

## Economics

9 June 2011 | 24 pages

# Global Economics View

## TARGETing the wrong villain: Target2 and intra-Eurosystem imbalances in credit flows

- We review recent articles by Martin Wolf and Hans-Werner Sinn on the role and interpretation of intra-Eurosystem (Target2) credit imbalances. We dispute their conclusions on both conceptual and empirical grounds.
- Target2 is the payment and settlement system in the euro area for euro transactions between national central banks (and some private participants) with central bank money.
- Increases in Target2 net liabilities of, say, the Central Bank of Ireland (CBI) should not be automatically interpreted as financing of Irish current account deficits.
- The ECB, like any other major central bank, targets an interest rate, not money or credit stocks – those are endogenously/demand-determined by commercial banks.
- Increases in CBI Target2 net liabilities thus do not cause reductions in central bank credit for German, or indeed any other euro area country's, banks.
- The stock of net Target2 claims of the Bundesbank does not reflect its exposure to risk and financial losses of other euro area central banks – the right measure would be the total exposure of the Eurosystem multiplied by the adjusted ECB capital share of the Bundesbank.
- The Interdistrict Settlement Account procedures of the Federal Reserve System do not prevent sustained interdistrict credit imbalances.
- Intra-Eurosystem credit and Target2 imbalances primarily reflect the difficulty of obtaining private market funding for euro area periphery banks. While a serious issue, we argue this is conceptually distinct from the case made by Wolf and Sinn.

---

### Willem Buiter

+44-20-7986-5944  
willem.buiter@citi.com

### Ebrahim Rahbari

+44-20-7986-6522  
ebrahim.rahbari@citi.com

### Jürgen Michels

+44-20-7986-3294  
juergen.michels@citi.com

*With thanks to*  
Deimante Kupcuniene

---

See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

Citi Investment Research & Analysis is a division of Citigroup Global Markets Inc. (the "Firm"), which does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the Firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

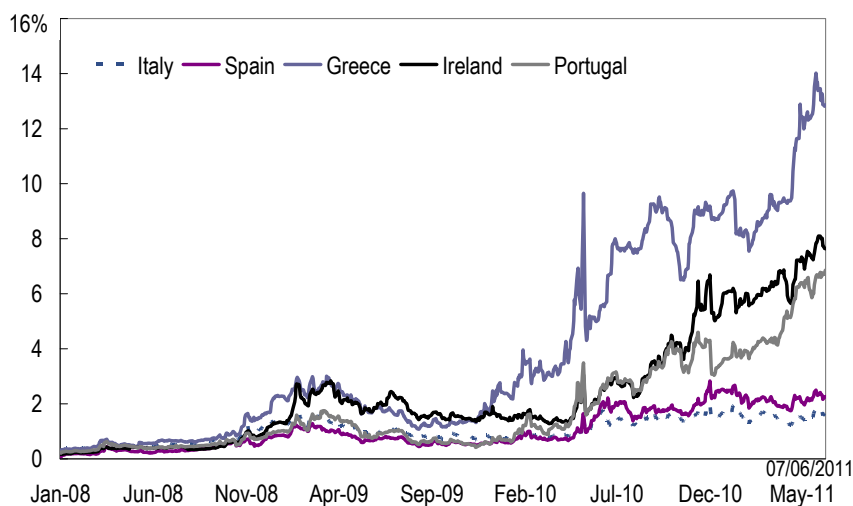
Target2 is the settlement system used by national central banks (NCBs) in the euro area to settle intra-euro area transactions

Target2 net liabilities of euro area periphery NCBs have increased strongly recently, with corresponding increases in the net Target2 credit position of the Bundesbank

## TARGETing the wrong villain: Target2 and intra-Eurosystem imbalances in credit flows

The sovereigns and the banking systems in the euro area periphery (EAP), notably in Greece, Portugal, and Ireland are under stress (Figure 1). In order to avoid needlessly aggravating the situation in these countries, it is imperative to avoid jumping to gloomy conclusions when confronted with potentially worrying data. Careful scrutiny of the data to achieve a full understanding of what they mean should come first.

Figure 1. Selected Countries – 10-year Sovereign Bond Spreads vs German Bunds, Jan 2008 – Jun 2011



Source: Bloomberg, Citi Investment Research and Analysis

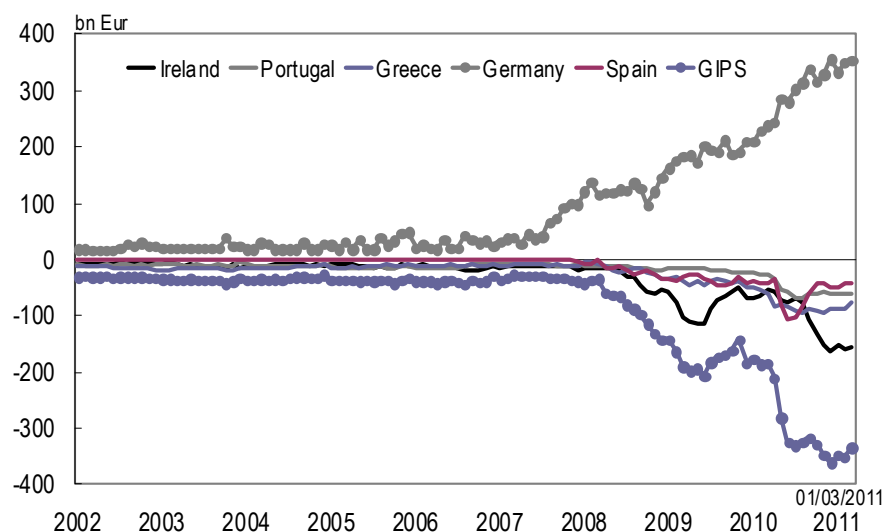
In this note, we examine a recent article by Martin Wolf in the Financial Times ('Intolerable choices for the eurozone', Financial Times, May 31, 2011), which discusses a lecture recently given by Professor Hans-Werner Sinn.<sup>1</sup> The subject of these contributions are intra-Eurosystem imbalances in money and credit flows.<sup>2</sup> Transactions between the national central banks or between national central banks and the ECB are recorded and settled in the Trans-European Automated Real-time Gross Settlement Express Transfer System or Target2, giving rise to (gross and net) national central bank claims on, or liabilities to, other national central banks in the euro area (EA).<sup>3</sup> Target2 imbalances within the Eurosystem have recently risen substantially, with the EA periphery, in particular the Central Bank of Ireland (CBI), recording larger net debt positions vis-à-vis Target2, while the Bundesbank expanded its net claims (Figure 2).

<sup>1</sup> The Wolf article can be found here: <http://www.ft.com/intl/cms/s/0/1a61825a-8bb7-11e0-a725-00144feab49a.html#axzz1NuQTKYWd>. The Sinn lecture has not been available to us, but an article of his on the same topic and published a few days later is Sinn (2011), 'The ECB's stealth bailout', vox, June 1, 2011, <http://www.voxeu.org/index.php?q=node/6599>. These posts have also been commented on favourably by Paul Krugman on his blog (<http://krugman.blogs.nytimes.com/2011/06/01/the-euro-living-dangerously/>). Related work has been done by John Wittaker, see e.g. Wittaker (2011), 'Intra-eurosystem debts', <http://www.lancs.ac.uk/staff/whittaj1/eurosystem.pdf>.

<sup>2</sup> The Eurosystem comprises the European Central Bank (ECB) and the national central banks of the member states which have adopted the euro, currently 17 in number.

<sup>3</sup> Private market participants also use the Target2 system, but are not our concern in this note.

Figure 2. Selected Countries – Target2 Net Claims (bn Eur.), 2002 – 2011



Notes: Germany: Other Assets of the Bundesbank. Spain: Banco de Espana: Liabilities: Other euro area countries: MFIs: of which: euro. Greece: Bank of Greece: Liabilities: Liabilities to Other MFIs: Other Euro Area Countries. Portugal: Central Bank Balance Sheet Liabilities: Non-Residents: Deposits & Related Instruments. Ireland: Central Bank Liabilities: Other Liabilities. GIPS is the sum of Greece, Portugal, Ireland, and Spain.  
Source: Haver, Bundesbank, Central Bank of Ireland, Bank of Greece, Banco de Espana, Banco de Portugal, Citi Investment Research and Analysis

Martin Wolf and Hans-Werner Sinn argue that:

- i) Target2 net liability increases of euro area periphery (EAP) NCBs finance EAP current account deficits
- ii) Target2 net liability increases of EAP NCBs crowd out central bank credit for the German banking system
- iii) The stock of Target2 NCB debt should be added to measures of public indebtedness of EAP sovereigns
- iv) Bundesbank Target2 net claims represent its exposure to financial losses
- v) The settlement procedures of the Federal Reserve System prevent persistent interdistrict credit flows

Based on these data, Wolf and Sinn draw several conclusions, notably i) that increases in Target2 net liabilities of EAP central banks are used to finance the current account deficits of Ireland, Portugal and Greece, ii) that increases in EAP NCB Target2 net liabilities and the increases in EAP central bank financing that these facilitate crowd out credit to the banking system in core EA countries, notably Germany, iii) that NCB Target2 net liabilities should be included in measures of (gross and net) indebtedness of EAP sovereigns, iv) that Bundesbank net Target2 claims somehow reflect exposure to risk and financial losses for the Bundesbank and v) that the clearing and settlement procedures of the Federal Reserve system in the US prevent the persistence of large interdistrict imbalances in credit flows.

We would disagree with these conclusions, both conceptually and empirically.

First, rising net debt of EA periphery central banks to Target2 is, in principle, consistent with surpluses, deficits and zeroes in the current account balance of their respective member states. Recently, rising Target2 net debt levels of EAP NCBs reflect difficulties of the local banking system in obtaining private market funding. They may or may not be associated with current account deficits, and even when they are the causation may or may not run from current account deficits to Target2 financing. Current account deficits of EAP countries can be, and have been, financed from sources other than increasing Target2 net debt, and increases in Target2 net debt can result from transactions that do not fund the current account of the balance of payments or the trade balance. For instance, the largest increases in CBI net debt to Target2 were recorded in 2010, when the Irish current account was almost in balance. In 2008 and 2009, increases in CBI Target2 net liabilities were also multiples of the level of the Irish current account deficit. Just as correlation does not imply causation, the absence of a correlation does not imply the absence of causation, but we interpret this evidence as at least suggestive of a marginal role of current account deficits in the build-up of Target2 net liabilities. Deposit flight from EAP banking systems and more general funding difficulties of EAP banks are likely more relevant, if not less worrying.

