

# Euro sovereign debt crisis: Moral suasion in GIPS government bond funds

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## Abstract

This study is the first to test the moral suasion hypothesis as the main driver for the increasing home bias in Euro government bond mutual funds after the Euro debt crisis. The research focuses on the most financially stressed economies during that period: Greece, Italy, Portugal, and Spain (GIPS). The findings reject a spillover effect of this type of financial repression from the previously documented EU banking sector into the GIPS government bond funds. The informal pressure by performance-chasing unitholders acts as an effective self-control of moral suasion channels in the mutual fund industries of fiscally-stressed countries.

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## 1. INTRODUCTION

The Euro sovereign debt crisis, beginning in late 2009, was precipitated by the financial downturn that affected the global economy in 2008-2009. The most turbulent phase of the Euro crisis occurred between early 2010 and mid-2012, i.e., until the European Central Bank calmed financial markets by announcing unlimited support to save the Euro (also called the Draghi effect).<sup>1</sup> This crisis showed striking differences in sovereign risk premia in the Euro government bond markets. Greece, Italy, Portugal and Spain (known as the GIPS countries) were the most financially stressed economies during this sovereign debt storm (Argyrou and Kontonikas, 2012; Bernoth et al., 2012; Bi, 2012). Financial literature examined how financial institutions, especially banks in the Eurozone, reacted to this crisis and how it impacted bank lending. Risk-shifting strategies by banks and moral suasion by governments have been analysed as the two main drivers of the shift in bank holdings from lending towards risky sovereign debt. The risk-shifting hypothesis posits that weakly capitalised banks with large sovereign debt exposures increased their risky positions to earn significant extra returns. Meanwhile, the moral suasion hypothesis suggests that fiscally stressed governments pressured their domestic banks to refinance sovereign debt.

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<sup>1</sup> From Mario Draghi's famous speech on July 26, 2012, at the U.K. Trade and Investment Global Investment Conference: "The ECB is ready to do whatever it takes to preserve the euro, and believe me, it will be enough".

The feedback loop between domestic financial sectors and fiscally stressed governments should not be limited to banks only. Our study attempts to shed light on moral suasion as a type of financial repression experienced by the mutual fund industry.<sup>2</sup> To the best of our knowledge, this is the first paper to test moral suasion as an explanation of the increase of home bias in the Eurozone's bond mutual fund market during the Euro sovereign debt crisis.

This hypothesis makes sense because of the economic relevance of the Eurozone mutual fund industry and its important connection with the domestic banking sectors in some Euro members (European Fund and Asset Management Association, 2019). At the end of the most turbulent phase of the Euro debt crisis, in December 2012, bond funds held total net assets (TNA) of €5,326 billion, representing 24% of the TNA of mutual funds worldwide. The TNA of Euro bond funds was €1,849 billion. This figure was equivalent to 71.2% of the TNA of U.S. bond funds, which constituted the largest bond fund market in the world (European Fund and Asset Management Association, 2013). According to the moral suasion hypothesis, the economic relevance of these portfolios might have encouraged the most vulnerable Eurozone governments (GIPS) during the sovereign debt crisis to exert formal and informal pressure on bond mutual funds managed by domestic fund companies to absorb new issues of domestic sovereign debt.

Once the financial literature has shown some evidence of moral suasion in the GIPS banking sector during the past Euro debt crisis (Becker and Ivashina, 2018; De Marco and Macchiavelli, 2016; Ongena et al., 2019), regulators and market supervisors should be aware of a potential spillover effect to other significant financial industries. This moral suasion in the banking industry could have easily spread to the mutual fund industries of the GIPS countries, which are largely controlled and influenced by bank groups. These bank-owned management companies could constitute a direct channel to spread the pressure by the GIPS governments to refinance their risky sovereign debt.

The magnitude of this type of financial repression in the Euro mutual fund industry should be the first step to assessing the need for further monitoring and preventing this practice of fiscally stressed governments in the event of future financial crises. The financial protection of millions of mutual fund unitholders in the Eurozone against excessive risk exposures as a consequence of moral suasion-biased management decisions should be a priority in case of finding significant evidence of this practice.

The remainder of this study is organised as follows. Section 2 motivates the home bias in connection with the moral suasion question. Section 3 presents the empirical assessment of the home bias reinforcement and the moral suasion hypotheses. Section 4 evaluates the liquidity constraints as a robustness test for the home bias reinforcement. Finally, Section 5 concludes.

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<sup>2</sup> McKinnon (1973) and Shaw (1973) are the first authors to use the term 'financial repression' to define a set of policies aimed at redirecting savings held by the domestic financial sector towards the government. These policies include regulation, direct control, and persuasion actions (i.e., moral suasion).

## 2. HOME BIAS AND MORAL SUASION

Milesi-Ferretti and Tille (2011), and Forbes and Warnock (2012) have documented an increase in home bias during periods of stress. Most of this research points to three broad explanations for home bias: exchange rate risk, transaction costs, and informational frictions (Coeurdacier and Rey, 2013). The fact that the Eurozone is increasingly financially integrated and has no exchange rate risk indicates that informational frictions could be the most realistic driver of home bias (Saka, 2020). This explanation is consistent with the existence of initially small informational differences (Van Nieuwerburgh and Veldkamp, 2009).

During the Euro sovereign debt crisis, the decline in creditworthiness among the Euro countries impacted their domestic banks due to large sovereign debt exposures, and consequently, these banks reduced their lending considerably (Popov and Van Horen, 2015; Altavilla et al., 2017; De Marco, 2019). Acharya and Steffen (2015), Drechsler et al. (2016), and Acharya et al. (2018) assess that this change in bank holdings from corporate lending towards risky sovereign debt is a consequence of weakly capitalised banks with a substantial exposure to GIPS sovereign debt at the beginning of the stress period in 2010 that increased their risky positions to earn additional returns by anticipating the survival of the Eurozone. On the other hand, De Marco and Macchiavelli (2016), Becker and Ivashina (2018), and Ongena et al. (2019) support that fiscally stressed governments pressured their domestic banks to refinance sovereign debt. Notably, findings from other studies are consistent with both the risk-shifting and the moral suasion hypothesis (Battistini et al., 2014).

Further, Kojien et al. (2021) find that in the Euro countries most affected by the sovereign debt crisis, other relevant financial institutions, such as insurance companies, pension funds and mutual funds, showed larger domestic sovereign debt exposures than those in non-vulnerable Euro countries. Moreover, Becker and Ivashina (2018) provide evidence that traditional bond investors, such as pension funds and insurance companies, were also subject to both formal and informal pressure by the government to refinance Euro sovereign debt. However, the moral suasion hypothesis has not been previously assessed in the GIPS mutual fund industry. Our paper contributes to the literature by evaluating the potential spillover effect of government pressure from banks to mutual funds.

A reinforcement in home bias in the GIPS mutual fund industry during the crisis might be partially explained by the increasing issues of sovereign debt under Excessive Deficit Procedures (EDP) in the GIPS economies, together with the role played by fund management companies as one of the main buyers of this EDP debt.<sup>3</sup> This potential explanation could be consistent with a spillover effect of the moral suasion evidence from the banking sector (De Marco and Macchiavelli, 2016; Becker and Ivashina, 2018;

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<sup>3</sup> EDPs are defined by the European Commission as corrective programs under the European Union Stability and Growth Pact designed to ensure that member states adopt policy responses to correct excessive deficits and/or debt.

