1	4	5
netrep	2,240	66.950	15.125	18	57	76	136
twed	2,240	41.809	5.781	28.078	38.258	45.464	57.104
unem	2,240	8.857	4.363	2	5.8	10.6	28
uniden	2,240	30.743	19.296	4.254	16.783	38.393	89.837
empl	2,240	8,018.665	10,385.250	144.330	1,491.427	8,809.775	45,244.000
infl	2,240	2.713	3.891	-3.867	1.058	3.333	53.767
euro	2,240	0.534	0.499	0	0	1	1

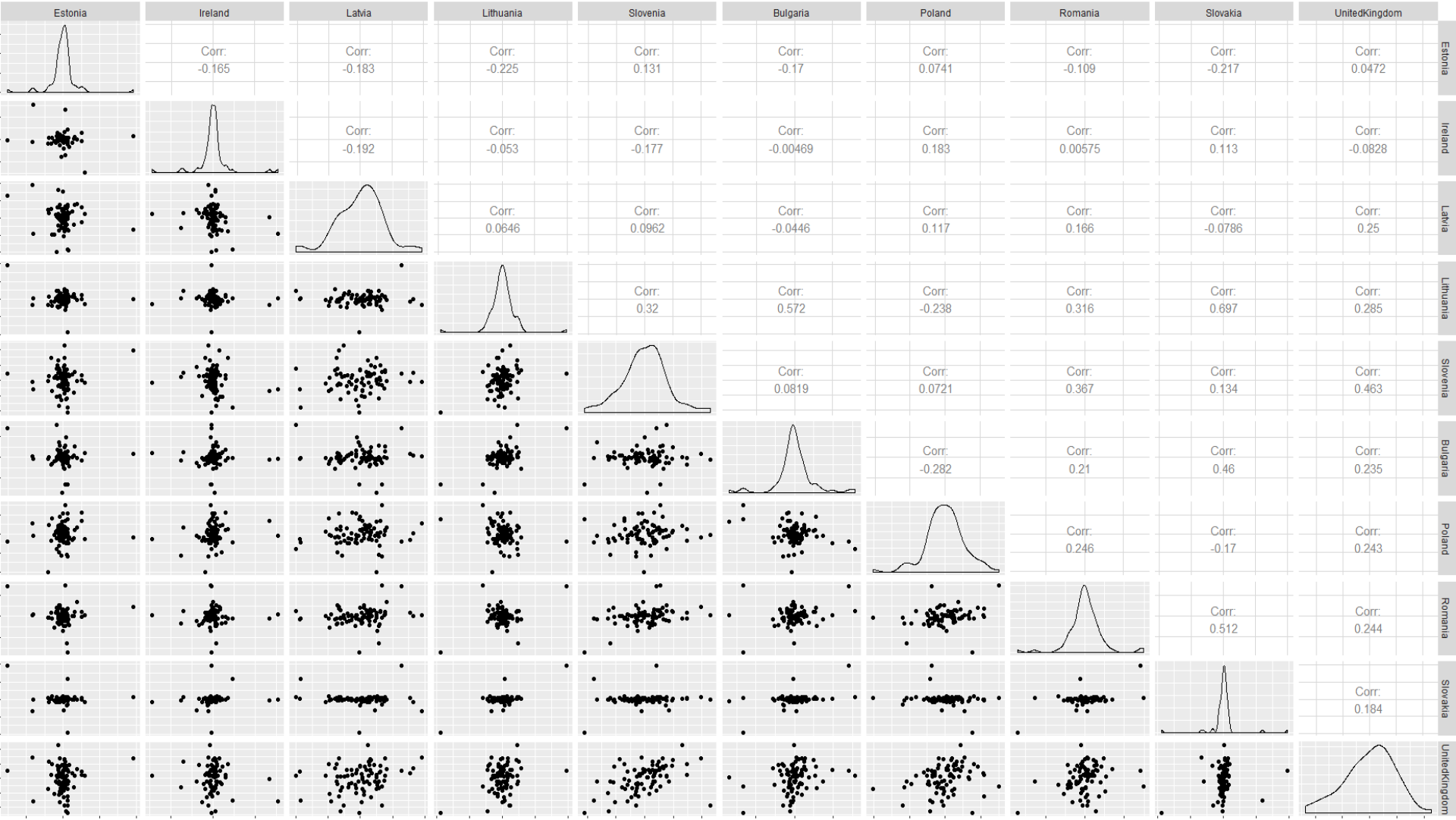
RESULTS



- **Principal component analysis**
- **Correlation coefficient means. Three filters, 4 BC variables, three periods.**
- **Impulse - response**
- **OLS**
- **Stepwise OLS**
- **Fixed country/time effects**

Hodrick-Prescott Filter of Austria**Cyclical component (deviations from trend)****Christiano-Fitzgerald Symmetric Filter of Austria****Cyclical component (deviations from trend)****Baxter-King Filter of Austria****Cyclical component (deviations from trend)**





**Real GDP per Capita. Mean of Correlation Matrix's (Hodrick-
Prescott)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.290	0.303	0.399

**Real GDP per Capita. Mean of Correlation Matrix's (Baxter-
King)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.582	0.625	0.687

**Real GDP per Capita. Mean of Correlation Matrix's
(Christiano-Fitzgerald)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.578	0.660	0.683

Real GDP per Capita. Mean of Correlation Matrix's 1999Q1-2009Q4 (Hodrick-Prescott)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.312	0.232	0.504

Real GDP per Capita. Mean of Correlation Matrix's 2010Q1-2018Q4 (Hodrick-Prescott)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.278	0.344	0.338

Real GDP per Capita. Mean of Correlation Matrix's 1999Q1-2009Q4 (Baxter-King)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.491	0.557	0.606

Real GDP per Capita. Mean of Correlation Matrix's 2010Q1-2018Q4 (Baxter-King)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.361	0.477	0.533

Real GDP per Capita. Mean of Correlation Matrix's 1999Q1-2009Q4 (Christiano-Fitzgerald)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.446	0.387	0.610

Real GDP per Capita. Mean of Correlation Matrix's 2010Q1-2018Q4 (Christiano-Fitzgerald)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.446	0.534	0.547

**Unemployment level. Mean of Correlation Matrix's (Hodrick-
Prescott)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.118	0.155	0.174

**Unemployment level. Mean of Correlation Matrix's (Baxter-
King)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.438	0.547	0.466

**Unemployment level. Mean of Correlation Matrix's
(Christiano-Fitzgerald)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.389	0.391	0.473

Unemployment level. Mean of Correlation Matrix's 1999Q1-2009Q4 (Hodrick-Prescott)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.104	0.159	0.150

Unemployment level. Mean of Correlation Matrix's 2010Q1-2018Q4 (Hodrick-Prescott)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.097	0.123	0.170

Unemployment level. Mean of Correlation Matrix's 1999Q1-2009Q4 (Baxter-King)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.194	0.216	0.346

Unemployment level. Mean of Correlation Matrix's 2010Q1-2018Q4 (Baxter-King)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.254	0.331	0.436

Unemployment level. Mean of Correlation Matrix's 1999Q1-2009Q4 (Christiano-Fitzgerald)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.215	0.221	0.359

Unemployment level. Mean of Correlation Matrix's 2010Q1-2018Q4 (Christiano-Fitzgerald)

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.371	0.379	0.445

**Employment level. Mean of Correlation Matrix's (Hodrick-
Prescott)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.604	0.634	0.599

**Employment level. Mean of Correlation Matrix's (Baxter-
King)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.422	0.554	0.608

**Employment level. Mean of Correlation Matrix's (Christiano-
Fitzgerald)**

EU_20	Liberal_Market_Economy	Coordinated_Market_Economy
0.333	0.343	0.380

Employment level. Mean of Correlation Matrix's 1999Q1-2009Q4 (Hodrick-Prescott)

EU_20 Liberal_Market_Economy	Coordinated_Market_Economy	
0.628	0.654	0.616

Employment level. Mean of Correlation Matrix's 2010Q1-2018Q4 (Hodrick-Prescott)

EU_20 Liberal_Market_Economy	Coordinated_Market_Economy	
0.601	0.631	0.600

Employment level. Mean of Correlation Matrix's 1999Q1-2009Q4 (Baxter-King)

EU_20 Liberal_Market_Economy	Coordinated_Market_Economy	
0.206	0.201	0.519

Employment level. Mean of Correlation Matrix's 2010Q1-2018Q4 (Baxter-King)

EU_20 Liberal_Market_Economy	Coordinated_Market_Economy	
0.252	0.266	0.618

Employment level. Mean of Correlation Matrix's 1999Q1-2009Q4 (Christiano-Fitzgerald)

EU_20 Liberal_Market_Economy	Coordinated_Market_Economy	
0.158	0.156	0.225

Employment level. Mean of Correlation Matrix's 2010Q1-2018Q4 (Christiano-Fitzgerald)

EU_20 Liberal_Market_Economy	Coordinated_Market_Economy	
0.280	0.293	0.378

SO,



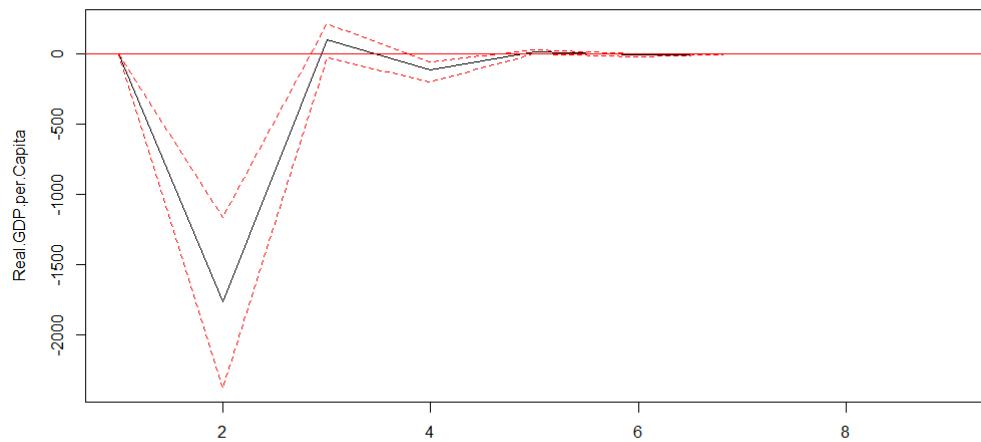
- LME and CME have higher correlation coefficients than the average of the EU in all 4 BC variables. Meaning higher synchronization level if I hold correlation as proxy for synchronization.
- CME have higher synchronization levels compared to other two
- Filter type has a significant impact on the correlation output also depending on the variable type
- The claim that BCS increased over time because of EU integration does not hold as in some

IMPULSE-RESPONSE FUNCTIONS

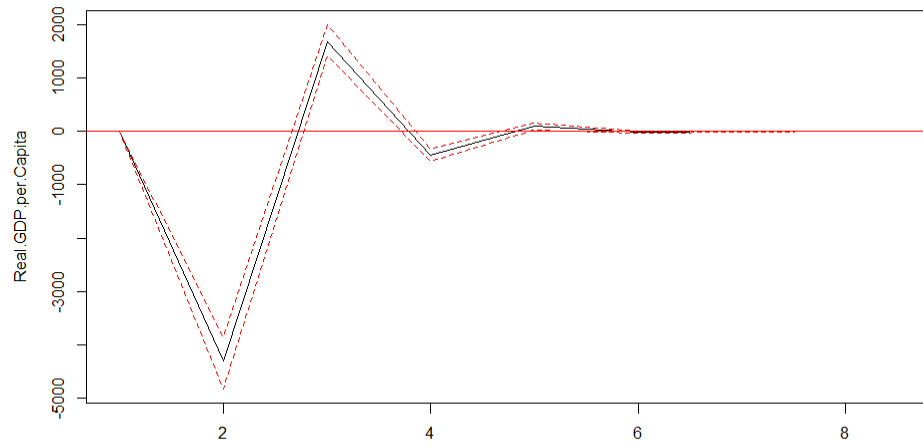


- Shows how different explanatory variables affect the volatility of key macroeconomic variables
- Shown effect of one standard deviation shock
- Effect on 8 time periods – 8 quarters

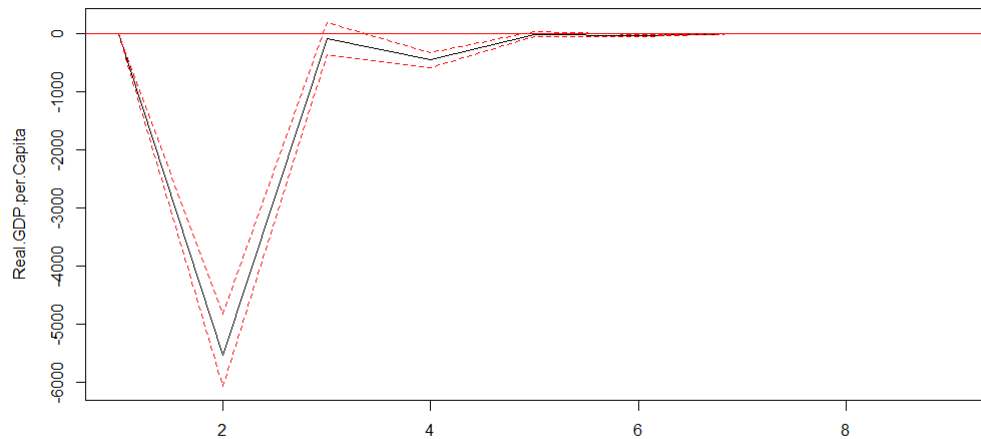
Orthogonal Impulse Response from Net.Replacement.Rate



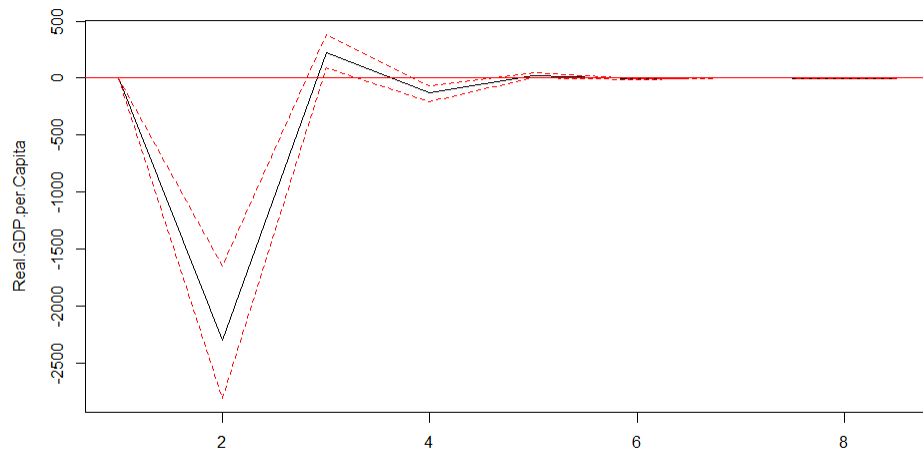
Orthogonal Impulse Response from Tax.Wedge



