Macro-Financial Stability Under EMU

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Abstract

This paper examines the cyclical behaviour of country-level macro-financial variables under EMU. Monetary union strengthened the covariation pattern between the output cycle and the financial cycle, while macro-financial policies at national and area-wide levels were insufficiently counter-cyclical during the 2003-2007 boom period. We critically examine the policy reform agenda required to improve macro-financial stability.

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1 Introduction

The aim of this paper is to address whether monetary union affects the growth process for member countries. While it is typically assumed that real variables (such as the level of output) should be unaffected by monetary factors in the long run, it is possible that short-term and medium-term output might be affected by the nature of the monetary regime through a number of mechanisms. Moreover, if hysteresis mechanisms are operative, such temporary output losses may have permanent costs (Fatas 2000, De Long and Summers 2012).

At the level of an individual member country, there are two types of misallocation that may harm growth performance. First, there may be a chronic/persistent misallocation by which an economy may have an inappropriate sectoral composition of output (tradables versus nontradables; investment in construction versus investment in machinery and equipment). Second, there may be acute/sharp intertemporal misallocations (spending levels too high relative to income levels) that result in a crisis, with an attendant post-crisis adverse impact on medium-term output (Reinhart and Rogoff 2009, Romer and Romer 2015).

The nature of a monetary union may foster both types of misallocation. There is considerable evidence that EMU increased the degree of cross-border financial integration among euro area member countries, especially in relation to external debt positions (Lane 2006, Lane 2009, Lane 2013). In turn, financial integration facilitated an increase in the size and persistence of current account imbalances (Blanchard and Giavazzi 2001, Lane and Pels 2012). Large-scale and persistent current account imbalances raise the likelihood of both the chronic and acute misallocation risks outlined above. In relation to chronic risks, surplus countries may see excessive growth in export-orientated sectors and insufficient growth in domestically-orientated sectors, with the opposite pattern prevailing in deficit countries. In relation to acute risks, external debt liabilities are a robust predictor of external crises (Catao and Milesi-Ferretti 2014). While crises primarily affect debtors, crises

also adversely affect creditor economies through wealth losses on external asset positions and trade channels.

In the other direction, international financial integration may also have positive effects on output growth. First, cross-border net financial flows may accelerate convergence, if capital is reallocated from capital-abundant economies to capital-scarce economies. Second, international risk sharing (through trade in equity-type instruments) may facilitate the selection of higher-return, higher-risk projects that generate faster (if more volatile) output growth (Obstfeld 1994). Moreover, for a given level of output volatility, international risk sharing reduces the welfare costs of volatility by insulating wealth and consumption from domestic production shocks.

However, monetary union has had relatively little impact on cross-border equity positions relative to cross-border debt positions. Also, the scale and composition of current account imbalances in the mid-2000s are consistent with "inefficient" imbalances that reflected excessive risk-taking by under-regulated national banking systems in some countries, over-investment in property assets (residential and non-residential) and delayed adjustment to adverse external shocks (Lane 2013). Following Forbes and Warnock (2012) and Bruno and Shin (2014), such domestic factors interacted with low global interest rates and "easy" financial conditions (as captured by the VIX and global liquidity indicators).

In addition to the direct impact of international financial integration, monetary union also alters the behaviour of important adjustment mechanisms. In particular, the absence of national currencies may make it more difficult to accomplish stabilising shifts in the real exchange rate. In turn, lack of adjustment in the real exchange rate may increase the persistence of external imbalances and sectoral misallocations (for both surplus and deficit economies). Going further, demand-type shocks may generate destabilising movements in the real exchange rate (and the real interest rate, since price level movements are typically persistent), with current account deficits associated with real exchange rate appreciation and a decline in the real interest rate through a positive and persistent inflation differential.

However, in the other direction, it is also true that a monetary union offers insulation against non-fundamental national-level exchange rate shocks. There is a sizeable literature emphasising the possible allocative inefficiencies associated with floating exchange rates, given the scope for speculative/noise shocks to shift currency values away from current fundamentals (see, amongst others, Berka et al 2012). A concrete recent example is provided by Iceland: the sharp appreciation of the Icelandic krona in the mid-2000s was an aggravating factor during its boom phase. Accordingly, it is not clear ex ante whether monetary union would increase or decrease the efficiency of the exchange rate adjustment mechanism (see also Lane 2010). In similar vein, the limited scope for independent monetary policies in mitigating international financial shocks is emphasised by Rey (2013).[1]

Along another dimension, conditional on a crisis occurring, membership of a monetary union provides a buffer through the operation of system-wide central bank liquidity mechanisms.[2] Through such cross-border liquidity flows (as captured by Target 2 balances in the eurosystem), the immediate output consequences of a sudden stop in private capital flows are mitigated. However, the existence of this buffer mechanism in turn may reduce private-sector incentives to maintain liquidity buffers and increase risk-taking incentives by banks (Fagan and McNelis 2014). Given these mixed effects, whether monetary union increases or decreases the costs associated with external crises cannot be firmly established on an ex ante basis.

