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Abstract

We investigate the degree of (a)symmetry of macroeconomic fluctuations within the euro area (EA). Our findings indicate, first, a high degree of co-movement of cyclical GDP across EA member states. However, the amplitudes of national business cycles appear to vary notably, meaning that booms and recessions differ with regard to their severity across EA member states. Second, the co-movement of cyclical unemployment is somewhat less pronounced than that of cyclical GDP and the sensitivity to common shocks is even more heterogeneous, suggesting that differences in labour market conditions play an important role with regard to the vulnerability to common shocks. Turning to potential stabilization mechanisms, we find that in general, the private sector has a huge potential to absorb asymmetric shocks. However, in international comparison, the shock-absorption capacity of the private sector in the EA is rather weak. Recent evidence suggests that promoting capital market integration may improve the private sector's shock absorption capacity.

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1 Introduction

The sovereign debt crisis has sparked a debate on the design of the European Economic and Monetary Union (EMU). On the one hand, there is the view that the eurozone needs stronger elements of fiscal risk-sharing and enhanced fiscal integration. Proponents of this view argue that common fiscal stabilization mechanisms are necessary to make the EMU more resilient against asymmetric macroeconomic shocks. Such fiscal stabilization mechanisms would lead to transfer payments from countries in a boom to those experiencing a recession and could thus dampen the adverse effects of a recession.[1]

On the other hand, critics of this view point to potentially undesirable consequences of fiscal stabilization mechanisms. First, if national cycles are highly synchronized so that symmetric shocks prevail, there is the risk that such stabilization mechanisms will inevitably lead to pro-cyclical transfers.[2] Second, transfers could easily become permanent if shocks become persistent. Persistent shocks, though, require structural adjustments and measures that increase flexibility, for example price and wage adjustments. A system of fiscal transfers could be detrimental to the successful implementation of structural reforms due to negative incentive effects.

Against this background, the first part of this paper examines the degree of (a)symmetry of macroeconomic shocks within the euro area. Our analysis sheds light on the question whether national business cycles are synchronized, i.e., whether booms and recessions tend to occur at the same time. Moreover, we investigate to what degree the magnitude of shocks differs across countries. We focus on the cyclical components of GDP and unemployment, two indicators that

[1] See for example the 'Five Presidents Report' (Juncker, 2015) and the 'Reflection Paper on the deepening of the Economic and Monetary Union' (European Commission, 2017). A fiscal risk-sharing scheme in the form of a common unemployment insurance scheme in the euro area has been proposed, among others, by Andor (2014) and the Italian ministry of finance (MEF, 2016).

[2] Dolls et al. (2017) show that in 2008/2009 when the whole eurozone was hit by a shock, a common unemployment insurance scheme for the euro area would have led to transfers from countries experiencing a relatively mild recession to those suffering from a more severe recession. In normal times, national automatic stabilizers are able to dampen macroeconomic fluctuations. They are found to be more effective in Europe compared to the US (Dolls et al., 2012).

have been proposed as triggers for fiscal transfer payments.[3] In the second part of the paper, we discuss to what extent macroeconomic shocks can be smoothed by private markets, for example through capital market integration.

Our main results are as follows. We find a high degree of co-movement of cyclical GDP and, albeit somewhat lower, cyclical unemployment across euro area (EA) member states. However, we do find some asymmetries in the amplitudes of national business cycles, both in terms of GDP and unemployment. Turning to the importance of different stabilization channels, we find that a much larger fraction of GDP shocks remains unsmoothed in the eurozone compared to the US. An important explanation for this result is the weaker shock absorption capacity of capital markets in the euro area which suggests that enhanced market risk sharing through capital market intregration could substantially improve the smoothing of asymmetric shocks.

2 Business Cycle Synchronisation in the Eurozone

2.1 Data and Empirical Framework

We focus on two main indicators to assess the degree of symmetry between the business cycles of the euro area countries: Gross domestic product (GDP) and the unemployment rate. Both time series are driven by an underlying long-run trend or a structural component, respectively (i.e. the 'natural' level of GDP and unemployment), as well as a business cycle component (i.e. the output and unemployment gap). We employ the Baxter-King filter (Baxter and King, 1999) to extract the cyclical components of GDP and unemployment.[4]

Our sample covers 17 EA member states. Malta and Cyprus are excluded from our analysis because GDP and unemployment data are not available for a sufficiently long time period. In the subsequent empirical analysis, we divide these 17 countries into 3 subgroups: the core EA countries, that is, Austria, Belgium,

[3] Cf. Beblavý et al. (2015); Brandolini et al. (2016); Enderlein et al. (2013).

[4] See the Appendix for more details.

Germany, Finland, France, Luxembourg and the Netherlands; the peripheral EA countries, that is, Greece, Ireland, Italy, Spain and Portugal; and the new EA countries, that is, Estonia, Latvia, Lithuania, Slovakia and Slovenia. In general, our data covers the time period from 1991 to 2017. However, for some countries, in particular for newer EA member states, data is only available for more recent years. Moreover, as filtering techniques are typically not able to well separate trend and cycle components in the first and final periods of a time series, the actual analysis encompasses the years 1994 to 2014. To ensure comparability, we use harmonized unemployment rates and PPP-adjusted real GDP figures in our analysis. GDP data are in logs and at quarterly frequency and unemployment data at monthly frequency.[5] All time series are seasonally adjusted. Our data are primarily taken from the OECD Economic Outlook.[6]

In the empirical analysis, we compare the business cycles of the EA member states to the aggregate business cycle of the EA-12 countries. Our aggregate business cycle measure consists of the cyclical components of overall GDP, or of weighted unemployment rates, across the 12 countries that had adopted the euro by 2002. When evaluating the degree of (a)symmetry between national cycles and the EA-12 cycle, the country under investigation is removed when computing the aggregate in case it belongs to the EA-12. That way, we rule out that the degree of business cycle symmetry is overestimated.[7]

In the subsequent empirical analysis, we proceed in two steps. First, we assess the degree of (a)symmetry between the national business cycles and the EA-12 cycle by computing correlation coefficients for the pre-Euro, pre-crisis and post-crisis period. In addition, we graphically illustrate how the correlations have evolved over time. To facilitate the interpretation of our findings, we then compare the eurozone countries to other European countries that have not adopted the euro so far as well as to the US states.[8] The latter serve as a benchmark given that the US

[5]Our results are robust with regard to the choice of monthly or quarterly unemployment data.

