



BANCA D'ITALIA  
EUROSISTEMA

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(Occasional Papers)

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Italy in 2011-2012 and 2018

by Valerio Della Corte and Stefano Federico

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# TWO TALES OF FOREIGN INVESTOR OUTFLOWS: ITALY IN 2011-2012 AND 2018

by Valerio Della Corte\* and Stefano Federico\*

## Abstract

This paper focuses on the Italian bond tensions in 2018, one of the most severe episodes of financial turbulence in the euro area since the peak of the sovereign debt crisis in 2011-12. It provides a detailed description of foreign investor outflows during that episode, and it also looks more systematically at the behaviour of euro-area investors in foreign and domestic securities throughout all the episodes of (acute or mild) financial turmoil in the euro area from 2009 to 2018, using data disaggregated by holder sector and country and issuer country. We show that the outflows in the 2018 episode differed in several respects from those recorded in 2011-12, and cannot be considered as a 'sudden stop'. Our broader analysis of investor behaviour during episodes of financial turmoil suggests that there is limited heterogeneity across investor categories. All foreign holders tend to pull out of a country during episodes of sovereign market stress, while domestic investors tend to repatriate their funds, although to a lesser extent since 2014.

**JEL Classification:** F32, F34, G01, G11, G15, H63.

**Keywords:** capital outflows, sudden stops, sovereign debt crisis, Italian bond market tensions, investment behaviour.

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# 1 Introduction<sup>†</sup>

Seven years have passed since the peak of the sovereign debt crisis, with key changes occurred in the financial landscape since then. Are euro-area countries now more resilient to “sudden stops”? Have the structural changes in the financial system contributed to make these countries less exposed to financial instability episodes? To shed light about these questions we examine the experience of the 2018 Italian bond turmoil, which - apart from the Greek crisis - was probably the most severe episode of financial turbulence in the euro area since the acute phase of the sovereign debt crisis.

Tensions on the Italian government securities market started at the end of May 2018, coinciding with uncertainty around the formation of the new government. Government bond yields remained under pressure throughout the end of the year, reflecting investors’ apprehension about the economic policy stance. Clearly, the Italian bond turmoil in 2018 is hardly comparable to the peaks of the sovereign debt crisis, when measures of sovereign risk premia, CDS premia, perceptions of redenomination risk had reached very high levels, and investors were worried about the possible break-up of the euro area. At the same time, the combination of tensions on the government debt market and significant foreign investor outflows makes it worthwhile to investigate the 2018 episode in more detail, especially in consideration of the structural changes occurred in the financial system since the sovereign debt crisis. These include, among others, new regulations for banks and insurance companies, the increased importance of securities-driven repos in the money market, and the growing role of investment funds and asset managers.

Focusing on a very recent episode of reversal in capital flows may therefore provide insights on how these changes influence the magnitude and patterns of foreign investor outflows and possibly the resilience of the current financial system. To cite just one example we notice that, as opposed to the sovereign debt crisis, during the 2018 Italian bond turmoil tensions in the government debt market did not spill over to the banking sector, which even at the peak of the recent turmoil managed to attract capital inflows. It is important to understand the reasons behind this trend and whether, for instance, the structural transformation of the interbank market from an unsecured to a largely secured market played a role.

The contribution of this paper is twofold. First, we provide a detailed description of capital outflows from Italy during the 2018 episode, and compare them with those occurred during the euro area sovereign debt crisis. While this case-study approach implies that our results are country-specific and therefore not necessarily representative of other countries’ experiences, it allows us to explore the two capital flow reversals much more in depth than within a cross-country setting, contributing to the international finance literature on the determinants and unfolding of “sudden stops” (Calvo et al., 2003, Li et al., 2019) and, more generally, extreme capital flow movements (Forbes and Warnock, 2012a, Forbes and Warnock, 2012b, Broner et al., 2013, Kräussl et al., 2016, Eichengreen et al., 2018).

As our second contribution, we analyze more systematically the behavior of euro area investors in foreign and domestic securities across all episodes of (acute or mild) financial turmoil

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in the euro area from 2009 to 2018. Using Eurosystem data from the Securities Holdings Statistics (SHS - Sector Module), we disentangle among the main holder sectors (banks, insurance companies, investment funds, and other investors) and provide new sector-level evidence on the portfolio rebalancing during episodes of market stress. This enables us to empirically validate and extend existing evidence on foreign investor retrenchment during the sovereign debt crisis (Beck et al., 2016, Schmidt and Zwick, 2015, Emter et al., 2019, Brutti and Sauré, 2016, Bijlsma and Vermeulen, 2016, Rousova and Giuzio, 2019), based on less complete coverage in terms of sectors and/or countries. As our data capture the latest episodes of capital flow reversals, including the 2018 Italian bond turmoil, we are also able to test whether the behavior of the various classes of investors during recent crisis periods differs from the one observed before the structural changes occurred in the financial system.

The paper is structured as follows. Section 2 describes the recent episode of foreign investor outflows in Italy, and compares it with the outflows observed during the peak of the sovereign debt crisis. It also applies a statistical methodology for the identification of sudden stops, in order to better evaluate the intensity of the two episodes. Going beyond the specific case-study of capital outflows in Italy, Section 3 uses instead detailed data on foreign and domestic holders of euro-area government debt securities, with a view to shedding light on the behavior of various institutional sectors during financial turmoil episodes, including the more recent ones. Section 4 concludes.

## 2 Capital flows in Italy and identification of sudden stops

### 2.1 Capital flows in Italy across the two episodes

Before describing the evolution of capital flows in Italy during the sovereign debt crisis and the 2018 Italian bond turmoil, it might be useful to briefly recap the timeline of each of the two episodes.

The beginning of the sovereign debt crisis is conventionally dated back to late 2009, as interest rates on bonds issued by Greece moved sharply upward, following a dramatic revision to its government deficit projections. Turmoil in Greece was then followed by rising interest rates on bonds issued by Ireland and Portugal. Pressures on the financial markets however began to significantly affect Italy only later, more specifically around July 2011. Despite the monetary policy measures implemented by the Eurosystem during the summer (including secondary market purchases of government paper under the Securities Markets Programme), sovereign debt strains in the euro area worsened in the autumn months, becoming systemic. The spread between the yields on Italian and German ten-year government securities reached 550 basis points in November 2011. After easing in the early months of 2012, owing also to the launch of the ECB's three-year refinancing operations, the tensions on the financial markets flared up again starting in spring. Progress in the governance of the euro area in June 2012 and the announcements made by the Governing Council of the ECB in early August contributed to the sharp attenuation of tensions on sovereign debt markets within the area (Neri and Siviero, 2018).

As regards the recent Italian bond turmoil, it started at the end of May 2018, coinciding with uncertainty around the formation of the new government. Tensions on the Italian government securities market rapidly heightened, driving up yields amid foreign investors' significant sales

of Italian assets. Over the following months, investors' uncertainty about the economic policy stance weighed on government bond yields: the spread between Italian and German bonds reached a peak of 330 basis points in mid-November. Since the start of 2019 tensions have instead subsided to some extent, owing to the agreement reached between the Italian Government and the European Commission regarding Italy's budget policies, to the easing of monetary conditions in the euro-area and to the improvement in conditions of global financial markets.

For our analysis of capital flows, we therefore identify the following two periods, which aim to capture the most acute phase of the sovereign debt crisis - as experienced by Italy - and the 2018 bond turmoil, respectively. The first episode goes from July 2011 to July 2012, thus ending immediately before the announcements made by the ECB in early August 2012. The second period goes from from May 2018 to December 2018. We do not consider the first half of 2019 as part of the recent Italian bond turmoil episode, because, while financial market pressures in Italy still remained somewhat elevated, foreign investors made significant net purchases of Italian assets since the beginning of the year, thus pointing to a renewed interest toward Italian securities. Financial conditions eased even further since July.