Of course, at a broader level, the crisis exposed the inadequacy of crisis management tools in many countries. In particular, insufficiently-capitalised banks and the absence of effective bank resolution regimes raised the costs of crisis management. The high degree of cross-border financial linkages within the euro area meant that national-level banking

[1] However, the degree of effective monetary autonomy is certainly non-zero, as shown by Klein and Shambaugh (2013)

[2] In relation to cross-border portfolio holdings, Galstyan and Lane (2013) also show that bond investors from outside the euro area were more likely to run for the exit during the crisis than were bond investors from fellow member countries.

policies had large area-wide spillover effects, which interacted with spillovers between the euro area and the financial systems of other advanced regions. In related fashion, the emergence of a diabolic loop between domestic banking systems and domestic sovereigns made management of the emerging sovereign debt crisis yet more problematic. In overall terms, the crisis highlighted the inefficiency of national banking policies in a common currency area, which also necessitated a clarification of the role of the eurosystem in underpinning area-wide financial stability. We return to the policy reform agenda in relation to financial integration and financial union in Section 3.

In terms of the contribution of this paper, we first examine the empirical evidence on whether membership of the euro area was associated with a shift in the cyclical behaviour of key macro-financial variables. If the euro has amplified pro-cyclical patterns in these variables, it reinforces the importance of designing and implementing offsetting stabilisation policies and ensuring that balance sheets are sufficiently resilient to absorb the impact of higher volatility. Our empirical strategy is to examine these issues in the context of the "initial phase" of EMU (1999-2007) and also the "crisis" phase (2008-2012/2014). Second, we turn to the policy reform agenda in relation to improving macro-financial stability for the aggregate euro area and the individual member countries.

The structure of the rest of the paper is as follows. We report our empirical work in Section 2. The policy agenda is discussed in Section 3. Finally, Section 4 concludes.

2 Empirical Analysis

In this section, we conduct three empirical exercises. First, we examine whether membership of the euro area has been associated with different cyclical behaviour of selected macro-financial variables relative to the experience of a large set of OECD countries over a

long time span.[3] Second, for the set of member countries, we investigate whether deviations in macro-financial variables from euro area aggregate values are associated with cyclical output deviations from the euro area aggregate. Third, we examine whether external adjustment since 2008 has been different for members of the euro area.

This empirical approach is broader than the method of calculating country-specific hypothetical Taylor-type interest rates rules for each member country and inferring the costs of monetary union from the deviations of these estimated shadow policy rates from the ECB policy rate (Honohan and Lane 2003, Ahrend et al 2008, Taylor 2008). Moreover, it is not clear that simulated Taylor rules provide a sufficient guide to the costs of monetary union during this period. First, while divergence in inflation rates and output gaps were significant in the initial years of EMU (1999-2002), inflation dispersion was relatively narrow by the mid-2000s and real-time estimates of output gaps were relatively small.[4] Second, interest rate policies would have been a costly way to tackle the financial imbalances emerging during the mid-2000s, in view of the limited impact of minor interest rate hikes on speculative behaviour during an asset price boom (Assenmacher-Wesche and Gerlach 2010). Third, interest rate hikes can have perverse effects for small open economies with poorly-regulated financial systems during periods of high global liquidity, since the associated currency appreciation may induce domestic speculators to increase foreign-currency leverage (Bruno and Shin 2015). Fourth, the evidence indicates that small open economies tend to deviate from Taylor-indicated interest rates in order to limit differentials with the policy rates of the major central banks (Taylor 2013).

Accordingly, we take a more indirect approach by investigating whether monetary union has been associated with a shift in the cyclical behaviour of key macro-financial variables.

[3] Estrada et al (2013) present related evidence but focus on different variables, a different comparator set of countries and different empirical methods. See also Giannone et al (2010) for related work on the characteristics of business cycles for members of the euro area.

[4] Of course, output gap estimates for the pre-crisis period have been heavily revised on the basis on ex-post information.

We first report some empirical results in relation to whether the cyclical behaviour of macro-financial variables has been different under EMU. In order to have a basis for comparison, we examine the member countries in the context of a wider group of 34 OECD countries for the both the pre-EMU and post-EMU periods.[5]

Over 1984-2013, we examine the following specification

$$\begin{aligned}\Delta X_{it} &= \alpha_i + \phi_t + \beta GROW_{it} + \sigma GROW_{it} * euro_{it} + \gamma GROW_{it} * noneuro_{it} \\ &\quad + \delta euro_{it} + \theta noneuro_{it} + \rho \Delta X_{it-1} + \varepsilon_{it} \end{aligned} \tag{1}$$

where X_{it} is a macro-financial variable (inflation, the real exchange, the current account balance and the fiscal balance) or an international financial flow variable (net debt flows, net portfolio flows, net other investment flows and net FDI flows), α_i is a country fixed effect, ϕ_t is a time fixed effect, $GROW_{it}$ is the output growth rate, $euro_{it}$ is a dummy for membership of the euro area (taking the value 1 from 1999-2013) and $noneuro_{it}$ is a dummy for nonmembership of the euro area (taking the value 1 for 1999-2013).[6]

The parameter β captures the cyclicality coefficient between output growth and ΔX_{it}, while σ and θ capture any shifts in cyclicality from 1999 onwards for members of the euro area and non-members of the euro area respectively. It is necessary to allow the cyclicality coefficient to change for even non-members of the euro area, since global factors may have altered the cyclical patterns in ΔX_{it} even in the absence of monetary union.

In terms of priors, we may expect σ to be positive for inflation and the real exchange rate to the extent that fluctuations in output are driven by demand-type shocks. Such shocks mean that surges in growth are associated with upward pressure on wages and prices. In the absence of countervailing poliy measures, this will result in positive comovement patterns

[5] The country list is: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

[6] We also examined an alternative sample interval 1984-2007. These results are available upon request.

between output growth and inflation and the real exchange rate. Similarly, demand-driven output fluctuations should be associated with a negative value for σ in relation to the current account balance, with increases in domestic demand boosting imports. The prediction for the fiscal balance is ambiguous: if membership of the euro area induces more fiscal prudence, we may expect a positive value for σ; whereas, if it induces less-disciplined fiscal policies (for instance, due to the breaking of the link between national fiscal balances and countervailing actions by the monetary authority), we would observe a negative value for σ. In relation to the international financial flow variables, a procyclical pattern in net debt inflows may be viewed as a risk-enhancing pattern, whereas a procyclical pattern in net equity-type inflows might be a risk-mitigating pattern.

Table 1 shows the results for inflation, the real exchange rate, the current account balance and the fiscal balance, while Table 2 shows the results for various categories of international financial flows. It turns out that membership of the euro area (compared to the pre-EMU period and the comparator group of non-member countries) is associated with a significantly different cyclical pattern for only two variables: inflation and net international portfolio flows.

In relation to the former, inflation has been relatively more procyclical for the member countries. This is consistent with a pattern of demand-type shocks that induce both faster growth and local inflation pressures. In relation to the latter, the negative estimated value of σ indicates that faster output growth for member countries was associated with greater net portfolio inflows, which is a destabilising pattern. Otherwise, we do not observe in the data any euro-specific shift in the relation between output growth and this set of macro-financial variables. In this limited sense, it seems that the euro did not amplify cyclical risks along most dimensions.

Next we perform an intra-group comparison by asking whether deviations in output growth among the member countries were associated with procyclical behaviour in a range of macro-financial variables. Procyclical patterns in these variables might be interpreted as

contributing to an amplification of national business and financial cycles within the euro area.

We run specifications of the following format

$$\Delta Z_{it} = \alpha_i + \theta_t + \beta * GROW_{it} + \varepsilon_{it} \tag{2}$$

where the inclusion of time dummies means that β captures the covariation between the growth deviation for country i in year t and the deviation in variable Z for country i in year t, relative to the area-wide common patterns in growth and variable Z. The sample period is 1999-2013.[7]

We consider a wide range of macro-financial variables: (i) the growth rate of private consumption; (ii) the growth rate of private investment; (iii) the growth rate of government absorption (consumption plus investment); (iv) the fiscal balance; (v) the current account balance;(vi) the log change in the real effective exchange rate; (vii) the CPI inflation rate; (viii) the GDP deflator inflation rate; (ix) the change in the ratio of domestic credit to GDP; (x) net international debt flows; (xi) net international equity flows; and (xii) net FDI flows.

Tables 3-6 show the results. All specifications include time dummies but we consider both pooled and fixed effects estimates. The former specification takes into account the information in cross-country variation in the data, whereas the latter specification focuses on within-country variation. In Table 3, the pooled estimates indicate that countries that grow more quickly in a given year typically experience faster investment growth but slower growth in private consumption and government absorption, while running a more positive current account balance. The only systematic within-country pattern is that an increase in a country's growth rate is associated with faster investment growth.

Table 4 shows that domestic inflation (both consumption and GDP deflator indices) is significantly positively associated with output growth in both the pooled and within-

[7]We also examined an alternative sample interval 1984-2007. These results are available upon request.

country estimates. This is a destabilising pattern in that, holding fixed the area-wide policy interest rate, an increase in the expected inflation rate implies a decline in the real interest rate, which further boosts demand.[8] However, it turns out that the real effective exchange rate is orthogonal to the growth rate, which can be explained by the dominant role of the external value of the euro in driving the real effective exchange rates of member countries.

We turn to the evolution of the fiscal balance and domestic credit growth in Table 5. The fiscal balance shows a stabilising pattern: faster output growth is associated with a larger fiscal surplus.[9] Domestic credit growth is significantly procyclical, which underlines the importance of macroprudential policies in ensuring macro-financial stability. We examine net international financial flows in Table 6.[10] While net FDI flows are orthogonal to output deviations, positive output deviations are associated with significantly larger net portfolio inflows. Again, this is a destabilising pattern to the extent that these portfolio inflows contribute to domestic asset price dynamics and domestic credit growth.[11]

Finally, we examine whether the nature of external adjustment in the aftermath of the crisis has been different for members of the euro area. In one direction, the inability to adjust nominal exchange rates at a national level may have constrained the external adjustment processs; in the other direction, access to cross-border eurosystem liquidity flows (as captured by Target 2 imbalances) may have cushioned the required scale of adjustment.

For this exercise, the sample consists of 64 advanced and emerging economies. Lane and Milesi-Ferretti (2012, 2015) examined cross-country variation in external adjustment

[8] Inflation differentials tend to be persistent so an increase in inflation in one period is associated with an increase in expected inflation.

