

## MONETARY RESEARCH

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### **Eurosystem debts, Greece, and the role of banknotes**

- The public debt of Greece to foreign governments, including debt to the EU/IMF loan facility and debt through the eurosystem, rose from €47.8bn to €180.5bn between January 2010 and September 2011. €17.1bn of the rise in eurosystem debt was due to an 86% increase in the Greek issue of euro banknotes.
- If EU/IMF loans to Greece cease, they will be replaced by larger Greek borrowing from the eurosystem, for as long as Greece stays in the euro.
- Eurozone governments would only escape from lending to Greece if access of the Bank of Greece to eurosystem credit were restricted. But this would impede the clearance of payments out of Greece, it would imply that cross-border payments by means of euro banknotes would also have to be restricted, and it would force Greece out of the euro.

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<http://www.lancs.ac.uk/staff/whittaj1/eurosystemNov2011.pdf>

## The operation of the eurosystem

An essential property of monetary union is that euro banknotes exchange one-for-one irrespective of their country of issue. Since notes are issued by all national central banks (NCBs) in the euro area, this means that each NCB must accept notes issued by all others, at par.

This gives rise to a second essential property: a euro bank deposit in one country has the same value as in any other country. To uphold this property, all NCBs must accept claims on all others that arise from cross-border financial flows.<sup>1</sup>

Cross-border flows that give rise to intra-eurosystem claims may be redemptions of government or private securities. They may also be payments for imported goods and services or 'capital flight'; that is, transfers of deposit balances from one euro country to another that are unrelated to trade.

Suppose a deposit is moved from a Greek bank to a German bank, but the German bank refuses to accept payment in the form of a claim on the Greek bank, either directly or via another interbank counterparty. The debt is then settled via their central banks: the Greek bank makes up for its lost deposit by borrowing more from its NCB (the Bank of Greece, BoG); the German bank reduces its borrowing from the Bundesbank (German NCB); and the Bundesbank acquires a claim on the BoG.<sup>2</sup>

These claims between the NCBs are aggregated by the EU settlement system known as TARGET2 and

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<sup>1</sup> In a fixed exchange rate regime between two currencies, the fixed rate is maintained by the commitment of one or both central banks to exchange the currencies at that rate in unlimited amounts. Countries that have adopted the euro have abandoned the separate identities of their currencies but the same principle applies.

<sup>2</sup> Sinn (2011) argues that Bundesbank lending to other countries via the eurosystem crowds out domestic lending by its own banks. However, as explained by Whelan (2011) and others, there is no such connection between the Bundesbank's lending to foreign NCBs and its lending to German banks.

are considered as a net claim or liability of each NCB against the European Central Bank (ECB). In other words, a creditor NCB such as the Bundesbank has a claim on the ECB while the BoG has a debt to the ECB.<sup>3</sup>

## Accounting for cross-border banknote flows

The other way to make payments between eurozone countries is by drawing euro banknotes in one country and depositing them in another. This also gives rise to intra-eurosystem claims and there needs to be a mechanism for clearing such payments through the respective NCBs.

Moreover, every unit of currency drawn from a central bank is effectively an interest-free loan to the central bank, against which it holds interest-bearing assets. In countries with their own sovereign currency, the *seigniorage* income thus derived accrues to the state. However, in the eurozone, euro banknotes are issued by all 17 NCBs, so the seigniorage has to be distributed amongst them.<sup>4</sup>

If euro banknotes carried a mark identifying the NCB that issued them, these ends could be achieved by repatriation: when a note issued by one NCB is deposited with another, the receiving NCB could send the note back to the issuing NCB for credit. But this is not possible as the banknotes issued by NCBs are indistinguishable.<sup>5</sup> Thus, the

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<sup>3</sup> See ECB Annual Report, 2010, page 219. Discussions of the transactions of the NCBs through TARGET2 can be found in Garber (2010), Whittaker (2011), Boone and Johnson (2011) and the Bundesbank Monthly Report, March 2011, pages 34-35.

<sup>4</sup> Disregarding coin (i.e. treating currency solely as banknotes) and disregarding the costs of production and distribution of banknotes, the eurozone seigniorage income during 2010 was €8.2bn, calculated as the cost of borrowing the outstanding banknote issue from NCBs at the main refinancing rate (1% during 2010).