[6]GDP data for Latvia is taken from the Latvian Central Statistics Bureau. Unemployment data for Lithuania stems from Eurostat.

[7]Member states with a large weight in the EA-12 aggregate might substantially drive the euro area cycle which would lead to an upward bias in the reported correlations. Results do not change much, however, when we do not exclude the respective member state from the aggregate.

[8]GDP and unemployment data for US states come from the Bureau of Economic Analysis

is considered to be a much more integrated currency union (Bordo et al., 2013). In a second step, we assess how the magnitudes of national business cycles compare to the aggregate cycle within the EA-12. To this end, the countries' cyclical components of GDP and unemployment are regressed on the aggregate EA-12 GDP and unemployment gap.

2.2 Correlation Between National Business Cycles and the EA-12 Cycle

To begin with, we focus on the degree of (a)symmetry of output cycles across the EA member states. Figure 2 of the Appendix illustrates the development of cyclical GDP for each EA member state separately along with the cyclical component of EA-12 GDP. The graphical evidence suggests that in most countries, the national cycle closely follows the EA-12 cycle. This is confirmed by the correlation coefficients presented in Table 1. Here, we divide our sample period into three sub-periods; the first sub-period comprises the years before the introduction of the euro (1994-1998), the second one the early phase of the euro (1999-2007), and the third one the years since the outbreak of the global financial and economic crisis (2008-2014). We additionally cover all years since the introduction of the euro (1999-2014; last column of Table 1).

Our results indicate that in general, the degree of symmetry between national output cycles across the EA member states must be considered large. With a correlation coefficient of 0.913, cyclical GDP in the group of core EA countries has been highly synchronized with the EA-12 aggregate ever since the introduction of the euro. Strikingly, the degree of output cycle synchronisation across the core countries is much larger than in the US (correlation coefficient 0.659).[9] In the peripheral countries, the degree of synchronisation between national cycles and the EA-aggregate was only a little smaller in the early phase of the euro (correlation coefficient 0.807), but has declined in the crisis-period (0.595) when it became even lower than that of the new (0.793) and non-EA member states (0.854). However,

and the Bureau of Labor Statistics.

[9]Unfortunately, quarterly real GDP data for the US states is only available for more recent years, which is why we cannot compute correlation coefficients for earlier periods.

even during the crisis period, the degree of symmetry between the output cycles of the peripheral countries and the EA-12 are reasonably close to the US benchmark. Italy and Greece stand out in the group of peripheral member states. While Italy's business cycle has been highly synchronized with the EA-12 cycle ever since the introduction of the euro, Greece's cyclical GDP has completely decoupled from the aggregate in recent years.

In contrast to the peripheral countries, business cycles in Eastern European and Baltic member states have – on average – continued to converge to the EA-12 cycle also during the crisis period. A similar picture emerges for the non-EA countries in our sample which, with the exception of Norway, are all highly synchronized with the eurozone.[10] These results are in line with findings by Belke et al. (2016) and De Grauwe and Ji (2016).

Next, we turn to the question to what extent cyclical unemployment follows a common cycle in the euro area. Figure 3 of the Appendix provides graphical evidence on the co-movement of national cyclical unemployment in EA member states and the aggregate cyclical unemployment in the EA-12. The figure suggests that there is substantial co-movement also in cyclical unemployment rates which is confirmed by the correlation coefficients presented in Table 2. The correlation between cyclical unemployment in the core and the peripheral countries on the one hand and the EA-12 on the other hand has been relatively stable since 1999. However, with values of 0.668 and 0.622, it is somewhat lower than the correlation coefficients reported for cyclical GDP. For the Eastern and Baltic member states, the correlation coefficients are even lower, although they show an upward trend in recent years.

As for cyclical GDP, there is no notable difference between the correlation found for the group of non-EA countries and the correlation reported for the core countries.[11]

[10] Norway as an oil-exporting country does not follow the euro cycle as closely as the other non-EA countries in our sample.

[11] Figure 4 of the Appendix provides additional graphical evidence on the correlation between the cyclical components of GDP and unemployment in euro area member states and the EA-12 aggregate. In contrast to the correlation coefficients reported for different time periods in Tables 1 and 2, it shows 5-year rolling correlations, i.e. the correlation coefficient shown for a given point in time refers to the average correlation over the last 5 years. The general picture, however, is the same.

To assess whether the degree of symmetry of cyclical unemployment in the eurozone can be considered large or small, we again take the US experience as a benchmark. Over the period from 1999 to 2014, the average correlation between cyclical unemployment in the US states and the US aggregate is equal to 0.918 (cf. bottom row of Table 2), which is notably higher than in the euro area. This suggests that asymmetric labour market shocks are more important in the euro area than in the US.

To sum up, our findings indicate that in general, the euro area is characterised by a high degree of symmetry with regard to fluctuations in GDP, implying that asymmetric output shocks are of minor importance. A glance at the US benchmark shows that this conclusion stands international comparison. However, in the aftermath of the financial and economic crisis, the degree of symmetry between national output cycles in the peripheral countries and the EA-12 cycle was dampened. The output cycles of the new EA member states, though, appear to converge continuously. When it comes to cyclical unemployment, the degree of symmetry across the EA member states is somewhat lower, indicating that asymmetric labour market shocks are more of a concern. We will elaborate further on this finding and potential reasons for it in the next section.