Figure 1 reports a summary decomposition of balance of payments flows in each of the two episodes. Flows are aggregated into the following items: a) foreign portfolio investment in Italian public sector securities; b) foreign portfolio investment in Italian bank bonds; c) foreign portfolio investment in other Italian securities (i.e. bonds issued by other sectors, equity and investment funds); d) Italian portfolio investment in foreign securities (which is reported with the opposite sign, so that positive values correspond to net sales of foreign securities by resident investors, i.e. inflows); e) current and capital account balances; f) Italian banks' net foreign funding in loans, deposits and other investment;<sup>1</sup> g) residual items of the balance of payments (which include direct investment, financial derivatives, remaining items of other investment, official reserves, errors and omissions; h) change in the Bank of Italy's TARGET2 balance. Given the balance of payments accounting identity, the change in the Bank of Italy's TARGET2 balance is obtained as the sum of items from a) to g).<sup>2</sup>

Between July 2011 and July 2012 foreign holders made net sales of Italian government bonds for almost €150 billion. This figure understates the actual amount of foreign investors' net sales, as it includes the securities purchased by the Eurosystem (excluding the Bank of Italy) in the context of the Securities Markets Programme (SMP): the ECB and the other euro-area national central banks are indeed considered non-resident investors in the balance of payments. Given the likely amount of SMP purchases of Italian government bonds by the ECB and the national central banks of the Eurosystem other than the Bank of Italy over this period,<sup>3</sup>

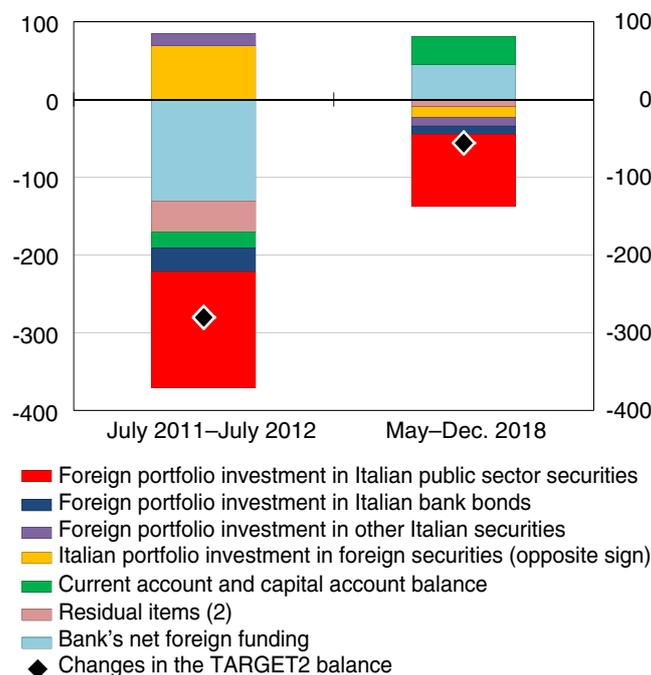
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<sup>1</sup>We define Italian banks' net funding on the international interbank market as the sum of two items in the balance of payments: banks' net other investment liabilities and banks' centrally cleared repo transactions with foreign counterparts. As explained in [Banca d'Italia \(2019\)](#), the latter transactions are recorded under other sectors' other investment - because the domestic central counterpart (Cassa di compensazione e garanzia SpA) is classified as a non-bank financial intermediary - but are economically attributable to the banking sector.

<sup>2</sup>For instance, an improvement in the Bank of Italy's TARGET2 balance (i.e. a less debtor balance) may reflect foreign portfolio investment in Italian securities, an increase in Italian banks' net funding on the international markets, a surplus on current account and on capital account, and residents' disposals of foreign portfolio assets.

<sup>3</sup>We use ECB public data on the composition of the SMP portfolio by issuer country and follow the timeline of [Trebesch and Zettelmeyer \(2018\)](#), according to whom there were two main large phases of the SMP: "[the first goes] from the inception of the program, on May 10, until early July of 2010. Bond purchases in this phase focused on Greek, Irish, and Portuguese debt. After 12 months with little or no purchases, the ECB announced a reactivation of the SMP on August 7, 2011, giving rise to the second phase of bond purchases, which lasted

Figure 1: Changes in the Bank of Italy’s TARGET2 balance and Italy’s balance of payments flows (cumulative flows, EUR bln) (1)



Source: Bank of Italy. (1) Breakdown of the change in Bank of Italy’s TARGET2 balance based on the balance of payments accounting identity. - (2) Direct investment, derivatives, other investment, official reserves, errors and omissions.

we estimate that foreign investors’ net sales amounted to about €235 billion (Figure 2), i.e. almost one third of their initial stock. Our estimates based on SHS and CPIS data suggest that every major sector of foreign holders (banks, insurance companies, investment funds and official reserve managers) made significant contributions to foreign investors’ overall sales of Italian public sector securities. This evidence does not seem to point to substantially different behavior across the various holder sectors during a phase of acute market stress; Section 3 will report the results of a more systematic analysis in which all episodes of financial turmoil in the euro area since 2009 are included.

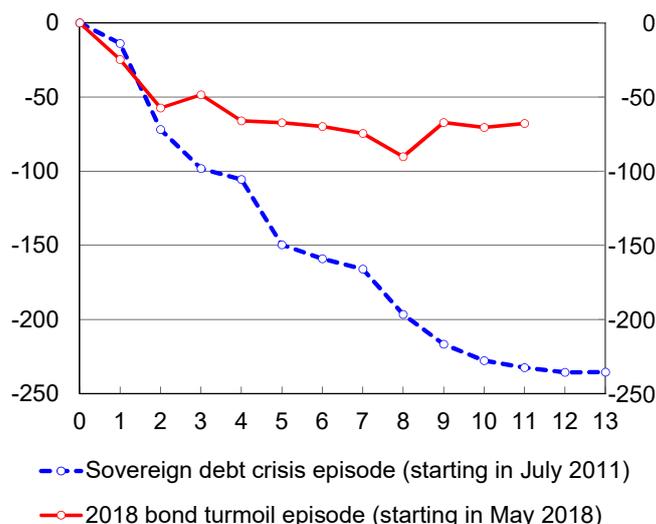
Large outflows hit not only the sovereign debt market but also the interbank market, as Italian banks’ funding on the international interbank market fell by €130 billion, in the context of a credit slowdown on the domestic market. Further outflows, although on a much smaller scale, were due to foreign portfolio disinvestment from bank bonds and to the relatively modest current account deficit, while inflows were mainly due to Italian investors’ net sales of foreign portfolio assets (for almost €70 billion). Reflecting the large outflows, the Bank of Italy’s TARGET2 balance worsened by €286 billion between July 2011 and July 2012.

In contrast to the sovereign debt crisis, the magnitude of capital outflows during the 2018 Italian bond turmoil looks much smaller, although significant foreign sales of Italian government bonds were nonetheless observed.<sup>4</sup> Between May and December of last year, foreign investors

until December 2011 and focused on Spanish and Italian bonds”.

<sup>4</sup>Bond spreads over German bunds remained well below the levels reached during the peak of the sovereign debt crisis (peaking at about 330 basis points in November 2018 versus 550 in November 2011 at the 10-years

Figure 2: Foreign investment in Italian public sector securities (cumulated flows, billions of euros) (1)



Source: Bank of Italy, ECB and authors' estimates. Excluding net purchases of public sector securities by the Eurosystem; purchases are estimated using public data on the Securities Markets Programme (SMP) and on the Public Sector Purchase Programme (PSPP).

(excluding the Eurosystem) disposed of €90 billion worth of government securities, or 12 per cent of their initial stock (Figures 1 and 2). Our estimates based on SHS and CPIS data suggest that two main holder sectors (investment funds residing in other euro-area countries and non-euro-area investors) recorded the largest reduction in their exposure to Italian public sector securities.

Capital outflows did not however spill over to Italian banks' funding on the international interbank market, which instead increased by €45 billion, driven by transactions on the MTS repo market (Figure 1).<sup>5</sup> This was partly thanks to relaxed funding conditions on this market (in turn favoured by the large share of transactions intermediated by central counterparties) and the high demand for Italian securities in the special repo segment which was met by Italian banks in exchange for liquidity. This development is in line with the evidence pointing to a structural shift from a cash-driven repo market to a securities-driven repo market (Brand et al., 2019), and the growing role of central counterparties in alleviating counterparty risk (Mancini et al., 2016, Affinito and Piazza, 2018). Reflecting these movements, between May and December 2018 the Bank of Italy's negative balance on TARGET2 widened by €56 billion; the increase was much smaller than the portfolio divestment, also thanks to the large surplus

maturity). Despite the lower yield levels reached during the latest episode, Cronin and Dunne (2019) find evidence of asymmetrical effects within the euro area sovereign debt market, which hit in particular the financial markets of more vulnerable countries.

<sup>5</sup>MTS Repo is the repo segment of the regulated wholesale market in government securities (MTS), managed by MTS S.p.A. In this market, central counterparty services are available on an optional basis, jointly supplied by Cassa di Compensazione e Garanzia S.p.A. (CCG) and LCH Clearnet SA. There are two repo segments: General Collateral Repo and Special Repo. In the general collateral segment, the securities posted as collateral are selected after the trade from a basket of eligible assets (i.e. a list of ISIN codes). In the special repo segment, the parties to a trade agree to a designated collateral asset (i.e. they specify the asset's ISIN code).

