- The single currency was expected to make balance of payments irrelevant between the euro-area member states. This benign view has been challenged by recent developments, especially as imbalances between euro-area central banks have widened within the TARGET2 settlement system.
- Current-account developments can be misleading as indicators of financial-account developments in countries that receive significant official support. Greece, Ireland, Italy, Portugal and Spain experienced significant private-capital inflows from 2002 to 2007-09, followed by unambiguously massive outflows.
- We show that such reversals qualify as . Euro-area sudden-stop episodes were clustered in three periods: the global financial crisis, a period following the agreement of the Greek programme and summer 2011. The timeline suggests contagion effects were present.
- We find evidence of substitution of the private capital flows with public components. In particular, weak banks in distressed countries took up a major share of the central bank refinancing. The steady divergence of intra-Eurosystem net balances mirrors this.
- In the short term, TARGET2 imbalances could be addressed by tightening collateral requirements for central bank liquidity. For the longer term, the evidence that the euro area has been subject to internal balance-of-payment crises should be taken

1. See for example Carney
   (2012), Giavazzi and

balance-of-payment crises within the euro area would become as unthinkable as they are within countries[5].

To our knowledge, the only one to challenge this benign view was Peter Garber in a 1998 paper on the role of TARGET in a crisis of monetary union (Garber, 1998). The paper insightfully recognised that the federal structure of the Eurosystem and the corresponding continued existence of national central banks with separate individual balance sheets made it possible to imagine a speculative attack within monetary union. According to Garber, the precondition for an attack

. His conclusion is that

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As said, the benign view prevailed during the first ten years of EMU. It even continues to dominate today. Indeed, casual data observation seems to vindicate it. Figure 1 reports the 2007-11 evolution of current-account balances in the three non-euro area EU countries and the three euro-area countries with the highest deficits in 2007[6]. It is apparent that the two groups of countries have not followed the same path: whereas adjustment has been brutal for the first group, with deficits amounting to 15 to 25 percent of GDP transformed into surpluses over three or four years, it has been

5. The literature of the 1990s explored this comparison and showed that the Feldstein-Horioka paradox vanishes entirely when applied to regions within countries. See for example Bayoumi (1999).

6. We have excluded Cyprus because of its small size.

second outflow in early 2011. In Ireland, private capital inflows dropped the first time in the early stage of the financial crisis (2008Q3). The outflow then paused temporarily, starting again when the Greek programme was agreed in the second quarter of 2010. In Spain also there was a first, short-lived outflow in spring 2010, followed by a second, in summer 2011, concurrent with the one experience by Italy.

Figure 2 provides   evidence of sudden stops of capital inflows. We complement this

11. Deutsche Bundesbank Monthly Report, March 2011.

12. We cannot exactly replicate the evolution of the international investment position simply by cumulating financial account flows . This is because the international investment position can be subject to major valuation effects, including the effect of market prices and of exchange rates (European Commission, 2006).

capital inflows are one standard deviation below the mean, and to end with the first observation for which capital inflows return above one standard deviation below the mean (see Appendix 1 for details). In Figure 3, we present the application of this methodology to the case of Greece. The grey areas correspond to sudden stop episodes.
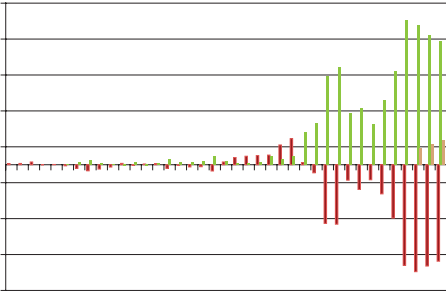
It is apparent in Figure 3 that the Calvo methodology provides a straightforward way to identify a

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Public support has taken three forms in the euro area: EU/IMF assistance programmes; provision by the Eurosystem of liquidity to the banking sector (captured by the development of TARGET

ations. Losses from Eurosystem monetary policy operations could occur in case that there is counterparty failure and the value of collateral posted at the ECB is not sufficient to cover the claim entirely. Such losses would however be shared by national central banks according to the extent of their participation in the Eurosystem's capital. In other words, the possible loss faced by each national central bank would be the same, irrespective of the size of the TARGET claims/liabilities recorded in their own balance sheets. For example the Bundesbank, being the largest shareholder in ECB capital, would bear the greatest loss even if private capital flows from the periphery had been directed massively towards France rather than towards Germany.

- Second, the only scenario in which TARGET would represent an actual additional risk for national central banks would be if one (or more) country decided to leave the euro area. In that case, the net claims against the rest of the system would constitute an additional risk. Any approach that would be interpreted as the introduction of a hedge against the break-up of the euro would involve the risk of sending the message that this break-up is indeed likely.

- Third, any proposal to limit the size of TARGET balances to a fixed threshold underestimates both the importance of a smoothly functioning payment system in a currency union, and the risk of speculative attacks that such limits would imply. The purpose of introducing the single currency was to overcome the weaknesses of fixed-exchange regimes, and this requires all capital flows between members to be treated in the same way. Placing caps on the size of TARGET balances would imply that euros would be entirely fungible across countries only up to a limit (Bindseil and Koenig, 2012), and this would in turn implicitly amount to the creation of two currencies. The threshold would offer a clear target to speculators in the same way that limited reserves offer a target in a fixed exchange-rate regime. Other proposals include the 'collateralising' of the TARGET balances of weaker countries and their disposal for an annual settlement (Sinn and Wollmerhaeuser, 2012). Though more reasonable in principle, such solutions would be very difficult to implement safely at present, given the size

of TARGET balances and the shortage of good collateral. Again, an approach of this sort would give an incentive for speculation against the possibility of the exhaustion of collateral reserves or the inability/unwillingness of countries to mobilise resources for periodic settlements.

TARGET2 balances are the symptom of the uneven distribution of central bank liquidity within the Eurosystem. Those who focus on TARGET2 imbalances as having significance beyond this confuse consequence and causes. Rather than tinkering with the symptom, with the risk of creating doubts about the very viability of the euro, attention should focus on curing the disease, in other words the underlying banking-system problems.

The Eurosystem can tackle the short-term high demand for liquidity by weak banks, against collateral of declining quality, by tightening the quality of the required collateral. This would be likely to reduce TARGET imbalances and is an option the central bank can consider without hampering the functioning of the euro area. Naturally, however, it can only be contemplated if banks are adequately recapitalised and if the threat of a vicious circle of bank and sovereign insolvency is removed. The introduction of a three-year LTRO at the end of 2011, and the extension of the range of eligible collateral, resulted from the Eurosystem's assessment that the risk of a funding crisis in major countries was significant enough for a massive provision of liquidity to be necessary, even though it implied almost by definition a widening

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Following Eichengreen (2006) we focus on the

- The end of a sudden stop coincides with change in capital flows reverting to the mean, namely above average minus one standard deviation.

Again following Calvo (2004), both average and standard deviations are computed in each month over an expanding window with starting date fixed at the earliest data available and a minimum width of 24 months. Moments and threshold are computed in each month t considering only data up to (*-1*), so excluding the potential crisis year. In this way we obtain 'adaptive' thresholds that keep track of the past evolution of capital flows but at the same time incorporate the increase in the volatility of capital flows recorded towards the end of the time series and toughen the requirements accordingly. However, thresholds take some time to adapt and therefore we risk detecting too many episodes of sudden stops especially in periods of high volatility (eg during the financial crisis). Therefore we decide to complement the Calvo criteria with an additional requirement and consider only episodes of sudden stops that last for at least three months. The time series of financial accounts have a different length for all countries, but for the purpose of identifying sudden stops we restricted the sample to the same period for all (2002-11). We did this for the sake of consistency, but we also replicated the analysis considering the whole (different) periods, and results are unaffected.

The Calvo methodology results in toughening the criterion for sudden stops in the case of repeated episodes. For this reason we have explored an alternative methodology to identify the months of sudden stop.

We 'freeze' the thresholds at the value observed the last month before a significant capital drop

May 2010	14.5	5.5	20
September 2010	6.5	2.6	9.1
December 2010		2.5	2.5
January 2011	6.5		6.5
March 2011	10.9	4.1	15
July 2011	8.7	3.2	11.9
December 2011	5.8	20.1	8

May 2011		1.75	6.1	7.85
June 2011	5.8	4.75		10.55
September 2011		7	3.98	10.98
October 2011		0.6		0.6
December 2011			2.9	2.9

January 2011		5	5.8	10.8
February 2011	3.3			3.3
March 2011		3.4		3.5
May 2011		3	1.58	4.58
September 2011		2	1.48	3.48
October 2011		0.5	0.5	1
November 2011	3			3
December 2011			3.9	3.9

* data has been aggregated at quarterly level for the sudden stop exercise