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### THE SOVEREIGN-BANK NEXUS

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*By K. Nikolov and A. Popov*

The sovereign debt crisis which erupted in the euro area in 2010 affected the global banking system and highlighted the close links between the fates of sovereigns and banks. It also prompted interventions by governments and central banks on a scale comparable to the programmes implemented during the financial crisis of 2008-09 in order to stabilise the banking sector. This article tackles two questions which are currently high on the policy agenda: What are the channels through which sovereign-bank linkages amplify twin fiscal/banking crises? And have tensions in euro area government bond markets been transmitted internationally through the bank lending channel?

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*By Marek Jarociński and Bartosz Maćkowiak*

An important challenge when formulating an econometric time series model in a data-rich environment is the question of how to choose the variables to put in the model. Recent research has developed a simple methodology to choose variables in vector autoregressions. Applying this methodology to euro area data shows that a modeller interested in tracking the price level, real GDP and the short-term nominal interest rate should pay close attention to survey-based indicators of economic sentiment and activity, changes in inventories and interest rate spreads.

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*By E. Angelini and M. Ca' Zorzi*

The balanced current account in the euro area has disguised sizeable imbalances at the country level. The policy debate has concentrated on whether demand in surplus countries should be strengthened or wage growth in deficit countries should be dampened. Using a multi-country model, we evaluate both alternatives. Improvements in wage competitiveness preserve external stability, but have only mildly expansionary effects.

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# THE SOVEREIGN-BANK NEXUS

By K. Nikolov and A. Popov



The sovereign debt crisis in the euro area has highlighted the close connection between the fates of sovereigns and banks. This article addresses two important questions which are currently high on the policy agenda: what are the channels through which sovereign-banking linkages amplify twin fiscal-banking crises, and whether tensions in euro area government bond markets have been transmitted globally through the bank lending channel. We first present a theoretical framework whereby a sovereign debt crisis, modelled as a self-fulfilling loss of confidence in the value of government debt, spills over onto bank solvency. Due to bail out guarantees in case of bank default and to potentially large profits if the crisis is averted, banks choose to increase their sovereign exposures rather than issue equity, amplifying the sovereign debt crisis further. Empirical evidence suggests that balance sheet exposure to sovereign debt securities issued by stressed countries has arrested the recovery in bank lending in the wake of the global financial crisis, with exposed banks engaging to a substantially lower degree in syndicated lending relative to non-exposed banks.

## Banks, regulation and sovereign debt

Banks around the world hold large quantities of government debt owing to its safety and liquidity. However, this makes their capital positions vulnerable to the rare possibility of government bonds losing significant amounts of value. Cooper and Nikolov (2013) look at how this spillover from fiscal problems to bank solvency amplifies sovereign debt crises, which are modelled, following the example of Calvo (1988), as a self-fulfilling loss of confidence in the value of government debt. A loss of confidence leads to higher expected default frequencies and raises interest rates to compensate investors for the increase in risk. In turn, the higher interest costs weaken government finances, thereby confirming the initial loss of confidence.

*The linkages between banks and sovereigns create a powerful amplification mechanism during fiscal crises.*

When we add in banks and sovereigns' exposure to one another, we are left with a powerful amplification mechanism which makes the fiscal crisis much more severe. When large mark-to-market losses materialise on banks' sovereign

bond holdings,<sup>1</sup> the banking system can find itself insolvent and reliant on government support. Governments then issue government debt to raise bailout funds for their banks at precisely the time when government debt is hard to sell in the market. As a result, interest rates rise even higher and the value of government bonds falls even further, deepening the banks' losses and necessitating further bailout assistance. Thus, the sovereign-bank loop acts as a vicious circle.

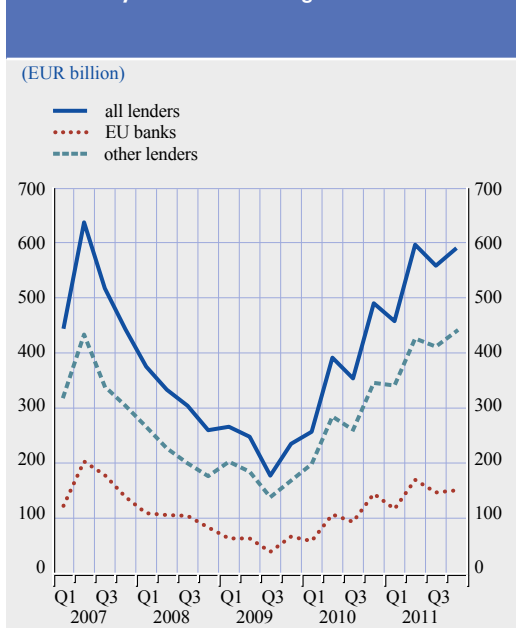
Cooper and Nikolov (2013) show that when banks issue equity against sovereign debt exposures, the sovereign-bank amplification loop ceases to operate because the equity absorbs losses, obviating the need for bailout assistance. However, the paper demonstrates that banks will not choose to issue equity and will instead increase their exposure to sovereigns if sovereign risks increase. The reason for this seemingly puzzling behaviour is traditional moral hazard. Banks make large profits if a fiscal crisis is averted and count on leaving losses to the state when it is not. As a result, sovereign-bank linkages deepen and fiscal crises are amplified further.