Table 1: Italy’s external statistics before the start of each episode (% of GDP)

	2011-12 sovereign debt crisis	2018 bond turmoil
Current account balance	-3.6	2.6
Net international investment position	-21.8	-8.4
External assets	122.2	155.7
External liabilities	144.0	164.1
of which: government portfolio debt	45.9	45.6
of which: non-government portfolio debt	19.5	16.6
of which: non-government portfolio equity	9.7	14.9
Banks’ net foreign funding	20.8	6.9
Bank of Italy’s TARGET balance	0.4	-25.5

*Source:* Bank of Italy and Istat. Stocks at the end of 2011Q2 for the first episode, end of 2018Q1 for the second one. Current account balance measured as four-quarter cumulated flows ending in 2011Q2 and 2018Q1, respectively.

in the current and capital accounts.

Overall, the different patterns in capital outflows across the two episodes clearly reflect the contrast between the extremely acute and systematic nature of the sovereign debt crisis, which reflected widespread concerns about the possible break-up of the euro area, and the smaller-scale and localized nature of the 2018 Italian bond turmoil episode. Additional explanations can be found in Italy’s lower ex-ante exposure to foreign capital at the onset of the latest episode (both overall and in the banking sector), and possibly in the structural transformation of the money market into a largely secured market, with a large share of tstrong role played by the central counterparty. Italy’s external position was indeed more balanced than in the past, as suggested by its net international investment position (-8 per cent of GDP in early 2018, compared to almost 22 per cent in 2011; Table 1).<sup>6</sup> While government portfolio debt liabilities were basically unchanged in terms of GDP (around 45 per cent), Italian banks’ net liabilities on the international interbank market in 2018 were only one third than in mid-2011 (7 per cent of GDP, compared with 21 per cent in mid-2011). Their lower exposure, combined with a largely secured interbank market, allowed Italian banks to attract funding from abroad even at the peak of the 2018 bond turmoil rather than suffer large outflows as in 2011-12.<sup>7</sup>

## 2.2 Statistical identification of sudden stop episodes

While the previous section provides a mostly narrative account of capital flows across the two episodes, it is useful to back up these findings with a more general statistical framework. We therefore follow [Forbes and Warnock \(2012a\)](#) and apply their methodology for the identification

<sup>6</sup>On the unwinding of Italy’s external stock imbalances since 2014, see [Della Corte et al. \(2018\)](#). Italy’s external accounts were also in better shape from a flow perspective. The current account balance was in surplus for about 2.5 per cent of GDP in early 2018, compared to a deficit of more than 3.5 per cent of GDP in mid 2011.

<sup>7</sup>The level of Italy’s external gross liabilities was about 20 percentage points of GDP larger than in 2011, but this increase was entirely driven by the Bank of Italy’s TARGET2 balance and by non-debt instruments such as portfolio equity, which are not necessarily associated with a higher vulnerability to capital outflows.

of sudden stops and surges.<sup>8</sup>

For a given type of gross capital inflow, we compute its twelve-months moving sum ( $C_t$ ), in order to eliminate the impact of seasonal fluctuations. We then calculate year-on-year changes in  $C_t$ , which we then use to compute rolling means and standard deviations on a 5-year rolling window. A stop episode is identified if the following two conditions hold: changes in gross inflows fall at least one standard deviation below their mean, and fall at least two standard deviations below their mean at some point; the episode ends when gross inflows are no longer at least one standard deviation below their mean. A surge episode is defined using a symmetric approach.

We apply this methodology using monthly data for Italy on two types of flows: a) gross foreign portfolio investment in government debt securities at the monthly frequency<sup>9</sup>; b) Italian banks' net foreign funding via loans, deposits and other investment (i.e. excluding bank bonds).

According to this methodology, Italy experienced indeed a sudden stop in capital flows to government debt securities during the sovereign debt crisis, starting in July 2011 and ending in June 2012 (Figure 3). This corresponds to a large extent to our previous definition of the sovereign debt crisis episode as relevant in the case of Italy. We observe a "surge" (i.e. a sharp increase in gross inflows) from November 2012 to September 2013, which corresponds to the period following the announcements made in August 2012 by the Governing Council of the ECB, in a context of easing financial market tensions. In contrast, the 2018 bond turmoil in Italy is not identified as a sudden stop: the year-on-year change of cumulated gross inflows was only about one standard deviation below the mean.

The application of the methodology to bank flows reveals that during the sovereign debt crisis there was also a sudden stop in Italian banks net borrowing from foreign counterparties (from September 2011 through July 2012; Figure 4). This was not the case instead in 2018, when Italian banks even managed to significantly increase their borrowing on international markets.

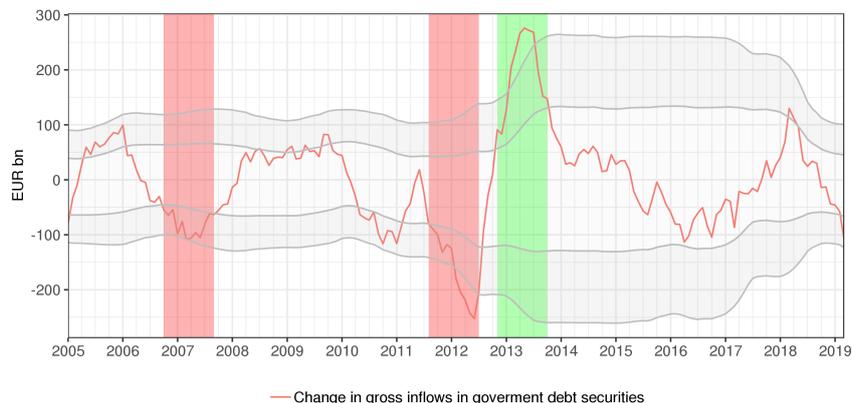
As a sanity check, we apply the same methodology to other euro area countries. We now mostly rely on quarterly instead of monthly data, because the latter are not available with a sufficient time span for many countries. Table 2 shows that sudden stops on government portfolio debt liabilities were observed in other euro area countries during the sovereign debt crisis, including Greece, Portugal and Spain. The timeline of sudden stops is in line with trends in interest rate spreads, which for instance spiked earlier in Greece and Portugal and only later in Spain. The evidence on banks' net foreign funding in the other euro area countries (Table 3) identifies a sudden stop in Spain and Portugal during the peak of the sovereign debt crisis. The results for the other countries are more heterogeneous and in a few cases less easy to reconcile with market-based indicators of financial stress; this might be related to intra-group financing flows, which are included in balance of payments flows and may therefore blur the

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<sup>8</sup>An alternative approach could be based on a measure of benchmark portfolio flows (Burger et al., 2018), which approximate the capital flows that one country would be expected to receive if new rest-of-the-world savings were allocated according to past portfolio weights. Although intuitively appealing and theoretically grounded, we do not follow this approach because its practical implementation presents huge challenges: one of them is related to China, which accounts for more than a quarter of world savings but generates little international portfolio investment, while the composition of its official reserve assets by issuing country is not disclosed.

<sup>9</sup>As before, we exclude capital inflows due to purchases of domestic government securities by the ECB and the other euro-area national central banks (which are considered non-resident investors in the balance of payments) in the context of the Securities Market Programme and, since March 2015, the Public Sector Purchase Programme.

Figure 3: Identification of sudden stops: foreign portfolio inflows in Italian government debt securities



Red (green) vertical bars indicate capital stops (surges). *Source:* authors' calculations on Bank of Italy and ECB data based on the methodology in [Forbes and Warnock \(2012a\)](#). Balance of payments data adjusted so as to exclude foreign capital inflows due to purchases of domestic government securities by the ECB and the other euro-area national central banks (which are considered non-resident investors in BOP data) in the context of the Securities Market Programme and, since March 2015, the Public Sector Purchase Programme. These purchases are estimated based on public data from the ECB.

actual financing conditions with external counterparts.<sup>10</sup>

<sup>10</sup>The increase in financial fragmentation in the cross-border interbank market during the sovereign debt crisis had persistent consequences, as net foreign borrowing and lending did not recover from its pre-crisis level in all main euro-area banking systems ([Emter et al., 2019](#)). In Spain, for instance, net foreign borrowing by domestic banks was only three percentage points of GDP in 2018-Q1 (from about 24 on average in 2009), 15 in Portugal (from about 47 points) and it was negative by some 8 percentage points in Ireland (from 183 in 2009). In creditor countries like Germany there was a simultaneous reduction in banks net cross-border lending (to about 9 GDP percentage points in 2018-Q1 from 24 in 2009).