<sup>5</sup> The serial code on each euro banknote contains a country letter: X refers to Germany and T to Ireland, for instance. However, this identifies the NCB that commissioned the printing of the notes, which may or may not be the NCB

method used in the eurosystem to distribute seigniorage and to account for cross-border banknote flows is to allocate each NCB a share of the total euro banknote issue outstanding at any time, weighted according to the country's population and GDP.<sup>6</sup> On an NCB balance sheet, the liability 'banknotes in circulation' shows this allocated value; it is not the value of banknotes issued by that NCB.

However, the net outstanding value of banknotes issued by an NCB has to be recorded as a liability in its balance sheet. An NCB that has issued more notes than its allocation therefore has a further entry on its balance sheet: 'liabilities related to the allocation of euro banknotes within the Eurosystem (net)'. When added to the NCB's allocation (the liability labelled 'banknotes in circulation'), this adjustment makes up the total banknote issue of that NCB, and it owes the amount of the adjustment to other NCBs. Conversely, where an NCB has issued fewer banknotes than its allocation, the difference is entered as an asset: 'claims related to the allocation of euro banknotes'.<sup>7</sup>

This banknote adjustment for each NCB is a claim on, or a liability to, other NCBs in the same respect as TARGET2 claims. Intra-eurosystem debts arising both from TARGET2 transactions and banknote movements bear interest at the main refinancing rate set by the ECB, currently 1.25%.

that issued them. This is because notes are distributed around the NCBs between printing and issue; also an NCB may reissue notes previously issued by other NCBs that it has redeemed. Notes drawn from a bank in a particular country may thus have any letter.

<sup>6</sup> The weight of each NCB's 'banknote allocation key' is the same as its 'capital key' (which sets the NCB's contribution to the capital of the ECB) multiplied by 92%, the remaining 8% being allocated to the ECB. For example, the Bundesbank has a capital key of 27.06% of the eurozone (January 2011) and a banknote allocation key of 24.90%.

<sup>7</sup> These procedures are set out in 'Decision of the European Central Bank on the issue of euro banknotes' (ECB/2010/29); *Official Journal of the European Union* L35, 9 February 2011, page 26, and are discussed in Jobst (2011).

## Magnitudes of NCB banknote issues and eurosystem debts

The values of banknotes issued by eurozone NCBs at June 2011 are shown in Table 1, together with the adjustments described above.

There are two notable features of these data. First, the actual issues of notes by some NCBs differ substantially from their allocations, giving rise to large adjustments, *i.e.* intra-eurosystem claims.

**Table 1. Banknotes issued by central banks**

	June 2011			
	issued	% of GDP	allocated	adjustment
Austria	-6.8	-2.3	21.6	28.4
Belgium	9.6	2.6	27.0	17.4
Cyprus	1.1	6.1	1.5	0.4
Estonia	0.4	2.4	2.1	1.7
Finland	10.8	5.7	13.9	3.1
France	83.9	4.2	158.3	74.4
Germany	374.0	14.5	210.9	-163.1
Greece	36.6	16.2	21.9	-14.8
Ireland	27.1	17.4	12.2	-14.9
Italy	140.9	8.9	139.2	-1.7
Luxembourg	69.4	158.4	1.9	-67.4
Malta	0.8	12.7	0.7	-0.1
Netherlands	19.9	3.3	44.8	24.9
Portugal	-0.3	-0.2	19.5	19.8
Slovakia	6.6	9.4	7.9	1.4
Slovenia	1.4	3.7	3.7	2.3
Spain	73.1	6.8	93.4	20.4
ECB	0.0		67.8	67.8
total eurozone	<b>848.5</b>	<b>9.0</b>	<b>848.5</b>	-----
US \$bn	985.8	6.7		
UK £bn	53.9	3.7		

*Negative adjustments indicate issues in excess of allocation. For instance, the central bank of Ireland has issued €14.9bn more banknotes than its allocation; it therefore owes this amount to other central banks.*

*source: NCB financial statements and IMF International Financial Statistics*

Second, the total banknote issue in the eurozone as a proportion of GDP is markedly larger than in the US or the UK, despite the use of US dollar notes outside the US. A likely cause of this large

demand for euro notes is the presence of high value notes. Of the total euro banknote issue, 57% is in €100, €200 and €500 notes (December 2010), whereas it is the smaller denominations that are commonly used as a medium of exchange.