**We disagree with these conclusions.**

- i) **There is little evidence that recent EAP NCB Target2 net liability increases have mainly financed EAP current account deficits**
- ii) **Target2 net liability increases of EAP NCBs do not crowd out central bank credit in the core**
- iii) **Adding CBI Target2 liabilities to Irish general government gross debt is not an appropriate way to calculate the gross debt of the consolidated Irish general government**
- iv) **The stock of Bundesbank Target2 net claims is not a correct measure of the exposure to risk and financial losses of the Bundesbank**
- v) **Settlement procedures in the Federal Reserve System allow persistent interdistrict credit flows**

Second, increases in the Target2 net liabilities of one NCB do not imply reduced central bank financing of or credit to the domestic banking system in another member state. The ECB controls an interest rate (strictly a corridor defined by the triplet of interest rates) in the euro area. The stock of base money (currency plus central bank overnight credit to eligible banks and other deposit-taking institutions) and the stock of central bank credit are then determined endogenously, i.e. demand-determined by commercial banks. This is true also when the ECB operates a partial allotment/limited tender regime (as it has done in the past), i.e. when it does not operate a full-allotment regime at all the maturities at which it provides central bank credit against collateral. Then, commercial banks may not obtain the desired amount of central bank liquidity in each facility (for each maturity), notably through the main refinancing operation (MRO), at the posted official (refi) rate. However, even then, the marginal lending facilities operate full allotment regimes for commercial banks to obtain overnight credit, as long as they have sufficient eligible collateral. An increase in CBI Target2 net liabilities therefore does not imply a reduction in central bank credit availability for German banks. Central bank credit to German banks has indeed fallen sharply recently, but this more likely reflects less attractive funding conditions of and costs for central bank credit and more attractive alternative funding sources.

Third, adding CBI Target2 liabilities to the gross debt of the Irish general government would not constitute the proper way of computing the gross debt of the Irish consolidated general government (the aggregate of the CBI and the Irish general government). To calculate that measure, the non-monetary debt of the CBI (which includes the Target2 liabilities of the CBI) would need to be added to Irish general government gross debt and general government deposits with the CBI, and general government debt held by the CBI would need to be deducted. The gross debt of the consolidated general government generally tends to be larger than the conventionally computed general government gross debt, while consolidated general government *net* debt – which is arrived at by deducting the financial liabilities of the consolidated general government from its liabilities – is in general smaller than conventional measures of general government net debt.

Fourth, Target2 net claims of NCBs, such as the Bundesbank, do not reflect their (or their sovereign's) exposure to risk and financial losses. Losses (and profits) from conventional monetary policy, liquidity and credit operations are pooled and shared between all NCBs in the Eurosystem according to their respective ECB capital shares, irrespective of where in the Eurosystem that loss occurs. The exposure of the Bundesbank to risk and financial losses from Eurosystem operations is thus given by the total exposure of the Eurosystem multiplied by the Bundesbank's adjusted ECB capital share. Only exposures and possible losses arising from the provision of emergency liquidity assistance (ELA) are not included in the profit or loss pooling arrangements of the Eurosystem, and are for the books of the NCB and its sovereign only, as long as the sovereign is itself solvent.<sup>4</sup> Target2 balances play no role in these calculations.

Fifth, the Interdistrict Settlement Account System of the Federal Reserve System in the US does not imply a substantially reduced scope for persistent imbalances in credit flows within the US currency area. While it is true that interdistrict imbalances need to be settled once a year with gold-backed securities or Treasury bills, individual district banks can purchase these securities in the open market and finance these purchases with base money creation. Therefore the US system does not effectively constrain interdistrict credit flows.

---

<sup>4</sup> See also [ELA: An Emperor without Clothes?](#) and [ELA Revisited: A Clarification](#)

Intra-Eurosystem credit imbalances mainly reflect the difficulty of obtaining private market funding for EAP banks

We do not argue that intra-Eurosystem credit imbalances reflected in outstanding Target2 net balances are benign, or that they do not carry any significance or even that there are no circumstances in which they could become a source of funding for unsustainable current account deficits or government deficits. In our view, however, they are primarily to be understood as reflections of the difficulty – or impossibility – in obtaining private market funding faced by large parts of the domestic banking systems of the EA periphery. That difficulty is indeed a serious issue and its resolution likely requires decisive bank recapitalization and (sovereign and unsecured bank) debt restructuring, but it is conceptually and empirically separate from the scale of EAP current account deficits and Target2 net lending to the EA periphery banking system, in our view.

## A stylized model of balance sheets in the euro area

We present stylized balance sheets for a simplified version of the euro area, consisting of Germany and Ireland

Each country consists of three sectors: the national central bank, the banks and the rest of the economy

In addition, there is a stylized version of the ECB/Target2, borrowing from and lending to the NCBs

To make our conclusions precise, we present a stylized balance sheet for a simplified version of the euro area. Assume that the euro area consists of just two countries, Germany (G) and Ireland (I). Generalisation to 17 countries is trivial but messy. For simplicity, again, we view this euro area as closed – there is no trade or financial interaction with the rest of the world. Official foreign exchange reserves are therefore omitted from the asset menu of the NCBs and the ECB. For each country we have three sectors – the central bank, the banking sector and the rest of the economy. So for Germany we have the Bundesbank (BB), ‘German banks’ (GB) and ‘Rest of Germany’ (RG), which consists of the non-bank financial sector, the private non-financial sector (households and businesses) and government. For Ireland we have the Central Bank of Ireland (CBI), ‘Irish Banks’ (IB) and ‘Rest of Ireland’ (RI), defined analogously to Germany.

There is also Target2 (T), a stripped-down version of the ECB. All it does is lend to or borrow from the NCBs. It does not issue base money itself – only the NCBs do, and it has no assets (A) or liabilities (L) other than its gross claims on and gross liabilities to the NCBs. We use the notation  $D^{ij}$  to denote the gross debt of sector  $i$  to sector  $j$ , so these are  $D^{T,BB}$ ,  $D^{BB,T}$ ,  $D^{CBI,T}$  and  $D^{T,CBI}$ .

Each NCB has as its assets the gross debt that Target2 has to it ( $D^{T,BB}$  and  $D^{T,CBI}$ ). On the liability side of each NCB’s balance sheet is the gross debt it owes to Target2 ( $D^{BB,T}$  and  $D^{CBI,T}$ ). The only other liability of each NCB is the national monetary base ( $M^G$  for Germany,  $M^I$  for Ireland). In the real world, the monetary base includes currency as well as overnight deposits/reserves held with the central bank by its eligible deposit-taking institutions, but we abstract from currency and from non-monetary liabilities of the central bank other than its Target2 liabilities. The monetary base in each country thus equals the debt of the central bank to its banks ( $M^G = D^{BB,GB}$ ,  $M^I = D^{CBI,IB}$ ). The only other asset of the NCB is the gross debt the domestic banks have to it ( $D^{GB,BB}$  and  $D^{IB,CBI}$ , loans from the central bank to eligible deposit-taking institutions, or ‘central bank credit’). We thus abstract from any outright holdings of government or private sector debt other than domestic bank loans by NCBs and debt to Target2.

For simplicity, the central banks and the commercial banks are not assumed to hold any foreign securities, but the rest of the economy does ( $D^{RI,RG}$  and  $D^{RG,RI}$ ). The rest of the economy also has deposits with domestic banks ( $D^{IB,RI}$  and  $D^{GB,RG}$ ) and foreign banks ( $D^{IB,RG}$  and  $D^{GB,RI}$ ), but the rest of each national economy can borrow only borrow from domestic banks ( $D^{RI,IB}$  and  $D^{RG,GB}$ ) and from the rest of the other national economy,  $D^{RI,RG}$  and  $D^{RG,RI}$ .

In addition, the Rest of Germany hold as an asset the German capital stock, denoted  $K^G$ , which is the value of the real (non-human) assets in Germany, such as land and the physical capital stock. The balance sheet of the Rest of Ireland (RI) and its components are defined analogously. The central banks jointly own Target2 (the ECB), with the BB owning a share  $s$  and the CBI owning a share  $1-s$ . The net worth of a sector is the excess of the value of its assets over the value of its liabilities. It is denoted  $W^i$  for sector  $i$ .

Figure 3. Stylised Balance Sheet of a Simplified Euro Area

Bundesbank (BB)		Target2 (T)		Central Bank of Ireland (CBI)	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
$D^{GB, BB}$	$D^{BB, GB}(=M^G)$			$D^{IB, CBI}$	$D^{CBI, IB}(=M^I)$
$D^{T, BB}$	$D^{BB, T}$	$D^{BB, T} + D^{CBI, T}$	$D^{T, BB} + D^{T, CBI}$	$D^{T, CBI}$	$D^{CBI, T}$
$sW^T$				$(1-s)W^T$	
	$W^{BB}$		$W^T$		$W^{CBI}$
German banks (GB)				Irish banks (IB)	
Assets	Liabilities			Assets	Liabilities
$D^{BB, GB}(=M^G)$	$D^{GB, BB}$			$D^{CBI, IB}(=M^I)$	$D^{IB, CBI}$
$D^{RG, GB}$	$D^{GB, RG}$			$D^{RI, IB}$	$D^{IB, RI}$
	$D^{GB, RI}$				$D^{IB, RG}$
	$W^{RG}$				$W^I$
Rest of Germany (RG)				Rest of Ireland (RI)	
Assets	Liabilities			Assets	Liabilities
$D^{GB, RG}$	$D^{RG, GB}$			$D^{IB, RI}$	$D^{RI, IB}$
$D^{RI, RG}$	$D^{RG, RI}$			$D^{RG, RI}$	$D^{RI, RG}$
$D^{IB, RG}$				$D^{GB, RI}$	
$K^G$				$K^I$	
	$W^{RG}$				$W^I$

Source: Citi Investment Research and Analysis

By consolidating the accounts of the Bundesbank (BB), German Banks and the Rest of Germany (RG), we get the balance sheet of Germany (G). On the asset side, Germany has the gross debt of Target2 to the Bundesbank, the gross liabilities of the Rest of Ireland to the Rest of Germany, the gross liabilities of Irish banks to the Rest of Germany, the German capital stock and the share of the Bundesbank in the equity of the ECB/Target2. On the liability side, it has the gross debt of the Bundesbank to Target2, the gross liabilities of the Rest of Germany to the Rest of Ireland and the gross liabilities of the Rest of Germany to Irish banks. Again, analogous entries appear on the balance sheet of Ireland (I) which is a consolidation of the balance sheets of the CBI, the Irish banks and the Rest of Ireland.

Figure 4. Stylised Consolidated Balance Sheet of Germany, Ireland and the Euro Area

Germany (G)		Euro Area (EA)		Ireland (I)	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
$D^{T, BB}$	$D^{BB, T}$			$D^{T, CBI}$	$D^{CBI, T}$
$sW^T$		$W^T$		$(1-s)W^T$	
$D^{RI, RG}$	$D^{RG, RI}$	$K^G + K^I$		$D^{RG, RI}$	$D^{RI, RG}$
$D^{IB, RG}$	$D^{GB, RI}$		$W^{EA}$	$D^{GB, RI}$	$D^{IB, RG}$
$K^G$				$K^I$	
	$W^G$				$W^I$

Source: Citi Investment Research and Analysis

For completeness, we also give the balance sheet of the consolidated euro area (EA), which consists of the sum of the German and Irish stocks of real capital and the net worth of Target2 (this last item equals zero in this simplified economy).