Table 2: Identification of sudden stops in foreign portfolio inflows in government debt securities: other euro-area countries

Date	AT <sup>(1)</sup>	DE	ES	FI	FR <sup>(1)</sup>	GR <sup>(2)</sup>	NL	PT
2007:Q1	surge					n.a.	n.a.	
2007:Q2	surge					n.a.	n.a.	surge
2007:Q3	surge					n.a.	n.a.	surge
2007:Q4						n.a.	n.a.	surge
2008:Q1	stop					n.a.	n.a.	surge
2008:Q2	stop					n.a.	n.a.	
2008:Q3	stop						n.a.	
2008:Q4			surge		surge		n.a.	
2009:Q1			surge		surge		n.a.	
2009:Q2			surge		surge		n.a.	
2009:Q3			surge		surge		n.a.	
2009:Q4			surge		surge		stop	
2010:Q1							stop	
2010:Q2						stop	stop	stop
2010:Q3					stop	stop	stop	stop
2010:Q4			stop		stop	stop		stop
2011:Q1			stop		stop	stop		stop
2011:Q2		surge	stop		stop			
2011:Q3		surge	stop					
2011:Q4			stop					
2012:Q1			stop					
2012:Q2			stop					
2012:Q3								
2012:Q4			surge					
2013:Q1			surge					
2013:Q2			surge					
2013:Q3			surge					
...								
2017:Q4		surge						
2018:Q1		surge					surge	
2018:Q2		surge					surge	
2018:Q3		surge					surge	
2018:Q4		surge					surge	

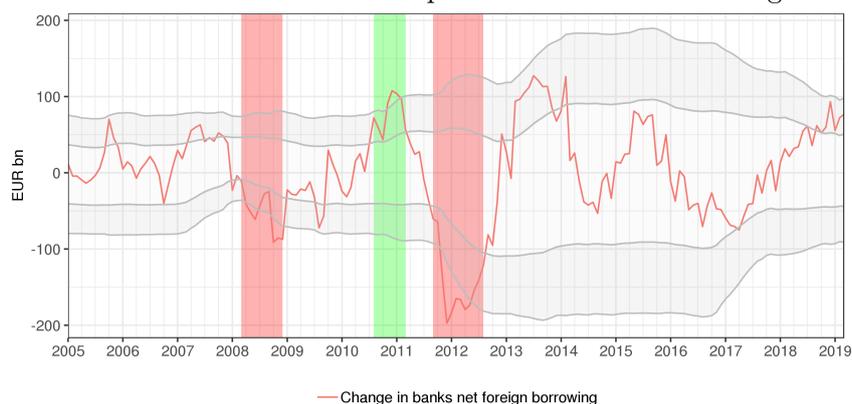
*Source:* authors' calculations on ECB data based on the methodology in [Forbes and Warnock \(2012a\)](#). BOP data are adjusted so as to exclude foreign capital inflows due to purchases of domestic government securities by the ECB and the other euro-area national central banks (which are considered non-resident investors in BOP data) in the context of the Securities Market Programme and, since March 2015, the Public Sector Purchase Programme. These purchases are estimated based on public data from the ECB. For the SMP, the timeline of the purchases follows the anecdotal evidence reported by [Trebesh and Zettelmeyer \(2018\)](#). Notes: for some countries, inflows in government debt portfolio liabilities are not available with a sufficient time span. In case (1), until 2012:Q2 waves in gross portfolio inflows in debt securities are reported instead. In case (2), waves in total gross portfolio liabilities are reported until 2014:Q2.

Table 3: Identification of sudden stops in banks' net foreign funding: other euro-area countries

Date	AT*	DE	ES	FI*	FR*	IE*	NL*	PT
2007-Q1	stop		stop					
2007-Q2	stop		stop					stop
2007-Q3	stop		surge					stop
2007-Q4			surge					stop
2008-Q1			surge				surge	
2008-Q2			surge		stop		surge	
2008-Q3			surge		stop	stop	surge	
2008-Q4					stop	stop	surge	
2009-Q1		surge			stop	stop		
2009-Q2		surge			stop	stop		
2009-Q3		surge						
2009-Q4	surge	surge						
2010-Q1	surge	surge						
2010-Q2	surge	surge						
2010-Q3	surge	surge						
2010-Q4		surge						
2011-Q1				stop			stop	
2011-Q2		stop		stop			stop	
2011-Q3		stop		surge				surge
2011-Q4		stop		surge				surge
2012-Q1		stop	stop	surge			surge	
2012-Q2			stop	surge			surge	stop
2012-Q3			stop		surge			stop
2012-Q4			stop	stop	surge			stop
2013-Q1		stop		stop	surge			surge
2013-Q2		stop	surge	stop	surge			surge
2013-Q3		stop	surge	stop				surge
2013-Q4		stop	surge					surge
2014-Q1			surge					
...								
2017-Q4	stop							
2018-Q1	stop							
2018-Q2								
2018-Q3								
2018-Q4		stop						

*Source:* authors' calculations on ECB data and BIS Locational Banking Statistics. Waves are identified based on the methodology in [Forbes and Warnock \(2012a\)](#). Notes: we use BOP monthly data from ECB when they are available with a sufficient time span (in these cases we report stops in each quarter for which at least one month is flagged as a stop). Otherwise (countries indicated with an asterisk), we use quarterly data on net foreign funding for loans and deposits from BIS Locational Banking Statistics.

Figure 4: Identification of sudden stops: Italian banks' net foreign funding



Red (green) vertical bars indicate capital stops (surges). *Source:* authors' calculations on Bank of Italy data based on the methodology in [Forbes and Warnock \(2012a\)](#). Balance of payments data adjusted so as to take into account repo funding intermediated by the resident central counterparty.

### 3 Investor behavior during financial turmoil episodes in the euro area

#### 3.1 Motivation

While the previous section has looked at the case-study of capital outflows in Italy in 2011-12 and 2018, this section takes a broader view of investor behavior during episodes of financial turmoil in the euro area. The latter approach can be viewed as complementary to the former, enabling us to validate whether the financial turmoil episodes in Italy share common features to the other main episodes in the rest of the euro area.

We therefore extend our focus to the main euro-area countries and we look at changes in government debt securities holdings by foreign and domestic investors from 2009 through 2018. We are particularly interested in analyzing whether different types of investors reacted in a heterogeneous way to deteriorated financial conditions, distinguishing between periods of *mild* financial tensions and periods of *acute* financial turmoil.

Some types of investors tend to trade pro-cyclically, exacerbating market movements, while others tend to firmly hold their positions, acting as stabilisers. For instance, insurance corporations and pension funds are generally deemed to behave as contrarian investors which tend to sell past winners and buy past losers ([Timmer, 2018](#); [de Haan and Kakes, 2011](#)), owing to the relatively persistent structure of their liability side, which keeps their funding and rollover risk moderate.<sup>11</sup> By the same token, banks may also act as market-prices stabilisers if they adopt long-term strategies based on holding illiquid fixed-income assets to maturity, as suggested by [Hanson et al. \(2015\)](#), although some recent evidence suggest that their cross-border investment could be procyclical ([Avdjiev et al., 2018](#)).<sup>12</sup> Mutual funds are often regarded instead as momentum investors, both in the equity market ([Grinblatt et al., 1995](#)) and in the debt markets

<sup>11</sup>An exception is the work by [Bijlsma and Vermeulen \(2016\)](#), in which they show that Dutch insurance entities exhibited a *flight to quality* behaviour during the European sovereign debt crisis, as opposed to their usual investment strategies.

<sup>12</sup>[Lanotte et al. \(2016\)](#) investigate instead the effects of regulation on sovereign exposure.

(Timmer, 2018).

The behavior of domestic investors may also differ from that of foreign investors, especially in times of crisis, when the former typically act as contrarian investors, repatriating funds as the latter pull out of the domestic market (Broner et al., 2013). Brutti and Sauré (2016) find evidence that during the sovereign debt crisis domestic banks in stressed countries increased their holdings of locally issued public debt compared to foreign banks, as predicted by the *secondary market theory* of public debt (Broner et al., 2010).

Differences in investor behavior across sectors imply that changes in the composition of a sovereign market’s investor base may translate into different degrees of financial vulnerability. Italy provides an example of significant changes to its sovereign market’s investor base in less than a decade. According to Italian balance of payments data, the share of government debt held by foreign investors was equal to 47% at the onset of the sovereign debt crisis, while it amounted to only 36% in early 2018. The composition of foreign investors also significantly changed over time, with a sharply lower share of non-euro area investors and a higher share held by euro-area investment funds.<sup>13</sup>

Finally, an additional advantage of our data is that, by covering the latest episodes of financial turmoil, we are able to test whether investors’ behavior has changed in the aftermath of the sovereign debt crisis, a period characterized by key regulatory changes. The introduction of Solvency II in January 2016 for insurance corporation and pension funds and the new prudential regulation for banks coming into force since 2014 were among these key changes. By construction, our approach cannot therefore precisely identify the effects of a specific policy change, as this would require a policy experiment setting. However, our results can provide suggestive evidence of differences between the latest episodes of financial turmoil and less recent ones, which might possibly be related to structural changes in the financial system and regulatory framework.