Orthogonal Impulse Response from Government.Role.in.Coordination



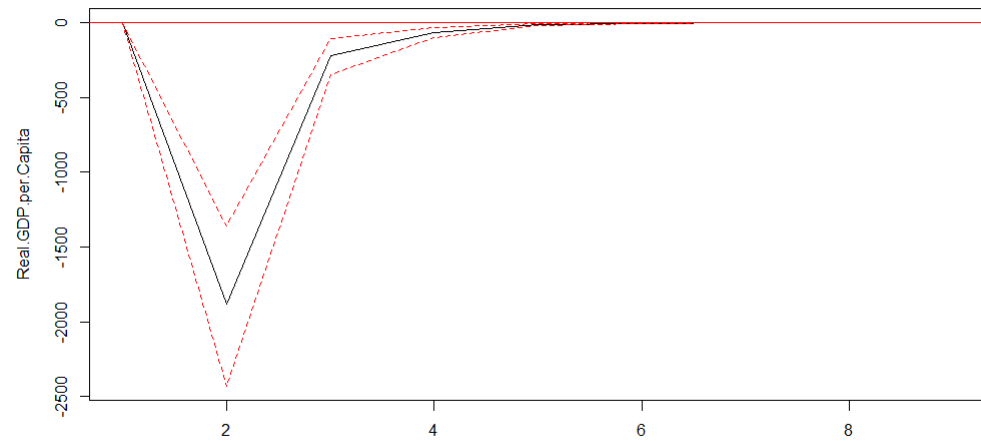
Orthogonal Impulse Response from Employment.Legislation.Strictness



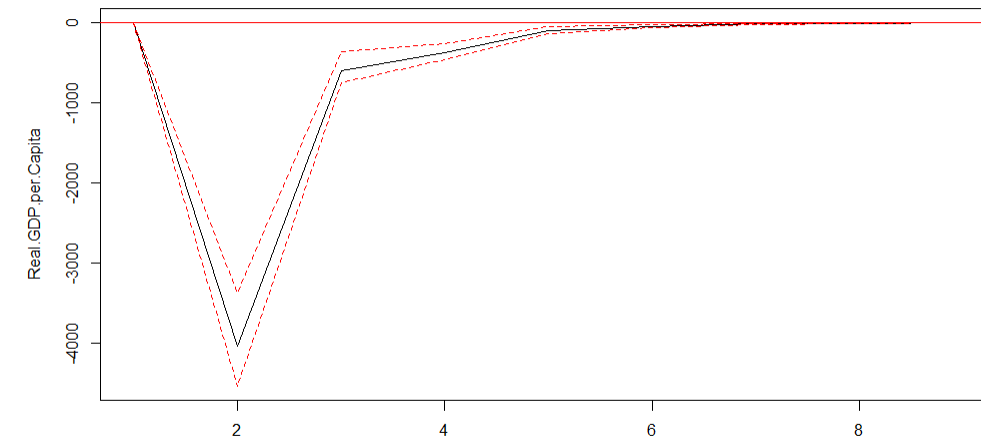
95 % Bootstrap CI, 100 runs

95 % Bootstrap CI, 100 runs

Orthogonal Impulse Response from Union.Density



Orthogonal Impulse Response from Degree.of.Coordination



95 % Bootstrap CI, 100 runs

Effects of Labor Market Institutions on Business Cycle Synchronization

Dependent Variable: Cross-Country Real GDP per Capita Correlations (Hodrick-Prescott)

OLS

	(1)	(2)	(3)	(4)
Diff in tax wedge	0.041 ^{***} (0.010)	0.050 ^{***} (0.010)	0.051 ^{***} (0.010)	0.051 ^{***} (0.010)
Diff in degree of coordination	0.095 [*] (0.056)	0.075 (0.055)	0.068 (0.054)	0.080 (0.054)
Diff in net replacement rate	-0.020 ^{***} (0.004)	-0.018 ^{***} (0.004)	-0.017 ^{***} (0.004)	-0.013 ^{***} (0.004)
Diff in union density	-0.011 ^{***} (0.003)	-0.019 ^{***} (0.003)	-0.016 ^{***} (0.003)	-0.020 ^{***} (0.003)
Diff in government role in coordination	-0.301 ^{***} (0.065)	-0.374 ^{***} (0.064)	-0.452 ^{***} (0.063)	-0.408 ^{***} (0.064)
Diff in level of coordination	-0.456 ^{***} (0.078)	-0.227 ^{***} (0.079)	-0.135 [*] (0.079)	-0.083 (0.079)
Diff in financial openness		-0.590 ^{***} (0.058)	-0.582 ^{***} (0.057)	-0.541 ^{***} (0.058)
Diff in fiscal deficit			-0.131 ^{***} (0.015)	-0.133 ^{***} (0.015)
Euro				-0.550 ^{***} (0.120)
Constant	1.519 ^{***} (0.497)	1.932 ^{***} (0.487)	1.325 ^{***} (0.485)	1.198 ^{**} (0.483)
R ²	0.130	0.168	0.196	0.203
Adjusted R ²	0.128	0.166	0.193	0.200
F Statistic	55.825 ^{***} (df= 6; 2233) 64.595 ^{***} (df= 7; 2232) 67.840 ^{***} (df= 8; 2231) 63.161 ^{***} (df= 9; 2230)			