## Do increases in CBI net Target2 liabilities reduce ECB/Bundesbank credit for German banks?

Transactions that result in increases in the CBI's net Target2 liabilities may be associated with reduced or unchanged central bank credit of German banks – it is the German banks that decide

Professor Sinn in the aforementioned article (Sinn (2011)) presents an example that is meant to illustrate the mechanism by which Target2 imbalances are created. The example is intended to illustrate that i) increases in CBI Target2 net debt finance Irish current account deficits, and ii) increases in CBI Target2 net debt reduce credit for German banks. This section is concerned with the former.

Assume, as Sinn does, that an Irish farmer borrows  $X$  euro from an Irish bank to purchase a (second-hand) German tractor.<sup>5</sup> In what follows, an increase in the value of any stock by an amount  $X$  euro is denoted by the symbol for that stock followed by  $\uparrow$ . If the stock is unchanged, the symbol for that stock is followed by  $\rightarrow$ , and if the stock falls, the symbol for that stock is followed by  $\downarrow$ . As a result of this transaction, in terms of the above notation, the Irish capital stock increases ( $K^I \uparrow$ ) and loan balances of Rest of Ireland with Irish banks increase ( $D^{RI,IB} \uparrow$ ). Now assume (note that this is an assumption, if not an implausible one), that instead of reducing its assets or borrowing from other sources, the Irish bank increases its borrowing from the CBI ( $D^{IB,CBI} \uparrow$ ). The CBI in turn increases its (gross and net) debt to Target2 ( $D^{CBI,T} \uparrow$ ). Thus, the sizes of the balance sheets of the Irish banks, the Rest of Ireland and the CBI have all increased ( $A^{IB} \uparrow, A^{RI} \uparrow, A^{CBI} \uparrow$ ). Central bank credit to Irish banks has also increased, while the Irish monetary base (which is here equal to the deposits of Irish banks with the CBI) has remained unchanged ( $D^{IB,CBI} \uparrow, M^I \equiv D^{CBI,IB} \rightarrow$ ).

Meanwhile, in Germany the capital stock falls ( $K^G \downarrow$ ), while deposits of the Rest of Germany with German banks increase ( $D^{GB,RG} \uparrow$ ). Now German banks face a *choice*. They can take the increased deposits of the Rest of Germany and deposit them with the Bundesbank ( $D^{BB,GB} \uparrow$ ). In that case, the German monetary base and the balance sheet of the Bundesbank would rise ( $D^{BB,GB} = M^G \uparrow, A^{BB} \uparrow$ ), and as a result also the total monetary base in the euro area ( $M^G \uparrow + M^I \rightarrow = M^E \uparrow$ ). The balance sheet of German banks would fall, while Bundesbank credit to German banks remains unchanged ( $A^{GB} \uparrow, D^{GB,BB} \rightarrow$ ), despite the fact that the CBI's net Target2 liabilities have increased and the Bundesbank's Target2 net claims have risen. This scenario does not fit Sinn's narrative. In fairness, Sinn (2011) does in fact seem to allow for the possibility of this scenario but dismisses it and instead focuses on a second scenario.<sup>6</sup>

The second scenario assumes instead that German banks, after receiving the deposits from the Rest of Germany, decide, instead of depositing the funds with the Bundesbank, to reduce their loans from the Bundesbank ( $D^{GB,BB} \downarrow$ ). In that case, the German and euro area monetary base would remain unchanged ( $M^G \rightarrow + M^I \rightarrow = M^E \rightarrow$ ). The sizes of the balance sheets of German banks, the Bundesbank and the Rest of Germany would also remain unchanged ( $A^{GB} \rightarrow, A^{BB} \rightarrow, A^{RG} \rightarrow$ ). Bundesbank credit to German banks would fall ( $D^{GB,BB} \downarrow$ ).

<sup>5</sup> A second-hand German tractor is part of the German capital stock. The essence of the example is unchanged if it were a newly produced tractor, but the accounting treatment would have to be slightly different.

<sup>6</sup> "However, the new money coming into the German economy as a result of the payment for the tractor is likely to crowd out normal German money creation by way of the Bundesbank's lending to German banks. *The crowding out will not necessarily occur*, but it is the normal case to be expected as, given Germany's GDP and given Germany's payment habits, the commercial banks only need a certain amount of euros for circulation in Germany." Sinn (2011, op.ed.)

The ECB does not set the stock of base money or credit in the euro area – it sets interest rates and base money and credit are endogenously determined

We do not argue that the second scenario is any more or any less likely than the first scenario. However, we would strongly suggest that even if the second scenario came to pass, it would not allow the conclusion that the increases in CBI Target2 net liabilities *caused* Bundesbank credit to German banks to fall. As the above discussion makes clear, if Bundesbank credit to German banks fell in such a scenario, it would be the result of a *choice* made by German banks.

In our view, Professor Sinn's interpretation can only be rationalised if the view were held that the ECB held the monetary base in the euro area constant in the above example. In fact, Professor Sinn states that "...strict crowding out is inevitable if the ECB controls the overall stock of central bank money in the Eurozone by way of sterilising interventions or auctioning off limited tenders". From  $M^E = M^G + M^I$ , it is clear that if euro area monetary base and the monetary base in Ireland remain constant, German monetary base will need to remain constant, too, consistent with the second scenario, under which Bundesbank credit to German banks fell, but not with the first, under which it did not.

However, we see no good reason why total base money in the euro area,  $M^E$ , should remain constant when  $M^I$  remains constant or when the CBI's net liabilities to Target2 increase. Certainly, we see no reason to believe that EA base money supply would remain constant at the insistence of the ECB. The ECB does not actually choose to control the overall amount of central bank money or credit, even though it could. Indeed no modern central bank has attempted to control base money. The main monetary instrument (leaving aside reserve requirements etc.) is, in principle, either the price of borrowing base money/bank reserves from the central bank by eligible deposit-taking institutions, or the quantity of base money (central bank overnight credit to the banks plus currency in circulation, the latter component omitted by us for simplicity). Modern central banks, including the ECB, set the price of central bank credit. In the case of the ECB, the official policy rate is the interest rate on the weekly main refinancing operations (MRO) or refi rate for short term money (currently 1.25 percent). The quantity of central bank credit is then endogenously determined, i.e. demand-determined by commercial banks.

### Partial allotment does not imply fixing the stock of base money

Base money is demand-determined in the euro area irrespective of whether the ECB operates a full or partial allotment regime for its main refinancing operation – there is always a 'full allotment regime' for the marginal lending facility

The ECB, like most modern central banks, operates a 'corridor system' for setting its official policy rate. The main refinancing or refi rate is the rate at which the ECB provides financing to eligible counterparties, against adequate collateral, for a weekly maturity. It currently stands at 1.25%. In addition to the refi rate, the ECB sets the rate on the deposit facility, which banks may use to make overnight deposits with the Eurosystem (currently 0.50%) and the rate on the marginal lending facility, which offers overnight credit to banks from the Eurosystem (currently 2.00%).

Note that the upper and lower bound of the corridor are for *overnight* lending and *overnight* borrowing respectively. The refi rate, however, is not an overnight rate, but the rate for one-week maturity collateralized lending by the central bank. If the central bank wished to set the safe overnight lending and borrowing rate, it could simply set the width of the interest rate corridor to zero - the interest rate on the marginal lending facility would be equal to the interest rate on the deposit facility. The refi rate would then be the rate at which the central bank would accept any amount of overnight deposits, as well as the rate at which it would be willing to lend any amount overnight, against suitable collateral. This interest-rate pegging facility should be available 24/7. This procedure would be the real-world expression of the

text-book ideal-type for setting or pegging a price or an interest rate. This would either make the overnight interbank market redundant or ensure that the overnight interbank rate, Eonia, would also equal the refi rate, except for the small differences introduced by counterparty risk and the fact that EONIA is an unsecured lending rate. The euro area equivalent of Ronia (Repurchase Overnight Index Average) would be a secured version of Eonia.

But the ECB, like most other central banks, believes that it can control both the price of central bank credit and its quantum. So as well as setting the price of central bank credit (the refi rate) it also, during normal times guesses/estimates the amount of credit that will be demanded by its counterparties at that refi rate and auctions that quantity using variable rate tenders with a minimum bid rate given by the refi rate. It is then hoped that the overnight interbank rate (Eonia) will not end up too far north or south of the refi rate. The deviations of Eonia from the refi rate are of course bounded by the existence of the interest rate corridor (assuming sufficient eligible collateral). Since October 15 2008, the ECB instead uses fixed rate tenders.<sup>7</sup> Since that date, the ECB has also engaged in fixed rate, full-allotment auctions of longer-term credit, up to 12 months for a time, although the maximum duration has now been reduced to 3 months, which had been the maximum duration before the financial crisis.

Note that, with the variable rate, fixed amount or limited tender procedure that prevailed between June 2000 and October 15 2008, no amount of lending to or borrowing from the ECB was actually guaranteed at the refi rate. If total bids exceeded the amount of liquidity offered by the ECB, bids would either be satisfied pro-rata (for the fixed-rate procedure) or in full for bids above the 'marginal rate of allotment' – the lowest rate bid before the indicated amount of liquidity to be provided is exhausted.

It is key to note that the ECB (and all other central banks) *always* operate an interest-rate setting rule, that is, a 'full allotment' system for overnight central bank credit (against high-grade collateral) for eligible counterparties, that is, even when it operates through variable rate limited tender auctions for credit with a maturity longer than overnight, and not through full allotment auctions. The amount of central bank credit of longer maturity (one week or more) is limited or controlled by the ECB under a partial allotment regime, but the total is not. Under the current full-allotment regime, even the amount of central bank credit of longer (weekly) maturity is not set by the ECB. The statement by Professor Sinn (2011): *"Moreover, strict crowding out is inevitable if the ECB controls the overall stock of central bank money in the Eurozone by way of sterilising interventions or auctioning off limited tenders."* is therefore not a characterisation of any interest-rate setting and credit auctioning regime that the ECB has ever implemented.

In terms of the notation above, no mechanical connection exists between an increase in the Target2 net liabilities (assets) of the CBI (Bundesbank) and a fall in Bundesbank credit to German banks.  $M^G$ , the monetary base in Germany, and  $M^E$ , total base money in the euro area are determined, subject to the banks having sufficient collateral available, by the demand of German and euro area commercial banks, respectively, for base money at the refi rate (or at rates defining the refi corridor).  $M^G$  may rise, fall, or stay constant when Target2 net liabilities of the CBI rise, and so may Bundesbank credit to the German banking system.