### 3.2 Data and empirical specification

To analyse the investment behaviour of different types of holders, we exploit the Eurosystem Securities Holdings Statistics (SHS - Sector Module) database. The confidential version of this database provides us with security-by-security holdings by euro area residents broken down by institutional sector and country of residency of the holder over the period from the first quarter of 2009 to the last quarter of 2018.<sup>14</sup> We distinguish between four holder sectors: banks, insurance corporations and pension funds (Icpf), other financial intermediaries (Ofi) and a sector composed by non financial corporations and households (Non-Fin), excluding Government. We restrict the sample to the following countries: Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, Netherlands and Portugal (as either holder countries or, with the exception of Greece and Luxembourg, issuer countries).<sup>15</sup>

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<sup>13</sup>As it can be inferred by International Monetary Fund (CPIS) data and Central Bank of Luxembourg data on debt holdings by Luxembourg mutual funds.

<sup>14</sup>Data until 2013-Q3 are experimental, as they were collected on a voluntary and best-efforts basis. Although subject to some limitations, the experimental data can be considered of good quality, especially for government debt securities (with a few exceptions mentioned in the text). We carry out several quality checks on data and run various sensitivity analyses. Among recent studies that use experimental SHS data until 2013, see Rousova and Giuzio (2019).

<sup>15</sup>We exclude small and very small euro-area countries with very low holdings and negligible size of their sovereign markets. By the same token, we exclude Luxembourg as a issuer country given the extremely small size

We adopt the following empirical specification:

$$\Delta \log(y_{s,h,i,t}) = \sum_{s=1}^S \mathbb{1}_s (\beta_{1,s} Mild_{i,t} + \beta_{2,s} Acute_{i,t}) + \alpha_{s,h,t} + \alpha_{h,i} + \epsilon_{s,h,i,t} \quad (1)$$

where  $\Delta \log(y_{s,h,i,t})$  is the change in the log of the nominal amount held by the  $s$  institutional sector in country  $h$  at quarter  $t$  of debt securities issued by the public sector of country  $i$  and  $h \neq i$ . Importantly, the nominal value is the notional amount of the holdings and it does not reflect price movements. It thus provides a more accurate measure of genuine investment decisions.<sup>16</sup>

The controls include country-pair fixed effects and (country-sector) investor-time fixed effects. Country-pair fixed effects (i.e. investor and issuer countries) account for observable and unobservable bilateral financial gravity factors that affect investment patterns (Lane and Milesi-Ferretti, 2008), and issuer time-invariant characteristics. The inclusion of investor-time fixed effect controls for (possibly time-varying) country-sector specific characteristics of holders.<sup>17</sup>

Our dimensions of interest are the set of coefficients  $\beta_{1,s}$  and  $\beta_{2,s}$  (one for each sector  $s$ ) on the dummies *Mild* and *Acute*, which equal one when the issuer country ( $i$ ) experiences, respectively, mild or high financial turmoil on the sovereign market. The ‘mild’ event is defined as a case in which government bond spreads relative to Germany are above 200 basis points or when a broader measure of sovereign market stress (the Composite Index of Systemic Sovereign Stress - SovCiss) is one standard deviation above its average value.<sup>18</sup> The ‘acute’ event is defined instead as a case in which government bond spreads relative to Germany are above 400 basis points<sup>19</sup> or when the Composite Index of Systemic Sovereign Stress is above two standard deviations.<sup>20</sup> Our ‘mild’ thresholds aim to capture episodes which were still characterized by significant tensions on financial markets, although less acute than those at the peak of the sovereign debt crisis; an example is indeed the 2018 Italian bond turmoil that we have described in the section 2.<sup>21</sup>

To test for changes in investor patterns in the post-crisis period, we also run a second regression where we interact our variable of interest (the dummy *Mild*) with a dummy for the period 2014-2018.<sup>22</sup>

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of its sovereign market, but include it as a holder country given the size of the investment fund industry therein. We exclude Greece as a issuer country since trading on the Greek government market recorded relatively low activity since 2010. We also exclude holdings by Irish investors in 2009, because of limited coverage in terms of sectors. The results presented below are robust to the exclusion of 2009 data for all investors.

<sup>16</sup>As compared with works that rely on data from CPIS, which are instead only available at market value and reflect valuation adjustments over time.

<sup>17</sup>In robustness checks (section A), we also include time-varying issuer fixed effects as control. The main results are unchanged.

<sup>18</sup>This index, computed and published by the ECB staff, integrates measures of credit risk, volatility and liquidity at short-term and long-term bond maturities (Garcia-de andoain and Kremer, 2018) and it is therefore able to capture sovereign stress beyond what elicited only by bond yield levels. The index goes from 0 to 1. Our threshold of one (two) standard deviations above the average value is 0.52 (0.78), computed considering the values of the index over the sample period 2009-2018 in euro-area countries.

<sup>19</sup>Brutti and Sauré (2016) use the same threshold in their analysis of debt repatriation by the banking sector.

<sup>20</sup>While acute episodes are clustered during the sovereign debt crisis years, there is nonetheless significant variation across countries in the timing during which each country experienced such episodes.

<sup>21</sup>In robustness checks (section A) we lower the thresholds to adopt a more conservative approach. The main results are unchanged.

<sup>22</sup>Notice that according to our criteria there were only two *mild* episodes in Italy (2018) and Portugal (2014

### 3.3 Foreign investors behaviour

The results from estimating equation (1) reveal only limited heterogeneity across holder sectors in terms of cross-border investment behaviour during episodes of sovereign market stress (Table 4). First, when sovereign market stress is *mild*, rebalancing out of the stressed country by foreign euro-area investors is limited at best and not statistically different from zero.<sup>23</sup> On the contrary, all financial investors strongly divest when stress becomes *acute*. Divestment is the strongest for insurance corporations and pension funds, amounting to a decrease of the nominal amount held by about 16 percentage points compared with normal times.<sup>24</sup> This contrasts with the recent evidence of counter-cyclical behaviour for these investors found by Timmer (2018) at the security level, while it is more in line with the evidence reported by Bijlsma and Vermeulen (2016) and Rousova and Giuzio (2019), showing that during particularly turbulent times or when risk-premia increase these institutions may exhibit flight to quality behaviour. Banks similarly divest by some 12 percentage points and the other financial intermediaries by about 10 points, while the non-financial sector keeps its exposure unchanged. The coefficient of the interaction term between the *Mild* dummy and the post-crisis period is nil for all sectors (regression (2) in table 4), suggesting that euro-area foreign investors did not pull out from stressed countries more strongly after the sovereign debt crisis.

We are also interested in the trading behaviour on the corporate debt market of the stressed country to assess if and how stress on the sovereign market affects foreign investment in this other segment. To do so, we run the same regression of model (1) considering as dependent variable the change in log holdings of private debt securities (i.e. securities issued by banks and corporates). Overall, there is limited evidence of sizeable spill-over effects from the sovereign into the private bond market in terms of foreign outflows (Table 5). Insurance corporations reduce their holdings of private debt issued in the stressed country during *acute* episodes (by about four percentage points). For the other holder sectors, the coefficient is not significantly different from zero.<sup>25</sup>

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and 2016-2017) and no *acute* episodes (our sample does not include Greece as issuer country). We therefore cannot test for changes in investors behaviour during acute episodes.

<sup>23</sup>As a robustness check, we entertain the possibility that the estimates for the *Mild* dummy are biased towards zero because they cover some of the quarters following the “*Whatever it takes*” speech by the President of the ECB Mario Draghi in London on 26 July 2012. In these quarters, the spreads quickly diminished and foreign investors may have offset part of their previous sales of public debt by reinvesting in the stressed countries. The results presented above are however robust to the inclusion of an interaction term between the *mild* dummy and a dummy equal to one for the two or six quarters following the Draghi speech. We do find however a positive coefficient on this interaction term for the other financial intermediaries sector, suggesting that mutual funds reinvested in the stressed countries during these quarters.

<sup>24</sup>Our estimates take into account an extensive set of fixed effects, including holder country-sector fixed effects. This implies that we do not know whether investors actually cut holdings of the stressed country’s securities during financial turmoil episodes or simply decrease the growth in holdings of those securities relative to the growth in their overall portfolio of euro-area government securities.

<sup>25</sup>The coefficient on the *Mild* dummy is positive and significant for their financial intermediaries and non-financial investors. As in the regressions on sovereign debt, this apparently counter-intuitive finding may be driven by periods in which financial market tensions gradually decrease (i.e. moving from an *acute* episode to a no-crisis episode), as in the quarters following the Draghi speech.