Ongena et al., 2019) into the GIPS mutual fund industries, which are largely controlled by bank groups (European Fund and Asset Management Association, 2019).

While the previous evidence of moral suasion on the banking sector has shown that market supervisors should monitor this type of financial repression on banks of the most fiscally stressed countries, it is necessary to evaluate the role of the performance-chasing unitholders as a self-control mechanism of a moral suasion spillover from banks to mutual funds. There is extensive evidence in financial literature finding that a superior relative performance for mutual funds is associated with subsequent greater money inflows (Ben-David et al., 2022; Berk and Green, 2004; Ferreira et al., 2012; Kaniel and Parham, 2017; Sirri and Tufano, 1998).

This extensively reported pressure of performance-based flows into mutual funds could be an effective mechanism to prevent moral suasion of fiscally-stressed governments in the mutual fund industry. Could this informal supervision help the market supervisors to protect millions of mutual fund unitholders in the Eurozone against moral suasion-biased management decisions? The results of our research should shed light on this question.

### 3. EMPIRICAL ANALYSIS

#### 3.1. Data and descriptive statistics

We analyse a comprehensive sample of Euro government bond funds registered in the most vulnerable countries during the sovereign debt crisis.<sup>4</sup> Since fund managers in the GIPS countries faced very similar investment choices during the Euro sovereign debt crisis, the sample is appropriate for testing the moral suasion hypothesis.<sup>5</sup>

Morningstar provides fund holdings from January 2004 to December 2014 for 87 mutual funds with domicile in GIPS, which are classified by Morningstar as Euro government bond funds.<sup>6</sup> A longer sample period after 2014 could provide empirical evidence masked by other facts rather than the immediate impact of the Euro sovereign debt crisis in our sample. According to Morningstar, Euro government bond funds primarily invest in government or government-backed agency securities denominated in or hedged into euros. We exclude funds that are only allowed to invest in home sovereign bonds due to their style designation.

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<sup>4</sup> The economic relevance of the bond mutual fund industry is different across the GIPS countries. Over the last decade, Spain and Italy have ranked in very relevant positions in the Euro bond mutual fund market in terms of TNA and the number of funds. In contrast, Greece and Portugal have both played similar residual roles in the Euro bond mutual fund industry. At the end of 2012, Greece and Portugal represented less than 3% of the TNA of the GIPS bond fund industry (European Fund and Asset Management Association, 2013).

<sup>5</sup> The government bonds issued by the GIPS countries show the highest average correlation in the Eurozone yield spreads over 10-year German government bonds during our sample period (2004-2014). Ireland is not included in our sample because Irish sovereign risk shows a significantly lower average correlation with the sovereign risk of the GIPS. We aim to construct a homogenous sample of funds where domestic fund managers could select domestic government bonds with very similar levels of risk to other domestic counterparts. The extension of our analysis to less vulnerable Euro bond markets might increase the economic significance of the sample at the cost of much greater heterogeneity.

<sup>6</sup> For this sample, four funds report different share classes with similar holdings but different fees and loads. Following Moneta (2015), we aggregate all observations of these multiple share class funds into one figure.

Our database includes both surviving and terminated Euro government bond funds registered in GIPS; thus, our sample is free of survivorship bias. We work with publicly reported holdings for each fund at the end of each quarter. Although some funds voluntarily disclose holdings more frequently than quarterly, these portfolios show an irregular distribution that may be affected by the reporting bias noted by Elton et al. (2010) for private data providers.

We exclude all funds with less than €1 million in the TNA to overcome the incubation bias documented by Evans (2010).<sup>7</sup> Finally, we require a fund to have at least two quarters of portfolio holdings to exclude funds with an immediate inception or termination date. Thus, our final sample consists of 68 Euro government bond funds registered in GIPS, with 1,348 quarterly portfolio reports and 39,745 holding observations.

**Table 1: Fund sample statistics**

Year	Number of funds				Total net assets			Euro sovereign debt		Liquidity		
	GR	IT	PT	ES	Mean	Q1	Q3	Mean	Controlled	Mean	Q1	Q3
2004	1	2	-	23	110.8	21.2	72.3	74.05%	99.29%	9.52%	1.9%	14.2%
2005	3	8	-	23	252.9	20.1	82.3	77.23%	98.80%	8.37%	2.0%	10.9%
2006	4	10	-	21	189.4	16.7	133.9	82.44%	99.14%	8.03%	3.0%	10.3%
2007	2	9	-	23	136.8	18.4	95.5	82.64%	99.75%	10.59%	3.7%	14.1%
2008	2	6	-	21	103.0	26.1	107.9	81.48%	99.58%	10.34%	3.4%	12.8%
2009	1	8	-	26	84.2	15.8	86.0	90.98%	99.69%	10.75%	5.3%	15.7%
2010	-	7	1	27	50.7	14.0	74.1	88.67%	99.81%	7.73%	4.2%	8.9%
2011	-	7	2	27	43.2	11.7	61.9	93.86%	99.96%	5.41%	3.7%	6.9%
2012	3	4	2	20	51.6	15.9	72.0	93.89%	100.00%	6.22%	3.6%	8.1%
2013	3	3	1	19	76.1	34.4	103.1	94.11%	100.00%	7.39%	3.9%	9.5%
2014	3	1	1	19	103.3	35.8	146.1	90.55%	100.00%	5.07%	3.1%	4.9%
04-14	6	21	2	39	109.3	20.9	94.1	86.35%	99.64%	8.12%	3.5%	9.6%
GR					134.5	33.5	220.9	81.66%	99.31%	6.96%	3.2%	9.4%
IT					255.5	59.8	474.6	89.04%	99.22%	6.30%	4.0%	7.6%
PT					4.6	4.4	4.8	85.80%	100%	7.23%	3.6%	5.8%
ES					66.3	19.2	93.7	86.43%	99.78%	8.72%	3.5%	10.4%

Notes:

Table 1 shows the descriptive statistics for our sample of Euro government bond funds registered in the GIPS countries at the end of each year. Information includes the total number of funds, the fund's TNA in € millions, the mean percentage of quarterly portfolio holdings identified as Euro government securities, the portfolio percentage in Euro government securities completely identified in terms of issuer, time-to-maturity and return records, and finally, the liquidity measure for funds. Columns with Q1 and Q3 indicate the breaking points for the corresponding quartiles. The final rows show the aggregated figures for the funds registered in each GIPS country for 2004-2014.

<sup>7</sup> Chen et al. (2010) and Moneta (2015) exclude U.S. bond funds with less than \$5 million in TNA to overcome this incubation bias. We change this size requirement to consider the average size of the GIPS bond fund industry because of the extreme differences between the size of U.S. and GIPS bond funds. The average size of U.S. funds is approximately €1,700 million, while approximately €300 million in Europe. Moreover, in Greece, the average size is less than €30 million (Investment Company Institute, 2017).