Table 2 shows aggregated intra-eurosystem debts.<sup>8</sup> The inclusion of debts arising from banknote flows makes a notable difference to the overall magnitudes of these debts, compared with the TARGET2 positions alone (as previously reported: Whittaker, 2011).

	<b>June 2011</b>	€ billions	
	TARGET2	banknote adjustment	total
Austria	-35.1 <sup>e</sup>	28.4	-6.7
Belgium	-21.3	17.4	-3.9
Cyprus	-6.4	0.4	-6.0
Estonia	-0.2	1.7	1.5
Finland	6.0	3.1	9.1
France	-18.3	74.4	56.1
Germany	336.5	-163.1	173.5
Greece	-96.8	-14.8	-111.6
Ireland	-129.5	-14.9	-144.4
Italy	6.0	-1.7	4.3
Luxembourg	69.9	-67.4	2.5
Malta	-1.9	-0.1	-2.0
Netherlands	20.5	24.9	45.5
Portugal	-57.3	19.8	-37.5
Slovakia	-13.4	1.4	-12.1
Slovenia	-2.0	2.3	0.4
Spain	-45.4	20.4	-25.0
ECB	-11.6 <sup>r</sup>	67.8	56.2

*Negative numbers indicate amounts owed to other central banks*  
*e = estimate; r = residual*  
*source: NCB financial statements and IMF International Financial Statistics*

As examples: as at June 2011, the German Bundesbank had issued €163.1 more banknotes than its share which, against its €336.5 TARGET2 claim, brought its total eurosystem claim to

<sup>8</sup> The only other intra-eurosystem debts on NCB balance sheets are claims on the ECB, mainly for foreign assets transferred to the ECB (a total of €40.2bn at December 2010, allocated across NCBs according to their 'capital keys'), which we disregard in this analysis.

€173.5; the NCB of Luxembourg had issued far more notes (€69.4) than its share (€1.9bn) but the difference (€67.4bn) is offset almost exactly by its TARGET2 claim (€69.9bn). Around 98% of the Luxembourg note issue is in high value notes.

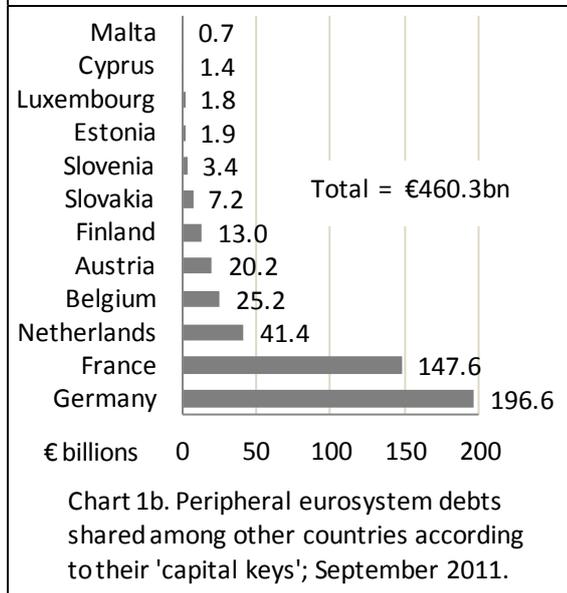
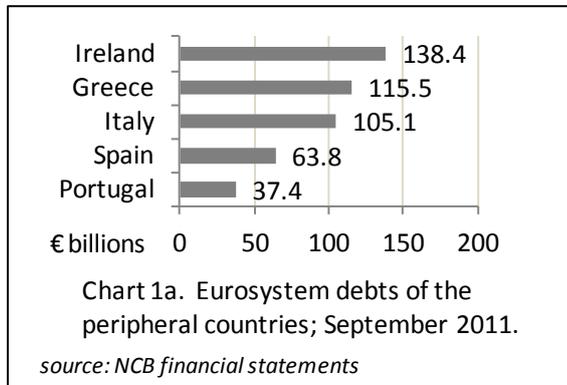
Amongst the peripheral eurozone countries, note issues in Ireland and Greece are also higher than their allocations. This adds to their TARGET2 debts and may reflect hoarding or cash transfers out of these countries via the banknote route. As an opposite example, the banknote issue in Portugal is approximately zero. The bank attributes this to tourism, with visitors drawing notes in other eurozone countries and spending them in Portugal (Annual Report, 2010, page 280).