## Sovereign debt exposure and bank lending

Sovereign debt and banking fragility reinforce each other, but what is their impact on the real economy? This is looked at by Popov and van Horen (2013), who examine the effect of sovereign debt losses on syndicated bank lending. Data availability and coverage mean that syndicated loans (i.e. loans by a group of banks to a large corporate customer) are particularly well suited to investigating the effect of the sovereign debt crisis on bank lending. Developments in syndicated

<sup>1</sup> Sovereign bond holdings do not need to be marked to market for regulatory purposes when they are held in the banking book. However, it is reasonable to assume that private short-term creditors (especially uninsured creditors) will care about bank solvency at market prices, rather than at hold-to-maturity valuations.

Chart 1 Syndicated lending 2007-11



lending between 2007 and 2011 (see chart) show that in the wake of the global financial crisis of 2008-09, syndicated lending by non-EU banks returned to pre-crisis levels by the end of 2011. However, the recovery in lending by EU banks was much weaker, and lending in the fourth quarter of 2011 was still 25% lower than it had been in the second quarter of 2007.

Popov and van Horen (2013) hypothesise that direct exposure to impaired sovereign debt is the main reason for the weak recovery in syndicated lending by European banks. They isolate a sample of 34 large banks in non-stressed countries and compare lending by banks exposed to sovereign debt issued by stressed countries with lending by non-exposed banks. While the effect on lending is probably more pronounced in stressed countries (i.e. lending by Greek banks to Greek customers), a decline in lending in those countries may be due to the fact that in a recessionary environment, customers

demand less credit and/or depositors reduce their savings to make up for a decline in labour income. Conversely, the identification of the impact that exposure has on lending rests on the fact that shocks to *foreign* sovereigns' creditworthiness are not correlated with *domestic* demand conditions.

Empirical analysis confirms that there is indeed a direct link between the deteriorating creditworthiness of foreign sovereign debt and lending by banks holding this debt on their balance sheets. With the preferred econometric specifications, the data suggest that as of the third quarter of 2010, affected banks increased overall lending by 23.5% less than non-affected banks. This is consistent with the evidence in Correa et al. (2012) and Ivashina et al. (2012) on lending by US banks. The overall reduction in lending is not driven by changes in borrowers' demand and/or quality, or by other types of shock to banks' balance sheets. Thus, the results show that having high levels of exposure to foreign sovereign debt that subsequently became impaired had important negative consequences for bank lending during the euro area sovereign debt crisis. While foreign asset holdings by banks are a natural feature of financially integrated markets, the evidence suggests that excessive pre-crisis purchases of riskier foreign sovereign bonds may have further exacerbated the crisis via reduced bank lending.

*Balance sheet exposure to impaired sovereign debt has weakened the recovery in syndicated lending by banks in non-stressed countries in the wake of the global financial crisis.*

largely by a "flight home" effect, as described in Giannetti and Laeven (2012), by flight away from countries with limited growth opportunities, and by the propensity of affected banks to avoid foreign currency exposures.

Finally, in the early stages of the crisis, the slowdown in lending was weaker for banks that increased their risky sovereign debt exposures during 2010, suggesting that the reduction in lending was halted by carry trade-type behaviour, whereby banks with access to short-term funding initially

The data also suggest that banks cut syndicated lending relatively strongly in the case of non-euro area borrowers (such as the United States and smaller foreign markets) and stressed euro area countries, but not in the case of core European markets (both domestic and foreign). This suggests that the reduction in lending was driven





established longer-term high-yield sovereign bond positions (see Acharya and Steffen, 2012). In the later stages of the crisis, the slowdown in lending was weaker for banks that significantly reduced their debt holdings in 2011, pointing to potential positive effects of central bank asset purchase programmes, such as the ECB's Securities Markets Programme.