Table 1: Correlation between national cyclical GDP and the EA-12 average

Country	1994-1998	1999-2007	2008-2014	1999-2014
AT	0.508	0.964	0.925	0.937
BE	0.297	0.815	0.969	0.904
DE	0.429	0.921	0.848	0.870
FI	0.420	0.916	0.964	0.938
FR	0.300	0.942	0.918	0.931
LU	-0.397	0.880	0.912	0.885
NL	0.290	0.887	0.958	0.924
Average Core	0.264	0.904	0.928	0.913
EL		0.521	0.017	0.193
ES	0.660	0.944	0.688	0.783
IE	0.430	0.865	0.643	0.685
IT	0.796	0.932	0.960	0.951
PT	0.469	0.772	0.666	0.719
Average Periphery	0.589	0.807	0.595	0.666
EE		0.740	0.776	0.773
LT		0.473	0.750	0.641
LV		0.696	0.625	0.670
SI		0.868	0.906	0.880
SK		0.546	0.907	0.679
Average new EA-MS		0.665	0.793	0.729
CH	-0.079	0.942	0.909	0.884
CZ		0.861	0.920	0.877
DK	0.103	0.87	0.948	0.916
HU		0.502	0.901	0.766
NO	0.002	0.778	0.492	0.649
PL		0.699	0.845	0.691
SE	0.823	0.914	0.951	0.937
UK	-0.138	0.686	0.867	0.802
Average non-EA countries	0.142	0.782	0.854	0.815
US States			0.659	

Notes: The Table shows the correlations between national cyclical quarterly GDP and the aggregate cyclical GDP in the EA-12 for different time periods. The cyclical components are extracted using the Baxter-King (BK) filter. Correlation coefficients for the group of 'Core', 'Periphery', 'New EA-MS' and 'Non-EA' countries represent (unweighted) averages. The correlation coefficient for US states refers to the (unweighted) average correlation between the cyclical GDP across all US states and the US aggregate.

Table 2: Correlation between national cyclical unemployment and the EA-12 average

Country	1994-1998	1999-2007	2008-2014	1999-2014
AT	0.125	0.742	0.814	0.727
BE	0.365	0.830	0.762	0.769
DE	0.172	0.640	0.656	0.477
FI	0.595	0.805	0.595	0.652
FR	0.587	0.650	0.897	0.762
LU		0.821	0.108	0.494
NL	-0.752	0.840	0.802	0.798
Average Core	0.182	0.761	0.662	0.668
EL		0.702	0.477	0.452
ES	0.376	0.447	0.923	0.617
IE	0.672	0.755	0.594	0.645
IT	-0.249	0.642	0.717	0.688
PT	-0.094	0.623	0.763	0.709
Average Periphery	0.176	0.634	0.695	0.622
EE		0.244	0.461	0.402
LT		0.220	0.459	0.401
LV		0.700	0.480	0.564
SI		0.796	0.806	0.779
SK		0.458	0.740	0.600
Average new EA-MS		0.484	0.589	0.549
CZ		0.507	0.869	0.644
DK	0.407	0.790	0.564	0.661
HU		0.647	0.659	0.653
NO	0.029	0.754	0.434	0.545
PL		0.716	0.786	0.598
SE	0.798	0.865	0.772	0.824
UK	0.369	0.344	0.754	0.629
Average non-EA countries	0.317	0.660	0.691	0.651
US States	0.569	0.881	0.943	0.918

Notes: The Table shows the correlations between national cyclical monthly unemployment and the aggregate cyclical unemployment in the EA-12 for different time periods. The cyclical components are extracted using the Baxter-King (BK) filter. Correlation coefficients for the group of 'Core', 'Periphery', 'New EA-MS' and 'Non-EA' countries represent (unweighted) averages. The correlation coefficient for US states refers to the (unweighted) average correlation between the cyclical unemployment across all US states and the US aggregate.

2.3 Comparing Business Cycle Amplitudes

Thus far, our analysis has focused on the degree of synchronization or co-movement of national business cycles. That is, we investigated whether booms and recessions tend to occur at the same time across the EA member states. In this section, we shed light on how the amplitudes of national business cycles compare to the EA-12 aggregate. To this end, we follow Belke et al. (2016) as well as De Grauwe and Ji (2016) and run OLS regressions with the cyclical component of, respectively, national GDP and unemployment as dependent variables. The EA-12 cycle is employed as an independent variable. The results are shown in Table 3. Columns 1 and 2 refer to cyclical GDP, columns 3 and 4 to cyclical unemployment.[12] The β-coefficients provide information on the relative size of the national business cycle compared to the EA-12 aggregate. More precisely, β indicates how strongly national GDP (unemployment) is affected by an increase in the aggregate EA-12 GDP gap (unemployment gap) by 1% (1 percentage point). $\beta = 1$ implies that the national business cycle and that of the EA-12 have the same amplitude. If $\beta > 1$, booms and recessions in the respective country tend to be more severe than in the EA-12 aggregate. If $0 < \beta < 1$, booms and recessions are less severe. β-coefficients that are not significantly different from zero (indicated by the lack of an asterisk behind the β-coefficient in Table 3) indicate that there is no association between the national cycle and the aggregate EA-12 cycle. The *R-squared* shown in Table 3 represents a measure of the degree of business cycle synchronisation similar to the correlation coefficients depicted in Tables 1 and 2 of Section 2.2.[13] A large *R-squared* indicates that the EA-12 cycle has a high explanatory power for the national cycle.

With regard to cyclical GDP, our results indicate that on average, booms and recessions within the group of core and peripheral countries are of similar magnitude as in the EA-12. For both groups of countries, the estimates of β are close to one, indicating that the amplitudes of the respective output cycles are, on average, virtually identical to the EA-12 aggregate. A closer look at the single countries,

[12] Note that we report here regression results only for the full time period (1999-2014) as these are more robust. β-coefficients for the US states are omitted as they are equal to one if states are weighted by their GDP or laborforce.

[13] Formally, the R^2 is equal to the square of the correlation coefficient.

though, reveals a notable degree of heterogeneity. Among the core countries, for example, Luxembourg's β is more than twice as large as the realisations of β found for France and Belgium. The estimates imply that if the aggregate output gap in the EA-12 is 1%, that of Luxembourg would be roughly 1.6%, while those of France and Belgium would be about 0.7%. A similar degree of heterogeneity can be found in the group of peripheral countries. Here, Ireland has by far the largest β, indicating that its cyclical GDP reacts particularly sensitively to aggregate output fluctuations. In contrast, the amplitudes of the output cycles in Spain and Portugal are notably lower than EA-12 aggregate. The amplitude of the GDP cycles in the Baltic and Eastern European countries is, on average, almost twice the size of the aggregate EA-12 cycle.