With the exception of the rapid recent increase in the banknote issue by the BoG (by 86% between January 2010 and September 2011), these different issues by each NCB have generally built up gradually over the years since joining the euro currency. In contrast, the large TARGET2 debts have arisen mainly during 2007-2010. The TARGET2 debts of Ireland and Portugal have fallen slightly during 2011, presumably being displaced by loans to these countries from the European Financial Stability Facility (EFSF).

Since June 2011, there have been marked increases in the TARGET2 debts of Spain and particularly Italy, which may reflect capital flight. By the end of September 2011, Spanish and Italian TARGET2 debts had risen by €38.8bn and €109.4bn respectively, raising total eurosystem debts of the peripheral countries (Greece, Ireland, Portugal, Spain and Italy) to €460.3 (Chart 1a).

Although these debts are accounted as lending by the ECB, the ECB itself is owned by the NCBs of eurozone states. Hence, irrespective of which NCBs are actually holding the corresponding claims, exposure to these debts falls on the remaining 12 (non-peripheral) countries, in proportion to their shares in the capital of the ECB (Chart 1b). It may be noted that, while Germany insists that its guarantee to the European Financial Stability Facility (EFSF) for supporting the

peripheral countries cannot exceed €211bn, its exposure to the same countries via the eurosystem (€196.6bn in September 2011 and unlimited) is in addition to this figure.



### The public debt of Greece to other governments

As set out above, net financial outflows from Greece cause a rise in BoG debts to the eurosystem. Besides private transfers, these outflows include the interest and principal repayments of the foreign debt of the Greek government.

Suppose, for instance, that some Greek government debt matures and the government repays a foreign bondholder by drawing from its account at the BoG. When the payment is deposited into a foreign bank, that bank acquires a

claim on its NCB which, in turn, acquires a (TARGET2) claim on the BoG.<sup>9</sup>

In other words, the repayment of a Greek government bond to a foreign creditor becomes an increase in the foreign debt of the BoG. But all profits and losses of NCBs accrue to their respective governments and their debts may thus be viewed as government debts. In this light, the repayment of a Greek government bond does not alter the magnitude of the foreign debt of the Greek government. It just shifts some of that debt so that the Greek government owes less to private foreign bondholders but more to foreign governments via the eurosystem.

The opposite changes occur when the Greek government receives EU/IMF funds ('bailout' funds) under the loan facility agreed in May 2010, which it deposits into its accounts at the BoG or Greek commercial banks, causing a *reduction* in the eurosystem debt of the BoG. The receipt by the Greek government of a tranche of funds from the loan facility just means that some of its debts to other governments become direct rather than indirect through their respective central banks.

It matters little whether foreign governments lend to Greece directly or through the eurosystem (*i.e.* the ECB), apart from the lower interest cost of eurosystem debt (currently 1.25%). Accumulated net financial outflows are therefore equal to the sum of debts under the loan facility and via the eurosystem (see Appendix).<sup>10</sup> This is presented in Chart 2, which shows how eurosystem debt fell in the months in which tranches of loan money were

<sup>9</sup> The outcome is the same if the Greek government pays by drawing from its account at a Greek commercial bank, causing that bank to borrow from the BoG (via refinancing or Emergency Liquidity Assistance).

<sup>10</sup> The total Greek public debt assumed by foreign governments also includes government bonds purchased by the ECB in the secondary market under the Securities Market Programme in May and June 2010. However, these purchases were at the initiative of the ECB, not caused by financial outflows from Greece. Moreover, they appear to have been mainly from non-Greek holders, thus having little effect on eurosystem borrowing.

received (May, September, December 2010; March, July 2011) while generally rising in between.