## Conclusions

The linkages between banks and sovereigns create a powerful amplification mechanism during fiscal crises. In Cooper and Nikolov (2013), banks are exposed to their sovereigns via their large government bond holdings and the sovereign is exposed to its banks through the need to provide bailout assistance during banking crises. As a result, sovereigns' troubles can infect the banking system, amplifying the fragility of both banks and sovereigns. Popov and van Horen (2013) show that banks that are hit by sovereign debt write-downs significantly reduce lending, with potentially large negative implications for the real economy.

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## CHOOSING VARIABLES IN MACROECONOMIC MODELLING

By Marek Jarociński and Bartosz Maćkowiak

Every modeller building an econometric time series model – e.g. for the purposes of policy projections – must choose the variables that will go in the model. Recent research has developed a methodology to choose variables in vector autoregressions. The methodology is both statistically formal and simple to use. Applying the methodology to euro area data shows that the following variables matter most to a modeller interested in tracking the price level, real GDP and the short-term nominal interest rate: survey-based indicators of economic sentiment and activity, changes in inventories and interest rate spreads. This conclusion holds both in the period before the financial crisis of 2008 and in the period after the crisis.

An important element of the practice of econometrics is model specification. Since Sims (1980), the dominant model in econometrics applied to macroeconomic data has been the vector autoregressive (VAR) model. VARs have been used widely, including at central banks and other policy institutions,

*Choosing variables in macroeconomic modelling can be both formal and simple.*

for forecasting and studying the macroeconomic effects of policy. The key to model specification in the context of VARs is the choice of variables. If a modeller wants to forecast variable  $x$  or calculate the impulse response of  $x$  to a monetary policy intervention using a VAR, which variables should the modeller include in the VAR? For example, if variable  $x$  is the price level, think about the large number of variables that could be of relevance when forecasting and calculating the impulse responses of  $x$ , and then imagine checking all the

possible combinations of this large number of variables. Although assessing the importance of a given variable, taking into account all possible combinations of variables, seems a gargantuan task, recent research conducted at the ECB (Jarociński and Maćkowiak, 2013) has developed a methodology for doing precisely that. The methodology is both formal – as explained below – and very simple. This is because the output of the methodology for any variable in the modeller’s dataset is a single number between zero and one – think of this number as a probability – that summarises the importance of this particular variable when modelling the variable of interest.

This article begins by describing how the methodology works. Then, the findings from applying the methodology to euro area data are presented.

### How to choose variables in VARs

The methodology developed in Jarociński and Maćkowiak (2013) is formal in the sense that it adheres to the following principle of Bayesian statistics: to compare or evaluate models, one needs to examine the out-of-sample predictive performance of the models (i.e. model A is better than

*A single number between zero and one summarises the importance of a particular variable when modelling the variable of interest.*

model B if – and only if – model A forecasts data better out-of-sample than model B). The problem is that it is often time-consuming to evaluate the out-of-sample predictive performance of models. Typically, you have to repeatedly re-estimate models and produce forecasts using an ever-growing data sample. The key contribution by Jarociński and Maćkowiak (2013) is the derivation of an analytical expression for an object called a “Bayes factor”, which lets you evaluate the out-of-sample predictive performance of

VARs. Since this expression is analytical, you can quickly compare alternative variables, allowing you to compare literally millions of different combinations of variables.







## Which variables matter when modelling the price level, real GDP and the short-term nominal interest rate?

In Jarociński and Maćkowiak (2013), we apply the methodology to quarterly euro area data from the first quarter of 1999 to the fourth quarter of 2012. We choose the following variables of interest: the

*Survey-based indicators of economic sentiment and activity, changes in inventories and interest rate spreads are key for modelling the HICP, real GDP and the EONIA.*

HICP, real GDP and the overnight money market rate EONIA. In other words, in our application,  $x$  consists of three variables: a standard measure of the price level, a standard measure of real economic activity and a standard measure of the short-term nominal interest rate in the euro area. In addition to these three variables, our dataset includes 38 macroeconomic and financial variables. For each of these 38 variables, we calculate the output of the methodology: a single number between zero and one that summarises –

based on out-of-sample predictive performance – how much that particular variable matters when modelling the HICP, real GDP and the EONIA. “1” means that the variable is extremely important, and “0” means that the variable is completely unimportant.<sup>1</sup>

The left-hand side of Table 1 shows the ten variables that are the most important for modelling the HICP, real GDP and the EONIA, according to the methodology. The most important variables can be grouped together as follows: (i) survey-based indicators of economic sentiment and activity (industrial confidence, the purchasing managers’ index, and consumer confidence); (ii) various components of real GDP (notably, changes in inventories);<sup>2</sup> and (iii) interest rates on public and private debt (the yield on two-year government bonds and the lending rate to non-financial corporations).<sup>3</sup> Based on this finding, we conclude that a modeller who is interested in tracking the HICP, real GDP and the short-term nominal interest rate should pay close attention to these variables.