Turning to cyclical unemployment, our findings suggest that core and peripheral countries differ quite notably in their sensitivity to common labour market shocks. The amplitude of cyclical unemployment in the peripheral countries is more than twice as large as in the core countries. If cyclical unemployment in the EA-12 was about to increase by 1 percentage point, unemployment in the core countries would be expected to increase by about 0.6 percentage points, while in the periphery, the estimated increase amounts to roughly 1.3 percentage points. Interestingly, though, countries in which the output gap is particularly sensitive to the aggregate EA-12 business cycle seem to exhibit a low sensitivity of cyclical unemployment to aggregate fluctuations in the unemployment rate. For example, Luxembourg, Finland and Germany are characterized by a comparably large β for GDP, but a rather small β with regard to unemployment. Thus, countries that tend to be more strongly affected by common output shocks are not necessarily more vulnerable to common employment shocks.

Figure 5 of the Appendix graphically illustrates the development of β-coefficients over time. For the core countries, the realisations of β appear to be relatively stable throughout our sample period. For the peripheral countries, though, the β-coefficients do vary quite remarkably. In particular, it appears that in recent years, Greece, Spain, Portugal and Italy have become more sensitive to common labour market shocks.

To sum up, our findings suggest that the correlation of cyclical unemployment

within the eurozone is not only somewhat weaker than the correlation of cyclical GDP (cf. Section 2.2 as well as the *R-squared* in Table 3), but the sensitivity of national labour markets to common employment shocks is much more heterogeneous, too. Thus, while the output cycle seems to be well synchronised across the EA member states, asymmetric fluctuations on national labour markets are still discernible. Arguably, this result suggests that national labour markets differ with regard to their vulnerability and/or resilience to (common) economic shocks, thus highlighting the importance of national labour market conditions.

Table 3: Relative amplitudes of cyclical GDP and unemployment, 1999-2014

	GDP		UR	
Country	β-coefficient	R-squared	β-coefficient	R-squared
AT	0.905**	0.878	0.484**	0.528
BE	0.726**	0.817	0.757**	0.591
DE	1.225**	0.757	0.394**	0.228
FI	1.482**	0.880	0.512**	0.426
FR	0.667**	0.867	0.607**	0.581
LU	1.555**	0.784	0.381**	0.244
NL	0.988**	0.854	0.852**	0.636
Core	1.078**	0.834	0.570**	0.462
EL	0.339	0.037	1.364**	0.205
ES	0.831**	0.613	2.127**	0.381
IE	1.780**	0.470	1.341**	0.416
IT	1.067**	0.904	0.648**	0.474
PT	0.750**	0.516	1.141**	0.503
Periphery	0.953**	0.508	1.324**	0.396
EE	2.659**	0.597	1.621**	0.162
LT	1.931**	0.411	1.611**	0.161
LV	2.412**	0.449	2.465**	0.318
SI	1.483**	0.774	0.845**	0.606
SK	1.155**	0.461	1.297**	0.360
New EA-MS	1.928**	0.538	1.568**	0.321
CH	0.808**	0.782		
CZ	1.296**	0.770	0.962**	0.415
DK	1.014**	0.838	0.778**	0.437
HU	0.955**	0.586	0.721**	0.426
NO	0.437**	0.421	0.372**	0.297
PL	0.650**	0.477	1.330**	0.357
SE	1.330**	0.877	0.958**	0.679
UK	0.761**	0.644	0.472**	0.396
Non-EA countries	0.906**	0.674	0.799**	0.430

Notes: The Table shows the coefficient estimates of regressions in which national cyclical GDP and unemployment are employed as dependent variables and the EA-12 cyclical GDP and unemployment as independent variables along with the R-squared. * and ** indicate significance at the 5% and 1% level. Statistical tests are based on Newey-West standard errors.

3 Stabilization Channels

An important question is to what extent private markets are able to dampen the effects of asymmetric shocks. Based on the methodology in Asdrubali et al. (1996), Alcidi et al. (2017) examine how GDP (Gross State Product, GSP) shocks in the euro area (US states) are smoothed through the cross-border ownership of productive assets (capital market channel), intertemporal consumption smoothing via cross-border savings and borrowing (credit market channel), as well as federal fiscal transfers.[14] The capital market channel implies that investors hold an internationally diversified portfolio. Due to that, investors are less vulnerable to country-specific shocks. The credit market channel refers to the intertemporal smoothing of consumption by saving or by taking up loans. Intertemporal consumption smoothing implies that fluctuations in aggregate demand are mitigated as it reduces the sensitivity of consumption to income shocks. In this regard, access to international credit markets ensures that firms' and households' savings and loan conditions are insensitive to the economic conditions within a particular country, contributing to the effectiveness of the credit market channel. Thus, both the capital as well as the credit market channel can dampen the impact of asymmetric shocks through cross-country risk-sharing.[15]

A key finding from Alcidi et al. (2017) on the importance of the different stabilization channels is presented in Figure 1. It shows how much of a given shock to GDP (GSP in case of the US states) is absorbed by a) capital markets, b) credit markets and c) federal fiscal transfers and which fraction is unsmoothed.[16] Using the US as a benchmark, the results presented in Figure 1 suggest that the shock absorption capacity of capital markets in the euro area is weaker than in the US and that this discrepancy has even widened since 2010. With regard to the US, capital markets are in fact the most powerful channel. Depending on

[14] Arguably, the 'credit market channel' should rather be labelled 'consumption smoothing channel' as it includes net savings of the household sector and the public sector. Here, we use the conventional term 'credit market channel' as it is used in most of the previous literature.

[15] Note that to some extent, the effectiveness of these channels is already reflected in the correlations presented in Section 2.2. I.e., if private markets are able to successfully dampen the impact of asymmetric shocks, the correlation of cyclical GDP and unemployment will be higher.

[16] Note that the shock measure used by Alcidi et al. (2017) differs from the one computed in Section 2 as it does not distinguish between the structural and the cyclical component.

the time period considered, 34-50% of the impact of shocks to GSP are smoothed at a one-year frequency. In the euro area, the corresponding absorption rate is much smaller (29-33% between 1998-2009) and became even negative in more recent years.[17] Also the credit market and the fiscal transfer channels play a more important role in the US compared to the euro area.[18] As a consequence, a much larger fraction of GDP shocks remains unsmoothed in the euro area relative to the US.