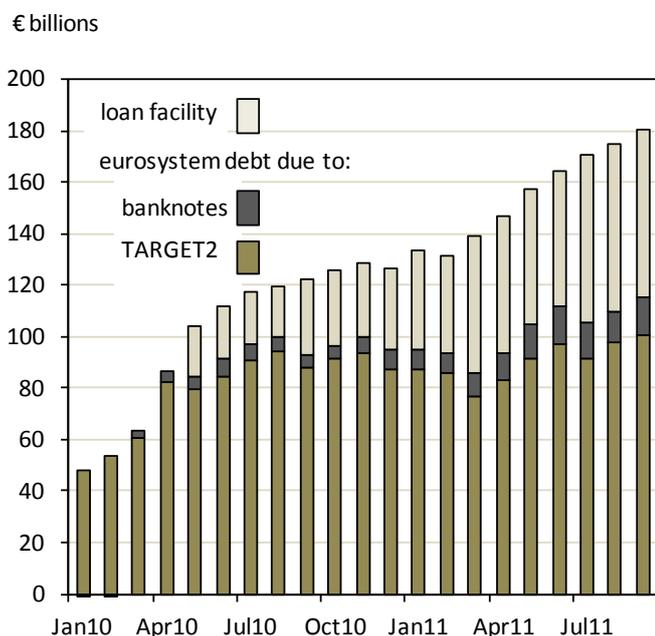


Chart 2: Greek public debt to other governments via the loan facility and the eurosystem.

source: Bank of Greece; European Commission

### What if payments from the loan facility cease?

Besides funding financial outflows, loans from the EU/IMF and/or the EFSF also help to finance the Greek government. But if these loans cease, there is another avenue by which the Greek government can continue to finance its deficits: it can resort to borrowing more from its commercial banks (a scenario discussed by Garber, 2010). Indeed, although the Greek government is unable to raise long-term funding on the bond markets, it increased its borrowing by means of short-term treasury bills by €22.8bn in the year to June 2011 (Public debt bulletins, Greek Ministry of Finance). The Greek government is able to borrow from its banks because those banks can borrow from the BoG and, in turn, the BoG can borrow from the ECB so long as Greece remains in the euro. The banks themselves would be in no position to object to taking on more government debt, especially if their existing holdings of government

debt are written down and this leads to larger state ownership.

The ending of EU/IMF lending to Greece would therefore not be a binding constraint on its government budget or its foreign borrowing. Foreign outflows would just cause greater borrowing through the eurosystem as described above. It would be as if Greece had obtained 'bailout' lending from the loan facility or EFSF after all. The same countries provide the loans or guarantees (apart from the non-eurozone contributions to the IMF component), with Germany bearing the largest share. There is no credible prospect that foreign outflows can be quickly reversed by sales of assets, by export surpluses or by attracting further foreign investment, even if 'austerity' achieves primary budget surpluses. Hence, if EU/IMF loans cease, as is repeatedly threatened, this will cause a faster rise in eurosystem debt.

A restructuring of Greek government debt in private hands would be of little help in this respect, even if it is orderly and managed by agreement with creditors. If redemption payments to private foreign bondholders were eliminated for the next few years by extending maturities (as in the July 2011 proposal) this would bring a reduction in foreign outflows of the order of €12bn per year. The cancellation of coupons on all Greek government bonds in private foreign hands would save an additional €6bn per year. These are small numbers compared with the current rate of increase of Greek public debts to foreign governments (say, €50bn per year, Chart 2).

Although the ECB would not condone an increase in backdoor funding of the Greek government via the eurosystem, there is little that it could do. It could make it hard for the BoG to refinance its banks, by ruling that Greek government debt is no longer eligible as collateral<sup>11</sup>. But then the BoG

<sup>11</sup> Such a prohibition would presumably extend to assets that have gained eligibility by means of a Greek government guarantee. Making Greek government debt

could extend its use of Emergency Liquidity Assistance which is not subject to ECB collateral rules. Although ELA is supposed to be for short periods, the Irish central bank has been using it for the past 2 years and is currently lending some €50bn to its banks via this route. The ECB Council could order the BoG to cease ELA, but this seems unlikely given the Irish precedent.

If the ECB did prohibit ELA, depriving the BoG of any approved means of lending to its banks, the BoG would have no option other than to defy the ECB and continue to lend anyway, given the consequence of not doing so: the closure of its banks for the want of liquidity.