[9] If output growth is driven by the financial cycle, the scale of surpluses required to ensure a stabilising pattern may be larger, given the procyclical nature of revenue streams generated by asset price booms and high construction investment.

[10] We exclude Ireland and Luxembourg, since the financial flow data for these countries are plagued by interpretation problems in relation to the mutual fund sector.

[11] See also Lane and McQuade (2014) and Carvalho (2014).

since 2008 conditioning on the scale of pre-crisis current account imbalances. In particular, a standard empirical model of current account imbalances was estimated on four-year averaged data over 1969-2008 and the level of pre-crisis "excessive" imbalances was calculated as the gap between the actual current account balance over 2005-2008 relative to the model-fitted value for the current account balance.[12] That is, $CAGAP_{0508} = CAB_{0508} - CAB^{FIT}_{0508}$. A country running an excessive pre-crisis surplus is marked by a positive $CAGAP$ value and a country running an excessive pre-crisis deficit is marked by a negative $CAGAP$ value. Table 7 shows the largest $CAGAP$ values for the advanced economies in the sample. It is clear that excessive imbalances were not confined to members of the euro area.

In order to assess whether membership of the euro area affected the external adjustment process in the wake of the crisis, we run specifications of the following format

$$\Delta Z_{it} = \alpha + \beta * CAGAP_{i0508} + \delta * euro_i + \sigma * euro_i * CAGAP_{i0508} + \varepsilon_{it} \qquad (3)$$

where Z_{it} is a macro-financial variable that is typically associated with external adjustment, $CAGAP_{0508}$ is the measure of "excessive" pre-crisis current account imbalances and $euro_i$ is a dummy for membership of the euro area.[13] We examine adjustment in: (i) the current account balance; (ii) the real exchange rate; (iii) domestic demand; (iv) output; (v) inflation; (vi) the fiscal balance; (vii) the stock-flow adjustment term in the net international investment position (a proxy for international valuation effects; (viii) export volumes; (ix) import volumes; and (x) domestic credit growth.

[12] The empirical model includes widely-employed covariates such as demographic variables, the level of development, the fiscal balance and correction factors for financial crises.

[13] Lane and Milesi-Ferretti (2012) estimated a model of medium-term current account balances over 1969-2008 and calculated $CAGAP$ as the deviation of the average current account balance in 2005-2008 from the model-predicted current account balance. The empirical model associates current account imbalances with demographic patterns, fiscal positions, the terms of trade, the rate of output growth, the level of development and historical exposure to financial crises. A positive value of $CAGAP$ means an "excessive" surplus and a negative value of $CAGAP$ means an "excessive" deficit.

Tables 8 and 9 show the results. Up to 2012, external adjustment has typically involved a closing of excessive current account imbalances, with those countries with negative current account gaps entering the crisis experiencing greater declines in domestic demand, output and import volumes. As highlighted by Lane and Milesi-Ferretti (2012, 2015), there was no cross-country correlation between current account adjustment and the real exchange rate up to 2012, so that the overall pattern for excessive-deficit countries is that of adjustment through "expenditure reduction" rather than "expenditure switching."

In relation to the differential experience of the euro area, the interaction term between $CAGAP$ and the *euro* dummy is not significant except for the real exchange rate and inflation regressions. In relation to the latter, the evidence does support some role for intra-area adjustment: inflation has declined by more over 2009-2012 (relative to 2005-2008) for those member countries with the most negative $CAGAP$ values. However, in the other direction, these countries experienced the smallest real exchange rate depreciations. This configuration can be reconciled by differences in trade patterns across the member countries. Still, the broad message from Tables 8-9 is that membership of the euro area has not substantially altered the external adjustment pattern relative to a broader sample of advanced and emerging economies.[14]

Next, we consider an extended specification

$$\begin{aligned} \Delta Z_i &= \alpha + \beta * CAGAP_{i0508} + \delta * euro_i + \sigma * euro_i * CAGAP_{i0508} \\ &\quad \theta * BELL_i + \gamma * BELL_i * CAGAP_{i0508} + \varepsilon_i \end{aligned} \tag{4}$$

where $BELL_i$ is a dummy that takes the value 1 for the group of new member states that pegged to the euro (Bulgaria, Estonia, Latvia and Lithuania). This is a relevant

[14] Lane and Milesi-Ferretti (2015) do show that countries with floating exchange rates were able to cut policy interest rates during the crisis. The common policy rate for the euro area has meant that interest rate differentials have not contributed to minimising the cost of external rebalancing within the euro area.

comparison group, since these countries were bound by the peg to the euro but did not have access to eurosystem liquidity facilities.[15]

Tables 10 and 11 show the results. Relative to the $BELL$ group, high-deficit members of the euro area experienced a less severe adjustment in the current account balance and a smaller compression in trade volumes. In this limited sense, it seems as if the cross-border liquidity support provided by the eurosystem facilitated a gentler form of adjustment.

In summary, the pattern in Table 1-6 is that the covariation between the output cycle and the financial cycle (as captured by domestic credit growth, net portfolio inflows and variation in national-level real interest rates) grew more intense under EMU. As shown in Tables 8-11 in relation to external adjustment, this proved costly since the macro-financial costs of closing excessive current account imbalances in the wake of the crisis have been severe.[16] These cyclical patterns and the crisis experience have generated a wide-ranging policy debate about macro-financial stabilisation under EMU. We turn to this debate in the next section.