The right-hand column in Table 1 shows the ten variables that we find to be associated with the lowest numbers. The least important variables are, for example, exchange rates, house prices,

**Table 1 Most important and least important variables**

Most important variables		Least important variables	
Variable	Importance indicator	Variable	Importance indicator
Changes in inventories	1.00	M3	0.14
Industrial confidence	1.00	Index of stock market volatility	0.13
Purchasing managers’ index	1.00	Commodity prices	0.12
Two-year government bond yield	0.98	Stock index	0.06
Oil price	0.98	Consumer prices excl. energy and food	0.04
Lending rate to non-financial corporations	0.96	Nominal effective exchange rate	0.04
Investment	0.94	Government debt	0.01
Exports	0.94	Loans for house purchases	0.01
Imports	0.91	House prices	0.00
Consumer confidence	0.90	US dollar/euro exchange rate	0.00

<sup>1</sup> Formally, the number that we report for a given variable  $y$  is equal to one minus the probability that the variables of interest  $x$  are “Granger-causally-prior” to the variable  $y$ . “Granger-causal-priority” is a sufficient condition for  $y$  not to matter when modelling  $x$ . See Jarociński and Maćkowiak (2013) for details. Granger-causal-priority is defined in Sims (2010), an unpublished work. Granger-causal-priority is a generalisation of the well-known concept of Granger-causality.

<sup>2</sup> Remember that in introductory macroeconomics, inventories are singled out as the variable that adjusts when “aggregate supply” does not equal “aggregate demand” in the short run.

<sup>3</sup> We refer to these interest rates as “interest rate spreads”, because with a simple adjustment one can express each of these interest rates as a spread relative to the EONIA, which is one of the variables of interest.

Table 2 Most important variables pre- and post-crisis

Pre-crisis		Post-crisis	
Variable	Importance indicator	Variable	Importance indicator
Industrial confidence	1.00	Consumer confidence	0.99
Changes in inventories	1.00	Industrial confidence	0.99
Two-year government bond yield	0.99	Corporate bond spread	0.99
Lending rate to non-financial corporations	0.99	Changes in inventories	0.99
Purchasing managers' index	0.96	Oil price	0.94
Housing investment	0.96	Purchasing managers' index	0.93
Consumption	0.95	Lending rate to non-financial corporations	0.82
Imports	0.94	Exports	0.82
Exports	0.93	Imports	0.80
Mortgage interest rate	0.92	Two-year government bond yield	0.76

loans for house purchases, government debt, stock market-related variables and the broad monetary aggregate M3.

The left-hand side of Table 2 shows the ten most important variables in the pre-crisis sample (i.e. the period from the first quarter of 1999 to the fourth quarter of 2007), while the right-hand side shows the ten most important variables in the post-crisis sample (i.e. the period from the first quarter of 2008 to the fourth quarter of 2012). The findings for the two samples are fairly similar. One notable difference is that the corporate bond spread (i.e. the difference between the interest rate on corporate bonds and the interest rate on government bonds of the same maturity) has been very important since the crisis, but was unimportant before the crisis. Another result worth pointing out is that the price of oil has been particularly important since the crisis.

We also applied this methodology to quarterly US data for the period from the first quarter of 1999 to the fourth quarter of 2012. The results were remarkably similar to our findings for the euro area.

In conclusion, we note that the methodology introduced here can guide the development of dynamic stochastic general equilibrium (DSGE) models.<sup>4</sup> For example, a large literature extends the simple New Keynesian model by adding one or more variables. By “the simple New Keynesian model”, we mean the well-known three-equation DSGE model that makes predictions about the price level (or inflation), output and the short-term nominal interest rate. The findings discussed here suggest that if a researcher is interested in explaining the dynamics of the price level, output and the short-term nominal interest rate, supplementing the simple New Keynesian model with survey data on economic sentiment and activity, data on inventories, and interest rates on government debt and private debt is the most effective way to improve that model.

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<sup>4</sup> An important application of VARs in macroeconomics has been their use guiding the development of DSGE models. See, for example, Christiano et al. (2005) and Altig et al. (2011).





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# EXTERNAL AND MACROECONOMIC ADJUSTMENT IN SPAIN AND GERMANY

By E. Angelini and M. Ca' Zorzi

In many euro area countries, external deficits have improved amid the crisis. Nevertheless, it may be too early to conclude that the adjustment process is over, given the high levels of unemployment. This article analyses the adjustment process using the New Multi-Country Model (NMCM), one of the main structural models used at the ECB for projections and policy analysis.