Table 1 presents the fund-sample statistics. From 2004 to 2014, the total number of Euro government bond funds in our sample remained very stable. However, funds are not consistently time distributed across GIPS countries. We confirm these striking differences between the registered government bond funds in each country provided by Morningstar with the official records in the national mutual fund associations (Ethe, Assogestioni, APFIPP, and Inverco, for Greece, Italy, Portugal, and Spain, respectively). Thus, we assume that our sample is fully complete and representative of the GIPS government bond funds markets but with an asymmetric distribution caused by Greece and Portugal. Therefore, the empirical findings will be comprehensive for the overall GIPS markets despite the residual role of Greece and Portugal in some periods of analysis. This small number of funds in Greece and Portugal could affect the statistical and economic significance of their specific results, but the exclusion of these markets would lack an important part of the Euro crisis dynamics.

The descriptive statistics in Table 1 show the dramatic decrease in the average fund size during the crisis, whereas the cross-sectional statistics show important differences in the average fund size in each country. Our fund sample holds, on average, more than 86% of the portfolio assets in Euro government debt securities. These public debt assets include sovereign debt, sub-sovereign debt issued by regional/local governments, agency debt issued by public companies and institutions that are government-backed, and debt issued by supranational institutions.

Finally, Table 1 reports the statistics of the liquidity dimension of mutual funds as the weighted average of the liquidity proxy of government bonds held by the funds. For the government bonds included in our sample, we compute the proxy for liquidity as the proportion of days with zero returns over the total number of trading days of any given year (Lesmond et al., 1999). When the return is zero, the market is inactive. Our fund sample reports low percentages of inactive bonds, even in the years with the least liquidity. This result is consistent across the four GIPS countries. The zero trading days measure for year  $t$  is calculated as follows:

$$Liq_t = \text{number of days with zero returns} / \text{total number of trading days} \quad (1)$$

Based on the information provided by Eikon-Refinitive, we identify the issuer of the portfolio holdings during our study period. We also analyse the publicly reported prospectuses of the corporate securities held by our fund sample to detect corporate issues that are government-backed. These issues present credit ratings that are similar to the institution which grants the guarantee for the coupons and principal repayment of the series; thus, these holdings should be considered Euro government assets. For instance, this practice is common in Spain for some securitisation vehicles, such as the asset-backed securitisation funds to finance loans for small- and medium-sized enterprises, termed FTPYME.

We analyse the Euro government debt composition across issuer countries and years for the set of funds registered in each GIPS country. A concise report of this information is provided in Table 2, along with the number of funds that hold assets from this issuer.

Overall, we find a total of 14 different issuing countries for the bonds held by the funds in our sample, besides the supranational securities that are multi-government-backed by the European Union (EU). For brevity, Table 2 reports only the top three weights of each bond issuer country for four years during our sample period. Most Euro government bond funds registered in each GIPS country primarily invest in their domestic government debt securities, even if Morningstar's definition of Euro government bond funds allows country diversification. From 2004 to 2014, the weight of domestic debt increased with a peak in 2012. The home bias detected in portfolio weights in Table 2 is especially noteworthy in our sample; the overweight in domestic debt of funds is far from the average structure of government debt holders. For instance, in 2014, while Eurostat (2015) reports that the public debt held by residents in Spain, Italy and Portugal was 58.4%, 33.5% and 30.1%, respectively, Table 2 shows that Euro government bond funds registered in these countries invest significant higher percentages of their portfolios in domestic bonds than the general breakdown of government debt holders. All of these preliminary results could be consistent with a moral suasion spillover from the GIPS banks to their domestic fund industries.

**Table 2: Euro government debt composition by country and fund**

GREECE							
	2004		2008		2012		2014
	Weight(funds)		Weight(funds)		Weight(funds)		Weight(funds)
Greece	73.62% (1)	Greece	75.71% (2)	Greece	93.58% (2)	Greece	72.04% (2)
		E.U.	2.04% (2)	Germany	25.04% (1)	Italy	24.61% (1)
				Italy	21.16% (1)	Spain	16.34% (1)
ITALY							
	2004		2008		2012		2014
	Weight(funds)		Weight(funds)		Weight(funds)		Weight(funds)
Italy	26.61% (2)	Italy	41.49% (6)	Italy	73.27% (4)	Italy	76.61% (1)
Germany	22.40% (2)	Germany	23.35% (6)	Spain	13.13% (4)	Spain	26.42% (1)
Spain	6.62% (2)	France	8.47% (4)	Ireland	10.52% (3)		
PORTUGAL							
	2004		2008		2012		2014
	Weight(funds)		Weight(funds)		Weight(funds)		Weight(funds)
	n.a.		n.a.	Portugal	83.08% (2)	Portugal	68.99% (1)
				Spain	18.40% (1)	Spain	10.57% (1)
SPAIN							
	2004		2008		2012		2014
	Weight(funds)		Weight(funds)		Weight(funds)		Weight(funds)
Spain	63.54% (23)	Spain	90.76% (21)	Spain	84.35% (20)	Spain	79.44% (19)
Italy	28.80% (3)	Netherl.	6.33% (1)	Germany	13.78% (3)	E.U.	34.35% (1)
Germany	10.26% (3)	France	6.19% (3)	Netherl.	12.58% (3)	Italy	17.15% (5)

Notes:

Table 2 shows the top three average portfolio weights in Euro government bonds by issuer country at the end of 2004, 2008, 2012 and 2014. The values in parentheses indicate the number of funds that average these portfolio weights. These statistics are shown for the funds registered in each GIPS country.



### 3.2. Reinforcement of home bias hypothesis

The previous preliminary results show a marked tendency for GIPS bond funds to hold domestic bonds issued by their governments. This initial finding requires deeper scrutiny to evaluate whether Euro sovereign debt crisis was significant in explaining the shifts of domestic bonds in the GIPS mutual fund industry.

Our hypothesis would be aligned with the retrenchment in international capital flows in periods of market stress (Milesi-Ferretti and Tille, 2011; Forbes and Warnock, 2012). Thus, our first alternative hypothesis is:

*Ha1: There was a significant increase in the home bias of GIPS Government bond funds as a response to the Euro sovereign debt crisis.*

We compare two different sub-periods to test the potential increase in home bias after the crisis. The pre-crisis period until 2009 with lower levels of market stress indicators (Galliani et al., 2014), and the post-Draghi period comprises the announcement of unlimited support to save the Euro (July 2012) to 2014. With this straightforward comparison, we avoid the period of potentially confusing management decisions during the most critical phase of the Euro debt crisis (2010-2012/2q) to better evaluate the changes in the level of home bias observed in our sample.<sup>8</sup>

In this comparison, we focus on the bond issuer as the informational source of the credit risk among Euro government bond funds to evaluate the level of home bias in our sample. This approach is consistent with the classification of international debt securities by residence of issuer used by Fidora et al. (2007) to evaluate home bias in global markets. A direct comparison of the domestic government debt portfolio allocation between the two previously defined pre-crisis and post-Draghi periods is a straightforward method for evaluating significant differences in the home bias of Euro government bond funds. The overall interpretation of these differences provides significant findings on the consequences of the Euro sovereign debt crisis on the level of home bias in our sample. We are concerned that GIPS bond fund managers could observe other more precise signals on the credit rating of domestic bonds than foreign bond fund managers do. These sophisticated signals could lead to some misspecification in our home bias approach, but a detailed search for these alternative signals is beyond the main scope of our research.