Notes: ^{***} Significant at the 1 percent level.

^{**} Significant at the 5 percent level.

^{*} Significant at the 10 percent level.

Standard Errors in Parenthesis.

Effects of Labor Market Institutions on Business Cycle Synchronization

Dependent Variable: Cross-Country Real GDP per Capita Correlations (Hodrick-Prescott)

	<i>OLS</i>			<i>panel linear</i>	<i>OLS</i>	
	(1)	(2)	(3)	(4)	(5)	
Diff in tax wedge	0.041 ^{***} (0.010)	0.050 ^{***} (0.010)	0.051 ^{***} (0.010)	0.051 ^{***} (0.010)	0.053 ^{***} (0.010)	0.048 ^{***} (0.009)
Diff in degree of coordination	0.095 [*] (0.056)	0.075 (0.055)	0.068 (0.054)	0.080 (0.054)	0.081 (0.057)	
Diff in net replacement rate	-0.020 ^{***} (0.004)	-0.018 ^{***} (0.004)	-0.017 ^{***} (0.004)	-0.013 ^{***} (0.004)	-0.011 ^{***} (0.004)	-0.014 ^{***} (0.004)
Diff in union density	-0.011 ^{***} (0.003)	-0.019 ^{***} (0.003)	-0.016 ^{***} (0.003)	-0.020 ^{***} (0.003)	-0.019 ^{***} (0.003)	-0.020 ^{***} (0.003)
Diff in government role in coordination	-0.301 ^{***} (0.065)	-0.374 ^{***} (0.064)	-0.452 ^{***} (0.063)	-0.408 ^{***} (0.064)	-0.397 ^{***} (0.065)	-0.376 ^{***} (0.052)
Diff in level of coordination	-0.456 ^{***} (0.078)	-0.227 ^{***} (0.079)	-0.135 [*] (0.079)	-0.083 (0.079)	-0.061 (0.081)	
Diff in financial openness		-0.590 ^{***} (0.058)	-0.582 ^{***} (0.057)	-0.541 ^{***} (0.058)	-0.590 ^{***} (0.063)	-0.548 ^{***} (0.055)
Diff in fiscal deficit			-0.131 ^{***} (0.015)	-0.133 ^{***} (0.015)	-0.159 ^{***} (0.018)	-0.133 ^{***} (0.015)
Euro				-0.550 ^{***} (0.120)	-0.605 ^{***} (0.124)	-0.546 ^{***} (0.117)
Constant	1.519 ^{***} (0.497)	1.932 ^{***} (0.487)	1.325 ^{***} (0.485)	1.198 ^{**} (0.483)		1.281 ^{***} (0.464)
R ²	0.130	0.168	0.196	0.203	0.210	0.202
Adjusted R ²	0.128	0.166	0.193	0.200	0.197	0.200
F Statistic	55.825 ^{***} (df = 6; 2233) 64.595 ^{***} (df = 7; 2232) 67.840 ^{***} (df = 8; 2231) 63.161 ^{***} (df = 9; 2230) 64.908 ^{***} (df = 9; 2203) 80.880 ^{***} (df = 7; 2232)					

Notes:

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Standard Errors in Parenthesis.