For many years, the balanced current account in the euro area has disguised sizeable imbalances at the country and sectoral levels (see Chart 1, left-hand side). A large percentage of the academic

*The reallocation of capital within the euro area used to be viewed as benign.*

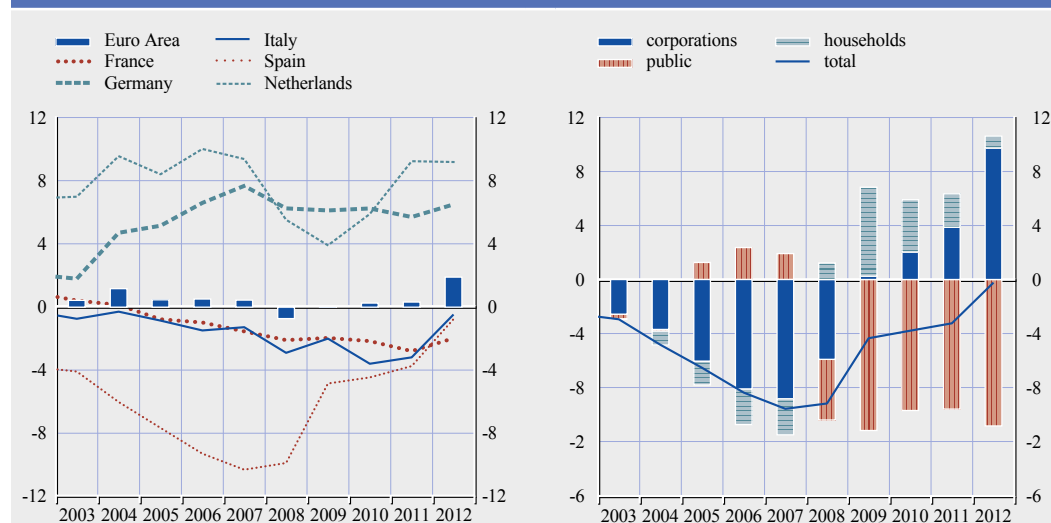
literature used to agree that in a monetary union, policy-makers should not be concerned about heterogeneous current account positions. It was argued that the large current account deficit in Spain in 2007 was offset by the current account surplus in Germany (Williamson, 2007; and Blanchard and Giavazzi, 2002). The reallocation of capital within the euro area was mostly viewed as a benign consequence of the European integration process.

A sectoral decomposition of the current account for the euro area reveals that until 2007, in net terms, the public sector was borrowing, the corporate sector was close to balance and the household sector was lending. However, there was considerable heterogeneity at country level. In the case of Spain, the corporate sector's net borrowing was almost 9% of Spanish GDP in 2007, while the public sector's net lending totalled 2% of GDP (see Chart 1, right-hand side). As the current account rapidly improved, the Spanish private sector – both households and corporations – was forced to adjust significantly.

*Understanding the country dimension of the euro area is critical.*

Following the crisis, the consensus has shifted radically. Understanding the country dimension is now viewed as key, given the limited role, until now, for a common European fiscal and regulatory framework to oversee a strongly integrated bond market (Obstfeld, 2012). The private capital flows from the stressed euro area countries to the core of the euro area may help to explain the strong recessionary forces experienced in those stressed countries. The Spanish unemployment rate has risen to unprecedented levels, prompting the question of whether external rebalancing has

**Chart 1 Current account positions (left-hand scale) and breakdown of net lending in Spain (right-hand scale)**



Sources: Authors' calculations, AMECO and flow of funds data from the euro area accounts.  
Note: All figures are shown as a percentage of GDP.





been achieved at the cost of greater domestic imbalances. A normative assessment based mainly on the external sector, of the kind that is implicit in the IMF's External Balance Assessment (EBA) procedure, is useful but could be too narrow in such circumstances.<sup>1</sup>

### A model-based assessment

To evaluate future adjustment scenarios, a structural modelling framework is helpful (Chen et al., 2012), even if many caveats apply. To this end, we employ the NMCM (Dieppe et al., 2012 and 2013), which is a large-scale model used at the ECB to project developments and conduct policy analysis in the five largest euro area countries. We use the “linked” version, which includes the five

*The NMCM is widely used at the ECB for forecasting and policy assessment.*

countries and a residual block for all other countries in the currency union. Simulations are run by setting monetary policy endogenously using a Taylor rule that is a function of aggregate euro area inflation and the output gap, and they account for trade spillovers. The exchange rate channel operates via uncovered interest rate parity. A fiscal rule is also included to stabilise