3 Policy Reforms

The high costs associated with resolving excessive external imbalances and recovering from financial crises have underlined the importance for all economies of maintaining macro-financial stability and improving the resilience of the real economy and the financial system to large-scale shocks. The absence of national currencies makes these issues even more acute for members of the euro area.

[15] See also Gross and Alcidi (2013). Of course, there are also other important differences between this group and members of the euro area (level of GDP per capita, country size, importance of foreign-owned banks).

[16] Tables 8-11 also show that the adjustment experience has not been markedly different for euro area member countries relatively to a broad comparator group and has been somewhat gentler than the sudden stop experienced by the BELL group.

At a national level, there are three main challenges. First, macroprudential regulation of the financial system has the potential to mitigate financial risks. However, this is no easy task and is made more difficult by the rise of shadow banking and shifts in financial activity towards non-regulated sectors. In addition, the scope for cross-border spillovers and leakages in relation to macroprudential policies means that appropriate coordination through the European Systemic Risk Board (ESRB) is essential.

Second, fiscal policy should at the same time both maintain long-term sustainability while also contributing to macroeconomic stability by moving counter-cyclically against both the output cycle and financial cycle (Calmfors 2003, Benetrix and Lane 2013). To this end, it is necessary that the European fiscal framework be intelligently interpreted to enable the attainment of these twin goals.

Third, national legal and financial systems and domestic labour markets should be designed to tolerate inter-sectoral reallocations. For smooth adjustment, the capital ratios and credit policies of banks should be sufficiently resilient to absorb losses in declining sectors while funding new lending in expanding sectors; bankruptcy and debt restructuring should be efficiently processed by the legal system; and labour market institutions should be capable of facilitating separations between workers and firms in contracting sectors and new matches in expanding sectors.

At the European level, there has been considerable progress in setting up bank recovery and resolution plans and important elements of banking union, including the establishment of the Single Supervisory Mechanism (SSM) and the initiation of a Single Resolution Fund. Still, a full-scale banking union requires further progress in developing a robust harmonised area-wide deposit insurance scheme and ensuring a joint fiscal backstop (Marzinotto et al 2011).

The stability of the European banking system would be further assured by reforms that limit excessive holdings of domestic sovereign bonds by banks (see also European Systemic Risk Board 2015). Brunnermeier et al (2011) and Corsetti et al (2015) highlight

the benefits of a multi- country diversification requirement in the sovereign bond portfolios held by banks. Furthermore, a pooled bundle of sovereign bonds could be divided into senior and junior tranches, with the senior tranche constituting an area-wide safe asset. As argued by Corsetti et al (2015), these senior tranche bonds could become the main instrument for eurosystem liquidity operations and quantitative easing programmes. The eurosystem could help develop the market for this security by stipulating that only these types of securities can achieve the highest rating in relation to risk weighting of assets and the calculaton of liquidity coverage ratios. In turn, if the links between banks and national government are weakened, the growth of pan-European banks will be encouraged. Through geographical diversification, such banks are more likely to be robust in the event of regional shocks.

In addition, the dilution of bank exposures to any individual sovereign also mean that it will be more feasible in the future to allow for sovereign debt restructuring if a national government loses market access (Corsetti et al 2015). International Monetary Fund (2014) provides a useful guide to the criteria that could be used to determine the role of sovereign debt restructuring (as a precursor to any official funding) in a given situation. The lending framework of the ESM should be aligned with these criteria.

The scope for international risk sharing can also be improved by the types of reforms envisaged under the Capital Markets Union (CMU) initiative. Deeper and more integrated corporate bond and asset-backed securities markets can provide extra cushioning relative to a bank-dominated credit system, while the integration of equity markets and the market for corporate control (by fostering higher FDI flows) can improve the equity-debt mix in cross-border flows. At the same time, it is important to design policy frameworks so that growth in non-bank debt markets does not damage the capacity of macroprudential regulation to tackle excessive credit growth.

The crisis has also posed challenges for the conduct of monetary policy by the ECB. Working out the appropriate roles of eurosystem liquidity policies and national-level Emer-

gency Liquidity Assistance (ELA) in stabilising distressed national banking systems (especially in the context of simultaneously-distressed sovereigns) has been an ongoing challenge for the eurosystem. In similar vein, the effectiveness of interest rate policies was compromised by the fragmentation of the interbank markets during the crisis and compromised state of bank balance sheets in many member countries. Most severely, speculation about redenomination risk induced elevated spikes in sovereign bond yields for a number of member countries.

Through the 2012 announcement of the OMT programme and 2014-2015 adoption of large-scale asset purchase programmes, the ECB has addressed uncertainty about the degree of its commitment to meeting its inflation target and supporting financial stability in Europe. Given the limitations of conventional and unconventional monetary policies at the "near zero" lower bound, the desirability of revising upwards the inflation target warrants debate. While this debate is also relevant for other major central banks, it has special relevance for the euro area in view of the desirability of facilitating adjustment of real exchange rates within the euro area.