---

<sup>7</sup> From January 1, 1999 till June 2000, the ECB also used fixed rate tenders.

Central bank credit to German banks has fallen recently, but the reduction is likely due to the reduced attractiveness of ECB funding relative to other funding sources rather than increases in CBI Target2 net liabilities

Figure 5 and Figure 6 depict the evolution of central bank credit and the monetary base in Germany, Ireland and the euro area. As Figure 5 shows, the stock of central bank credit to German banks has indeed fallen sharply recently, from a high of almost €300bn in October of 2008 to below €65bn for the last available data (April 2011). Eurosystem credit to Irish banks (even excluding Emergency Liquidity Assistance (ELA) provided by the CBI) has seen no such fall. Its levels reached a maximum of €136bn only in November 2010 and remain high at over €105bn in April 2011. Including ELA, the maximum was reached only in February 2011 at a level of €185bn and had fallen to €158bn by April 2011. The monetary base in Germany and in the euro area as a whole has remained relatively constant (and has even fallen somewhat recently) since the beginning of 2009, at levels of €250bn – €300bn for Germany and €1trn – €1.3trn for the euro area. While these data are consistent with Sinn's preferred scenario discussed above, they do not constitute evidence that it was the increase in CBI credit to Irish banks that reduced Bundesbank credit to German banks, nor that the ECB fixed the monetary base at a certain level. Observationally equivalent but, in our view, more plausible alternative explanations exist.

We believe it is more likely that German banks *chose* to demand less Bundesbank credit after the fall of 2008. After the expiration of the 12-month long-term refinancing operation (LTRO) in July 2010, such credit was a lot less attractive to banks, giving one good reason to reduce demand of commercial banks for Bundesbank/ECB credit.<sup>8</sup> Another reason for this relative unattractiveness of central bank credit could be that German commercial banks could by then access other sources of financing that were relatively more attractive, such as domestic or foreign private deposits. Figure 5 already contains some evidence in favour of such a hypothesis, as it shows that ECB lending to commercial banks in the euro area as a whole also declined sharply recently, from a high of just under €900bn in June 2009 to €424bn in March 2011. Sinn's reasoning would maybe imply that CB credit to German banks would fall, but even if increased credit to Irish banks completely "crowded out" (in his words) Bundesbank credit to German banks, there would be no reason for total ECB credit to euro area banks to fall. It would remain constant at worst.<sup>9</sup> Arguably, the fall in CB credit to German and euro area banks could be interpreted as reassuring rather than a cause for concern, as it may indicate an improved ability of German banks to attract private sector funding and acquire a more stable funding base.<sup>10</sup> Whether the fall in ECB/Bundesbank lending to German banks is interpreted favourably or not, and whether such lending in fact fell or not, there can in any case be little argument over the fact that credit of commercial banks is endogenous, and demand-determined rather than set by the ECB through Target2.

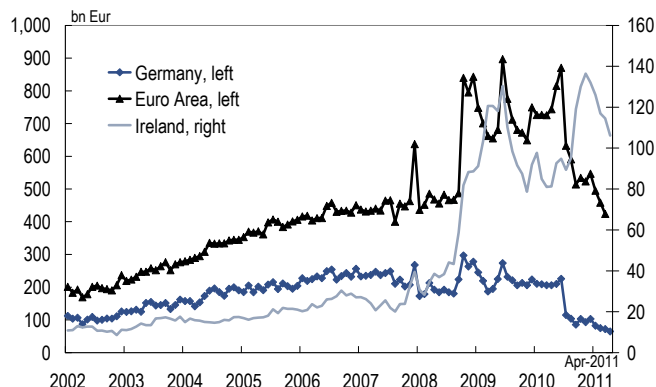
---

<sup>8</sup> Compared to market funding rates, the interest rate for the 12M LTRO were very attractive for (even healthy) euro area banks.

<sup>9</sup> We recognize, however, that Figure 3 does not provide conclusive evidence against Sinn's hypothesis, if total ECB credit to euro area banks (and maybe German banks) fell for reasons unrelated to Irish credit or Target2 transactions between NCBs. Since the fall in total ECB lending is quantitatively so large in the data and since the amount of central bank credit to German banks is of such obvious concern to Professor Sinn, we would argue, however, that it would only be natural to focus on those reasons unrelated to Target2 instead.

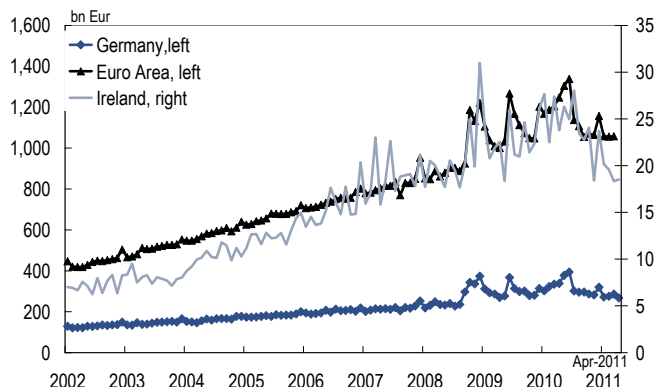
<sup>10</sup> An obvious alternative explanation for the reduction in central bank credit would be lack of eligible collateral by euro area deposit-taking institutions. However, we are not aware of evidence of a general shortage of such collateral in Germany or the euro area as a whole.

Figure 5. Germany and Ireland – Central Bank Lending to Banks (Bn Eur.), 2002 – 2011



Note: Lending to EA Credit Institutions in euro.  
Source: Bundesbank, Central Bank of Ireland, Citi Investment Research and Analysis

Figure 6. Germany and Ireland – Monetary Base (Bn Eur.), 2002 – 2011



Note: Sum of banknotes in circulation, current accounts and deposit facility balances of eligible credit institutions at the central bank. Coins are omitted.  
Source: Bundesbank, Central Bank of Ireland, Citi Investment Research and Analysis

## Sterilisation of non-standard central bank interventions

### The Securities Markets Programme

The ECB cannot 'sterilize' the effects of the SMP on base money through issuing term deposits, as base money is demand-determined

The ECB supposedly sterilises the impact on the monetary base of, say, outright purchases of sovereign debt under the Securities Markets Programme (SMP): *"The impact of these interventions is sterilised through specific operations to re-absorb the liquidity injected and thereby ensure that the monetary policy stance is not affected."*<sup>11</sup> This means that when the ECB purchases sovereign securities in amount X and pays for this by increasing the monetary base by that same amount X, it also increases its non-monetary liabilities by that amount X and in doing so reduces the monetary base to the old level (the level it would have been at without the sovereign security purchases). Typically, the non-monetary ECB liabilities that have been issued to sterilise the SMP purchases have been term deposits with a one-week maturity.

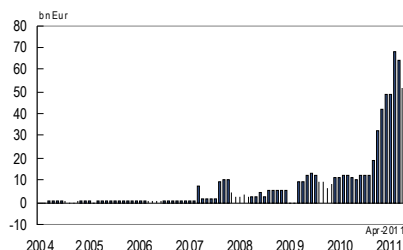
However, if the ECB sets/pegs the overnight interest rate, then the stock of overnight credit is determined by that peg and by the yields on other, longer-maturity assets, including the yield on one-week deposits, and by other asset prices, including the exchange rate. For the reasons discussed in the previous subsection, increasing the stock of one-week-term deposits, even if these are 'paid for' (by the banks) with overnight deposits, does not reduce the stock of overnight deposits that banks wish to hold. Under the current full-allotment procedure for weekly, one month and three month ECB financing, it also does not reduce the stock of base money provided through the main refinancing operation. And we will not even begin to discuss the *economic* difference between ECB base money outstanding and an equivalent amount of ECB term deposits of weekly maturity.<sup>12</sup>

The instruments sold to sterilise the monetary consequences of SMP operations need not be one-week term deposits, but could involve other instruments such as ECB debt certificates, that is, ECB bills or bonds (analogous to Treasury bills or bonds, but unlike those actually free of default risk). This would not change the conclusion that, for a given sequence of current and expected future official policy rates, sterilisation operations by the ECB do not affect the stock of base money, because this is endogenously determined by the commercial banks.

<sup>11</sup> See ECB Website: <http://www.ecb.int/home/glossary/html/act4s.en.html>.

<sup>12</sup> In our view, there is hardly any. See [Games of 'Chicken' Between Monetary and Fiscal Authority: Who Will Control the Deep Pockets of the Central Bank?](#)

Figure 7. Ireland – ELA (Bn Eur), 2004 – 2011



Note: 'Other Assets' of the Central Bank of Ireland minus 'Other Assets' at the beginning of 2004.

Source: Central Bank of Ireland, Citi Investment Research and Analysis

## Emergency Liquidity Assistance

The demand for central bank reserves depends not only on the sequence of current and anticipated future official policy rates but also on the demand for central bank loans by eligible deposit-taking institutions. Loans by the central bank are effected either through repurchase agreements or through collateralised lending. The set of eligible collateral and the other terms and conditions of these loans (valuation haircut, interest rate etc.) influences the demand for such loans and therefore the demand for central bank liquidity.

The Eurosystem has a parallel system of NCB lending to its eligible counterparties that accepts a wider class of eligible collateral (that is, it accepts lower quality collateral) than the Eurosystem in its regular liquidity operations. It also can charge different (generally higher) interest rates for a given maturity than the Eurosystem in its regular operations. These national facilities, managed by the national central bank, are called Emergency Lending Assistance (ELA), and the exposure incurred by the NCB through the ELA is supposed to be explicitly guaranteed by the national sovereign. The ELA liabilities are Eurosystem liabilities, monetary or non-monetary.<sup>13</sup> Ireland's ELA peaked at €68bn at the end of February 2011 and now stands at around €52bn (Figure 7).<sup>14</sup>

Clearly, a relaxation of the collateral constraint on loan demand will boost the demand for loans at any interest rate, so the activation of the ELA in Ireland increased the stock of base money in Ireland and in the euro area. In principle, the ECB, which has the opportunity to block ELA provision by NCBs, endeavours to sterilize ELA by issuing non-monetary liabilities. However, all of the above considerations apply. Since the official policy rate was not changed as a result of the activation of the ELA, and because the collateral requirements for borrowing from the Eurosystem were not changed in the Eurosystem outside Ireland, the increased lending by the CBI to Irish banks was not at the expense of reduced lending by the Bundesbank to German banks, and any supposed sterilization meant to undo the effects of ELA on euro area base money will not be effective.