Table 4: Foreign investment during financial turmoil - Government debt securities

	Dependent variable: $\Delta\log$ of nominal amount held							
	Banks	Icpf	Ofi	Non-Fin	Banks	Icpf	Ofi	Non-Fin
	(1)				(2)			
Mild	-0.029 (0.024)	-0.027 (0.027)	-0.004 (0.020)	0.014 (0.026)	-0.024 (0.027)	-0.019 (0.025)	-0.006 (0.029)	-0.005 (0.042)
Acute	-0.123*** (0.043)	-0.159*** (0.030)	-0.104*** (0.026)	0.035 (0.034)	-0.122*** (0.044)	-0.157*** (0.029)	-0.104*** (0.027)	0.032 (0.032)
Mild X post-crisis					-0.014 (0.033)	-0.022 (0.052)	0.005 (0.033)	0.047 (0.057)
Observations		16391				16391		
R-squared		0.250				0.250		
Holder-Time FE		YES				YES		
Country-pair FE		YES				YES		
	Test $H_0 : \beta_{.,s} = \beta$ . (p-values)							
	Mild	Acute			Mild	Acute	Mild X post-crisis	
All	0.549	0.0001			0.559	0.0003	0.817	
Excl. Non-Fin	0.630	0.294			0.442	0.478	0.966	

*Notes.* Estimation of equation (1) using quarterly bilateral holdings of main euro-area countries vis-a-vis other main euro area countries' government debt securities. Standard errors clustered by holder country-sector in parenthesis. Stars indicate significance levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

Table 5: Foreign investment during financial turmoil - private debt securities

	Dependent variable $\Delta\log$ of nominal amount held							
	Banks	Icpf	Ofi	Non-Fin	Banks	Icpf	Ofi	Non-Fin
	(1)				(2)			
Mild	-0.007 (0.014)	0.017 (0.012)	0.030*** (0.009)	0.050* (0.025)	-0.008 (0.018)	0.014 (0.014)	0.038** (0.014)	0.041** (0.018)
Acute	0.025 (0.020)	-0.044** (0.017)	-0.012 (0.020)	0.036 (0.029)	0.025 (0.021)	-0.044** (0.018)	-0.011 (0.020)	0.035 (0.028)
Mild X post-crisis					0.003 (0.027)	0.008 (0.034)	-0.021 (0.033)	0.023 (0.053)
Observations		13922				13922		
R-squared		0.219				0.219		
Holder-Time FE		YES				YES		
Country-pair FE		YES				YES		
	Test $H_0 : \beta_{.,s} = \beta$ . (p-values)							
	Mild	Acute			Mild	Acute	Mild X post-crisis	
All	0.247	0.007			0.353	0.007	0.767	
Excl. Non-Fin	0.132	0.015			0.225	0.014	0.854	

*Notes.* Estimation of equation (1) using quarterly bilateral holdings of main euro-area countries vis-a-vis other main euro area countries' government debt securities. Standard errors clustered by holder country-sector in parenthesis. Stars indicate significance levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

### 3.4 Adding domestic investors to the picture: repatriation and flight to safety

We then extend the analysis to include domestic investors to investigate potential sector heterogeneity along two additional lines. First, we look at cross-border reallocation of investors facing sovereign stress in their home country in the context of possible flight to safety behaviour. Second, we look at domestic investment in order to check whether the evidence in favour of repatriation pattern found for the banking sector by [Brutti and Sauré \(2016\)](#) during the euro area sovereign debt crisis extends to other institutional sectors or whether it is mostly bank-specific as suggested in [Acharya and Steffen \(2015\)](#).<sup>26</sup>

Accordingly, we augment our empirical model as follows:

$$\begin{aligned} \Delta \log(y_{s,h,i,t}) = & \sum_{s=1}^S \mathbb{1}_s (\beta_{1,s} Mild_{i,t} + \beta_{2,s} Acute_{i,t} + \beta_{3,s} Mild_{h,t} \cdot Safe_{i,t} + \beta_{4,s} Acute_{h,t} \cdot Safe_{i,t} + \\ & + \beta_{5,s} Mild_{i,t} \cdot Own_{h,i} + \beta_{5,s} Acute_{i,t} \cdot Own_{h,i}) + \alpha_{s,h,t} + \alpha_{h,i} + \epsilon_{s,h,i,t} \end{aligned} \quad (2)$$

where  $Safe_{i,t}$  is a dummy which equals one if the issuer country is among the countries that over our sample never experienced a sovereign stress episode<sup>27</sup> and  $Own_{h,t}$  is a dummy indicating domestic investment. The coefficients on the interaction between the crisis dummies and the safe dummy (our flight to safety variable) measure the rebalancing by domestic investors towards countries considered safe in response to financial turmoil in their home countries.

Table 6 reports the results. The coefficients on the interaction between the crisis dummies and the safe dummy are generally positive for *mild* episodes, but statistically significant only for insurance corporations (column (1)). In *acute* episodes the behaviour is heterogeneous across sectors. Other financial intermediaries marginally increase their holdings of safe public debt, while banks in particular decrease it, quite possibly reflecting a stronger shift towards locally issued debt. In column (2) we interact the flight to safety variable for mild episodes with a dummy for the post-crisis period in order to test whether some investors became more cautious after the sovereign debt crisis. The coefficient on this interaction is positive for the banking sector (about 0.3, corresponding to an increase in safe debt of 30 percentage points) and statistically significant, suggesting that after the crisis these institutions may have become more risk-averse. Overall, we find some evidence in favour of a flight to quality behaviour by specific sectors of stressed countries, although less pronounced than what was suggested by previous empirical results ([Beck et al., 2016](#)).<sup>28</sup>

<sup>26</sup>An analysis of domestic investors' behavior might also be useful in relation to the rich debate on the sovereign-bank loop ([Brunnermeier et al., 2016](#)).

<sup>27</sup>Namely, France, Germany, Finland and the Netherlands. Results are robust if we also include Austria and Belgium among the safe countries, which experienced only mild episodes at the beginning of the sample period in 2009.

<sup>28</sup>There may be different reasons behind this somewhat different findings. One is the inclusion of country-pair fixed effects in our specification, while [Beck et al. \(2016\)](#) rely on financial gravity variables to capture bilateral patterns. A second reason has to do with the quarterly frequency of our data, which enables us to disentangle the investment behaviour in crisis episodes - which was partly country specific - more precisely, while they consider the overall change in holdings over the two years from the end of 2009 and the end of 2011. A third reason is that we are performing the analysis at the country-sector level instead of the country level (which will tend to weigh more the rebalancing of sectors with higher holding amounts). Finally, we directly measure flows, while [Beck](#)

There is instead strong evidence in support of reallocation towards locally issued public debt by domestic investors in response to sovereign stress at home (*repatriation*). When stress is *acute*, all domestic sectors strongly increase their holdings of domestic public sector bonds: by about 22-23 percentage points banks and insurance corporations, by about 18 points the other financial intermediaries and 15 points the non financial investors. Our finding that all sectors invest proportionally more in domestic debt partly contradicts explanations for repatriation that stress moral suasion by the sovereign or carry trade strategies (both of which would have supposedly had a stronger impact on domestic banks than on the other sectors<sup>29</sup>). Looking at the whole sample period, it seems that during times of *mild* stress insurance corporations and non financial investors tend to increase their holdings of their own sovereign debt (respectively by about 14 and 18 percentage points) more than the remaining institutional sectors. The coefficients are positive also for banks and other financial intermediaries, but not statistically significant.

Interacting this variable with the post-crisis period reveals however a different behaviour between the two periods. Both insurance corporations and banks increased substantially their holdings of domestic public debt during *mild* episodes before 2014 (by 13 and 19 percentage points, respectively). The tendency to repatriate was instead almost nil from 2014 onward, suggesting again that these institutions have become more reluctant to take on more sovereign risk in times of stress.<sup>30</sup>

Although the corporate debt market in most countries is usually smaller than the sovereign debt market, it is informative to look again at the simultaneous investment patterns on this market segment when the investor country is under stress. Results in Table 7 indicate only a quite limited rebalancing away from safe country corporate market, marginally significant only for banks in times of mild stress and for insurance corporations when turmoil is acute. Interestingly, we find that there is a degree of repatriation going on also in the private market: this pattern is stronger for the banking sector, which increases on average their nominal holdings of domestic corporate debt by 27 percentage points.

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et al. (2016) use the change in market-value stocks: given the increase in prices of bonds issued by non-stressed countries during the crisis, this might induce an upward bias in the actual flows towards non-stressed countries.

<sup>29</sup>A Wald test does not reject the null that the coefficients are the same across sectors (table 6).

<sup>30</sup>With a benchmark level of 0.128 and coefficient for the interaction of  $-0.107$  corresponds to a negligible coefficient of 0.02 for banks and of 0.061 for insurance corporations and pension funds (0.185-0.124).