In relation to fiscal policy, national fiscal policies should be embedded in an area-wide aggregate fiscal position that is appropriate for the broad macroeconomic environment.[17] To this end, further reform of the European fiscal process may be necessary. In particular, the first stage of the European Semester could be devoted to determining the appropriate aggregate fiscal position for the euro area, with national fiscal plans subsequently framed to ensure that the aggregate position is achieved while also ensuring that national fiscal positions are sustainable. To support this two-step process, the establishment of an

[17] In this paper, I do not explore the scope for a larger-scale fiscal union that would involve cross-border net fiscal transfers in response to asymmetric shocks. The degree of political integration required for a large-scale fiscal union does not seem imminent. In any event, if the reforms discussed in this paper are implememted, the scope for large-scale asymmetric shocks (which have primarily emerged from the financial system) should be sharply curtailed.

independent, non-political European Fiscal Council could be helpful in formulating the appropriate area-wide aggregate fiscal position.

In principle, European-level surveillance of macro-financial risks may also be helpful in order to avoid national-level group think problems and reconcile the aggregate implications of diverse trends across the member economies.[18] While the European Union's Macroeconomic Imbalances Procedure (MIP) spans a wide range of relevant national-level macro-financial risk factors, country-level risk analysis should be embedded in a broader framework that is capable of providing a coherent account of area-wide risk. While an EU framework has been established to monitor financial stability risks through the ESRB, there is no similar institutional arrangement to monitor broader macroeconomic risks.

Finally, high legacy debt levels in a number of member countries make it more difficult to implement the range of reforms outlined in this section, even if debt servicing problems are certainly less acute at current low interest rates. Corsetti et al (2015) outline a range of options to alleviate the burden of high debt levels, in order to support the transition to a safer, more stable euro area.

4 Conclusions

This paper has examined whether monetary union has been associated with a shift in the cyclical behaviour of an array of national-level macro-financial variables. In common with other advanced economies, the euro area experienced a major financial boom-bust cycle during 2003-2010. Along several important dimensions, this cycle was more severe within the euro area.

The failure to implement sufficiently countercyclical macroprudential and fiscal policies during the boom phase was costly, as was the absence of effective area-wide crisis management institutions once the crisis emerged. While there has been considerable progress in

[18] Lunn (2013) provides an insightful account of decision-making biases during the Irish credit boom.

remedying these policy and institutional failures, much remains to be done, with the recent Five Presidents's Report outlining the range of reforms required to ensure a more robust monetary union. Whether Europe has the political appetite to implement these reforms is a major question for the coming years.

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Table 1: Macro-Financial Cyclical Elasticities I, 1984-2013

	π	ΔRER	ΔCAB	ΔFB
GROW	-1.7***	0.5**	-0.3***	0.3***
	(0.4)	(0.2)	(0.04)	(0.1)
GROW∗euro	1.3*	-0.4	-0.0	-0.2**
	(0.7)	(0.4)	(0.1)	(0.1)
GROW∗neuro	0.8	0.5	-0.2***	-0.1**
	(0.6)	(0.4)	(0.1)	(0.1)
euro	-23.3***	0.8	-1.1*	-4.0***
	(6.2)	(3.2)	(0.7)	(0.7)
neuro	-27.7***	0.1	-0.4	-3.7***
	(6.1)	(3.1)	(0.6)	(0.7)
LDV	0.5***	0.1**	-0.1***	-0.1**
	(0.03)	(0.03)	(0.03)	(0.03)
R^2 (within)	0.37	0.05	0.17	0.32
R^2(between)	0.83	0.03	0.0004	0.0002
R^2 (overall)	0.42	0.05	0.15	0.31
N	975	878	962	850
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Standard errors in parentheses. ***,**,* denote significance at 1, 5 and 10 percent levels respectively. π is the inflation rate; ΔRER is the log change of the real effective exchange rate; ΔCAB is the first difference of the current account balance scaled by GDP. ΔFB is the first difference of the fiscal balance scaled by GDP; GROW is the percentage change of GDP at constant prices; euro is a dummy that equals one if a country is member of the euro area and zero otherwise; neuro is a dummy that equals one if a country is not member of the euro area during its existence and zero otherwise; LDV is the lagged dependent variable.

Table 2: Macro-Financial Cyclical Elasticities II, 1984-2013

	FDI	PORT	DEBT^B	DEBT^T
GROW	0.1	-0.1	-0.1	0.5
	(0.2)	(0.3)	(0.6)	(0.7)
GROW∗euro	-0.2	-1.8***	1.6	0.9
	(0.4)	(0.6)	(1.1)	(1.3)
GROW∗neuro	-0.1	0.005	-0.4	-0.9
	(0.3)	(0.5)	(0.9)	(1.1)
euro	-1.4	3.9	-1.2	8.0
	(3.4)	(5.4)	(9.3)	(10.8)
neuro	-0.2	1.2	0.7	10.7
	(3.3)	(5.2)	(9.0)	(10.5)
LDV	-0.2***	-0.3***	-0.4***	-0.2***
	(0.03)	(0.03)	(0.03)	(0.03)
R^2 (within)	0.20	0.14	0.16	0.09
R^2(between))	0.02	0.33	0.82	0.004
R^2 (overall)	0.20	0.13	0.15	0.09
N	946	921	961	953
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Standard errors in parentheses. ***,**,* denote significance at 1, 5 and 10 percent levels respectively. FDI is the first difference of net FDI outflows scaled by GDP; PORT is the first difference of net portfolio outflows scaled by GDP; DEBT^B is the first difference of net other investment outflows scaled by GDP; DEBT^T is the first difference of net debt outflows scaled by GDP.

Table 3: Macro-Financial Deviations I , 1999-2013

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	C	I	G	CAB	C	I	G	CAB
GROW	-2.1***	0.4***	-0.3***	0.7***	-0.1	0.5***	-0.01	0.1
	(0.4)	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)
R2 (within)					0.04	0.30	0.05	0.07
R2 (between)					0.72	0.01	0.23	0.26
R2 (overall)	0.04	0.30	0.05	0.07	0.10	0.11	0.01	0.02
N	180	180	180	180	180	180	180	180
Country FE	No	No	No	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses. ***,**,* denote significance at 1, 5 and 10 percent levels respectively. GROW is the percentage change of GDP at constant prices; C is the deviation of private consumption from the euro area aggregate; I is the deviation of private investment from the euro area aggregate; G is the deviation of government spending from the euro area aggregate; CAB is the deviation of the current account balance from the euro area aggregate. All variables are scaled by GDP.

Table 4: Macro-Financial Deviations II, 1999-2013

	(1)	(2)	(3)	(4)	(5)	(6)
	ΔRER	π	π^Y	ΔRER	π	π^Y
GROW	0.1	0.1***	0.3***	0.1	0.1***	0.3***
	(0.1)	(0.04)	(0.1)	(0.1)	(0.04)	(-0.1)
R2 (within)				0.82	0.15	0.18
R2 (between)				0.03	0.001	0.06
R2 (overall)	0.82	0.15	0.18	0.80	0.11	0.17
N	168	180	168	168	180	168
Country FE	No	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses. ***,**,* denote significance at 1, 5 and 10 percent levels respectively. GROW is the percentage change of GDP at constant prices; ΔRER is the deviation of the log change of the real exchange rate from the euro area aggregate; π is the deviation of the consumer price index from the euro area aggregate; π^Y is the deviation of the log change of the GDP deflator from the euro area aggregate.

Table 5: Macro-Financial Deviations III, 1999-2013

	FB	DC	FB	DC
GROW	0.7***	1.7***	0.5***	1.6***
	(0.1)	(0.3)	(0.1)	(0.3)
R2 (within)			0.19	0.23
R2 (between)			0.22	0.23
R2 (overall)	0.18	0.23	0.17	0.23
N	180	176	180	176
Country FE	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Standard errors in parentheses. ***,**,* denote significance at 1, 5 and 10 percent levels respectively. GROW is the percentage change of GDP at constant prices. FB is the deviation of the the fiscal balance from the euro area aggregate; DC is the log change in domestic credit.

Table 6: Macro-Financial Deviations III, 1999-2013

	$PORT^N$	FDI^N	$PORT^N$	FDI^N
GROW	-1.8***	0.1	-2.0***	0.01
	(0.3)	(0.2)	(0.4)	(0.2)
R2 (within)			0.27	0.11
R2 (between)			0.00	0.02
R2 (overall)	0.24	0.09	0.24	0.09
N	150	148	150	148.00
Country FE	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Standard errors in parentheses. ***,**,* denote significance at 1, 5 and 10 percent levels respectively. GROW is the percentage change of GDP at constant prices. $PORT^N$ is the deviation of net portfolio outflows from the euro area aggregate; FDI^N is the deviation of net FDI outflows from the euro area aggregate. All dependent variables are scaled by GDP.

Table 7: Current Account Gap 2005-2008: Large Excess Values

Country	Negative	Country	Positive
Croatia	-2.1	Sweden	10.1
Slovakia	-2.4	Germany	7.3
Australia	-3.1	Austria	4.3
Slovenia	-3.2	Japan	4.1
Greece	-3.6	Finland	3.8
Ireland	-3.7	Netherlands	3.5
Portugal	-3.8	Norway	2.6
United States	-4.0		
New Zealand	-4.7		
Spain	-4.9		
Estonia	-5.0		
Lithuania	-5.4		
Serbia	-7.2		
Romania	-7.3		
Latvia	-9.9		
Bulgaria	-16.3		
Iceland	-17.7		

Advanced economies with current account gap values (2005-2008) in excess of 2 percent of GDP in absolute value.

Table 8: External Adjustment I

	(1) CAB	(2) DD	(3) Y	(4) ΔDC	(5) FB
$CAGAP$	-0.74***	1.51***	0.90***	1.30	-0.002
	[-6.96]	[6.34]	[4.57]	[1.02]	[-0.05]
$CAGAP * euro$	-0.28	0.41	-0.14	-1.54	-0.16
	[-1.29]	[1.21]	[-0.53]	[-0.89]	[-0.73]
$euro$	0.03***	-0.17***	-0.13***	0.06	0.01
	[2.98]	[-7.21]	[-6.76]	[1.10]	[1.50]
α	-0.0008	0.10***	0.10***	0.12***	-0.02***
	[-0.14]	[5.69]	[7.43]	[3.20]	[-4.22]
N	64	64	64	59	62
R^2	0.66	0.58	0.45	0.11	0.07

Note: CAB is current account adjustment between 2005-08 and 2012; DD is the change in domestic demand between 2007-08 (average) and 2012; Y refers to the change in real GDP between 2007-08 (average) and 2012; ; ΔDC is the change in ratio of domestic credit to GDP; FB refers to the change in general government structural balance as percent of potential GDP between 2005-08 (average) and 2012. OLS estimation. ***,**,* denote significance at 1, 5 and 10 percent levels respectively.