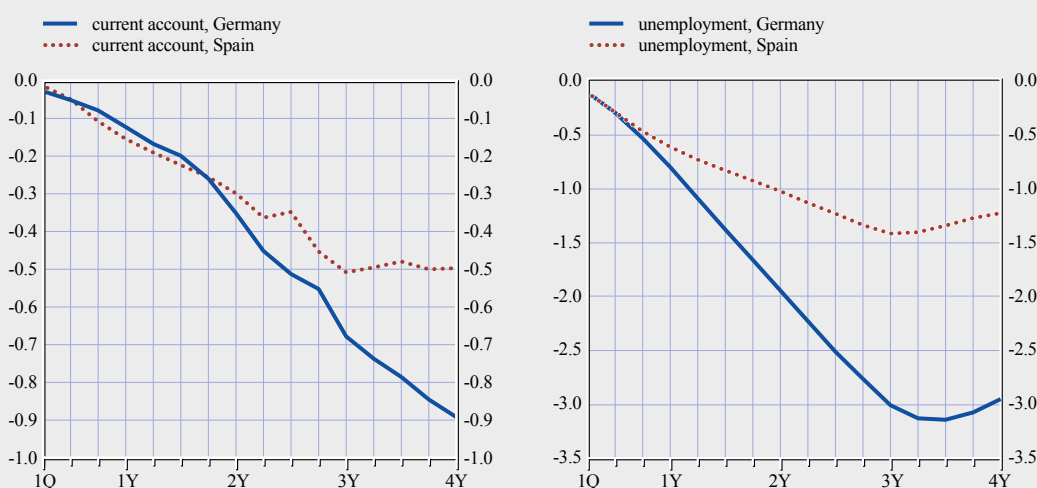
public debt. A model such as this may help to evaluate several different scenarios. The policy debate has often concentrated on whether external imbalances among euro area countries could decline as a result of stronger demand in the surplus countries or slower wage growth in the deficit countries. On this issue, we consider two illustrative scenarios.

### A German-led demand recovery

Consider a recovery characterised by a positive demand shock that is twice as strong in Germany as it is in Spain. Let us assume, more specifically, that consumption increases by 5% relative to the baseline in Germany and by 2.5% in Spain within a period of four years. This could be explained by the different ways in which the crisis has affected the balance sheets of euro area households.

**Chart 2 Impact of a German-led demand shock on current accounts and unemployment rates**

(as percentage of GDP)



Source: Authors' calculations using the NMCM.

Note: Figures are shown as the deviation, in percentage terms, from the baseline.

<sup>1</sup> Empirical literature on external imbalances and the IMF's EBA procedure is based largely on reduced-form panel data regression. The aim is to assess the extent to which the current account position of a given country can be explained by economic fundamentals. Large current account deficits and surpluses are typically left unexplained. Thus any closure of such deficits or surpluses can only be interpreted as a return to equilibrium.

A heterogeneous shock such as this triggers a gain of competitiveness in Spain vis-à-vis Germany, in terms of both relative prices and wages. The simulation shows that the current accounts of both countries worsen, as extra-euro area imports grow. The demand-led recovery helps to reduce unemployment. By construction, however, unemployment falls more in Germany, hence the two countries' economic divergence increases (see Chart 2).

A scenario such as this would not reduce the large unemployment differential in the euro area, since the recovery is skewed towards Germany. Moreover, from a sectoral perspective, net borrowing by households rises considerably in both countries.

### Wage competitiveness shock

Economic policies may also trigger an adjustment in relative price competitiveness. Consider a scenario characterised by a progressive wage cut in Spain, reaching -15% at the end of a four year period, which would imply an internal devaluation vis-à-vis Germany. Under this configuration, the economic divergence between Germany and Spain falls from both an external and an internal perspective (see Chart 3, first and second charts).

At the end of the four-year period, the current account in Spain improves by around 3.6% of GDP relative to Germany, which underscores the importance of relative wage

*A cut in wages improves the external side, but is not enough to deal with high levels of unemployment and puts pressure on debt.*