Table 6: Domestic and foreign investors rebalancing during financial turmoil - Government debt securities

	Dependent variable: $\Delta \log$ of nominal amount held							
	Banks	Icpf	Ofi	Non-Fin	Banks	Icpf	Ofi	Non-Fin
	(1)				(2)			
Mild <sub>i</sub>	-0.033 (0.026)	-0.034 (0.026)	-0.000 (0.020)	0.018 (0.027)	-0.037 (0.024)	-0.033 (0.027)	-0.000 (0.019)	0.020 (0.027)
Acute <sub>i</sub>	-0.129*** (0.043)	-0.169*** (0.031)	-0.100*** (0.025)	0.038 (0.035)	-0.136*** (0.041)	-0.168*** (0.032)	-0.100*** (0.025)	0.041 (0.036)
Flight to safety X Mild <sub>h</sub>	0.076 (0.094)	0.056** (0.024)	0.053 (0.040)	0.098 (0.061)	-0.013 (0.018)	0.066* (0.033)	0.049 (0.063)	0.152* (0.083)
Flight to safety X Acute <sub>h</sub>	-0.048* (0.027)	-0.040 (0.024)	0.044* (0.024)	0.029 (0.027)	-0.049* (0.026)	-0.036 (0.023)	0.047** (0.023)	0.033 (0.027)
Own X Mild <sub>h</sub>	0.064 (0.051)	0.139*** (0.045)	0.078 (0.058)	0.181** (0.079)	0.128*** (0.032)	0.185*** (0.047)	0.110 (0.080)	0.173 (0.110)
Own X Acute <sub>h</sub>	0.229*** (0.045)	0.224*** (0.029)	0.182*** (0.066)	0.148** (0.059)	0.223*** (0.046)	0.211*** (0.028)	0.175*** (0.060)	0.130** (0.056)
Flight to safety X Mild <sub>h</sub> X post-crisis					0.297* (0.162)	-0.019 (0.037)	0.019 (0.076)	-0.133 (0.092)
Own X Mild <sub>h</sub> X post-crisis					-0.107*** (0.022)	-0.124** (0.047)	-0.103 (0.091)	-0.029 (0.094)
Observations		17864				17864		
R-squared		0.239				0.240		
Holder -Time FE		YES				YES		
Country-pair FE		YES				YES		

	Test H <sub>0</sub> : $\beta_{.,s} = \beta$ . (p-values)							
	Own		Flight to safety		Own		Flight to safety	
	X Mild <sub>h</sub>	X Acute <sub>h</sub>	X Mild <sub>h</sub>	X Acute <sub>h</sub>	X Mild <sub>h</sub>	X post-crisis	X Mild <sub>h</sub>	X post-crisis
All	0.4094	0.4802	0.977	0.000	0.63		0.817	
Excl. Non-Fin	0.4074	0.792	0.9236	0.000	0.547		0.966	

*Notes.* Estimation of equation (2) using quarterly bilateral holdings of main euro-area countries vis-a-vis other main euro area countries' government debt securities. Flight to safety is a dummy indicating investment in *Safe* countries, namely Germany, France, Finland and the Netherlands. Own is a dummy indicating domestic investment. Standard errors clustered by holder country-sector in parenthesis. Stars indicate significance levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

Table 7: Domestic and foreign investors rebalancing during financial turmoil - private debt securities

	Dependent variable: $\Delta \log$ of nominal amount held							
	Banks	Icpf	Ofi	Non-Fin	Banks	Icpf	Ofi	Non-Fin
	(1)				(2)			
Mild <sub>i</sub>	-0.014 (0.016)	0.003 (0.011)	0.019* (0.010)	0.014 (0.029)	-0.015 (0.015)	0.003 (0.011)	0.018* (0.010)	0.013 (0.030)
Acute <sub>i</sub>	-0.001 (0.020)	-0.065*** (0.014)	-0.029 (0.019)	0.018 (0.026)	-0.002 (0.020)	-0.065*** (0.015)	-0.030 (0.019)	0.016 (0.025)
Flight to safety X Mild <sub>h</sub>	-0.052* (0.030)	-0.020 (0.017)	-0.010 (0.020)	-0.050 (0.053)	-0.063 (0.043)	-0.023* (0.012)	-0.006 (0.029)	-0.074 (0.085)
Flight to safety X Acute <sub>h</sub>	0.004 (0.034)	-0.042* (0.024)	-0.008 (0.027)	0.012 (0.050)	0.006 (0.036)	-0.040 (0.025)	-0.006 (0.028)	0.013 (0.052)
Own X Mild <sub>h</sub>	0.078* (0.040)	0.065* (0.038)	-0.052 (0.050)	-0.002 (0.038)	0.088* (0.050)	0.101** (0.041)	-0.066 (0.071)	-0.005 (0.047)
Own X Acute <sub>h</sub>	0.266* (0.135)	0.098 (0.063)	0.117*** (0.027)	0.095 (0.071)	0.265* (0.136)	0.096 (0.062)	0.115*** (0.030)	0.094 (0.073)
Flight to safety X Mild <sub>h</sub> X post-crisis					0.036 (0.037)	0.011 (0.032)	-0.009 (0.031)	0.065 (0.088)
Own X Mild <sub>h</sub> X post-crisis					-0.025 (0.043)	-0.086 (0.056)	0.040 (0.074)	0.012 (0.068)
Observations		18067					18067	
R-squared		0.232					0.232	
Holder -Time FE		YES					YES	
Country-pair FE		YES					YES	

	Test H <sub>0</sub> : $\beta_{.,s} = \beta$ . (p-values)							
	Own		Flight to safety		Own		Flight to safety	
	X Mild <sub>h</sub>	X Acute <sub>h</sub>	X Mild <sub>h</sub>	X Acute <sub>h</sub>	X Mild <sub>h</sub>	X post-crisis	X Mild <sub>h</sub>	X post-crisis
All	0.0467	0.6285	0.6093	0.0576	0.3163		0.6303	
Excl. Non-Fin	0.039	0.4456	0.4689	0.0484	0.2278		0.5468	

*Notes.* Estimation of equation (2) using quarterly bilateral holdings of main euro-area countries vis-a-vis other main euro area countries' private debt securities. Flight to safety is a dummy indicating investment in *Safe* countries, namely Germany, France, Finland and the Netherlands. Own is a dummy indicating domestic investment. Standard errors clustered by holder country-sector in parenthesis. Stars indicate significance levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

### 3.5 Foreign and domestic investors during the two Italian episodes

We conclude our analysis by going back to the two main episodes of the sovereign debt turmoil in Italy as identified in the previous section. We adapt the previous models, focusing on Italy as an issuer country and on the two financial turmoil episodes (the sovereign debt crisis and the 2018 Italian bond turmoil). Our aim is to compare foreign and domestic investors' behavior across the two crisis episodes, controlling for (country-sector) holder time fixed effects.

We collapse our quarterly data in the two crisis periods and run a regression where the dependent variable is the average quarterly log changes in holdings of Italian Government debt in each episode by foreign investors. The first period captures the log change in holdings between end-2011Q2 and end-2012Q2, while the second period captures the log change in holdings between end-2018Q1 and end-2018Q4. To ensure comparability across episodes of different length, we compute the quarterly average of the change in holdings. We do no longer include issuer fixed effects, as we now only consider holdings of Italian government debt. We do include however fixed effects for the holder (a country-sector pair). As we only have two observations for each holder (one for each episode), the differences in investment behaviour by sector can simply be captured by a dummy for the 2018 episode specific to each holder sector. A positive coefficient would then indicate that the change in holdings during the 2018 episode has been milder than during the 2011-12 crisis.

Our results (Table 8) report a positive coefficient for all sectors (although basically zero in the case of insurance companies). For the other financial intermediaries, the coefficient is significantly different from zero, thus implying a statistically milder rebalancing away from the Italian government debt market during the 2018 bond turmoil than during the sovereign debt crisis. The coefficient for the banking sector is also positive and very similar in magnitude to the one for the other financial intermediaries, although just below conventional significance thresholds. With the exception of insurance companies, this evidence seems broadly consistent with our previous analysis of the differences between the acute financial turmoil during the sovereign debt crisis and the milder episode experienced by Italy in 2018.

We then turn our attention to the behaviour of Italian investors in terms of flight to safety.<sup>31</sup> The dependent variable is now the average log change in holdings of foreign government debt securities by Italian sectors across the two episodes. We include holder sector - issuer country fixed effects so that the differences in flight to safety behaviour between the two episodes can be captured with an interaction between a dummy for the 2018 episode and the dummy *Safe* specified in the previous section.

We find that in the 2018 episode all institutional sectors exhibited a relatively higher tendency to increase their portfolio allocation towards safest countries, although the coefficient appears statistically significant only for the other financial intermediaries and, albeit smaller, for the insurance corporations and pension funds sector (Table 9). This result is consistent with our previous finding for the insurance corporations and pension funds, which exhibited flight to safety behaviour only in mild episodes.

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<sup>31</sup>Notice that we cannot properly study repatriation patterns given that there are not enough degrees of freedom.