Table 9: External Adjustment II

	(1) π	(2) RER	(3) EXP	(4) IMP	(5) SFA
$CAGAP$	0.07	0.67	-0.08	0.52***	2.82
	[1.46]	[1.58]	[-1.05]	[3.68]	[0.86]
$CAGAP * euro$	0.26**	-1.45***	-0.36	0.06	-1.78
	[2.06]	[-3.24]	[-1.27]	[0.22]	[-0.49]
$euro$	0.004	-0.04*	-0.02	-0.06***	0.17
	[0.82]	[-1.86]	[-1.39]	[-3.51]	[1.54]
α	-0.01***	0.02	0.05***	0.05***	-0.12
	[-4.39]	[1.22]	[7.09]	[5.70]	[-1.39]
N	64	64	64	64	64
R^2	0.14	0.13	0.06	0.33	0.12

Note: π is change in inflation between 2005-2008 and 2009-2012; RER refers to the log change in real effective exchange rate between 2005-08 and 2012; EXP and IMP are volume growth in exports and imports , respectively, between 2007-2008 and 2012; SFA is the cumulative stock flow adjustment term in the net international investment position over 2009-12. OLS estimation. ***,**,* denote significance at 1, 5 and 10 percent levels respectively.

Table 10: External Adjustment III

	(1) CAB	(2) DD	(3) Y	(4) ΔDC	(5) FB
$CAGAP$	-0.65***	1.55***	0.94***	1.52	0.02
	[-6.78]	[5.48]	[4.13]	[1.03]	[0.46]
$CAGAP * euro$	-0.20	0.54	0.07	-3.03*	-0.02
	[-0.87]	[1.19]	[0.18]	[-1.79]	[-0.09]
$CAGAP * BELL$	-0.52**	-0.03	0.09	-5.02*	0.08
	[-2.58]	[-0.05]	[0.21]	[-1.80]	[0.32]
$euro$	0.03***	-0.17***	-0.14***	0.10*	0.01
	[2.94]	[-6.45]	[-6.16]	[1.95]	[1.02]
$BELL$	-0.01	0.03	0.05	-0.62***	0.04
	[-0.42]	[0.40]	[1.01]	[-3.19]	[0.96]
α	-0.003	0.10***	0.10***	0.11***	-0.02***
	[-0.52]	[5.44]	[7.21]	[2.69]	[-4.10]
N	64	64	64	59	62
R^2	0.69	0.58	0.46	0.19	0.11

Note: BELL is dummy for group consisting of Bulgaria, Estonia, Latvia and Lithuania. CAB is current account adjustment between 2005-08 and 2012; DD is the change in domestic demand between 2007-08 (average) and 2012; Y refers to the change in real GDP between 2007-08 (average) and 2012; ; ΔDC is the change in ratio of domestic credit to GDP; FB refers to the change in general government structural balance as percent of potential GDP between 2005-08 (average) and 2012. OLS estimation. ***,**,* denote significance at 1, 5 and 10 percent levels respectively.

Table 11: External Adjustment IV

	(1) π	(2) RER	(3) EXP	(4) IMP	(5) SFA
$CAGAP$	0.03	0.89**	-0.08	0.54***	3.63
	[0.70]	[2.13]	[-0.82]	[3.15]	[0.96]
$CAGAP * euro$	0.19**	-1.21***	0.07	0.58*	-1.72
	[2.17]	[-2.76]	[0.24]	[1.83]	[-0.46]
$CAGAP * BELL$	0.27**	-1.33*	0.90***	0.99***	-6.69
	[2.35]	[-1.91]	[3.79]	[3.00]	[-1.14]
$euro$	0.004	-0.04*	-0.03**	-0.07***	0.19
	[1.03]	[-1.83]	[-2.22]	[-4.01]	[1.50]
$BELL$	-0.0002	-0.02	0.15***	0.18***	-0.35
	[-0.02]	[-0.29]	[4.14]	[3.73]	[-0.91]
α	-0.01***	0.02	0.05***	0.05***	-0.14
	[-3.99]	[0.91]	[6.79]	[5.46]	[-1.43]
N	64	64	64	64	64
R^2	0.21	0.18	0.17	0.40	0.17

Note: BELL is dummy for group consisting of Bulgaria, Estonia, Latvia and Lithuania. π is change in inflation between 2005-2008 and 2009-2012; RER refers to the log change in real effective exchange rate between 2005-08 and 2012; EXP and IMP are volume growth in exports and imports , respectively, between 2007-2008 and 2012; SFA is the cumulative stock flow adjustment term in the net international investment position over 2009-12. OLS estimation. ***,**,* denote significance at 1, 5 and 10 percent levels respectively.