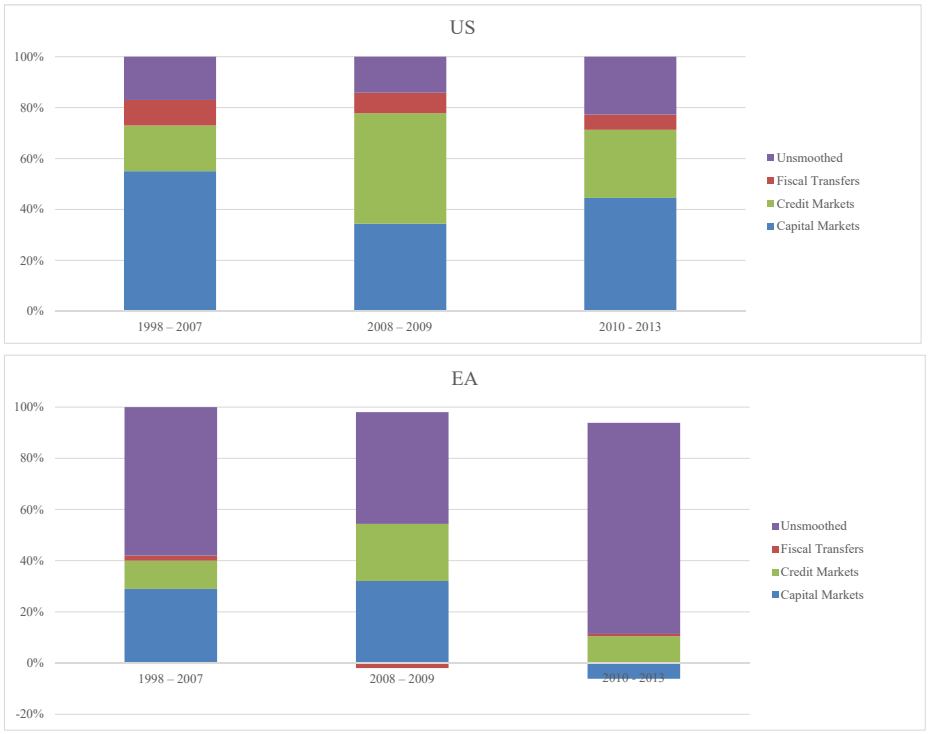
The comparably poorer performance of capital and credit markets in absorbing asymmetric shocks indicates that there is still much scope for financial integration in the euro area. A prerequisite for the effectiveness of both the capital and credit market channel is the integration and well-functioning of financial markets. However, up-to-date, financial integration in the EA was rather one-sided as it was mainly driven by interbank lending (Fecht et al., 2012; Lane and Milesi-Ferretti, 2008). The crisis has shown that interbank credit flows can abruptly stop and even reverse, especially when claims are unequally distributed across member states and inflows are concentrated in few states. This was the case in the EA until 2010. This one-sided way of financial integration can even lead to an amplification of shocks (Alcidi, 2017).

In contrast, cross-country equity flows tend to be more stable and are less likely to be suddenly reversed in the event of a crisis, mainly because equity is costlier to liquidate. Consequently, recent evidence suggests that by fostering the cross-country ownership of assets, market risk sharing can be improved and the impact of asymmetric shocks can be dampened (Alcidi and Thirion (2016)). However, cross-country equity ownership is still limited in the EA. According to Furceri and Zdzienicka (2015), the lack of capital market integration and the bias toward interbank credit when it comes to financial integration are the two main factors hindering further risk sharing in the EA. In this regard, the creation of a Capital

[17]Note that in the previous literature, the absorption rate was usually found to be only 10%. However, this difference is due to the use of different data. In the US accounting system, companies' retained earnings are counted as international factor income and not as savings. Hence, to ensure comparability of US and euro area data, adjustments to the the euro area dataset have been made.

[18]As shown in Figure 1, the capacity of federal fiscal transfers to dampen shocks is limited, even in a monetary union such as the US which is characterized by a high degree of fiscal integration.

Figure 1: Smoothing channels



Source: Alcidi et al. (2017). Notes: Corporate retained earnings are included in the capital market channel in order to ensure the comparability of results for the euro area and the US.

Markets Union as a means to foster the integration in capital markets and to move toward a more market-based financial system could have a substantial impact on the risk-sharing capacity of private markets within the monetary union.

4 Conclusions

This paper assesses the degree of (a)symmetry of macroeconomic shocks within the euro area (EA), shedding light on the synchronicity of national business cycles and how their amplitudes compare. To this end, we employ two business cycle indicators: (i) the GDP gap and (ii) the unemployment gap. In addition, we examine to what extent private markets are able to dampen the effects of asymmetric shocks.

Our findings indicate that national output cycles in the EA strongly overlap, that is, booms and recessions tend to occur at the same time across EA member states. Only in the aftermath of the recent financial and economic crisis we observe some divergence with regard to national output cycles within EA peripheral countries. We do find some asymmetries in the amplitudes of GDP shocks, with some countries reacting more strongly to common output shocks compared to others. However, this asymmetry is found within the groups of core and peripheral EA member states and not between the averages of these two groups.

The degree of correlation of national cyclical unemployment in the EA is somewhat lower compared to the correlation of national output cycles, but still significant. It is also lower compared to the correlation of cyclical unemployment among the US states. Moreover, the sensitivity of national labour markets to the common eurozone cycle is much more heterogeneous, too. This suggests that structural differences across EA member states, such as differences in national labour market institutions, rather than asymmetric shocks, are responsible for asymmetries in labour market cycles in the eurozone.

Our results have important implications for the debate about fiscal risk-sharing mechanisms in the eurozone and the further integration of financial markets. First, the high degree of synchronisation of cyclical output and unemployment suggests that the interregional smoothing potential of any such mechanism is limited. If the

eurozone as a whole is hit by a shock, fiscal risk-sharing arrangements could indeed lead to pro-cyclical transfers, as shown in previous research. Second, the fact that (a)symmetries between cyclical output and unemployment differ implies that the effects of fiscal stabilization schemes would be sensitive to the underlying business cycle measure. Third, we conclude that financial market integration fostering cross-country ownership of capital should be a key priority in order to strengthen the role private markets can play in smoothing asymmetric shocks in the euro area.