Further, we also use the Herfindahl index to evaluate the distribution of credit ratings proxied by issuer countries across Euro government bond funds. This is computed as:

$$H_{i,t} = \sum_j w_{i,j,t}^2 \quad (2)$$

where  $H_{i,t}$  is the Herfindahl index of the country  $i$  (Greece, Italy, Portugal and Spain) in any potential country of investment  $j$ , and  $w_{i,j,t}$  is the weight of the portfolio formed by

<sup>8</sup> The tables included in this empirical section also provide the results for the 2010-2012/2q period. Detailed statistical tests are not shown for the sake of brevity but they are available upon request.

all investment funds domiciled in the country  $i$  investing in country  $j$  in quarter  $t$ . A higher Herfindahl index indicates a higher concentration in a given country. If this concentration corresponds to the country where the funds are domiciled, the evidence should respond to a sign of home bias. A similar interpretation of this index is used in García-Herrero and Vázquez (2013) in the analysis of the home bias in the international allocation of bank assets.

Table 3 shows a reinforcement of the strong home bias detected in the Euro government bond funds registered in the GIPS during the years preceding the Euro sovereign debt crisis.<sup>9</sup> This reinforcement is significant for the largest GIPS fund markets of Italy and Spain, although the domestic debt increase was already important during the most critical phase of the debt crisis. Even in Greece, with a non-significant increase in domestic debt, home bias is noticeable given that Greek public debt securities are no longer in the portfolios reported by Italian and Spanish funds during the 2012/3q–2014 period. This finding is consistent with the lack of investment grade assessment of Greek public debt, contrary to the investment grade ratings for Spain and Italy. Thus, many Euro bond fund managers could exclude Greek or even Portuguese public debt from their portfolios due to these countries' worse ratings.

In addition, Table 3 also shows that domestic funds not only increased holdings of domestic bonds but also other GIPS bonds, which could be potentially explained by the information-based reallocation channels instead of moral suasion. In this sense, Saka (2020) finds that the European bank's home bias was driven by a debt reallocation mechanism in that informally distant foreign banks tend to sell domestic bonds to domestic banks (or to informationally closer foreign banks). Such reallocation affected sovereign bonds as well as private sector exposures.

Table 4 complements Table 3 as it uses the Herfindahl index to evaluate how the government bonds issued by each GIPS country are distributed across the funds registered in each GIPS market. The lowest Herfindahl scores reported by Spain show that is the only GIPS market in which home government debt is widespread and consistently allocated during all the sample period. The higher Herfindahl scores of the Italian funds holding Italian debt show that this home bias is much more concentrated in fewer funds than in Spain.

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<sup>9</sup> Our straightforward approach to home bias reinforcement is based on the increase of weight in domestic government debt in the portfolios of GIPS bond funds. However, this simple approach could be further elaborated with more sophisticated measures. To do that, we obtain the variations of the relative portfolio weight of a domestic government bond class in a bond fund to its global weight in Euro government bond markets (Burger et al., 2018). The empirical findings with this relative measure support the overall reinforcement of home bias identified by Table 3. Spain is the only case where this reinforcement is not so clear due to the highest home bias before the debt crisis and the significant increase in the weight of Spanish government debt in the Euro bond markets. The weights of GIPS government debt in the Euro bond markets are available at (Eurostat: <https://ec.europa.eu/eurostat/web/government-finance-statistics/data/database>). Detailed results are not shown for brevity but are available upon request.

**Table 3: Euro government debt composition by country**

Funds registered in Greece <sup>†</sup>					Funds registered in Italy				
	05-09	10-12/2q	12/3q-14	Diff.		05-09	10-12/2q	12/3q-14	Diff.
Greece	74.13	75.40	78.84	4.7	Italy	31.86	52.93	75.17	43.3**
Italy	0.58	-	5.09	4.5**	Spain	3.73	5.81	16.26	12.5**
Portugal	-	-	1.93	-	Portugal	0.75	2.17	5.17	4.4**
Spain	-	-	-	-	Greece	3.83	1.32	-	-

  

Funds registered in Portugal <sup>††</sup>					Funds registered in Spain				
	05-09	10-12/2q	12/3q-14	Diff.		05-09	10-12/2q	12/3q-14	Diff.
Portugal	-	50.22	68.67	-	Spain	75.10	82.52	82.27	7.1**
Spain	-	14.13	10.06	-	Italy	1.48	1.80	2.83	1.3*
Italy	-	2.45	3.55	-	Greece	0.75	0.14	-	-
Greece	-	1.91	-	-	Portugal	0.23	0.27	-	-

Notes:

Table 3 shows the average portfolio weight (%) in Euro government bonds by GIPS issuer country over the 2005-2009, the 2010-2012/2q, and the 2012/3q-2014 periods. The difference between the portfolio weights in the 2005-2009, and the 2012/3q-2014 periods are also reported in the table. These measures are split for the funds registered in each GIPS country. <sup>†</sup> (<sup>††</sup>) No Euro government bond fund operates in Greece (Portugal) from 2010 to 2011 (from 2005 to 2009), as classified by Morningstar. \*\* and \* denote significance in the difference tests at the 1% and 5% levels, respectively.

**Table 4: Herfindahl index by country**

Funds registered in Greece <sup>†</sup>					Funds registered in Italy				
	05-09	10-12/2q	12/3q-14	Diff.		05-09	10-12/2q	12/3q-14	Diff.
Greece	81.04	50.00	75.58	-5.4	Italy	42.22	21.62	48.67	6.4
Italy	23.26	-	90.00	66.7**	Spain	60.18	24.32	47.90	-12.2
Portugal	-	-	90.00	-	Portugal	65.76	40.56	47.91	-17.8
Spain	-	-	-	-	Greece	50.63	48.77	-	-

  

Funds registered in Portugal <sup>††</sup>					Funds registered in Spain				
	05-09	10-12/2q	12/3q-14	Diff.		05-09	10-12/2q	12/3q-14	Diff.
Portugal	-	92.20	86.70	-	Spain	11.70	8.87	9.64	-2.1
Spain	-	100	97.19	-	Italy	56.46	65.48	52.34	-4.1
Italy	-	30.00	30.00	-	Greece	68.60	73.09	-	-
Greece	-	20.00	-	-	Portugal	79.33	79.20	-	-

Notes:

Table 4 shows the average Herfindahl index (%) in Euro government bonds by GIPS issuer country over the 2005-2009, the 2010-2012/2q, and the 2012/3q-2014 periods, where an index value equal to 100% denotes that all bonds issued by a GIPS country are held by only one fund, whereas an index value close to 0% denotes that the bonds issued by a country are similarly shared by all funds included in the analysis. The difference between the Herfindahl index values in the 2005-2009, and the 2012/3q-2014 periods are also reported in the table. These measures are split for the funds registered in each GIPS country. <sup>†</sup> (<sup>††</sup>) No Euro government bond fund operates in Greece (Portugal) from 2010 to 2011 (from 2005 to 2009), as classified by Morningstar. \*\* and \* denote significance in the difference tests at the 1% and 5% levels, respectively.

Furthermore, Table 5 provides evidence that the significant increase in Euro government debt in the portfolio weights during the 2012/3q–2014 period was mainly caused by Euro sovereign debt. This increase started during the most critical phase of the sovereign debt crisis (2010-2012/2q). The combined interpretation of both Tables 4 and 6 supports the notion that the funds included in our sample invest significantly more in home

sovereign debt after the most critical phase of the Euro debt crisis. That is, the stronger home bias compared to the years preceding the crisis is explained much more by the increase in sovereign debt rather than by other debt classes.

Table 6 provides additional evidence of the significant increase in the relevance of sovereign and sub-sovereign debt during the 2012/3q-2014 period. The significant results show that Euro sovereign and sub-sovereign debt are more widely held by Euro government funds after the crisis, whereas agency and supranational debt are more concentrated in fewer funds than in the 2005-2009 period, especially supranational debt backed by the EU.

Together, the previous tables provide overall evidence of reinforcement of home bias after the Euro crisis, thereby accepting hypothesis *Hal*. A larger number of Euro government bond funds invest significantly more in Euro sovereign and sub-sovereign debt than before the crisis. Considering that 41 out of the 68 funds in our sample are managed by domestic bank-owned companies, our finding could be related to Saka (2020), who shows that home bias for resident banks in the periphery countries increased after the crisis.

**Table 5: Portfolio weights in Euro government assets by issuer type**

	Sovereign	Sub-sovereign	Agency	Supranational
2005-2009	71.21	4.52	5.17	0.59
2010-2012/2q	75.71	7.51	7.85	0.46
2012/3q-2014	78.48	7.95	4.80	1.59
Difference	7.28**	3.43*	-0.37	1.00**

*Notes:*

Table 5 shows the portfolio weights (in percentage) of the Euro government debt by issuer type held by our fund sample over the 2005-2009, the 2010-2012/2q, and the 2012/3q-2014 periods. The differences between these measures in the 2005-2009 and the 2012/3q-2014 periods are also reported in the table. \*\* and \* denote significance in the difference tests at the 1% and 5% levels, respectively.

**Table 6: Herfindahl index by issuer type**

	Sovereign	Sub-sovereign	Agency	Supranational
2005-2009	13.92	45.99	17.14	63.60
2010-2012/2q	6.42	21.94	15.36	73.22
2012/3q-2014	6.67	29.58	26.52	89.64
Difference	-7.24*	-16.41*	9.38*	26.04**

*Notes:*

Table 6 shows the average Herfindahl index (in percentage) in Euro government bonds by issuer type over the 2005-2009, the 2010-2012/2q, and the 2012/3q-2014 periods. An index value equal to 100% denotes that the bond class is held by only one fund, whereas an index value close to 0% denotes that the bond class is similarly shared by all funds included in the analysis. The difference between the Herfindahl values in the 2005-2009, and the 2012/3q-2014 periods are also reported in the table. \*\* and \* denote significance in the difference tests at the 1% and 5% levels, respectively.

### 3.3. Moral suasion hypothesis

The previous section has shown that Euro sovereign debt crisis was relevant for a significant reinforcement of the home bias in the portfolio holdings of GIPS bond funds after the Euro crisis. This increase was especially dramatic for Italy, with a lower level of home bias than the rest of GIPS markets before the crisis. But the motivation behind this increase in home bias is crucial for the assessment of further policy implications. If the significant increase in home bias was driven by mutual fund strategies seeking additional returns associated with higher levels of risk, market supervisors should limit themselves to ensuring that these investment decisions comply with the investment criteria included in the mutual funds' prospectuses accepted by their unitholders. On the contrary, if this reinforced home bias was because of any financial repression, market supervisors should be alert to repression channels that could distort the asset allocation of bond fund managers of the most stressed Euro countries. Such monitoring should be necessary to prevent perverse consequences on the performance attributions of GIPS government bond funds due to moral suasion-biased decisions. Given the moral suasion evidence in the GIPS banking sector, this supervision should pay special attention to bank-owned fund management companies. Thus, we formulate our second alternative hypotheses as follows:

*Ha2: The significant reinforcement of the home bias after the Euro sovereign debt crisis was due to moral suasion from GIPS governments on Euro government bond funds.*

To test this hypothesis in our sample, for each GIPS country, we identify two different sub-periods from the beginning of the Euro crisis (2010/1q) to the end of our sample horizon (2014/4q). Funds terminated before 2010/1q are excluded from this analysis. Thus, our sample consists of 46 Euro government bond funds registered in the GIPS countries with 566 quarterly portfolio reports.<sup>10</sup>

Following Ongena et al. (2019), we define the sub-period with the highest market pressure during the Euro crisis as the period when each GIPS country became eligible for the Securities Markets Programme (SMP) of the European Central Bank, that is, 2010/2q-2012/3q for Greece and Portugal and 2011/3q-2012/3q for Italy and Spain.<sup>11</sup> The rest of the quarters are included in a second, out-of-SMP sub-period characterised by lower levels of market pressure. To test moral suasion in the banking sector, Ongena et al. (2019) focus on the SMP sub-period only, but the gross issuance of sovereign debt securities by the most economically relevant GIPS countries was even more intense outside this period (European Central Bank Statistical Data Warehouse, 2020). Thus, we extend our analysis of moral suasion in GIPS government bond funds to a longer period during which the fiscally stressed governments placed large amounts of sovereign debt

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<sup>10</sup> Approximately 2.5% of the quarterly portfolios in the initial sample are also excluded due to unavailable or poor-quality data for the variables included in the model of Equation 3.

<sup>11</sup> The Securities Markets Programme (SMP), which was announced by the European Central Bank on 10 May 2010, was intended to ensure depth and liquidity in malfunctioning segments of the debt securities markets and to restore the appropriate functioning of the monetary policy transmission mechanism.

on the market. This will allow us to better identify how market stress could affect government pressure on GIPS government bond funds.

We must also identify those quarters<sup>12</sup> in which there was a high need for GIPS governments to find investors to buy their sovereign debt issues relative to quarters in which there was a low need. The moral suasion hypothesis is consistent with the idea that if governments need to alleviate their funding stress, they will be more likely to attempt to sway bond mutual funds managed by domestic fund companies in quarters when governments need to place larger amounts of new sovereign debt on the market than in the rest of quarters. This identification process is built on the median amount of new sovereign debt issued by each country for the sub-periods defined above based on each country's eligibility for the SMP.

Following a similar approach to Ongena et al. (2019), the quarterly change in the weight of domestic sovereign bonds in each fund's portfolio captures changes in the propensity to hold domestic sovereign debt. This measure is valid even for mutual funds not buying or selling new debt, but simply letting old debt mature. This approach is consistent with our method of detecting home bias by directly comparing the weights of domestic sovereign debt in fund portfolios before and after the Euro crisis. We model it as follows:

$$\begin{aligned} \Delta DomSovDebt_{ijt} = & \beta_1 HighNeed_{jt} \times Domestic_{ij} + \\ & \beta_2 HighRisk_{jt} \times HighNeed_{jt} \times Domestic_{ij} + \beta_3 HighRisk_{jt} \times Domestic_{ij} + \quad (3) \\ & \beta_4 X_{ijt} + \beta_5 \varphi_i + \beta_6 \mu_{jt} + \varepsilon_{ijt} \end{aligned}$$

where  $\Delta DomSovDebt_{ijt}$  is the change in the weight of domestic sovereign debt issued by country  $j$  in the fund  $i$ 's portfolio in quarter  $t$ ;  $HighNeed_{jt}$  is a dummy variable equal to 1 if the total amount of new sovereign debt issued by country  $j$  in quarter  $t$  is above the median amount for that country for each sub-period of the crisis, and 0 otherwise;  $HighRisk_{jt}$  is a dummy variable equal to 1 for the highest market pressure period in country  $j$  in quarter  $t$  (2010/2q-2012/3q for Greece and Portugal, and 2011/3q-2012/3q for Italy and Spain), and 0 otherwise;  $Domestic_{ij}$  is a dummy variable equal to 1 if mutual fund  $i$  in country  $j$  is managed by a domestic fund company and 0 if the fund company is foreign-owned;  $X_{ijt}$  is a vector of time-varying fund-specific control variables;  $\varphi_i$  is a vector of fund fixed effects;  $\mu_{jt}$  is a matrix of interactions of country and quarter dummies; and  $\varepsilon_{ijt}$  is an independent and identically distributed (i.i.d.) error term.

The vector of fund-specific variables,  $X_{ijt}$ , allows us to control for two time-varying variables. These are fund size,  $Size_{ijt}$ , and fund flows,  $Flows_{ijt}$ , which may be relevant in a fund's decision to modify its domestic sovereign debt holdings. These variables are lagged by one quarter because their effects may not be immediate. We also interact with country and quarter fixed effects so that the results of the model reflect the comparison

<sup>12</sup> Ongena et al. (2019) use monthly information because new debt issues are mainly determined by maturing sovereign debt that governments need to roll over. Consequently, there are sharp fluctuations in the monthly issuance of sovereign debt securities. Because our sample lacks monthly portfolios, we cannot follow this ideal research approach. However, we find that quarters in which governments have a high need to place their debt include on average 2.11 high-need months, while low-need quarters include on average 1.02 low-need months. This strong correlation in the features of the quarterly and monthly data highlights that potential bias arising from our use of quarterly information should not be extremely relevant to our conclusions.

of domestic and non-domestic funds in the same country during the same quarter. Given the differences in the economic relevance and intensity of the sovereign debt storm across the countries that we analyse, we cluster these interactions into two country groups: Greece and Portugal, on the one hand, and Italy and Spain, on the other.

In a classical difference-in-differences interpretation,  $\beta_1$  captures the difference in the change in the portfolio weight of domestic sovereign debt between high- and low-need quarters for domestic funds in relation to non-domestic funds. That is, a positive and significant coefficient of  $\beta_1$  would indicate that domestic funds increased their domestic sovereign debt holdings significantly more than non-domestic funds in those quarters with higher issues of sovereign debt. However, this significant difference would not be affected by the stress of the sovereign debt market when government pressure might be substantially different.  $\beta_2$  completes the interpretation of the previous interaction during periods of sovereign debt stress and periods of calm, i.e., a positive and significant coefficient of  $\beta_2$  would reveal that domestic funds increased their domestic sovereign debt holdings significantly more than non-domestic funds in high-need quarters during periods of sovereign debt stress. This positive and significant coefficient would be aligned with our hypothesis *Ha2* and the moral suasion evidence found by Ongena et al. (2019) for the EU banks. Finally,  $\beta_3$  captures the difference in the change in the portfolio weight of domestic sovereign debt during periods of sovereign stress and calm for domestic funds in relation to non-domestic funds. A positive and significant coefficient of  $\beta_3$  would reflect that domestic funds increased their domestic sovereign debt holdings significantly more than non-domestic funds in quarters of high debt stress. However, this significant difference would not reflect any incentive of governments to sway domestic funds in quarters when governments need to place larger amounts of new sovereign debt on the market, i.e., this behaviour is independent of high-need quarters and could response to different management strategies of domestic funds seeking for extra returns of government debt in periods of sovereign debt stress.

Table 7 shows the difference-in-differences estimates of the propensity of domestic funds to increase the portfolio weight of domestic sovereign debt. First, Columns 1 and 2 indicate that relative to foreign-owned funds, domestic funds significantly increased the weight of domestic sovereign debt in their portfolios during high-need quarters. This result includes both fund fixed effects and interacted country and quarter fixed effects. Further, it is also robust to the addition of time-varying fund-specific controls. Thus, it is unlikely that our results are driven by time-invariant fund heterogeneity, country-specific changes in the demand for domestic sovereign debt, or by the propensity of funds to modify their portfolio weights in response to external shocks.

However, identifying high-need quarters based on the respective country median for each SMP-based sub-period may be questionable if the country's gross issuance of sovereign debt was even more intense in the out-of-SMP sub-period, such as in Italy and Spain. Thus, Columns 3 and 4 provide the results considering the country median for the entire sample period. The results again support that the propensity of domestic funds to hold domestic sovereign debt during high-need quarters is higher than in foreign-owned

funds. Thus, the reinforcement of home bias in GIPS government bond funds was significantly driven during high-need quarters.

According to Ongena et al. (2019), we consider the interaction of high-need quarters with periods of sovereign debt stress and periods of calm. We do that for the same specifications of high-need quarters included in Columns 1, 2, 3 and 4. The new findings provide robust evidence of the increase in the weight of domestic sovereign debt in the portfolios of domestic funds during high-need quarters. However, Columns 5, 6, 7 and 8 suggest that this difference is not significant in those periods with high sovereign debt stress. These results contradict the positive and significant role of sovereign stress periods in the moral suasion evidence found by Ongena et al. (2019) for the EU banks. We reject our alternative hypothesis *Ha2* of a potential spillover from the banking into the GIPS mutual fund industry.

Further, Columns 5, 6, 7 and 8 also lacks a significant increase in the weight of domestic sovereign debt in the portfolios of domestic funds during periods of sovereign debt stress. This finding also casts doubt on significantly different risk-shifting strategies followed by domestic funds seeking for extra returns during the periods with the highest sovereign stress in the Euro debt crisis.

In brief, Table 7 supports that home bias of domestic funds could be explained by the significant increase of sovereign debt allocations when high-need periods, but this increase is independent of high-stress periods when the government pressure could be even more intense or the opportunities to seek for extra returns could be more. Therefore, domestic debt allocation of GIPS government bond funds is sensitive to high-need quarters, but the reason explaining this behaviour cannot be isolated through a pure financial repression mechanism. This result is mainly explained by Italy and Spain;<sup>13</sup> these countries experienced much more funding stress in the out-of-SMP sub-period, with the gross issuance of government debt being approximately 5% and 37% higher in Italy and Spain, respectively, after the SMP sub-period (European Central Bank Statistical Data Warehouse, 2020).

We use alternative measures instead of quarterly changes in portfolio weights to provide robustness to our findings. We run Equation 3 using both the fund's net flows of domestic debt and the ratio of the fund's net flows of domestic debt to the fund's total holdings. Our new findings for the mutual fund industry are far of being conclusive in terms of moral suasion.<sup>14</sup>

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<sup>13</sup> We run Equation 3 for each of the SMP-based sub-periods. We find that during the periods of sovereign stress, there was not a significantly higher increase during high-need quarters in the portfolio weight of domestic sovereign debt held by domestic funds than in the corresponding portfolio weight in foreign-owned funds. In contrast, this increase was significant for the out-of-SMP sub-periods. When we replicate the analysis for Italy and Spain, the results are even more significant than those initially obtained. These findings are also robust to the amount of auctioned debt as a continuous variable instead of the *HighNeed* dummy. Details are not shown for brevity but are available upon request.