The only way for the ECB to stop this indirect eurosystem lending to the Greek government would be by ordering other NCBs to refuse further credit to the BoG, shutting the BoG out of the TARGET2 system.<sup>12</sup> But this would prevent clearance of cross-border payments out of Greece and amount to the expulsion of Greece from the euro. The free flow of credit between eurozone NCBs is an essential feature of monetary union. It is what keeps a euro in a Greek bank equal to a euro in banks elsewhere.

As long as Greece remains in the euro, it cannot be excluded from eurosystem credit, so Germany and any other euro countries that still have sound finances will keep lending, whether or not the Greek government defaults. If this is not done via an official loan facility, it will go through the eurosystem (ECB), and it will increase if uncertainty about Greece remaining in the euro accelerates the flight of capital.

The ECB has so far refused to back the EFSF and it is not comfortable with its purchases of peripheral government debt under the Securities Market

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ineligible would also cause difficulties for other NCBs that are holding it as security for refinancing their banks.

<sup>12</sup> This scenario is considered by Boone and Johnson (2011) who make comparisons with the breakup of the post-USSR ruble zone.

Programme. However, it cannot avoid continued lending to Greece or any other troubled country that remains in the euro. The ECB (or, more accurately, its owners, the NCBs that constitute the eurosystem) is the lender of last resort whether it likes it or not. If it were prepared to play this role more explicitly, this would do much to help confidence in peripheral sovereign debts.

### **The role of banknotes**

With doubts about agreement on the latest Greek bailout-*cum*-austerity package, there is growing speculation that Greece may not stay in the euro. However, although a depreciating national currency would bring a temporary improvement in competitiveness, it is unlikely that Greece would find departure attractive.<sup>13</sup>

Even if government debts could be simply rewritten into new drachmas, there would be serious disputes over which currency applies to international private contracts. Business would face higher retail lending rates as loans are converted from 'hard' euros to 'soft' drachmas and companies with debts in euros but earnings in drachmas would be in an impossible position. Amongst other difficulties, it is doubtful whether it would be possible to prevent large-scale capital flight.

However, if Greece's access to TARGET2 credit were cut, the decision would be taken out of its hands and it would be forced out of the euro. In particular, without TARGET2 credit, it would be inconsistent for the BoG to continue with unrestricted issue of euro banknotes which could still be used for making cross-border payments, allowing the BoG to continue running up eurosystem debts as described above. One is forced to envisage attempts by means of border

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<sup>13</sup> Detailed analyses of the problems for a country leaving the euro appear in Eichengreen (2010), Deo *et al.* (2011), and Buiters and Rabhari (2011). Lachman (2010) suggests that the political costs of continuing 'austerity' may be sufficient to induce Greece to take the initiative of leaving the euro.

controls to prevent banknotes leaving Greece until the BoG changed its issue in order to identify them as Greek (drachmas), or the rest of the eurozone countries changing the design of their euro notes in order to distinguish them from Greek euros.<sup>14</sup>

If Greek-issued banknotes were distinguishable from the banknotes of other euro countries, it would be easier to argue that debts of Greek entities were measured in Greek euros. Then exit from the euro by suspending convertibility of Greek euros to euros of other countries would be less of an upheaval. But that was the point of

making them indistinguishable. Economic and Monetary Union was supposed to be permanent. Cementing all domestic claims into a foreign currency (the euro) was deliberate, enhancing the commitment of eurozone members but also adding greatly to the cost and uncertainty for them all when some member does finally leave.

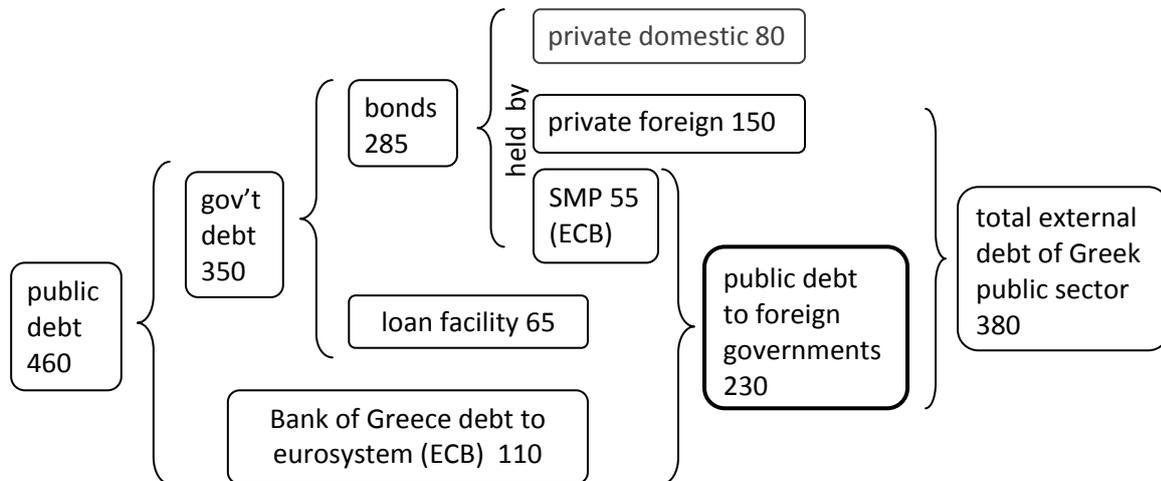
It is this, above all, that persuades Germany and others to keep lending, whether this is via EFSF loans, levered EFSF loans, ECB-backed loans, Eurobonds or the eurosystem.

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<sup>14</sup> When the Czech Republic and Slovakia agreed to separate their currencies in 1993, limits were applied to banknote withdrawals, the carriage of banknotes across borders was restricted and existing banknotes were stamped to identify the country of issue until new national banknotes could be printed.

## Appendix: Decomposition of Greek public debt to foreign governments

Approximate magnitudes in € billions, June 2011



Greek public debt is defined here as the debt of the government and the Bank of Greece.

The following identities hold:

Increase in public debt to foreign governments

$$= \left\{ \begin{array}{l} \text{increase in borrowing from loan facility} \\ + \text{ increase in eurosystem (ECB) debt} \\ + \text{ ECB purchases of government bonds (Securities Market Programme; SMP)} \end{array} \right.$$

$$= \left\{ \begin{array}{l} \text{deficit on the current account of the balance of payments} \\ + \text{ net private capital outflows} \\ + \text{ net redemptions of foreign held government debt (or sales to the ECB)} \end{array} \right.$$

For example, in a period in which there is no new borrowing from the loan facility and no ECB purchases of Greek government debt under the SMP, capital flight (net private capital outflows) causes an increase in borrowing of the Bank of Greece through the eurosystem (ECB).

## References

- Boone, Peter and Simon Johnson (2011) 'Europe on the Brink', Peterson Institute for International Economics, Policy Brief PB11-13, July. <http://www.piie.com/publications/pb/pb11-13.pdf>
- Buiter, Willem and Ebrahim Rabhari (2011), 'The future of the euro area: fiscal union, break-up or blundering towards a 'you break it you own it Europe'', Citigroup Global Economics Review, 9 September.
- Deo, Stephane, Paul Donovan and Larry Hatheway (2011), 'Euro break-up – the consequences', UBS Global Economic Perspectives, 6 September.
- Eichengreen, Barry (2010), 'The euro: love it or leave it?', VoxEU, 4 May. <http://www.voxeu.org/index.php?q=node/729>
- Garber, Peter, (2010), 'The Mechanics of Intra Euro Capital Flight', Deutsche Bank Special Report, 10 December.
- Jobst, Clemens (2011), 'A balance sheet view on TARGET – and why restrictions on TARGET would have hit Germany first', VoxEU, 19 July. <http://www.voxeu.org/index.php?q=node/6768>
- Lachman, Desmond (2010) 'Can the euro survive?' Legatum Institute, December. <http://www.li.com/attachments/Legatum%20Institute%20-%20Can%20the%20euro%20survive.pdf>
- Sinn, Hans-Werner (2011), 'The ECB's stealth bailout', VoxEU, 1 June. <http://www.voxeu.org/index.php?q=node/6599>
- Whelan, Karl (2011) 'Professor Sinn Misses the Target', Institute for International and European Affairs, 7 June. <http://www.iiea.com/blogosphere/professor-sinn-misses-the-target>
- Whittaker, John (2011), 'Intra-eurosystem debts', Monetary research, Lancaster University Management School, 30 March. <http://www.lancs.ac.uk/staff/whittaj1/eurosystem.pdf>