References

Alcidi, C. (2017). Fiscal Policy Stabilisation and the Financial Cycle in the Euro Area. European Economy Discussion Paper 052.

Alcidi, C., P. D'Imperio, and G. Thirion (2017). Risk-sharing and Consumption-smoothing Patterns in the US and the Euro Area: A comprehensive comparison. CEPS Working Document No 2017/04, May 2017.

Alcidi, C. and G. Thirion (2016). Assessing the Euro Area's Shock-Absorption Capacity: Risk Sharing, Consumption Smoothing and Fiscal Policy. CEPS Special Report No. 146.

Andor, L. (2014). Basic European Unemployment Insurance - The best way forward in strengthening the EMU's resilience and Europe's recovery. *Intereconomics Vol. 49 (4)*, 184–189.

Asdrubali, P., B. Sorensen, and O. Yosha (1996). Channels of interstate risk sharing: United States 1963-1990. *Quarterly Journal of Economics 110*(4), 1081–1110.

Baxter, M. and R. G. King (1999). Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series. *Review of Economics and Statistics 81*(4), 575–593.

Beblavý, M., D. Gros, and I. Maselli (2015, January). Reinsurance of National Unemployment Benefit Schemes. CEPS Working Document No. 401.

Belke, A., C. Domnick, and D. Gros (2016, October). Business cycle synchronization in the EMU: Core vs. periphery. ROME Discussion Paper Series, No. 16-08.

Bordo, M., L. Jonung, and A. Markiewicz (2013). A Fiscal Union for the Euro: Some Lessons from History. *CESifo Economic Studies 59 (3)*, 449–488.

Brandolini, A., F. Carta, and F. D'Amuri (2016). A feasible unemployment-based shock absorber for the euro area. *Journal of Common Market Studies 54(5)*, 1123–1141.

Cogley, T. and J. M. Nason (1995). Effects of the Hodrick-Prescott filter on trend and difference stationary time series - Implications for business cycle research. *Journal of Economic Dynamics and Control 19*(1), 253–278.

De Grauwe, P. and Y. Ji (2016). Flexibility versus Stability: A difficult tradeoff in the Eurozone. *Credit and Capital Markets 49*(3), 375–413.

Dolls, M., C. Fuest, D. Neumann, and A. Peichl (2017). An Unemployment Insurance Scheme for the Euro Area? A Comparison of Different Alternatives using Micro Data. *International Tax and Public Finance*.

Dolls, M., C. Fuest, and A. Peichl (2012). Automatic Stabilizers and Economic Crisis: US vs. Europe. *Journal of Public Economics 96*, 279–294.

Enderlein, H., L. Guttenberg, and J. Spiess (2013). Blueprint for a cyclical shock insurance in the euro area. Project EU & Differentiated Integration.

European Commission (2017). Reflection paper on the deepening of the Economic and Monetary Union. COM(2017) 291 of 31 May 2017.

Fecht, F., H. Gruner, and P. Hartmann (2012). Financial integration, specialization, and systemic risk. *Journal of International Economics 88*(1), 150–161.

Furceri, D. and A. Zdzienicka (2015). The Euro Area Crisis: Need for a Supranational Fiscal Risk Sharing Mechanism? *Open Economies Review 26 (4)*, 683–710.

Gächter, M. and A. Riedl (2014). One money, one cycle? The EMU experience. *Journal of Macroeconomics 42*, 141–155.

Harvey, A. C. and A. Jaeger (1993). Detrending, stylized facts and the business cycle. *Journal of Applied Econometrics 8*(3), 231–247.

Juncker, J.-C. (2015). Completing Europe's Economic and Monetary Union. in close collaboration with D. Tusk, J. Dijsselbloem, M. Draghi and M. Schulz.

Lane, P. and G. Milesi-Ferretti (2008). The Drivers of Financial Globalization. *American Economic Review, Papers and Proceedings 98*(2), 327–332.

MEF (2016). A European Unemployment Benefit Scheme: Nine Clarifications. Ministero dell'Economia e delle Finanze.

Woitek, U. (1998). A note on the baxter-king filter.

Appendix

Technical details

Extracting the cyclical component

The Baxter-King (BK) filter is a band-pass filter that decomposes a time series into a trend component, a cyclical component and irregular disturbances. To extract the cyclical component, the minimum and maximum length of a business cycle must be chosen. As suggested in the literature (Baxter and King, 1999), we suppose that business cycles last between 1.5 and 8 years. Very short cycles are classified as noise – this would be the case for one time events, for example – while very long cycles are assumed to be of a structural nature. This filter is a modification of the Hodrick-Prescott (HP) filter, which is often used in the literature (e.g. De Grauwe and Ji, 2016; Gächter and Riedl, 2014). As opposed to the HP filter, which only distinguishes between trend and cycle, the BK filter additionally separates noise from the cyclical component. The non-consideration of the irregular component can lead to distortions in the cyclical observations (Baxter and King, 1999). In addition, it is shown that in case the underlying time series contain a unit-root, the HP filter creates a spurious cyclical structure (Cogley and Nason, 1995; Harvey and Jaeger, 1993). This problem is found to be less severe for the BK filter (Woitek, 1998). However, as a robustness check, we also applied the HP filter instead of the BK filter. Results are similar and are available upon request. In our empirical analysis, we apply the BK filter to the log of real PPP-converted GDP and harmonised unemployment rates. The time series are seasonally adjusted.

Relative magnitude of shocks

In order to determine the magnitude of shocks, we regress the each country's cyclical component on the EA-12 cyclical component. I.e. we estimate the following equation for country i's GDP (and an analoguous equation for the unemployment rate):

$$GDP_{cyclical,i} = \beta_{0,i} + \beta_{1,i} GDP_{cyclical,EA12} + \epsilon_i$$

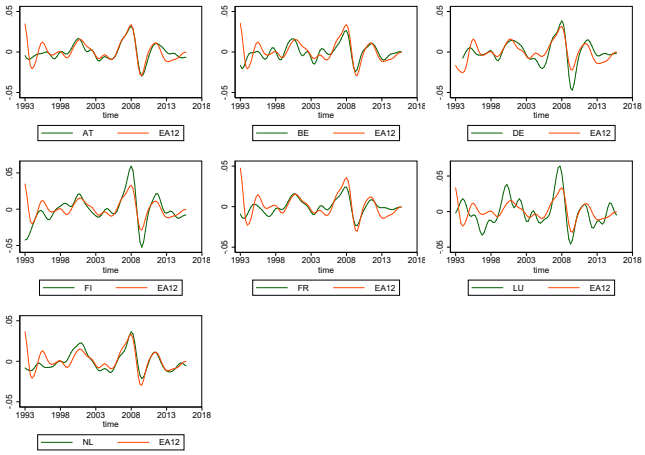
We employ autocorrelation- and heteroskedasticity-robust standard errors. As by construction, cyclical components average zero over time, $\beta_{0,i}$ is close to zero and

is hence not reported. The equation captures the contemporaneous relationship between shocks.

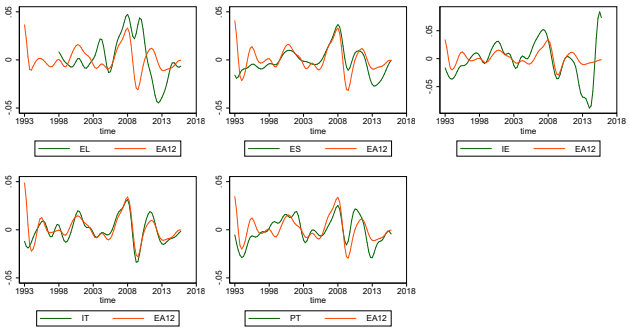
Figures and Tables

Figure 2: Cyclical component of GDP: National cycles vs. EA-12

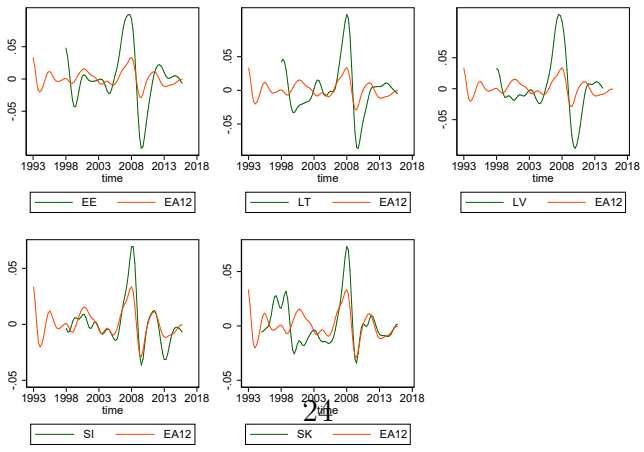
(a) Core countries



(b) Periphery



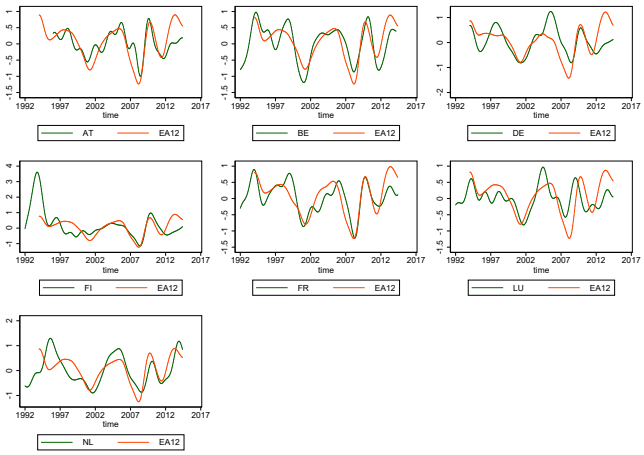
(c) Newer eurozone members



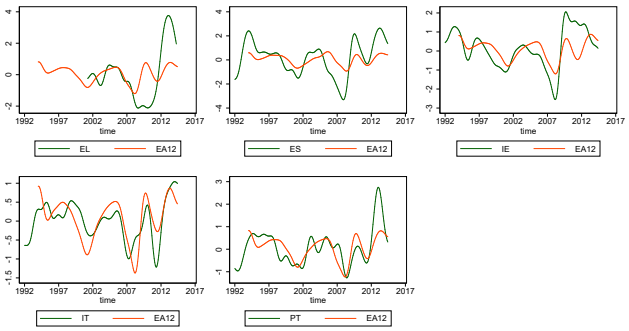
Notes: Evolution of the cyclical component of quarterly real GDP of EA member states along with the cyclical component of quarterly EA-12 GDP.