<sup>14</sup> Detailed results are not shown for the sake of brevity but are available upon request.



**Table 7: Quarterly change in portfolio weights of domestic sovereign debt**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighNeed x Domestic	0.039*	0.036*	0.044**	0.041*	0.064**	0.059**	0.049**	0.045*
HighRisk x HighNeed x Domestic					-0.067	-0.062	-0.011	-0.010
HighRisk x Domestic					0.042	0.041	0.036	0.036
Size		3.4e-10		3.1e-10		3.1e-10		3.1e-10
Flows		2.9e-10		2.7e-10		2.7e-10		2.7e-10
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.010	0.016	0.014	0.018	0.018	0.023	0.017	0.021
No. Observations	566	566	566	566	566	566	566	566

Notes:

Table 7 shows the difference-in-differences estimates of the propensity of domestic funds to increase the portfolio weight of domestic sovereign debt. The sample includes 39 (7) funds managed by a domestic (foreign-owned) fund company. The results reflect the period from the beginning of the Euro crisis (2010/1q) to the end of our sample horizon (2014/4q). For each country, we split this period into two sub-periods based on a country's eligibility for the Securities Market Programme (SMP) of the European Central Bank. That is, we define the SMP sub-period as 2010/2q-2012/3q for Greece and Portugal, and as 2011/3q-2012/3q for Italy and Spain. The rest of the quarters for each country fall under the out-of-SMP sub-period. The dependent variable is the change in the weight of domestic sovereign securities issued by country  $j$  in fund  $i$ 's portfolio in quarter  $t$ . *HighNeed* is a dummy variable equal to 1 if the total amount of new sovereign debt issued by country  $j$  in quarter  $t$  is above the median amount for that country for each sub-period of the crisis, and 0 otherwise. *HighRisk* is a dummy variable equal to 1 for the SMP period in country  $j$  in quarter  $t$ , and 0 otherwise. *Domestic* is a dummy variable equal to 1 if mutual fund  $i$  in country  $j$  is managed by a domestic fund company and 0 if the fund company is foreign-owned. *Size* denotes the fund's TNA. *Flows* is the change in the fund's total assets net of the fund's returns. *Size* and *Flows* are lagged by one quarter. Columns 1, 2, 5 and 6 (3, 4, 7 and 8) present the results for high-need quarters identified by the specific median amount of sovereign debt issued by the corresponding country for each of the two SMP sub-periods (for the entire sample period). \*\*, and \* denote significance at the 1%, and 5% levels, respectively.

Furthermore, the GIPS mutual fund industry is largely controlled by bank groups (European Fund and Asset Management Association, 2019). Therefore, if the domestic bank-affiliated Euro government bond funds showed a larger increase in their home bias, the moral suasion hypothesis can still affect the fund industry as a spillover effect of the previous evidence for the GIPS banks. We only analyse funds managed by a bank-owned company. Domestic bank-owned companies manage 41 out of the 46 bank-owned funds included in our sample, and there is at least one fund in each GIPS country. Panel A in Table 8 reports the difference-in-differences estimates of the propensity of domestic bank-owned funds to increase the portfolio weight of domestic sovereign debt. This propensity is not larger than that in Table 7, which includes the whole sample, and shows no significant role in periods of high sovereign debt stress. These results cast additional doubts about a potential spillover of moral suasion from GIPS banks into GIPS mutual fund industries.

According to Acharya and Steffen (2015), Becker and Ivashina (2018) and Ongena et al. (2019), domestic bank-affiliated funds that are directly influenced by the government are more likely to be swayed to increase portfolio weights in domestic debt. This direct influence can be either because banks are state-owned or because they receive government support. Therefore, we identify those funds managed by domestic banks

under the direct influence of the GIPS governments during our sample period. Specifically, five bank-owned companies (three in Spain and two in Greece) may have been directly influenced in our sample period. However, Panel B in Table 8 does not provide any significant evidence that public and government-supported bank-owned funds increase the portfolio weight of domestic sovereign debt more than the rest of the bank-affiliated funds.

Finally, if fiscally stressed governments pressured their domestic bank-owned fund companies to refinance sovereign debt, then the government levers should be directed to larger management companies. These companies would increase the domestic sovereign debt held by their mutual funds much more than other small bank-owned fund companies.

We identify the funds managed by the GIPS banks included in the top 50 European banks in terms of total assets. This choice is justified by the important consolidation trend of the European banking sector since 2008 to reduce overcapacity and improve profitability (European Banking Federation, 2020). In our sample, only five Spanish fund companies were owned by these top banks. However, Panel C in Table 8 shows no significant propensity of these funds managed by top bank-owned companies to increase the portfolio weight of domestic sovereign debt more than the rest of the bank-affiliated funds.

All results reported in this section 3.3 cast serious doubts on moral suasion as a mechanism to explain the significant increase in home bias in the Euro government bond funds domiciled in GIPS countries, thereby rejecting our alternative hypotheses  $H_{a2}$ .

While some previous literature has shown that market supervisors should closely monitor the consequences of financial repression of the most fiscally stressed governments on EU banks, our results provide evidence that this repression cannot significantly reach mutual funds that are presumed to answer to their investors; by undertaking large redemptions, investors could punish those moral suasion-biased strategies which are not in accordance to their investing interests. These large fund outflows can severely distress those mutual fund industries with extensive assets-based fees, such as the GIPS countries. All of this leads to infer that performance-chasing investors might act as an effective mechanism to prevent moral suasion in the GIPS fund industry.

**Table 8: Quarterly change in portfolio weights of domestic sovereign debt in bank-owned funds**

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighNeed x DomBank	0.038*	0.034	0.046*	0.042*	0.062*	0.056*	0.051**	0.046*
HighRisk x HighNeed x DomBank					-0.066	-0.060	-0.013	-0.017
HighRisk x DomBank					0.041	0.040	0.038	0.036
Size		4.4e-10		4.1e-10		4.1e-10		4.0e-10
Flows		3.3e-10		3.0e-10		3.1e-10		3.0e-10
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.009	0.016	0.014	0.020	0.015	0.022	0.017	0.023
No. Observations	527	527	527	527	527	527	527	527
Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighNeed x PubBank	0.005	0.005	0.002	-0.001	0.004	0.002	0.006	0.003
HighRisk x HighNeed x PubBank					0.003	0.008	0.003	0.008
HighRisk x PubBank					0.038	0.038	0.039	0.038
Size		4.8e-10*		4.8e-10*		4.8e-10*		4.9e-10
Flows		3.4e-10		3.4e-10		3.4e-10		3.4e-10
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.001	0.009	0.000	0.009	0.003	0.013	0.003	0.013
No. Observations	527	527	527	527	527	527	527	527
Panel C	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighNeed x LargBank	-0.005	-0.014	0.001	-0.008	-0.002	-0.014	0.005	-0.005
HighRisk x HighNeed x LargBank					-0.005	0.006	-0.034	-0.020
HighRisk x LargBank					-0.019	-0.018	-0.011	-0.013
Size		5.2e-10*		5.0e-10*		5.0e-10*		4.8e-10*
Flows		3.6e-10		3.5e-10		3.5e-10		3.3e-10
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.000	0.010	0.000	0.010	0.002	0.012	0.003	0.011
No. Observations	527	527	527	527	527	527	527	527