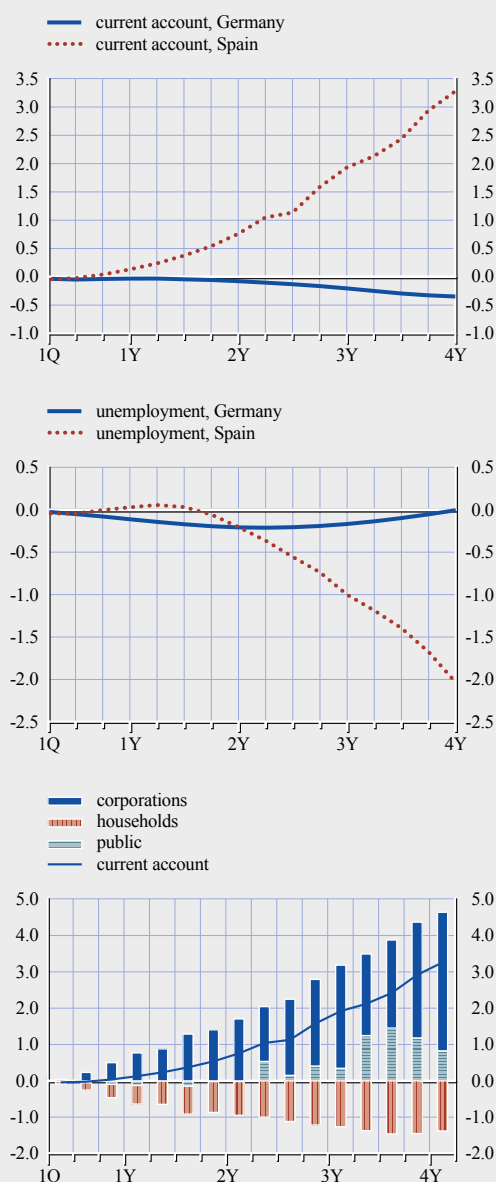
competitiveness for external rebalancing within the euro area. The unemployment gap falls by just over 2 percentage points by the end of the simulation period. The model also suggests that the improvement in the current account is driven mainly by a rise in net lending in the corporate and public sectors (see Chart 3, third chart). However, lower wages lead to higher net borrowing requirements for households as their income falls. Moreover, as a percentage of GDP, government debt increases and net foreign assets decline somewhat, owing to the fall in nominal GDP.

To sum up, stimulus effects on aggregate demand are present, but not overly large, as the recovery is also dependent on global and domestic



**Chart 3 Impact of a wage shock on current account positions, unemployment rates and net lending in Spain**

(as percentage of GDP)



Source: Authors' calculations using the NCMC.

Note: Figures are shown as the deviation, in percentage terms, from the baseline.



demand, a supportive monetary policy and the return of business and consumer confidence (Angelini et al., 2013). This provides support for the views of Galí (2013) and Galí and Monacelli (2013), who consider that wage moderation in one country in the currency union will not greatly increase employment.<sup>2</sup> However, it does help to ensure a balanced recovery over medium-term horizons.

## Conclusion

The balanced current account in the euro area has disguised sizeable imbalances at the country and sectoral levels that may have been an underlying factor in the euro area sovereign debt crisis. While current account deficits have declined, for example in the case of Spain, the unemployment rate has risen very sharply, so the normative conclusion that the adjustment process is over might be premature. The policy debate has often concentrated on whether the adjustment process should take place via stronger demand in the surplus countries or slower wage growth in the deficit countries. Model simulations indicate that, in the first case, the economic outlook improves, but the unemployment gap persists and the current account deteriorates in both surplus and deficit countries. In the second case, the improvement in wage competitiveness helps to preserve external stability, but has only mildly expansionary effects, while net borrowing by households increases. Moreover, as a percentage of GDP, public and private debt might increase. While the selected scenarios have highlighted the contribution of country-specific adjustments and policies in rectifying imbalances, the economic recovery will also depend crucially on global and domestic demand conditions in the euro area as a whole.

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<sup>2</sup> The response by monetary policy (i.e. the endogenous policy channel) is related to aggregate euro area inflation rates. Consequently, the stimulus effect comes almost entirely via some improvement in net trade (i.e. the competitiveness channel).

## Box

**“HETEROGENEITY IN CURRENCY AREAS AND MACROECONOMIC POLICIES”: CONFERENCE HOSTED BY THE ECB ON 28 AND 29 NOVEMBER 2013**

On 28 and 29 November 2013 the ECB hosted a conference entitled “Heterogeneity in currency areas and macroeconomic policies”, which was organised jointly by the ECB’s Monetary Policy Research and Monetary Policy Strategy Divisions, as well as the CEPR. The conference brought together a number of papers highlighting different aspects of heterogeneity and their positive and normative implications. Overall, the various contributions to the conference pointed to the crucial role played by heterogeneities – across both agents and countries – in explaining recent economic developments. The research presented at the conference and the interventions by discussants and the audience showed that policy interventions and the design of policy institutions must take proper account of such heterogeneities.

The conference began with a session on macroeconomic adjustment in currency areas. Atif Mian (Princeton University) gave a keynote speech on the role of risk-sharing in financial crises. He pointed out that during financial crises, the value of collateral falls, while the real value of debt tends to increase, exacerbating the recession. In his view, debt contracts should be redesigned in order to introduce elements of state contingency with regard to aggregate risk. This would increase risk-sharing without increasing the problem of moral hazard, as aggregate risk cannot be affected by the single debtor.