## Does Target2 finance the current account deficit of Ireland?

Our discussion in the previous section was based on the example given by Professor Sinn to illustrate the causes for the emergence of increases in Target2 net debt of the CBI and Target2 net claims by the Bundesbank. We therefore maintained throughout that section Sinn's assumption of transactions in goods between Ireland and Germany resulting in an Irish trade or current account deficit, which in turn drive the increase in the CBI's Target2 net debt. In our view, however, this example is in fact not instructive for illustrating the type of transactions that underlie the emergence of the Target2 imbalances. In this section, we question both the conceptual link between Irish current account deficits and increases in CBI Target2 net debt, and its empirical relevance in the case of Ireland.

**Irish current account deficits have not been the main drivers of increases in CBI Target2 net liabilities**

<sup>13</sup> See also [ELA: An Emperor without Clothes?](#) and [ELA Revisited: A Clarification](#)

<sup>14</sup> Central Bank of Ireland, Statistics: Credit, Money and Banking Statistics Data, Money and Banking Tables.

The current account of a country can be defined as the net increase in foreign claims

The current account deficit can be defined in various ways. One useful definition is that the current account surplus equals the increase in net foreign claims.<sup>15</sup> In terms of our notation above, the Irish current account surplus can then be expressed as the increase in the net worth of Ireland ( $W^I$ ) minus the increase in domestic wealth (the domestic capital stock,  $K^I$ ):

$$CA^I \equiv \Delta W^I - \Delta K^I,$$

where  $\Delta$  denotes differences or changes.

Irish net worth is given by the sum of domestic net worth and the sum of two components of foreign net claims: net claims of the CBI on Target2 and net claims of the consolidated Rest of Ireland and Irish banks on the consolidated Rest of Germany and German banks:<sup>16</sup>

$$W^I \equiv K^I + (D^{T,CBI} - D^{CBI,T}) + (D^{RG,RI} - D^{RI,RG} + D^{GB,RI} - D^{IB,RG})$$

Current account deficits of a EA member state can be financed by increases in Target2 balances or any other type of capital outflow from public or private Irish entities

The Irish current account surplus is therefore given by the change in these two components of net foreign claims:

$$\begin{aligned} CA^I &\equiv \Delta(D^{RG,RI} - D^{RI,RG} + D^{GB,RI} - D^{IB,RG}) + \Delta(D^{T,CBI} - D^{CBI,T}) \\ &\equiv \Delta(D^{RG,RI} - D^{RI,RG} + D^{GB,RI} - D^{IB,RG}) + \Delta(D^{BB,T} - D^{T,BB}), \end{aligned}$$

Net increases in Target2 debt are consistent with CA deficits or surpluses

where the second equality follows from the fact that, in our simplified example, net claims of the CBI on Target2 are equivalent to net liabilities of the Bundesbank to Target2, and vice versa. Thus, an Irish current account deficit ( $CA^I < 0$ ) could be financed by capital outflows from Ireland that are the result of transactions in financial assets between all domestic and foreign private and public entities, other than the national central banks ( $\Delta(D^{RG,RI} - D^{RI,RG} + D^{GB,RI} - D^{IB,RG}) < 0$ ).<sup>17</sup> The other alternative is an increase in the net credit position of Target2 vis-à-vis the CBI ( $\Delta(D^{T,CBI} - D^{CBI,T}) < 0$ ). A combination of the two is, of course, possible as well.

Now, the fact that an increase in the net credit position of Target 2 vis-à-vis the CBI is consistent with an Irish current account deficit does not suggest causation running from the latter to the former, nor from the former to the latter. What is more, an increase in Irish net debt to Target2 is in fact also consistent with an Irish current account surplus as long as that surplus is smaller than the net capital inflow into Ireland from the transactions of public and private entities other than the CBI, i.e. if  $CA^I < \Delta(D^{RG,RI} - D^{RI,RG} + D^{GB,RI} - D^{IB,RG})$ .

<sup>15</sup> The current account surplus is the value of the net change in claims in the rest of the world, not the change in the value of net claims on the rest of the world. So the current account excludes capital gains and losses on existing holdings of external assets and liabilities. In what follows, we assume for simplicity that there are no asset and liability revaluations. The thrust of the argument does not depend on this.

<sup>16</sup> In our simplified example, the net worth of Target2 is zero and therefore omitted in our presentation.

<sup>17</sup> Remember that we assume that commercial banks do not have any foreign assets. We can easily generalize to allow for foreign bank assets, but the generalization adds nothing to our presentation.

**Net increases in CBI Target2 net liabilities have been multiples of Irish current account deficits**

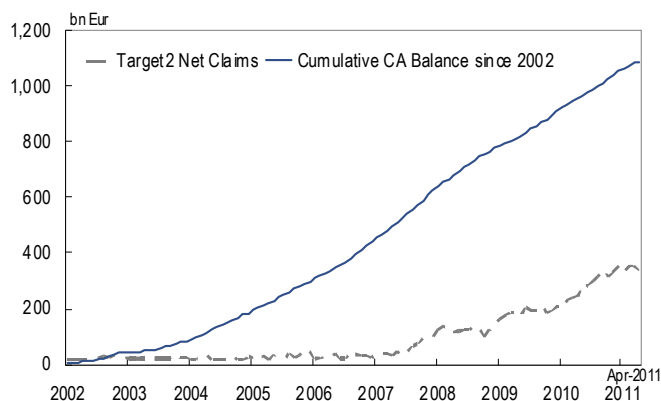
The above discussion is not just theoretical. One way to interpret the driving forces behind the recent increase in the net debt of the CBI to Target2 is indeed the inability of the Irish public and private sector other than the central bank to sell assets to the rest of the world (here the euro area) or to increase their liabilities to them to fund Ireland's current account deficit. The increase in the net credit position of a member state NCB vis-à-vis Target2 is the equivalent of what the official settlements balance (the change in the stock of official gold and foreign exchange reserves) was in pre-common currency days. Only with zero international capital mobility would an increase in the CBI's net debt to Target2 be the only way to finance an Irish current account deficit vis-à-vis the rest of the euro area. Leaving out a discussion other sources of public and private capital flows can be misleading, as we show now.

Figure 8 to Figure 17 compare Target2 imbalances of NCBs and current account balances for Germany, Ireland, Portugal, Greece and Spain. Ideally, we would want to compare the NCB Target2 net claims and liabilities with the current account deficits of these countries with the rest of the euro area only, but those data are unfortunately not available. Nevertheless, some conclusions can be drawn from these charts. Figure 8 shows that the cumulative current account surplus of Germany since 2002 is much larger than the cumulative Target2 imbalances, indicating that Target2 financing was insufficient to fund the rest of the world's current account deficit with Germany over this period, once again pointing to sources of capital flows other than Target2 access. But Figure 9 also shows that in the years in which increases in Bundesbank Target2 net claims were largest (2009 and 2010), those increases actually *exceeded* Germany's current account surpluses.

The charts for Ireland (Figure 10 and Figure 11) are even more telling. The overwhelming increases in net Target2 liabilities of the CBI were between 2008 and 2010 and in all three years, increases in CBI Target2 liabilities were multiples of the Irish current account deficit – if Target2 liabilities were financing the Irish current account deficit with the rest of the world at all, they also financed an even larger net capital outflow from Ireland. In 2010, when the increase in CBI Target2 net liabilities was largest at an estimated €93bn (for a total outstanding stock of Target2 net liabilities of €162bn), the Irish current account was close to being balanced.

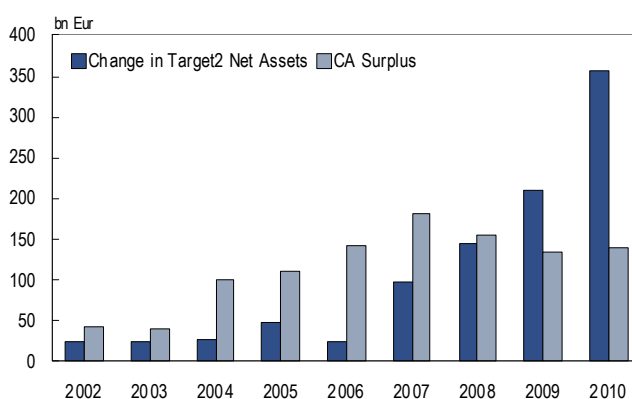
Figure 12 to Figure 17 present analogous evidence for Greece, Portugal and Spain. All three countries run persistent current account deficits with the rest of the world and also have NCBs with a net liability position vis-à-vis Target2, loosely fitting the Sinn narrative. But for Greece and Portugal, again, the largest increases in Target2 net liabilities were, again, in 2010, when the increase in Target2 net debt was much larger than the overall current account deficit. The data on current account deficits and changes in Target2 balances therefore do not provide support for the hypothesis that the current account has been the main driver of change in national net Target2 balances for the EAP countries.

**Figure 8. Germany – Target2 Balance and the Current Account I (Bil Eur.)**



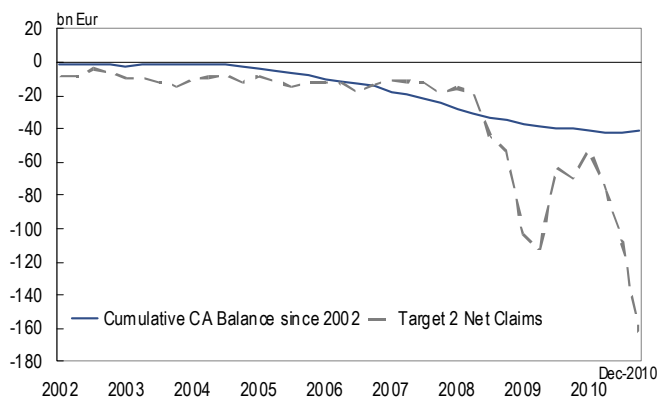
Note: Target2 Net Claims are 'Other Assets' of the Bundesbank.  
Source: Bundesbank, Citi Investment Research and Analysis

**Figure 9. Germany – Target2 Balance and the Current Account II (Bil Eur.)**



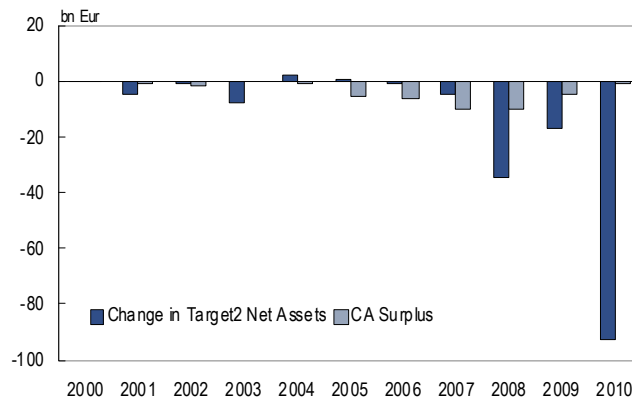
Note: Target2 Net Claims are 'Other Assets' of the Bundesbank.  
Source: Bundesbank, Citi Investment Research and Analysis

**Figure 10. Ireland – Target2 Balance and the Current Account I (Bil Eur.)**



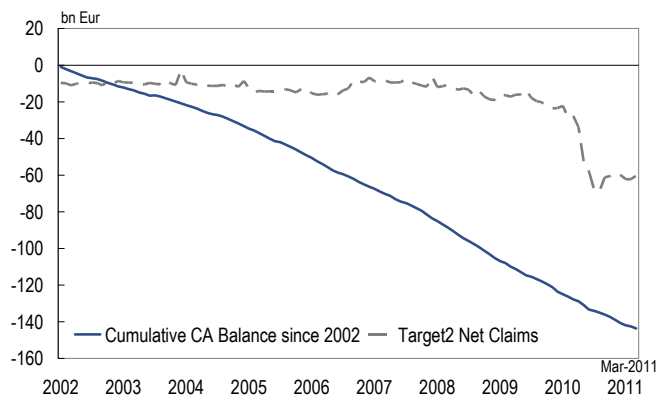
Note: Target2 Net Debt are 'Other Liabilities' of the Central Bank of Ireland  
Source: Central Bank of Ireland, Central Statistics Office Ireland, Citi Investment Research and Analysis

**Figure 11. Ireland – Target2 Balance and the Current Account II (Bil Eur.)**



Note: Target2 Net Debt are 'Other Liabilities' of the Central Bank of Ireland  
Source: Central Bank of Ireland, Central Statistics Office Ireland, Citi Investment Research and Analysis

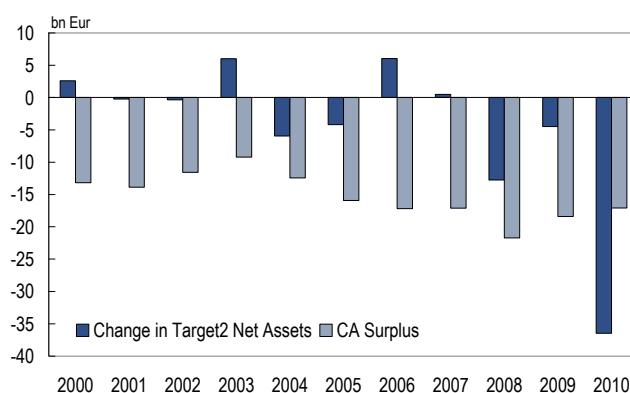
**Figure 12. Portugal – Target2 Balance and the Current Account I (Bn Eur.), 2002 – 2011**



Note: Target2 Net Claims are minus Portugal: Central Bank Balance Sheet Liabilities: Non-Residents: Deposits & Related Instruments.

Source: Banco de Portugal and Citi Investment Research and Analysis

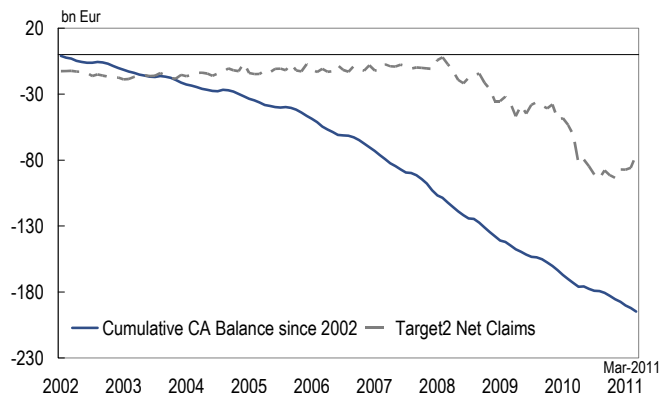
**Figure 13. Portugal – Target2 Balance and the Current Account II (Bn Eur.), 2000 – 2010**



Note: Target2 Net Claims are minus Portugal: Central Bank Balance Sheet Liabilities: Non-Residents: Deposits & Related Instruments.

Source: Banco de Portugal, Citi Investment Research and Analysis

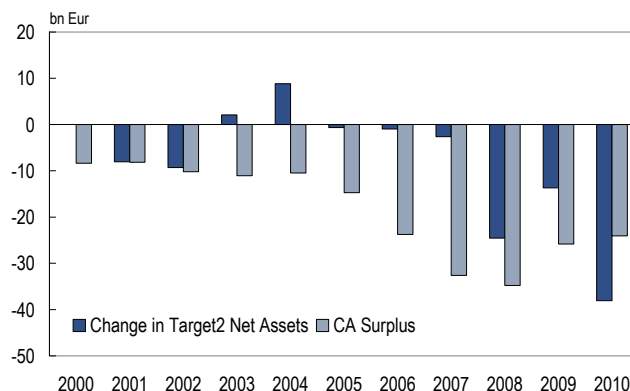
**Figure 14. Greece – Target2 Balance and the Current Account I (Bn Eur.), 2002 – 2011**



Note: Target2 Net Claims are minus Greece: Bank of Greece Liabilities: Liabilities to Other MFIs: Other Euro Area Countries

Source: Bank of Greece, Citi Investment Research and Analysis

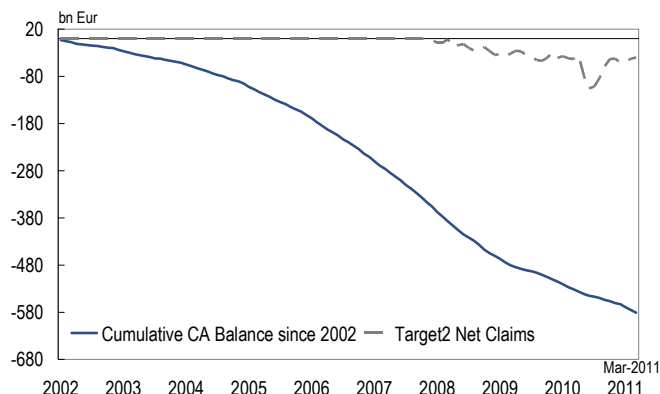
**Figure 15. Greece – Target2 Balance and the Current Account II (Bn Eur.), 2000 – 2010**



Note: Target2 Net Claims are minus Greece: Bank of Greece Liabilities: Liabilities to Other MFIs: Other Euro Area Countries

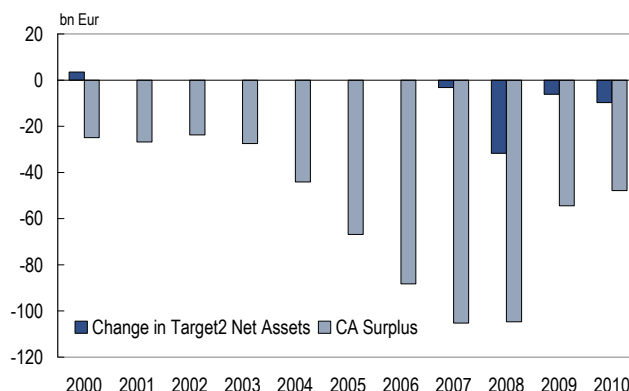
Source: Bank of Greece, Citi Investment Research and Analysis

Figure 16. Spain – Target2 Balance and the Current Account I (Bn Eur.), 2002 – 2011



Note: Target2 Net Claims are minus Spain: Central Bank BSh: Residents of Other Euro Area Country Liabilities: MFIs: o/w Euro  
Source: Banco de Espana, Citi Investment Research and Analysis

Figure 17. Spain – Target2 Balance and the Current Account II (Bn Eur.), 2000 – 2010



Note: Target2 Net Claims are minus Spain: Central Bank BSh: Residents of Other Euro Area Country Liabilities: MFIs: o/w Euro  
Source: Banco de Espana, Citi Investment Research and Analysis

## A more plausible example: Deposit flight and a funding crisis of the EAP banking system

Private capital outflows by Irish and non-Irish euro area residents were likely a more significant driver of the build-up in CBI Target2 net debt than Irish current account deficits

Imagine a German farmer with a deposit in an Irish bank. Somewhat concerned about the solvency of his Irish bank (or of the Irish bank and the Irish sovereign that effectively underwrites the Irish Deposit Protection Guarantee), he decides to withdraw his deposit and instead deposits it with a German bank. In terms of our notation above, deposits of Rest of Germany with Irish banks fall ( $D^{IB, RG} \downarrow$ ). Most of the remaining movements in balances are equivalent to those in the discussion of the two scenarios in the previous section: Irish banks increase their loans from the CBI ( $D^{IB, CBI} \uparrow$ ), and the CBI increases its net debt to Target2 ( $D^{CBI, T} \uparrow$ ). German banks, which have seen their domestic liabilities/deposits increase ( $D^{GB, RG} \uparrow$ ), as above, face a choice of depositing the increase in deposits with the Bundesbank ( $D^{BB, GB} \uparrow$ ) or reduce loans from the Bundesbank ( $D^{BB, GB} \downarrow$ ). In both cases, net claims of the Bundesbank to Target2 increase ( $D^{T, BB} \uparrow$ ). Only if German banks deposit their increase with the Bundesbank does the German monetary base increase ( $M^G = D^{BB, GB} \uparrow$ ), while Bundesbank credit to German banks falls if German banks instead decide to reduce their reserve balances with the Bundesbank ( $D^{BB, GB} \downarrow$ ).

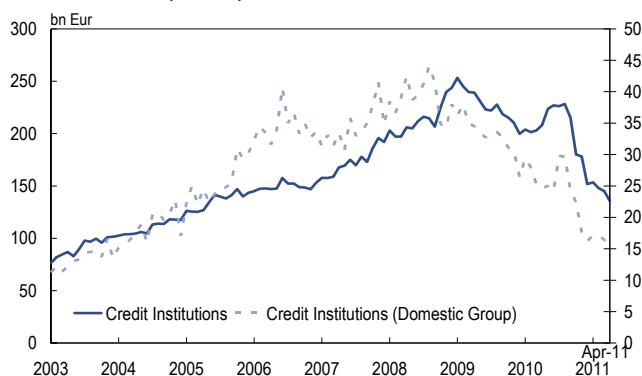
Many of the movements in assets and liabilities in this example are identical to those in Sinn's example. But the narrative is very different. Our example does not imply a current account deficit or trade deficit of Ireland vis-à-vis Germany. Instead, the driver is what could be termed 'deposit flight' – a movement of financial balances from Ireland to Germany which is, at least directly, unrelated to the demand for goods – it is a financial portfolio rebalancing that does not require any change in the national saving-investment balance. This example avoids pointing the finger at perceived Irish overspending, and, more relevantly, may be empirically more plausible.

Deposits by non-Irish euro area residents alone at Irish credit institutions fell by €118bn from a high of €253bn in January 2009 to but €136bn in April 2011, and continue to fall.

Figure 18 and Figure 19 present the level of deposits by Irish residents and non-Irish euro area residents in Irish credit institutions. All four series are clearly off their peaks, with the largest falls in the deposits of non-Irish euro area residents. Deposits by non-Irish euro area residents alone at Irish credit institutions fell by €118bn from a high of €253bn in January 2009 to just €136bn in April 2011, and continue to fall. In our example, we focused on the example of a non-Irish euro area resident moving funds from Ireland to Germany. But the implications for Target2 balances, central bank credit and the monetary base in both Germany and Ireland are equivalent if the agent were instead an Irish resident.

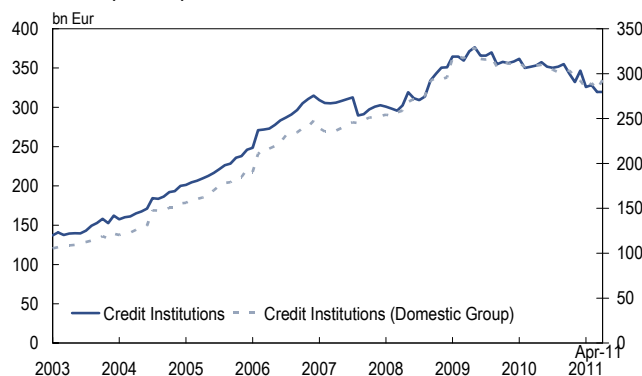
Falls in deposits by non-euro area residents were even larger than reductions by non-Irish euro area residents, but as we endeavour to account for intra-euro area capital flows, these are not our primary concern. Deposit flight from Irish banks was strongest in 2009 and 2010, exactly the years when increases in CBI net Target2 liabilities also increased by most. Gross private capital outflows, not current account deficits were likely the most important driver of increases in CBI Target2net debt. For Portugal and Greece, and to a lesser extent Spain, gross private capital outflows were smaller in scale, but there, too, they likely played a significant role in the emergence of the Target2 imbalances.

**Figure 18. Ireland – Deposits of non-Irish euro area residents in Irish credit institutions (Bn Eur), 2003 – 2011**



Source: Central Bank of Ireland, Citi Investment Research and Analysis

**Figure 19. Ireland – Deposits of Irish area residents in Irish credit institutions (Bn Eur), 2003 – 2011**



Source: Central Bank of Ireland, Citi Investment Research and Analysis

**Target2 net assets of the Bundesbank do not reflect its exposure to risk and financial losses from CBI lending or Irish credit**

## Do Bundesbank Target2 net claims reflect Bundesbank exposure to financial losses?

Martin Wolf, referring again to Professor Sinn's work, states that when one adds the sums owed by national central banks to those of the (general) government, one arrives at "frighteningly" high levels for the euro area periphery countries. That may be true, but that does not mean it would be the most appropriate way to consolidate the debt of the, say, CBI and the Irish sovereign. We have argued before that such a consolidation would indeed be desirable, i.e. data on gross and net debt (and also for gross and net non-monetary debt) should be calculated and published for what we call the consolidated general government – the consolidation of the general government and the central bank.

How would such figures be computed? Take consolidated general government non-monetary gross debt: It should be computed as the sum of general government gross debt plus the non-monetary debt of the central bank minus any general government debt held (outright) by the central bank and any general government deposits with the central bank. Target2 net debt is indeed a non-monetary liability so that including it in computations of the consolidated general government debt would in fact be appropriate.

Calculations of the (non-monetary) consolidated general government net debt would deduct the consolidated financial assets of general government and central bank from the consolidated general government gross debt. Since a substantial portion of the liabilities of a typical central bank are monetary liabilities and capital, from first principles of accounting, the net debt of the consolidated general government would in general be lower than the net debt of the conventional general government debt, while consolidated general government gross debt is likely to be larger than conventional general government gross debt.<sup>18</sup> Only considering the latter would give a misleading and unduly negative picture of the sustainability of EAP sovereign debt.

<sup>18</sup> This statement strictly only follows if we assume that general government debt held by the NCB and general government deposits with the NCB are small.

The considerations of the previous paragraphs apply in principle for all central banks and sovereigns. In the case of the euro area, the ECB and the Eurosystem, there is an additional complication. In the case of EA member states, NCB balance sheets, even taking the steps of consolidation outlined above, are not appropriate in order to estimate the exposure to risk and financial losses of the NCB and ultimately the sovereign. The reason is that in the Eurosystem profits and losses from most monetary policy operations are pooled and shared with the other EA NCBs according to their respective ECB capital shares. These represent off-balance sheet contingent assets or liabilities, and are not included in any conventional presentation of the public sector (or the central bank's) accounts.

**Figure 20. ECB capital shares**

NCB	Capital key (%)	Adjusted capital key (%)	Paid-up capital (€)
Nationale Bank van België	2.43	3.47	180,157,051.35
Banque Nationale de Belgique			
Deutsche Bundesbank	18.94	27.06	1,406,533,694.10
Eesti Pank	0.18	0.26	13,294,901.14
Central Bank of Ireland	1.11	1.59	82,495,232.91
Bank of Greece	1.96	2.81	145,939,392.39
Banco de España	8.30	11.87	616,764,575.51
Banque de France	14.22	20.32	1,056,253,899.48
Banca d'Italia	12.50	17.86	928,162,354.81
Central Bank of Cyprus	0.14	0.20	10,167,999.81
Banque centrale du Luxembourg	0.17	0.25	12,975,526.42
Central Bank of Malta	0.06	0.09	4,694,065.65
De Nederlandsche Bank	3.99	5.70	296,216,339.12
Oesterreichische Nationalbank	1.94	2.78	144,216,254.37
Banco de Portugal	1.75	2.50	130,007,792.98
Banka Slovenije	0.33	0.47	24,421,025.10
Národná banka Slovenska	0.69	0.99	51,501,030.43
Suomen Pankki - Finlands Bank	1.25	1.79	93,131,153.81
<b>Total</b>	<b>69.97</b>	<b>100.00</b>	<b>5,196,932,289.36</b>

Note: Adjusted capital key adjusts for the capital of share-holders of the ECB which are not currently part of the euro area. With effect from 29 December 2010, the ECB increased its subscribed capital by €5bn, from €5.76 billion to €10.76 billion. The euro area NCBs paid their first instalment of their additional capital contributions on 29 December 2010 and the remaining two instalments will be paid at the end of 2011 and 2012, respectively.  
Source: ECB, Citi Investment Research and Analysis

**Profits and losses from conventional ECB monetary policy operations are pooled and shared between all NCBs according to their adjusted ECB capital shares**

The exposure to risk and possible losses of, say, the Bundesbank, as of any NCB, is thus given by the total exposure of the Eurosystem and the share of the Bundesbank in the ECB's capital, currently just over 27 percent (see **Figure 20**). The balance sheet exposure is limited to the size of the Eurosystem balance sheet, which stood at €1.9 trillion on May 27, 2011. Against that exposure, the ECB holds capital.<sup>19</sup> The Bundesbank, as shareholder of the ECB, thus shares in the pooled profits or losses made by the entire Eurosystem (as long as these profits or losses were incurred as part of the normal monetary, liquidity and credit operations of the ECB). Its exposure to losses therefore bears no relationship to the net credit position of the Bundesbank vis-a-vis Target2, and only moderate relation to the size of its own balance sheet. Target2 balances are remunerated at the refi rate, but as any resulting profits are shared within the Eurosystem (using the same key as for the distribution of Eurosystem losses), it is to a first order irrelevant also for the financial surplus of the Bundesbank whether it had positive Target2 net claims or negative ones.

<sup>19</sup> Total capital and reserves for the Eurosystem are just over €81 bn. There is also, however, just under €306bn in the Revaluation Accounts, and this too should be loss-absorbing. In addition to the on-balance sheet exposure there are off-balance sheet exposures, such as swap lines with other central banks or lines of credit.

**ELA exposure is different – it is for the books of the respective NCB and sovereign only**

Similar considerations apply to the NCBs of the euro area periphery, including Ireland, Portugal and Greece. For these countries, too, the exposure of the sovereign to risk and potential losses from monetary policy operations is given by their respective adjusted ECB capital shares and the total exposure of the Eurosystem. The one important qualification is that only losses or profits made through NCBs' ordinary monetary policy operations are shared and pooled with the other NCBs. Emergency Liquidity Assistance facilities are excluded. Losses resulting from these facilities will be for the book of the respective NCB only (and its sovereign, as these facilities are customarily granted by an NCB under full and explicit guarantees/indemnities by the respective sovereign). In our view, the 'fair value' of the ELA exposure of the sovereign, through the sovereign's guarantee or indemnity for the ELA assets, viewed as a contingent claim and priced accordingly, should be included even in the conventional measure of general government debt of the respective sovereign. In addition, the assets (collateralised loans) acquired by an NCB as a result of ELA operations should be valued at fair value. Despite haircuts on the collateral, overcollateralisation and margin calls when either the borrowing bank's creditworthiness deteriorates or the fair value of the collateral declines, it is certainly plausible that the fair value of the CBI's ELA assets is less than their notional value. They should be marked down accordingly.

## **Does the US settlement system prevent sustained intra-currency union discrepancies in credit flows?**

**The Interdistrict Settlement Account procedures of the Federal Reserve System require settlement of interdistrict credit imbalances once a year via gold-backed securities or Treasury bills**

**Individual Reserve banks can purchase such securities in the open market, financed by base money creation, implying that the settlement procedures do not constitute an effective constraint on inter-district credit flows**

In his article, Professor Sinn referred to the Interdistrict Settlement Account of the Federal Reserve System and suggests that the Fed has a superior way of dealing with imbalances in credit flows between different Federal Reserve districts.

At the close of business each day, all Reserve Banks and branches assemble the payments due to or from other Reserve Banks and branches as a result of transactions involving accounts residing in other Districts that occurred during the day's operations. Such transactions may include funds settlement, cheque clearing and automated clearinghouse ("ACH") operations, and allocations of shared expenses. The cumulative net amount due to or from other Reserve Banks is reported as the 'Interdistrict settlement account'. The Interdistrict Settlement Account must be settled once a year with gold-backed securities or Federal treasury bills. This would represent a constraint on inter-district credit flows only if the stock of Federal Treasury bills allocated to the individual Federal Reserve banks was exogenous. However, individual regional reserve banks can always buy Federal treasury bills from banks or other holders of the stuff in their own districts, financing this with an increase in base money. The Federal Reserve Board could then decide to undo this transaction or 'sterilise', it. However, an interest-rate-setting Fed will only undo this, if the regional Fed's Treasury bill purchase and the associated increase in base money were to lead to an excessive divergence between the actual Federal Funds rate and the Federal Funds target. This is highly unlikely. Even when the Fed's official policy rate is at the effective lower bound for the official policy rate and the Fed is engaged in QE, there is no effective constraint on the ability of regional Reserve Banks to settle the Interdistrict Settlement Account imbalances with Treasury Bills funded with base money issuance. The yearly settlement requirement in the Interdistrict Settlement Account procedure would thus not appear to be a constraint on persistent credit imbalances between individual Federal Reserve banks' districts.

## **Conclusions**

There are good reasons for worrying about the risk exposure of the ECB/Eurosystem. There also are solid grounds for being concerned about large and persistent current account deficits and government deficits. However, we argue that linking these legitimate concerns to the emergence and persistence of growing net liabilities of euro area periphery central banks to Target2, and to large and growth net credit positions of the Bundesbank is unwarranted – conceptually/analytically and empirically.

## Appendix A-1

### Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of this research report are named in bold text in the author block at the front of the product except for those sections where an analyst's name appears in bold alongside content which is attributable to that analyst. Each of these analyst(s) certify, with respect to the section(s) of the report for which they are responsible, that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc and its affiliates. No part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendation(s) or view(s) expressed by that research analyst in this report.

### IMPORTANT DISCLOSURES

---

Analysts' compensation is determined based upon activities and services intended to benefit the investor clients of Citigroup Global Markets Inc. and its affiliates ("the Firm"). Like all Firm employees, analysts receive compensation that is impacted by overall firm profitability which includes investment banking revenues.

---

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Investment Research & Analysis product ("the Product"), please contact Citi Investment Research & Analysis, 388 Greenwich Street, 28th Floor, New York, NY, 10013, Attention: Legal/Compliance. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures, are contained on the Firm's disclosure website at [www.citigroupgeo.com](http://www.citigroupgeo.com). Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Historical disclosures (for up to the past three years) will be provided upon request.

### NON-US RESEARCH ANALYST DISCLOSURES

Non-US research analysts who have prepared this report (i.e., all research analysts listed below other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization and therefore may not be subject to the NYSE Rule 472 and NASD Rule 2711 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. The legal entities employing the authors of this report are listed below:

Citigroup Global Markets Ltd

Willem Buiter; Ebrahim Rahbari; Jürgen Michels

### OTHER DISCLOSURES

---

For securities recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in the issuers' financial instruments and may act as principal in connection with such transactions. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

---

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Investment Research & Analysis (CIRA) does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of CIRA to provide research coverage of the/those issuer(s) mentioned therein, including in response to news affecting this issuer, subject to applicable quiet periods and capacity constraints. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus.

---

Investing in non-U.S. securities, including ADRs, may entail certain risks. The securities of non-U.S. issuers may not be registered with, nor be subject to the reporting requirements of the U.S. Securities and Exchange Commission. There may be limited information available on foreign securities. Foreign companies are generally not subject to uniform audit and reporting standards, practices and requirements comparable to those in the U.S. Securities of some foreign companies may be less liquid and their prices more volatile than securities of comparable U.S. companies. In addition, exchange rate movements may have an adverse effect on the value of an investment in a foreign stock and its corresponding dividend payment for U.S. investors. Net dividends to ADR investors are estimated, using withholding tax rates conventions, deemed accurate, but investors are urged to consult their tax advisor for exact dividend computations. Investors who have received the Product from the Firm may be prohibited in certain states or other jurisdictions from purchasing securities mentioned in the Product from the Firm. Please ask your Financial Consultant for additional details. Citigroup Global Markets Inc. takes responsibility for the Product in the United States. Any orders by US investors resulting from the information contained in the Product may be placed only through Citigroup Global Markets Inc.

---

**Important Disclosures for Morgan Stanley Smith Barney LLC Customers:** Morgan Stanley & Co. Incorporated (Morgan Stanley) research reports may be available about the companies that are the subject of this Citi Investment Research & Analysis (CIRA) research report. Ask your Financial Advisor or use [smithbarney.com](http://smithbarney.com) to view any available Morgan Stanley research reports in addition to CIRA research reports.

Important disclosure regarding the relationship between the companies that are the subject of this CIRA research report and Morgan Stanley Smith Barney LLC and its affiliates are available at the Morgan Stanley Smith Barney disclosure website at [www.morganstanleysmithbarney.com/researchdisclosures](http://www.morganstanleysmithbarney.com/researchdisclosures). The required disclosures provided by Morgan Stanley and Citigroup Global Markets, Inc. on Morgan Stanley and CIRA research relate in part to the separate businesses of Citigroup Global Markets, Inc. and Morgan Stanley that now form Morgan Stanley Smith Barney LLC, rather than to Morgan Stanley Smith Barney LLC in its entirety. For Morgan Stanley and Citigroup Global Markets, Inc. specific disclosures, you may refer to [www.morganstanley.com/researchdisclosures](http://www.morganstanley.com/researchdisclosures) and [https://www.citigroupgeo.com/geopublic/Disclosures/index\\_a.html](https://www.citigroupgeo.com/geopublic/Disclosures/index_a.html). This CIRA research report has been reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval was conducted by the same person who reviewed this research report on behalf of CIRA. This could create a conflict of interest.

The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by. The Product is made available in Australia through Citigroup Global Markets Australia Pty Ltd. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in Brazil by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários, BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBID - Associação Nacional dos Bancos de Investimento. Av. Paulista, 1111 - 11º andar - CEP. 01311920 - São Paulo - SP. If the Product is being made available in certain provinces of Canada by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in Chile through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is made available in France by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 1-5 Rue Paul Cézanne, 8ème, Paris, France. The Product is distributed in Germany by Citigroup Global Markets Deutschland AG ("CGMD"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGMD, Reuterweg 16, 60323 Frankfurt am Main. If the Product is made available in Hong Kong by, or on behalf of, Citigroup Global Markets Asia Ltd., it is attributable to Citigroup Global Markets Asia Ltd., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Product is made available in Hong Kong by The Citigroup Private Bank to its clients, it is attributable to Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. The Citigroup Private Bank and Citibank N.A. is regulated by the Hong Kong Monetary Authority. The Product is made available in India by Citigroup Global Markets India Private Limited, which is regulated by Securities and Exchange Board of India. Bakhtawar, Nariman Point, Mumbai 400-021. The Product is made available in Indonesia through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in Israel through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A., Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in Italy by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. Foro Buonaparte 16, Milan, 20121, Italy. The Product is made available in Japan by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Shin-Marunouchi Building, 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-6520 Japan. If the Product was distributed by Nikko Cordial Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Global Equities Online (GEO) website. If you have questions regarding GEO, please call (81 3) 6270-3019 for help. The Product is made available in Korea by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 110-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. <http://dis.kofia.or.kr/fs/dis2/fundMgr/DISFundMgrAnalystPop.jsp?companyCd2=A03030&pageDiv=02>. The Product is made available in Malaysia by Citigroup Global Markets Malaysia Sdn Bhd, which is regulated by Malaysia Securities Commission. Menara Citibank, 165 Jalan Ampang, Kuala Lumpur, 50450. The Product is made available in Mexico by Acciones y Valores Banamex, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Banamex ("Accival") which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Reforma 398, Col. Juarez, 06600 Mexico, D.F. In New Zealand the Product is made available through Citigroup Global Markets New Zealand Ltd. (Company Number 604457), a Participant of the New Zealand Exchange Limited and regulated by the New Zealand Securities Commission. Level 19, Mobile on the Park, 157 Lambton Quay, Wellington. The Product is made available in Pakistan by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the Philippines through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in Poland by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the Russian Federation through ZAO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in Singapore through Citigroup Global Markets Singapore Pte. Ltd., a Capital Markets Services Licence holder, and regulated by Monetary Authority of Singapore. 1 Temasek Avenue, #39-02 Millenia Tower, Singapore 039192. The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore branch, a licensed bank in Singapore

that is regulated by Monetary Authority of Singapore. This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigold/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigold/Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. Citigroup Global Markets (Pty) Ltd. is incorporated in the Republic of South Africa (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in Spain by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 29 Jose Ortega Y Gassef, 4th Floor, Madrid, 28006, Spain. The Product is made available in Taiwan through Citigroup Global Markets Taiwan Securities Company Ltd., which is regulated by Securities & Futures Bureau. No portion of the report may be reproduced or quoted in Taiwan by the press or any other person. 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan. If the Product is related to non-Taiwan listed securities, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities. The Product is made available in Thailand through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 18/F, 22/F and 29/F, 82 North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand. The Product is made available in Turkey through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Buyukdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the U.A.E, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different CIRA ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in United Kingdom by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. This material may relate to investments or services of a person outside of the UK or to other matters which are not regulated by the FSA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. The Product is made available in United States by Citigroup Global Markets Inc, which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013. Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Limited, which is regulated by Financial Services Authority.

Pursuant to Comissão de Valores Mobiliários Rule 483, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

Many European regulators require that a firm must establish, implement and make available a policy for managing conflicts of interest arising as a result of publication or distribution of investment research. The policy applicable to CIRA's Products can be found at [www.citigroupgeo.com](http://www.citigroupgeo.com).

Compensation of equity research analysts is determined by equity research management and Citigroup's senior management and is not linked to specific transactions or recommendations.

The Product may have been distributed simultaneously, in multiple formats, to the Firm's worldwide institutional and retail customers. The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.

Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to sudden and large falls in value that could equal or exceed the amount invested. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product. CIRA concurrently disseminates its research via proprietary and non-proprietary electronic distribution platforms. Periodically, individual analysts may also opt to circulate research to one or more clients by email. Such email distribution is discretionary and is done only after the research has been disseminated via the aforementioned distribution channels.

---

© 2011 Citigroup Global Markets Inc. Citi Investment Research & Analysis is a division of Citigroup Global Markets Inc. Citi and Citi with Arc Design are trademarks and service marks of Citigroup Inc. and its affiliates and are used and registered throughout the world. All rights reserved. Any unauthorized use, duplication, redistribution or disclosure of this report (the "Product"), including, but not limited to, redistribution of the Product by electronic mail, posting of the Product on a website or page, and/or providing to a third party a link to the Product, is prohibited by law and will result in prosecution. The information contained in the Product is intended solely for the recipient and may not be further distributed by the recipient to any third party. Where included in this report, MSCI sourced information is the exclusive property of Morgan Stanley Capital International Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, disseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI, Morgan Stanley Capital International and the MSCI indexes are services marks of MSCI and its affiliates. The Firm accepts no liability whatsoever for the actions of third parties. The Product may provide the addresses of, or contain hyperlinks to, websites. Except to the extent to which the Product refers to website material of the Firm, the Firm has not reviewed the linked site. Equally, except to the extent to which the Product refers to website material of the Firm, the Firm takes no responsibility for, and makes no representations or warranties whatsoever as to, the data and information contained therein. Such address or hyperlink (including addresses or hyperlinks to website material of the Firm) is provided solely for your convenience and information and the content of the linked site does not in anyway form part of this document. Accessing such website or following such link through the Product or the website of the Firm shall be at your own risk and the Firm shall have no liability arising out of, or in connection with, any such referenced website.