Notes:

Table 8 shows the difference-in-differences estimates of the propensity of bank-owned funds to increase the portfolio weight of domestic sovereign debt. The sample includes 34 (7) funds managed by a domestic (foreign) bank-owned company. Panel A shows the difference-in-differences estimates of the propensity of domestic bank-owned funds to increase the portfolio weight of domestic sovereign debt. *DomBank* is a dummy variable equal to 1 if mutual fund *i* in country *j* is managed by a domestic bank-affiliated company, and 0 otherwise. Panel B shows the difference-in-differences estimates of the propensity of public and supported bank-owned funds to increase the portfolio weight of domestic sovereign debt. *PubBank* is a dummy variable equal to 1 if mutual fund *i* in country *j* is managed by a public or government-supported bank-affiliated company, and to 0 otherwise. Panel C shows the difference-in-differences estimates of the propensity of large bank-owned funds to increase the portfolio weight of domestic sovereign debt. *LargBank* is a dummy variable equal to 1 if mutual fund *i* in country *j* is managed by a large bank-affiliated company, and 0 otherwise. The remaining variables, statistics, and columns are listed in Table 7. \*\*, and \* denote significance at the 1%, and 5% levels, respectively.

#### 4. LIQUIDITY CONSTRAINTS AS A ROBUSTNESS TEST

Having rejected moral suasion hypothesis to explain the reinforcement of home bias in GIPS bond mutual funds during the Euro sovereign debt crisis, we assess liquidity constraints as a significant factor in influencing fund managers towards domestic sovereign debt. During the most critical phase of the Euro sovereign debt crisis, there were large money outflows from the GIPS fund industry. Fund managers would have sold the most liquid holdings in the portfolios to cope with large fund redemptions. Given that GIPS sovereign debt securities were the most distressed and the most illiquid, it is plausible that these funds sold the other most liquid bonds first, leading to a greater concentration of portfolios in their domestic sovereign debt. Accordingly, we evaluate whether the significant reinforcement of the home bias after the Euro sovereign debt crisis was due to a mechanical liquidity-based rebalancing of the portfolios to meet these large bond fund redemptions. Under this assumption, there would not be any type of distinctive practice of GIPS bond mutual funds, and the performance-chasing unitholders as an effective mechanism to prevent moral suasion would make no sense.

Table 9 reports the analysis of this mechanical explanation for the increase in home bias. Panel A finds significant results for large money redemptions from distressed portfolios during the most critical phase of the Euro sovereign debt crisis.<sup>15</sup> Further, Panel B notes significantly lower levels of liquidity of GIPS sovereign bonds with respect to the remaining sovereign debt held by our sample. Even though the liquidity of GIPS sovereign debt improved after the Euro debt crisis, this significant difference is consistent before and after the crisis. These two points confirm the two premises of the mechanical explanation for the increase in home bias. However, Panel C rejects the premise that fund managers sold their most liquid securities to meet the large redemptions due to persistent money outflows during the crisis. The results indicate that both GIPS and non-GIPS bonds sold by fund managers were less liquid (the zero return measures 11.79% and 6.48%, respectively) than the bonds left in the portfolios to meet later redemptions (8.34% and 5.42%, respectively).<sup>16</sup> This finding leads us to reject the the liquidity constraints as a mechanical explanation of the increase of home bias in the GIPS bond fund industry.

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<sup>15</sup> Jiang et al. (2021) explore the liquidity management practices in corporate bonds and find dynamic management of liquidity according to market conditions.

<sup>16</sup> This result is robust for different maturity bands and years. Details are available upon request.

**Table 9: Fund flows and bond liquidity for different periods and issuers**

Panel A		2010-2012	2013-2014	Difference	
	Net Flows (quarterly)	-868	3,882	-4,750**	
Panel B		GIPS	Non-GIPS	Difference	
2005-2014	Liquidity	12.28%	6.83%	5.46%**	
	No.Observations	2,127	1,480		
2005-2009	Liquidity	16.12%	7.52%	8.60%**	
	No.Observations	964	898		
2010-2012	Liquidity	9.94%	6.19%	3.75%**	
	No.Observations	715	439		
2013-2014	Liquidity	7.74%	4.41%	3.33%**	
	No.Observations	448	143		
Panel C		Bonds that remain in the portfolio		Bonds sold from the portfolio	
		GIPS	Non-GIPS	GIPS	Non-GIPS
2010-2012	Liquidity	8.34%	5.42%	11.79%	6.48%
	No.Observations	408	293	115	192
Liquidity Difference Matrix (Bonds in portfolios – Bonds sold)					
		GIPS bonds sold		Non-GIPS bonds sold	
	GIPS bonds	-3.44%		1.86%	
	Non-GIPS bonds	-6.37%**		-1.06%	

*Notes:*

Table 9 reports statistics about net fund flows and bond liquidity for different periods and issuers. Panel A shows the quarterly average of the net money flows (in € thousands) in our fund sample during the most critical phase of the Euro sovereign debt crisis and afterwards. Panel B shows the proxy of liquidity of the bonds included in the portfolios analysed as defined in Equation 1. These measures are split up for the bonds issued by GIPS and the rest of countries before and after the Euro debt crisis. Panel C reports the proxy of liquidity as defined in Equation 1 for those bonds that fully disappeared and those held in our portfolio sample in the following year. All securities with a maturity band lower than 1 year were excluded from the sample to avoid a potential maturity bias in the results. These measures are split for the bonds issued by GIPS and the rest of countries during the most critical phase of the Euro sovereign debt crisis. \*\* and \* denote significance in the difference tests at the 1% and 5% levels, respectively.

## 5. CONCLUSIONS

This study is the first to test the moral suasion hypothesis as the main driver for the increasing home bias in Euro government bond mutual funds after the Euro debt crisis. This analysis focuses on the countries most affected by the Euro sovereign debt crisis: Greece, Italy, Portugal, and Spain.

Assessing the Euro sovereign debt crisis, we find an increase in the relevant home bias already present in the preceding years, especially in Italy and Spain. This reinforcement of home bias was significantly driven during high-need periods with larger issues of sovereign debt. However, market stress periods do not significantly affect the portfolio allocation to domestic sovereign debt of GIPS government bond funds.

Then, moral suasion hypothesis cannot robustly explain the increasing home bias in Euro government bond funds registered in GIPS. We reject a spillover effect of the moral suasion assessed in the banking sector into the GIPS mutual fund industries. Our hypothesis is that the informal pressure by performance-chasing unitholders acts as an effective self-control of moral suasion channels in the mutual fund industries of fiscally-

stressed countries. Market supervisors would have an excellent help in their monitoring of financial repression.

Our findings are robust for alternative measures of the domestic government debt allocations and for different model specifications of bank-owned fund companies. These results cannot be explained by the liquidity constraints for domestic sovereign bonds held by funds either.

Further research should provide evidence about the role of informational frictions and behavioural issues in home bias reinforcement after the Euro debt crisis as well as the role of market supervision of an excessive home bias with higher levels of risk than efficiently diversified strategies.

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