The first session included three further presentations. Rudolf Bems (IMF and Latvijas Banka) presented evidence that developments in Latvia’s trade balance during the recent crisis were partially explained by domestic demand switching from imported goods to domestic goods. He showed that this switch was only partly explained by relative price movements, while the contraction in income played an important role. Jordi Galí (CREI) showed that, in a New Keynesian small open-economy model, increases in wage flexibility are not necessarily welfare-improving when goods prices are not fully flexible, provided that monetary policy does not respond to domestic inflation too strongly (e.g. in the case of a small open economy in a currency area). Frank Smets (ECB) revisited empirical evidence on the role of migration in labour market adjustments. Using survey data for Europe and the United States, he found strong similarities between these two economic areas. For both areas, the role of migration has declined in the last ten years.

The second day of the conference began with a session on fiscal unions and a keynote speech by Emmanuel Farhi (Harvard University) on macro-prudential policies for currency areas. He pointed out that in the presence of financial frictions, which create heterogeneity across agents (e.g. borrowers and lenders), a “Keynesian” type of demand externality emerges, through which transfers from lenders to borrowers are beneficial to all (given the differences in the propensity to consume of these two types of agent). He argued that monetary and macro-prudential policies can be used together to avert or remedy an economic contraction where financial frictions play an important role.

The session continued with a presentation by Luigi Guiso (EIEF) entitled “A culture clash view of the EU crisis”. He presented survey evidence on heterogeneous social attitudes and preferences across a number of euro area countries. He then developed a simple evolutionary game involving equilibria in which excessive punishment of cheats could result in inefficient aggregate outcomes. Delegation to supranational authorities can mitigate these effects for the benefit of all. Fabio Canova (European University Institute) presented work in progress on international spillovers from





fiscal shocks. Using a panel VAR, he showed that spillovers can be highly heterogeneous across countries, although the crisis has increased homogeneity across countries on the periphery of the euro area. The preliminary results point to some benefits for core euro area countries from fiscal contractions in the periphery, possibly owing to the depreciation of the euro. Philippe Martin (Sciences Po) presented preliminary results from his recent paper on leverage and the “Great Recession” in the euro area. He first provided some evidence on the positive relationship between households’ leverage and the depth of the economic contraction across euro area countries and US states. This evidence shows remarkable similarities, on average, across the two economies. He then developed a simple theoretical model with borrowing constraints which captured some of the stylised facts fairly well.

In the last session of the conference, which looked at monetary and financial stability in currency areas, Illenin Kondo (Federal Reserve Board) presented a paper on the relationship between inflation, debt and default. He showed that the co-movement of inflation and consumption growth fluctuates over time. As the real value of debt changes with inflation, and as the price of risk varies with consumption, these fluctuations are reflected in the risk premia for government debt. He then presented a model whereby risk premia are affected by the government’s decision to default. For a given inflation process, the model can match the data fairly well. Matteo Cacciatore (HEC Montréal) presented the results of a paper on optimal market deregulation and monetary policy in a currency area. Strongly regulated product and labour markets (i.e. markets with large monopolistic distortions) reduce welfare, as well as the gains from price and wage stability. He argued that, as deregulation takes place, monetary policy should be accommodative in order to reduce transition costs. In the long run, having more deregulated markets increases the benefits of price stability. Furthermore, reforms may need to be synchronised across countries to reduce trade-offs, as conducting a single monetary policy for the currency area is more effective when countries are more homogeneous. Finally, Margarita Rubio (University of Nottingham) presented an open economy model of macro-prudential policy. The macro-prudential tool consists of a countercyclical rule for loan-to-value ratios. The rule is assumed to respond to house prices, as well as GDP. She finds that the optimal policy should react strongly to house price movements.

The conference programme can be accessed at: [www.ecb.europa.eu/events/conferences/html/131128\\_heterogeneity.en.html](http://www.ecb.europa.eu/events/conferences/html/131128_heterogeneity.en.html)



## RESEARCH BULLETIN 20

### RECENT JOURNAL PUBLICATIONS BY ECB STAFF

**Bañbura, M. and M. Modugno (2012)**, “Maximum likelihood estimation of factor models on data sets with arbitrary pattern of missing data”, *Journal of Applied Econometrics*, published online in November.

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**Giannone, D., M. Lenza, D. Momferatou and L. Onorante (2013)**, “Short-term inflation projections: A bayesian vector-autoregressive approach”, *International Journal of Forecasting*, published online in September.

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#### Imprint

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