Figure 3: Cyclical component of unemployment: National cycles vs. EA-12

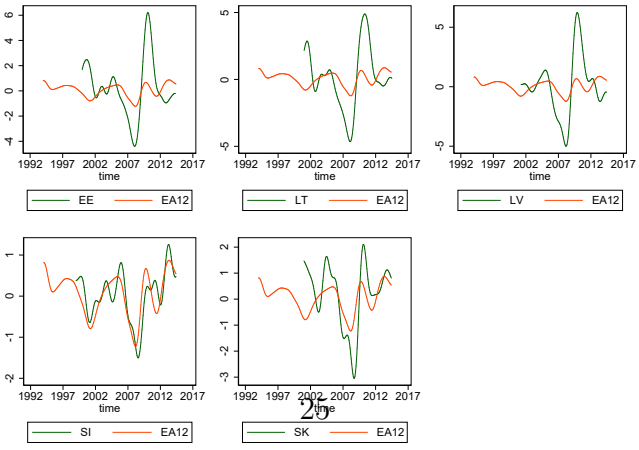
(a) Core countries



(b) Periphery



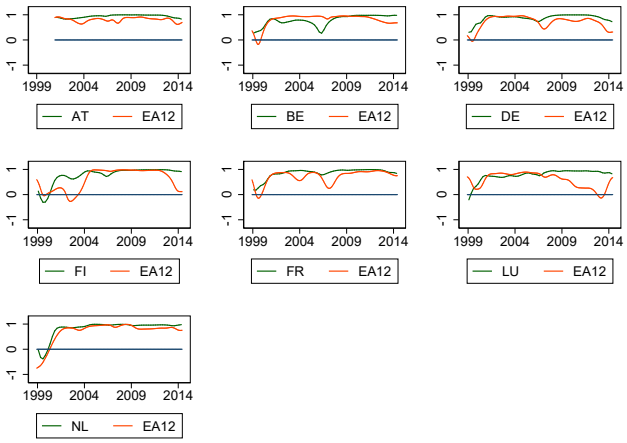
(c) Newer eurozone members



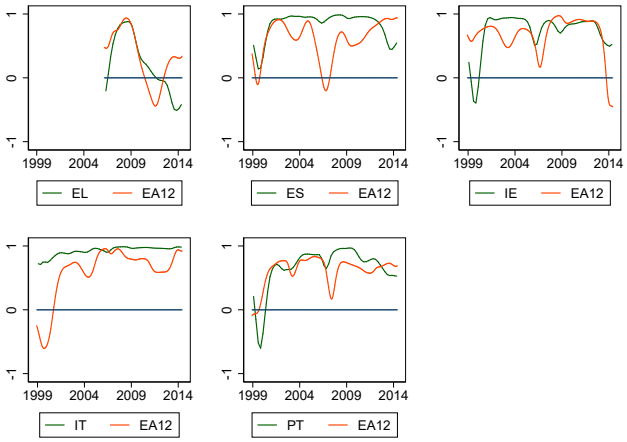
Notes: Evolution of the cyclical component of monthly unemployment rates in EA member states along with the cyclical component of monthly EA-12 unemployment rates.

Figure 4: 5-year rolling correlations: Cyclical GDP and unemployment

(a) Core countries



(b) Periphery



(c) Newer eurozone members

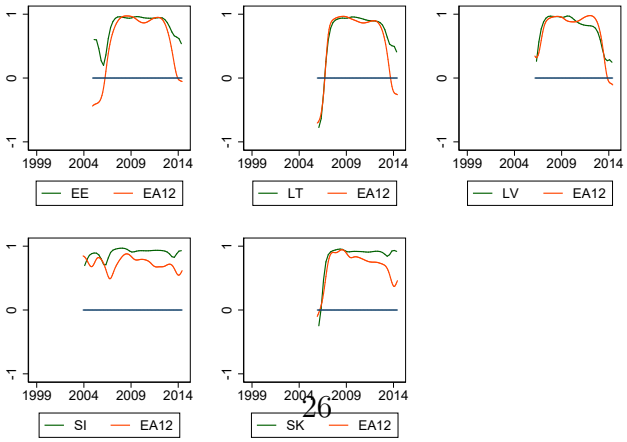
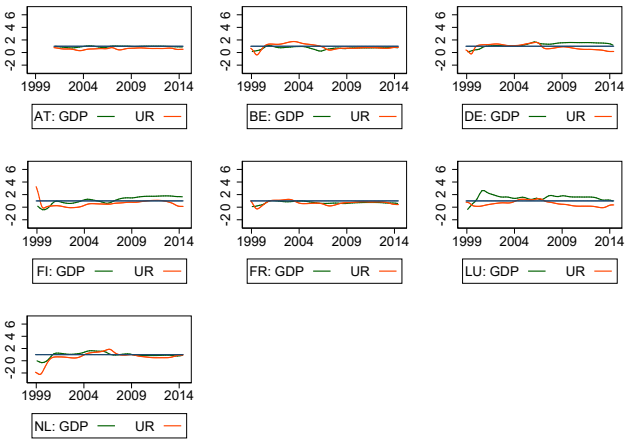
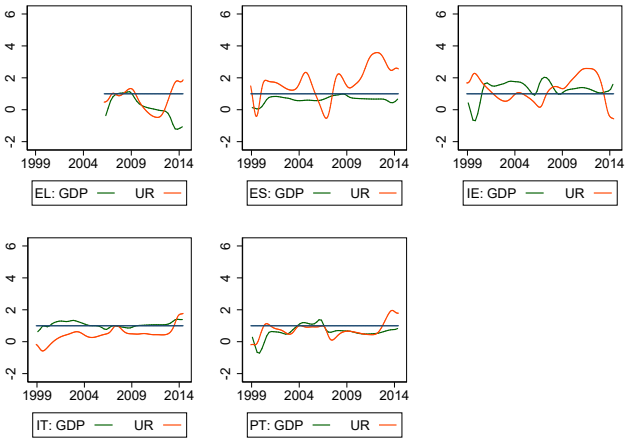


Figure 5: 5-year rolling regressions: Cyclical GDP and unemployment

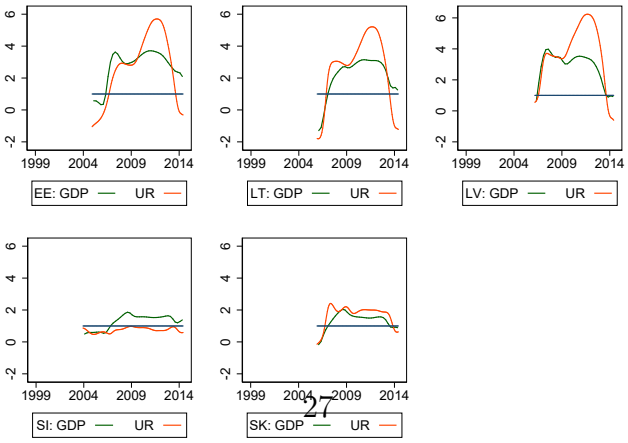
(a) Core countries



(b) Periphery



(c) Newer eurozone members



EconPol Europe

EconPol Europe - The European Network for Economic and Fiscal Policy Research is a unique collaboration of policy-oriented university and non-university research institutes that will contribute their scientific expertise to the discussion of the future design of the European Union. In spring 2017, the network was founded by the ifo Institute together with eight other renowned European research institutes as a new voice for research in Europe.

The mission of EconPol Europe is to contribute its research findings to help solve the pressing economic and fiscal policy issues facing the European Union, and thus to anchor more deeply the European idea in the member states. Its tasks consist of joint interdisciplinary research in the following areas

1) sustainable growth and 'best practice',

2) reform of EU policies and the EU budget,

3) capital markets and the regulation of the financial sector and

4) governance and macroeconomic policy in the European Monetary Union.

Its task is also to transfer its research results to the relevant target groups in government, business and research as well as to the general public.