Table 8: Foreign investors - Italy in 2011-12 and 2018

Dependent variable: quarterly average of $\Delta \log$ of Italian Government debt held	Banks	Icpf	Ofi	Non-Fin
	2018 crisis episode	0.093 (0.066)	0.004 (0.091)	0.093** (0.041)
Holder (country-sector) FE			YES	
Observations			76	
R-squared			0.696	

*Notes.* The dependent variable is given by the quarterly average of  $\Delta \log$  of nominal amount of Italian government debt held by main euro-area investors computed over the periods from 2011-Q3 through 2012-Q2 and from 2018-Q2 through 2018-Q4. Quarterly averages are considered so as to insure comparability between the two periods with different lengths. Robust standard errors in parenthesis. Stars indicate significance levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

Table 9: Domestic investors - Italy in 2011-12 and 2018

Dependent variable: quarterly average of $\Delta \log$ of foreign Government debt held	Banks	Icpf	Ofi	Non-Fin
	Flight to safety X 2018 episode	0.137 (0.163)	0.052* (0.027)	0.122*** (0.044)
Holder sector-issuer country FE			YES	
Observations			72	
R-squared			0.532	

*Notes.* The dependent variable is given by the quarterly average of  $\Delta \log$  of nominal amount of government debt issued by the main euro-area countries held by Italian investors. The quarterly averages are computed over the periods from 2011-Q3 through 2012-Q2 and from 2018-Q2 through 2018-Q4. Robust standard errors in parenthesis. Stars indicate significance levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

## 4 Conclusions

The first contribution of this paper lies in providing a detailed analysis of capital outflows during the 2018 Italian bond turmoil, comparing them with those recorded during the sovereign debt crisis. Overall, the outflows of foreign capital from Italy which began in May 2018 exhibited characteristics that differed from the outflows recorded during the most acute phase of the sovereign debt crisis in 2011-12. Specifically, sales of public sector securities on the part of all the main categories of foreign investors were more limited. The outflows were limited to a few specific short-term bouts and then came to a stop. Finally, inflows were registered through the bank funding channel, reflecting Italian banks' lower net funding on foreign markets as well as the growing importance of securities-driven repo transactions. This descriptive analysis finds support also in the results of the application of a statistical methodology, which does not identify a sudden stop episode in 2018, in contrast to 2011-12.

Our second contribution comes from our broader investigation of the behavior of the main classes of euro area investors in foreign and domestic securities during episodes of financial turmoil over the last decade. Our results reveal only limited heterogeneity across holder sectors in terms of cross-border investment behaviour during episodes of sovereign market stress, as all institutional investors tend to divest strongly when tensions are acute. There is only mixed evidence in favour of a flight to quality behaviour by investors in stressed countries, but strong evidence in support of repatriation phenomenon, that is reallocation towards locally issued public debt by domestic investors in response to sovereign stress at home. However, we also show that domestic investors' repatriation propensity weakened after the sovereign debt crisis, especially for banks and insurance corporations.

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## Appendix - Robustness checks

Table 10: **Regression using a different definition of *mild* and *acute* episodes**  
Domestic and foreign investors rebalancing during financial turmoil - Government debt securities

	Dependent variable: $\Delta \log$ of nominal amount held							
	Banks	Icpf	Ofi	Non-Fin	Banks	Icpf	Ofi	Non-Fin
	(1)				(2)			
Mild <sub>i</sub>	0.016 (0.038)	0.004 (0.026)	0.029* (0.016)	0.068*** (0.021)	0.020 (0.044)	0.002 (0.031)	0.033 (0.029)	0.026 (0.048)
Acute <sub>i</sub>	-0.083** (0.039)	-0.119*** (0.027)	-0.049*** (0.016)	0.039 (0.031)	-0.081** (0.039)	-0.114*** (0.027)	-0.046*** (0.017)	0.041 (0.030)
Flight to safety X Mild <sub>h</sub>	0.109*** (0.037)	0.020 (0.022)	-0.011 (0.018)	0.052 (0.089)	0.106*** (0.022)	0.057*** (0.019)	-0.005 (0.042)	0.143 (0.140)
Flight to safety X Acute <sub>h</sub>	-0.046** (0.019)	-0.044* (0.022)	0.040 (0.027)	-0.003 (0.027)	-0.051** (0.019)	-0.049** (0.022)	0.035 (0.028)	-0.013 (0.030)
Own X Mild <sub>h</sub>	0.069 (0.054)	0.098 (0.067)	0.007 (0.031)	-0.005 (0.047)	0.115* (0.057)	0.243*** (0.079)	0.033 (0.057)	0.136 (0.100)
Own X Acute <sub>h</sub>	0.168*** (0.049)	0.179*** (0.031)	0.174** (0.066)	0.227*** (0.078)	0.151*** (0.053)	0.159*** (0.029)	0.160** (0.062)	0.201*** (0.071)
Mild <sub>i</sub> X post-crisis					-0.002 (0.025)	0.006 (0.046)	-0.005 (0.035)	0.074 (0.070)
Own X Mild <sub>h</sub> X post-crisis					-0.092** (0.038)	-0.259*** (0.080)	-0.067 (0.077)	-0.239* (0.135)
Flight to safety X Mild <sub>h</sub> X post-crisis					-0.003 (0.071)	-0.067*** (0.021)	-0.017 (0.056)	-0.157 (0.127)
Observations		15150					15150	
R-squared		0.225					0.226	
Holder-Time FE		YES					YES	
Country-pair FE		YES					YES	

*Notes.* Estimation of equation (2) using quarterly bilateral holdings of main euro-area countries vis-a-vis other main euro area countries' government debt securities. With respect to the baseline, the bond yields spread thresholds to identify *mild* and *acute* episodes have been lowered to, respectively, 150 basis points and 300 basis points. The SovCiss index thresholds are, respectively, 0.42 and 0.64, corresponding to one and two standard deviations above the mean of the index computed over the period from 2001 through 2018. Flight to safety is a dummy indicating investment in *Safe* countries, namely Germany, France, Finland and the Netherlands. Own is a dummy indicating domestic investment. Standard errors clustered by holder country-sector in parenthesis. Stars indicate significance levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

Table 11: **Regression with issuer-time fixed effects**

Domestic and foreign investors rebalancing during financial turmoil - Government debt securities

	Dependent variable: $\Delta \log$ of nominal amount held							
	Banks	Icpf	Ofi	Non-Fin	Banks	Icpf	Ofi	Non-Fin
	(1)				(2)			
Mild <sub>i</sub>	-0.052 (0.043)	-0.063** (0.030)	-0.040* (0.023)	-	-0.056* (0.030)	-0.034 (0.034)	0.016 (0.034)	-
Acute <sub>i</sub>	-0.125*** (0.045)	-0.160*** (0.036)	-0.089*** (0.030)	-	-0.177*** (0.049)	-0.217*** (0.046)	-0.157*** (0.039)	-
Flight to safety X Mild <sub>h</sub>	0.110*** (0.040)	0.018 (0.029)	-0.006 (0.018)	0.051 (0.084)	-0.048 (0.037)	0.044 (0.032)	-0.053 (0.052)	0.062 (0.061)
Flight to safety X Acute <sub>h</sub>	-0.080*** (0.023)	-0.073*** (0.023)	0.006 (0.026)	-0.035 (0.027)	-0.096*** (0.035)	-0.096*** (0.029)	0.082 (0.063)	-0.033 (0.030)
Own X Mild <sub>h</sub>	0.071 (0.055)	0.096 (0.063)	0.007 (0.027)	-0.005 (0.046)	0.188*** (0.060)	0.214*** (0.049)	0.121 (0.086)	0.169 (0.132)
Own X Acute <sub>h</sub>	0.160*** (0.059)	0.157*** (0.034)	0.161*** (0.059)	0.195** (0.086)	0.155** (0.069)	0.148*** (0.031)	0.143*** (0.044)	0.066 (0.052)
Mild <sub>i</sub> X post-crisis					-0.023 (0.057)	-0.051 (0.071)	-0.026 (0.037)	-
Flight to safety X Mild <sub>h</sub> X post-crisis					0.294 (0.201)	-0.040 (0.037)	-0.058 (0.094)	-0.086 (0.072)
Own X Mild <sub>h</sub> X post-crisis					-0.202*** (0.066)	-0.177** (0.070)	-0.153 (0.112)	-0.080 (0.110)
Observations		15150					15150	
R-squared		0.252					0.253	
Holder -Time FE		YES					YES	
Country-pair FE		YES					YES	
Issuer-time FE		YES					YES	

*Notes.* Estimation of equation (2) using quarterly bilateral holdings of main euro-area countries vis-a-vis other main euro area countries' government debt securities. Flight to safety is a dummy indicating investment in *Safe* countries, namely Germany, France, Finland and the Netherlands. Own is a dummy indicating domestic investment. Standard errors clustered by holder country-sector in parenthesis. Stars indicate significance levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .