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Citation for published version:
Rommerskirchen, C 2019, 'Foreign bond investors and market discipline', *Competition and Change*, pp. 1-23. https://doi.org/10.1177%2F1024529419872171

Digital Object Identifier (DOI):
10.1177%2F1024529419872171

Link:
Link to publication record in Edinburgh Research Explorer

Document Version:
Peer reviewed version

Published In:
Competition and Change

OPEN ACCESS

FOREIGN BOND INVESTORS AND MARKET DISCIPLINE

Abstract

This article scrutinizes the impact of foreign bond ownership on market discipline, that is the mutual responsiveness of financial markets and sovereign borrowers. The empirical investigation covers 12 advanced economies during the Great Moderation (1981-2008). This article finds no evidence that foreign bond investors affect the sensitivity of bond spreads to fiscal policy. Reversely, results show that government responsiveness to market pressure is contingent on the make-up of its investor base. Bond spreads spur on fiscal consolidation. The larger the share of foreign bond investors the bigger this effect.

Introduction

Sovereign borrowing, central to the functioning of the modern state, is a fickle thing. Amidst the, at the time of writing, becalmed European Debt Crisis, the challenge of how to appease bond markets continues to preoccupy academics and policy-makers alike. The set of post-Great Recession consolidation policies, now commonly labeled 'austerity', are frequently presented as a necessary evil to restore market confidence. Paul Krugman (2010) compared this strategy as 'the policy elite [...] acting like the priests of some ancient cult, demanding that we engage in human sacrifices to appease the anger of invisible gods' (cf. Cox, 2016). Who then are these bond gods on whose altar governments gather? Discussion of financial markets, like the treatment of other markets, tends to lump together actors with possibly distinct, at times even opposing, characteristics. Labels such as 'electronic herd' (Friedman, 2000), 'bond gods' (Krugman, 2010), or 'Marktvolk' (Streeck, 2016) are ill-suited to capture different evaluation and investment practices of financial market participants.[1] Within the academic literature there is a growing body of research that suggests important differences between bond investors. Like all polytheist religions, the sovereign bond market is said to be populated by deities of greater or lesser status, with varying preferences and predilections. This means, at least in theory, that the ability of governments to secure stable and favorable borrowing is contingent as much on domestic and international risk factors as it is on the make-up of the investor base.

Of all bond gods, foreign investors are met with particular reverence. Consider the testimony of Erskine Bowles (quoted in Krugman, 2014: 470), co-chairman of President Obama's debt commission, who amidst US bond yields plunging to historic lows warned that 'if our bankers over there in Asia begin to believe that we're not going to be solid on our debt, that we're not going to be able to meet our obligations, just stop and think for a minute what

happens if they just stop buying our debt'. This statement suggests that, even for a country at the center of the financial universe, so-called 'bond market vigilantes' can hold sway over public officials (see also Langley 2014: ch.8).

Financial innovation and globalization during the Great Accumulation period (1975-2005)[2], heralded substantial changes in the sovereign debt composition of advanced economies and notably an expansion in foreign bond investor (Fastenrath et al. 2017: 280; Preunkert, 2017: 38). Although important differences in the investor profiles of countries persist, there has been a clear trend towards an increased internationalization of sovereign bond holders. In 1979 the share of foreign holders in advanced economies stood at 8 percent, over the next three decades this figure grew to 16 percent (1989), 27 percent (1999) and finally 45 percent (2009). The internationalization of the sovereign bond market is closely linked to a broader trend towards financialization (that is an increased ability to trade risk (Hardie 2012: 14)). It is worth emphasizing that this internationalization has been, at least for the advanced economies under scrutiny in this article, for the most part a project with considerable state agency. Sahil Dutta (2018: 4) thus cautions against 'casting the state as a passive recipient of creditor agendas when it raises public finance', instead 'global financial markets also present opportunities for states to shape and improve the terms by which they obtain finance'. Debt management in particular actively courted foreign investors with measures ranging to regulatory changes such as eliminating withholding taxes imposed on interest earned by foreign bond holders, to issuing debt in foreign currencies, to numerous road shows targeting specific foreign investor groups.[3]

Given this internationalization of sovereign bond markets, what effect does the share of foreign bond investors have on sovereign bond pricing? What is more, if bond pricing is thought to differ according to who holds government bonds, government responsiveness to

price signals should in turn be influenced by the make-up of sovereign bond investors. Indeed governments, and particularly their national debt agencies, possess an acute awareness of the investor base and its implications for the financing of public debt at low costs and low risk (DMO, 2014; Warnock, 2015). This begs a second question: *does the makeup of the investor base matter for government responsiveness to market pressure?*

This article seeks to advance the existing annotation of the bond god pantheon by scrutinizing the impact of the foreign bond investors on market discipline, that is the mutual responsiveness of financial markets and sovereign borrowers. I present a model of market discipline and investor types that considers market pressure (bond spreads) on the one hand, and government responsiveness (fiscal consolidation) on the other hand. The empirical investigation covers 12 advanced economies over the period 1981-2008. This article contributes to and advances a number of literatures. First, it adds new insight to the empirical work on the determinants of government bond pricing and the make-up of bond holders (e.g. Andritzky, 2010; Arslanalp and Tsuda, 2012). The interaction between sovereign risk and foreign bond investors has been subject to little scrutiny. In so doing, this study seeks to contribute to the multi-disciplinary literature that seeks to pry open the black box of financial market behavior (e.g. Deeg and Hardie, 2016; Wellhausen, 2016) and evaluation practices in financial markets (e.g. MacKenzie, 2011). Second, I analyze the neglected flipside of market discipline: government responsiveness. Building on the fiscal consolidation literature (Wagschal and Wenzelburger 2008; Nickel et al. 2010; Molnar 2012), I demonstrate that market pressure does not present a uniform motivation for fiscal retrenchment but is instead contingent on the size of the foreign investor base. Third, this article contributes new evidence to the question of market discipline in developed economies who, unlike their developing counterparts, are thought to have

substantial 'room to move' (Mosley, 2000). In so doing, this article builds on Sylvia Maxfield's argument (1998: 70) that different classes of investors constrain governments' policy choices differently (see also Cohen, 1998: 284).

This article is structured as follows. In the next section, I discuss the theoretical perspectives and expectations motivating the research. Third, I provide an overview of the data and empirical strategy used to analyze how the presence of foreign bond investors mitigate market discipline. In the fourth section, I present results and discuss how they relate to the initial research hypotheses. The fifth section offers a battery of robustness tests. Finally, I conclude by discussing key implications of the findings.

Literature and hypotheses

Market responsiveness

According to the ability to exit thesis, the capacity to sell an investment position is key for the behavior of financial market participants. Building on Alfred Hirschman's seminal account (1970), Benjamin Cohen's view of monetary power (2003: 126) centers on the premise that capital expresses itself through exit, voice, and loyalty: 'the greater the ability of market actors to evade the preferences of public officials (Exit), the less the government will be able to count on or command submissive loyalty'. A key premise of this article is that different groups of government bondholders have different motives for holding and selling sovereign debt and face different constraints in doing so with noticeable implications for sovereign bond spreads (Krishnamurthy and Vissing-Jorgensens 2007). This is in line with wider assumptions about the ownership of capital in the literature regarding for example financial enterprises or non-financial firms (cf. Deeg and Hardie, 2016).

Bond investors in advanced economies face (more or less appealing) exit options. Key barriers to exit in the bond market are linked to regulatory constraints, moral suasion and risk synchronization, in addition to market liquidity. These barriers to exit pose less of a hurdle for foreign investors. There is some evidence that an increase in foreign investors reduces sovereign bond yields in advanced economies (e.g. Andritzky 2012; Arslanalp and Poghosyan, 2014). This is confirmed in the single-country literature on the United States, which finds a negative effect of the rise in global investors on US Treasury securities and long-term sovereign bond yields (Warnock and Warnock 2009; Beltran et al. 2012). Yet similar to short-term debt, foreign investors, although reducing interest rates, amplify debt vulnerabilities because they are said to be less loyal in times of troubles (Dell'Erba et al. 2013).

Foreign investors, so the argument, face lower costs of exits in foreign markets given that they are less likely to be part of a captive audience and have a broader pool of alternative assets they can invest in than their domestic counterparts (Arslanalp and Tsuda, 2012). The sovereign rating methodology of Moody's (2008), a leading rating agency, operates on this assumption, namely 'the extent to which the debt is owned by a captive set of local investors or by footloose foreign investors'. Similarly, according to Standard and Poor's methodology (2011), a share of foreign investors above 60 per cent of marketable debt is considered to compromise sovereign creditworthiness. Domestic investors are commonly assumed to 'be easier for the government to influence, […] not cut and run in crisis, [to] be more likely to further national prosperity and autonomy through their lending and reinvestment policies, and [to] even serve as national champions promoting the nation's image and interests on the international scene' (Johnson and Barnes, 2015: 5). The home

bias of investment decisions is well documented across markets. Erik Jones (1989) analyses sovereign borrowing in Belgium in the 1980s and concludes that the ability of the government to finance a persistent deficit at favorable terms is largely due to a captive and fractured domestic bond market. During the economic depression of the early 1990s, nearly 40 per cent of all domestic investment was allocated to Finnish government bonds to rescue the state from insolvency (McCarthy et al. 2016: 763). The non-event of a run on Japanese or Italian government bonds, despite high debt levels, is frequently explained by a high share of domestic investors (e.g. Kamikawa, 2013: 228). Amongst domestic bond holders, there is evidence that banks are loyal investors in times of market distress. They are said to engage in risk synchronization, keen to take on the sovereign bonds of their home country given that the banks' survival is likely to be contingent on the liquidity of governments (Diamond and Rajan, 2011).[4] Viral Acharya and Sascha Steffen (2013) show that the home bias, measured by banks' holding of domestic sovereign debt relative to total assets, lowered spreads in the periphery during the European debt crisis. Moreover, domestic banks are assumed to be endowed with sufficient *Sitzfleisch*; a substantial fraction of sovereign exposures is held to maturity in the banking book — and was prior to 2011 not subject to mark-to-market valuation.[5] There is some evidence that an increase in central bank holdings of sovereign debt leads to a reduction of sovereign bond yields and their volatility (Jaramillo and Zhang, 2013) – particularly when central banks offer governments the capital that other investors refuse (Krishnamurthy and Vissing-Jorgensen, 2007).

Governments are equipped with a broader array of tools to encourage patience or loyalty from domestic investors. The literature on financial repression discusses some of these. As coined by Ronald McKinnon (1973), the term describes various policies that enable

governments to 'capture' and 'under-pay' investors. 'Modern financial repression' in advanced economies (van Riet, 2018) remains a far cry from its cousin of previous centuries (cf. Ironside, 2014). And yet in light of increases of central bank-held debt and the tightening of the relationship between sovereign borrowers and domestic institutional investors, studies have suggested that the post-recession years marks an increase in financial repression (Kirkegaard and Reinhart, 2012; Monnet et al. 2014). Domestic banks in the EU were under supervisory pressure to repatriate funds from abroad coupled with moral suasion to invest in domestic government bonds (Ongena et al. 2016). In light of recent sustained central bank activism (not covered by the empirical analysis of this article), there is an argument to be made that 'the disciplinary power of international investors' (Lavery, 2018) has decreased. Although this portrait of central banks as easing the funding conditions and constraints for governments is in line with the domestic-foreign dichotomy found in the literature, I am cautious to generalize about the effects that central banks have on market discipline more broadly and government fiscal responsiveness to market signals more specifically. In the Eurozone for instance, the very bank that has the ability to soften market discipline, has continually stirred and empowered markets, notably via its collateral rules and the conditionality of its helping hand (Woodruff, 2016; Orphanides, 2017). What is more, domestic and EU policy-makers' stubborn attachment to market discipline (Rommerskirchen, 2019) as a means to keep governments on the fiscal straight and narrow has not waned in the age of 'central bank led capitalism' (Bowman et al. 2010). Central bankers' reluctant acceptance of their role as market makers has also not stopped governments across the world from reacting to (anticipated) market signals with promises of or indeed delivered austerity.[6]

Following this literature, I expect that the investor composition impacts on sovereign bond spreads. My theoretical argument is built on the interplay between market behavior (bond spreads) and market participants (that is the share of foreign bond holders). I propose two

sequential assumptions: first, foreign investors are more footloose than their domestic counterparts in the event of rising debt levels. This means that, second, the impact of government debt levels on sovereign bond spreads is mitigated by the composition of foreign vs. domestic investors.

Hypothesis 1. All else being equal, the share of foreign bond holders affects the sensitivity of bond spreads to sovereign debt.

Government responsiveness

The end of Bretton Woods heralded the widespread adoption of neoliberal policies, notably a move to greater capital account openness and thus greater international capital mobility. This posed both opportunity and challenge for domestic government and sparked debates about the structural power of finance. Different variants of structural dependency thesis consider varying degrees of influence of capital over politics (e.g. Przeworski and Wallerstein, 1988; Garrett and Mitchell, 2001). Key to the structural power of finance thesis is the assumption that the mobility of capital constrains governments from pursuing the policies they prefer, notably in the realm of taxation and regulation (Culpepper, 2015: 403). It is the threat of exit that enables (global) finance to demand 'submissive loyalty' (Cohen, 1998) from sovereign states. According the Jennifer Holt-Dwyer (2001: 35) an increase in capital mobility bundled with a decrease in exit costs relative to the cost of voice, mean that the leverage of financial-market participants lies 'less in how effectively they pressure the government through domestic political mobilization, and more in self-motivated government attention to how these powerful market actors' preferences are expressed through their economic behavior'. Under the structural dependence theory, market discipline, be it in the form of (threat of) exit or voice, prompts *government action*

(cf. Lane, 1993) – in this article the focus lies on government action in the form of fiscal consolidation.

The notion of market discipline has been a key feature of analyses on the dynamics between markets and states. Market discipline takes many shapes both across and within different market segments (e.g. labor markets, capital markets). Within studies of financial market discipline it has been argued that the government bond market 'provides a most likely location for the operation of financial market pressures through changes in the cost and availability of borrowing' (Mosley, 2003). The literature on fiscal consolidation has presented evidence that market pressure impact on fiscal adjustment (e.g. Molnar et al. 2012; Rommerskirchen, 2015a). More broadly, the notion that policy makers react to developments in the financial markets by offering their pound of flesh is widely accepted.[7] Both the former UK Prime Minister David Cameron (2013) and the former French President Nicolas Sarkozy (2012) have justified their budgetary consolidation plans in light of market pressure. Twenty years earlier Bob Rubin, then Director of the National Economic Council, successfully lobbied US President Clinton to balance the books with a view of 'best not offend the Bond Gods' (Parenteau, 2005: 140). 'In a world of globalized finance', so the underlying assumption, 'bond markets can discipline politicians just as effectively as an opposition party can, or even more so' (Johnson and Barnes, 2015: 21). Little is however known about the impact of different types of bond investors on fiscal consolidation. Jean Tirole (2012) speculates that foreign investors present a source for stronger market pressure. Yet this hypothesis is not empirically tested, a gap in the literature which this contribution seeks to fill.

Layna Mosley (2003) demonstrates that not all governments are equally vulnerable to financial market pressure. She notably distinguishes between developed and developing

countries in her study of market discipline. This article focuses not on variation in the *receiver* of market pressure (governments), but on variation in the *originator* of market pressure (bond investors). I hypothesize that governments are more sensitive to market signals (bond spreads) if the bond investor base is made up of a high share of foreign investors with a supposedly high(er) ability to exit. Specifically, I assume that governments are more/less responsive to sovereign bond spreads if their investor base has a larger/smaller share of foreign investors. The broader tensions in the debate about market discipline concern the role of markets in guiding (or coercing) state action and in posing a corrective to 'excessive' fiscal positions or structural challenges prompting change in the 'right' direction. Examining the two sides of market discipline, I do however not wish to present a normative account as to the appropriateness of either bond market or government (re)actions.

Hypothesis 2. All things being equal, the impact of bond spreads on fiscal consolidation increases with the share of foreign bond holders.

EMPIRICAL APPROACH

Market discipline is double-edged. Financial markets react to fiscal policy outcomes and governments react to market signals. This model echoes what Gabor and Vestergaard (2018: 141) term the 'prevailing view of markets' which casts bond markets as 'neutral signaling devices' or 'vigilantes of fiscal discipline'. The co-movement of market and government signals gives rise to concerns over the endogeneity of the regressor and heterogeneous dynamic of the error term. Further complicating an investigation into market discipline are anticipatory mechanisms. Governments may anticipate an increase in bond spreads and adjust policies accordingly; Bond investors may react in anticipation of the fiscal consolidation/expansion. The bi-directionality of market discipline means that the ordinary

least squares (OLS) estimates may be biased and inconsistent. I address this problem by using a simultaneous-equation model, three-stage least squares (3SLS) (Zellner and Theil, 1962; see also Rommerskirchen, 2015b).[8] I test the two hypotheses on an unbalanced panel of 12 OECD countries from 1981-2008 using annual data. These countries are Australia, Belgium, Canada, France, Germany, Ireland, Italy, Japan, the Netherlands, Spain, Sweden, and the UK. I performed panel unit root tests and confirm the stationarity of the variables used in the regression analysis. The linear specification used is as follows:

$$Spread_{i,t} = \alpha + \beta_1 Spread_{i,t-1} + \beta_3\, Debt_{i,t-1} + \beta_4\, Foreign_{i,t} + \beta_5\, Debt\_Foreign_{i,t} + \varphi Y_{i,t} + \varepsilon_{i,t}$$

$$Consolidation_{i,t} = \alpha + \beta_1\, Consolidation_{i,t-1} + \beta_2\, Spread_{i,t} + \beta_3\, Foreign_{i,t} + \beta_4 Spread\_Foreign_{i,t} + \psi Z_{i,t} + \varepsilon_{i,t}$$

The variable *Spread* records the difference between country i's nominal interest rate on long-term government bonds to what is considered to be risk-free government bonds (US's nominal interest rate on 10-year T-bills) of an equivalent duration. Sovereign spreads are supposed to capture the expected losses from default and the risk premium associated with the possibility of unexpected losses. The second dependent variable measures government responsiveness (*Consolidation*). Government responsiveness to market pressure is not merely a by-product or reflex but concerns purposeful policy. To isolate purposeful changes in government spending and taxation, *Consolidation* records the budgetary impact of fiscal consolidation measures in percentage of GDP. The variable comes from Devries et al. (2011) data set of discretionary changes in taxes and government spending.

Data on the share of foreign bond investors comes from Abbas et al. (2014): *Foreign*,

records the share of non-resident bond investors. The available data has limitations. First, the measurement is not as granular as one would hope but bundles together foreign investors with potentially different investment behavior, such as (central) banks, hedge funds, institutional and individual investors. Second, I rely on an aggregate measurement of bond spreads. This means that I am not able analyze the price movements of bonds held by a specific investor class: a dissection of individual investor types pricing of government bonds is not feasible. I hypothesize that bond spreads are more responsive to debt levels when a greater share of debt is owned by foreigners. We do not know whether this would be because foreign owners act differently or because market participants, perceiving the high share of foreign ownership, adjust their own strategy. The later is particularly relevant in the context of the well-documented portrait of financial market evaluation practices as not taking place in isolation (Sinclair 2005: 52) or Iain Hardie's characterization (2012: 249) of market participants as 'engaged in what can be termed *pre-emptive imitation*' (a version of Keynes' beauty contest).

Figure 1 summarizes the distribution of foreign bond investors by country (1981-2008) with a box plot. For each country, the box contains the inter-quartile range (a measure of statistical dispersion) of the share of foreign bond investors, the medians are marked with dark lines, the whiskers indicate the range of the more extreme values and the dots mark any outliers. Overall, the presence of foreign investors in these sovereign bond markets varies considerably from country to country (for a historic overview of this variation see Abbas et al., 2014).

Figure 1 here

Hypotheses 1 and 2 are tested via an interaction model analyzing whether the share of foreign bond investors mitigates market discipline. *Debt*, that is general government

primary debt as percentage of GDP, is entered as explanatory variable of bond spreads. Ceteris paribus, I expect countries with larger debt burdens to be subject to higher market pressure and that this pressure increases with the share of foreign bond investors. Market pressure (*Spread*) is thus determined by sovereign risk, the foreign investor share and the interaction of both terms (*Debt_Foreign*). On the second equation, government responsiveness (*Consolidation*) is expected to be influenced both by market pressure (*Spread*), the variable measuring the share of foreign bond investors (*Foreign*), and again an interaction term of both variables (*Spread_Foreign*).

Control variables

I further include a host of control variables, Y and Z respectively. In the interest of parsimonious hypothesis testing, I concentrate here on the commonly identified key determinants. I include lagged dependent variables in each of the two structural equations. In the public finance literature, the inclusion of a lagged dependent variable is a common feature and has frequently been attributed to the path dependency of fiscal policy (Davis et al. 1966). Put differently, consolidation will have consolidation. For bond spreads, persistence is also likely. Sovereign risk is usually not evaluated from scratch but instead informed by previous country and group models and information shortcuts which favors stickiness (Mosley, 2003: 743f).

For the bond spread equation, I further control for: *Risk*, *Liquidity*, *Short$_{(t-1)}$*, *Marketable, CAO*. Turning to external risk factors, I include financial market risk aversion using the average change in Moody's Seasoned Baa Corporate Bond Yield Relative to Yield on 10-Year US Treasury Constant Maturity as the external *Risk* variable. It serves as a measure for the implied bond market risk premium and is a conventional proxy of market risk aversion. I furthermore control for market liquidity. Market liquidity can be broadly

defined as the ability to swiftly execute financial transactions, notably exit, at low cost with limited price impact. Reversely, markets with poor liquidity, according to Richard Prager (2012), a strategist at the bond investor BlackRock, are like 'a lobster pot: Easy to get into, but tough to crawl out of'[9]. In periods of low liquidity even sound sovereign borrowers may face substantial borrowing costs (Kindleberger, 1978:15).[10] I approximate the liquidity risk with the domestic gross debt in US dollar - market size has a positive impact on liquidity (for similar approaches see Gravelle, 1999). The natural log transformation is used to ensure stationarity. An increase in the supply of sovereign bonds impacts on not only the market liquidity but also the default risk of the issuer country. Including total debt/GDP in the estimation equation assures that the coefficient on the liquidity variable will not be biased towards zero. Furthermore, I account for the maturity of outstanding debt. The variable *Short$_{(t-1)}$,* records the percentage of short-term debt in the overall government debt portfolio (debt with less than one-year maturity). Short-term borrowing leaves large amounts of debt to roll over and thereby exposes sovereigns to higher risks in the event of market fluctuations. Long-term bonds and the associated insulation from market turbulences often come at the cost of higher interest rates (e.g. von Hagen et al. 2011). [11] The patience or loyalty of the investor base is however not well proxied by the maturity of sovereign bonds. The long maturity of borrowing is neither necessarily a sign for patient investors, nor for the strong presence of domestic investors; Japan's average maturity (with a 2018 gross financing need of 40 per cent of GDP)[12] remains on the lower spectrum of developed economies, below Greece, Spain and Italy (IMF Fiscal Monitor, 2018).[13] The variable *Marketable* accounts for the share of marketable debt and accounts for the liberalization and developments in sovereign bond markets beginning in the mid-1970s (Preunkert, 2017). To capture capital account liberalization, I include Karcher and Steinberg's updated measure of capital account

openness (2013), *CAO*. Capital controls are thought to act as an 'insulation device' (Mosley, 2003: 229) shielding governments from market pressure. As such they could mute the responsiveness of bond spreads to fiscal policy outcomes. The reputation of capital controls has not (yet) come full circle during the time-frame of this analysis, from a prevalent means to command financial capital flows in the early 70s, to capital account liberalization during the 1980s and being endorsed by the International Monetary Fund as 'legitimate part of the policy toolkit' (Grabel, 2015).

The controls for the equation estimating fiscal consolidation, *Z*, are: *Debt$_{(t-1)}$*, Δ*GDP$_{(t-1)}$*, *Short$_{(t-1)}$*, *Concentration*, *Ideology*, and *Election*. Public debt to GDP is a proxy measure for a country's fiscal space, or its fiscal room for manoeuver. This means that debt levels restrict policy-makers fiscal policy choices and should motive fiscal consolidation. Including economic growth accounts for the fact that, a reduction in deficits becomes both more urgent and more difficult in times of sluggish, or even negative, economic growth, as recent experience has clearly demonstrated. By including the share of short-term debt, I account for debt-roll-over pressures that arise when governments need to refinance existing debt which should favor consolidation. The variables *Concentration* and *Ideology* are taken from Michael Breen and Iain McMeniman (2013). *Concentration* is based on a weighted index of the effective number of parliamentary parties, concentration versus power sharing in the cabinet, executive-legislative relations, electoral disproportionality, and interest group pluralism. I am interested in government's ability to respond to market pressure. Put simply the variable *Concentration* is thought to capture 'the ability to get things done'. Building on George Tsebelis veto player theory (1995) I assume that government responsiveness (fiscal consolidation) will increase with the concentration of power within the political system. *Ideology* is based on the Comparative Manifesto Project, which notwithstanding its shortcomings in placing political parties in policy space

(e.g. Gemenis and Dinas, 2010; Pelizzo, 2003), continuous to be the key reference for parties' ideological positions. The variable calculates scores of all parties by subtracting the percentage of the manifesto coded as right-wing from the percentage coded as left-wing. Positions of all parties are then summed and weighted by their cabinet shares. A large part of the literature on fiscal consolidation suggests that partisanship matters for implementing austerity policies. Right-leaning governments are here found to be more likely to implement harsher cuts than their left-leaning counterpart (Korpi and Palme, 2003; Allan and Scruggs, 2004, for contradicting findings see Hübscher, 2015). I further control for the fiscal business cycle by including the variable *Election*, which takes 1 in an election year and 0 otherwise. There is no agreement in the literature on the effect of elections on fiscal consolidation with some studies (e.g. Guichard et al. 2007) arguing for a positive effect and others (e.g. Alesina and Perotti, 1995) present no significant impact of the closeness of elections. Summary statistics and sources for all variables used in the analysis are presented in Table 1.

Table 1 here

DISCUSSION

Table 2 presents the 3SLS estimation results for Models 1–2, that is with and without interaction effects. In both models and in both sides of the equation results confirm path dependency with statistically significant lagged dependent variables. There is some evidence that fiscal consolidation is associated with higher bond spreads, a finding consistent with for example McMenamin et al. (2015) and which speaks to the broader debate on the fiscal multipliers of consolidation (see Helgadottir, 2016). Turning to the economic controls on the spread equation, results suggest that an increase in debt to GDP levels lead to higher bond

spreads, a finding that is again intuitive and consistent with existing studies. The coefficient for the measurement for financial market risk (*Risk*) is statistically significant and suggests that an increase in market risk leads to higher bond spreads. There appears no evidence as to a significant impact of market liquidity, marketable debt, capital account openness and the share of short-term debt on bond spreads in our model specification and time-frame. Furthermore, there is no evidence that the share of the foreign investor base alone brings bond spreads down or encourages fiscal consolidation.

Table 2 here

The second equation on the determinants of fiscal consolidation provides evidence that the debt burden is a determinant of retrenchment. What is more, results suggest that the timing of elections matters, with fiscal retrenchment being less likely in election years. This makes intuitively sense as 'austerity' politics hardly represent a set of voter-pleasing initiatives, at least in the eyes of policy-makers.[14] Results suggest that there is no partisan bias at play in fiscal consolidation and that furthermore the concentration of power within the political system has no statistically significant impact. Higher spreads spur on fiscal consolidation (in model 2 the coefficient of Spread is jointly significant with Spread*Foreign). This finding speaks to the 'disciplinary power' of bond market signals discussed above. In a similar vein, the share of short-term government debt is positively related to fiscal consolidation in the context of roll-over risk, another channel of market discipline.

Market discipline and foreign bond investors

Does the make-up of the sovereign bond investor base mediate market discipline? Although the 3SLS results presented in model 1 of Table 2 provide insights into the dynamics of sovereign bond pricing and the determinants of consolidation, they give only a limited account of market/government responsiveness. These results do however not tell

us whether the response to government debt/market pressure is contingent on the share of foreign bond investors. To answer these questions, I now turn to interaction models.

For the estimation of bond spreads this interaction term takes on *Debt*Foreign*, for the estimation of fiscal consolidation this interaction term takes on *Spread*Foreign*. In so doing, I am able to answer whether the effect of domestic risk on bond spreads hinges on the share of foreign investors, and whether a rise in bond spreads will prompt fiscal consolidation depending on the make-up of bond holders. The second model in Table 2 presents these results. Yet these are not readily interpretable as regular additive models and the significance levels of variables can be misleading. To be able to make better inference I calculate the full range of conditional coefficients and standard errors. These are graphically illustrated in Figure 2. The solid sloping lines indicate the value of estimated causal effect on *Spread/Consolidation* across the range. These conditional coefficients are not statistically significant if the dashed lower bound of the 95% confidence interval is below the zero line and the dashed upper bound is above it. The left graph in Figure 2 illustrates market responsiveness to an increase in government debt depending the share of foreign bond investors. I find no evidence that the responsiveness of bond spreads to public debt levels is conditional on the share of foreign bond investors (as the upper bound is above and the lower bound is below the zero line).

Figure 2 here

Government responsiveness reveals however a contrasting pattern. The right graph of Figure 2 presents evidence that government responsiveness to market pressure is contingent on the composition of the foreign vs. domestic investor base. Bond spreads have a positive impact on fiscal consolidation only if the foreign investor base reaches 10 per cent (as is the case for 85 per cent of the 1981-2008 sample). In other words, for a

country with a comparatively low foreign investor share, like Japan, rising bond spreads do not represent a motivation for fiscal retrenchment. This finding furthermore bespeaks to the growing structural power of capital with an overall increase in foreign bond investors across advanced economies from a sample average of 9.5 per cent in 1980 to 45 per cent in 2009. Once the 10 per cent threshold is reached, the impact of bond spreads on fiscal consolidation increases. We can see that, ceteris paribus, a jump from 20 per cent to 60 per cent of foreign investors doubles the impact of market pressure on governments. Although Figure 2 suggests that the effect of debt levels on bond spreads is *not* mitigated by the share of foreign bond investors, governments seem to cater more readily to non-residents' (alleged) demand for fiscal consolidation.

Robustness checks

I performed a battery of further checks, which are not presented here to conserve space (see Online Appendix). First, results are robust to both excluding the lagged dependent variable (Figure A1). Second, our results hold when we start our investigation in 1990 (Figure A2). This robustness test accommodates for the fact that the (particularly secondary) bond market underwent considerable change in the 1980s – this is also documented in an increase of the share of marketable debt from an average of 58 per cent in 1980 to an average of 79 per cent in 1990. Third, findings hold if I exclude Ireland, a persistent outlier for high rates of foreign bond investors (Figure A3). Next, I replicated the marginal effects system using bond yields instead of bond spreads. This allows us to also include the US in the sample; results hold. I furthermore consider whether the share of foreign bond investors mediates the responsiveness of bond spreads to *the change* (instead of level) of government debt; this is not the case (Figure A5). Finally, I tested

whether results hold when we consider the impact of bond spreads on debt levels instead of fiscal consolidation. This also allows us to include the contemporaneous debt variable in the first equation (on the drivers of bond spreads). Results (Figure A6) indicate that again foreign bond ownership does not mediate the impact of debt on bond spreads. However, the negative effect of bond spreads on debt levels is mitigated by the share of non-resident bond investors – the higher the share, the stronger the effect once foreign bond ownership reaches about 20 per cent (this applies to 59 per cent of cases in the 1981-2008 sample). These results provide further evidence that governments' fiscal responsiveness to market signals is contingent on the makeup of the investor base.

Investors are said to be attracted to, repelled by, or indifferent to sovereign risk. Foreign investors, light-footed and disloyal, are charged with leaving countries in distress. Consider the case of Greece, where domestic bank ownership of sovereign bonds increased from 10 per cent in late 2008 to 24.4 per cent in late 2015. In the same timeframe Greeks foreign investor base shrank from 75.3 per cent to 42.2 per cent (Merler and Pisani-Ferry, 2012). Sovereign risk matters for the investor base, and the investor base matters for sovereign risk. This poses a challenge to identify clear lines of causality in the relationship between the share of foreign investors, fiscal policy outcomes and sovereign risk; the endogeneity problem raises its ubiquitous head. Seeking to address this. I use an instrumental variables estimation technique with standard errors that are robust to the presence of arbitrary heteroskedasticity (Baum et al. 2002). The share of foreign bond investors is instrumented by three group dummies variables acting as proxies that capture the foreign language difficulty of a country's official language.[15] This proxy is thought to have an impact on the presence of foreign investors, yet I do not assume that this variable interacts systematically with the sovereign bond spread; in other words, our instrument z has the property that changes in z are associated with changes in x but do not led to change in y (aside from the indirect route via

x). This instrument is individually significant in the first stage. I then confirm that instruments are neither weak instruments (Kleibergen-Paap rk Wald F-statistic) nor correlated with the error term (Hansen J statistics). I then test for endogeneity and conclude that the specified endogenous regressors can be treated as exogenous (with a p-value of .39 and .96 for the corresponding null hypothesis in the two respective models for market responsiveness and government responsiveness).

Conclusion

This article addressed an enduring debate over the power of bond investors. Foreign bond holders in particular have been cast as market vigilantes with substantial sway over democratically elected governments. Here, I assessed the extent to which this reputation is earned. In so doing I tested two hypotheses about the impact of foreign bond holders on government responsiveness and bond market responsiveness. Building on the ability to exit thesis, I expected that the share of foreign bond holders would affect the sensitivity of bond spreads to sovereign debt. Building on the structural dependency thesis, I expected that the share of foreign bond holders would affect the sensitivity of fiscal policy to bond spreads. Regarding the first hypothesis, results confound expectations; I find no conclusive evidence that the share of foreign bond investors alters the pricing of sovereign bond spreads. Regarding the second hypothesis, results suggest that bond spreads spur on fiscal consolidation and that this impetus is conditional on the make-up of sovereign bond investors. The effect on fiscal consolidation increases with the share of foreign bond investors. An investor category that does not seem to map onto the reality of bond market behavior, has manifest traction in fiscal policy decisions. These results give further evidence to the claim that market structure (in this case the composition of bond holders) matters for market discipline.

This article's findings are particularly relevant in the context of growing debt burdens and persistent financial vulnerabilities across bond markets. The increase in foreign investors over the past three decades may have reduced borrowing costs, yet this came at the cost of having made governments more beholden to market signals. Alongside broader institutional and managerial changes in public debt management (e.g. Trampusch, 2019; Dutta, 2018; Fastenrath et al. 2017), debt management in advanced economies has actively courted foreign investors, notably via changes in debt products (what is sold) and changes in the marketing thereof (how they were sold). To give an example of the first channel, according to Tetsuya Miura, chief bond strategist of Mizuho Securities in Tokyo, 'foreign investors, especially those in the UK, love inflation-linked bonds' (cited in Hayes, 2013). More broadly, inflation-linked bonds are attractive for foreign investors because they can help to absorb the exchange rate risk of home-country denominated bonds. An example of the second channel is Germany's introduction of a web-based auction platform, the Bund Bidding System in 2005 whose predecessor, the Automated Bidding System has been available in German only and was not accessible from other countries (Bundesbank 2007). The issue of bond holder composition is usually viewed through the cost-risk trade-off prominent in the debt management literature. The presence of foreign investors, so the argument, leads to a broader investor pool and thus reduce borrowing costs, while rendering governments more vulnerable to financial market volatility, similar to the argument on the maturity spectrum of borrowing (cf. Riksgalden 2018). The findings of this article tell us that there is an other important dimension to the increased internationalization of government debt markets: An international investor base spurs fiscal consolidation, or put differently the composition of bond investors mitigates governments' (perceived) fiscal room to move. This finding resonates with Iain Hardie's study on the financialization in emerging markets (2012, see also Masso, 2016).

This article falls deliberately short of providing policy recommendation. Policy-makers who wish to reduce the (perceived) demand for fiscal consolidation by market participants might well be tempted to reduce the presence of foreign bond investors. Such move is however likely to rise the opposition from central bankers (for whom foreign investors are a source for liquidity) as well as national debt managers (for whom foreign investors reduce funding costs and diversity risk). What is more, possible additional funding costs due to constrained liquidity or a reduced investor pool could offset or even exceed the benefits of a more domestically oriented bond market.

These findings and the study's limitations have several key research implications. First, the very notion of investor types and the crude distinction between foreign and domestic investors may well be misleading (see also Hardie, 2012; Gelpern, 2018). Future works is needed to enable more nuanced analyses of investor types and market discipline. Data collection and analysis should ideally move beyond the existing dichotomy between foreign and domestic investors. Further research is also needed to test whether the interplay between government and market responsiveness is a distinct feature of advanced economies or holds across levels of economic and political development. This would allow us to further unpack the conditionality of market discipline on the investor side and on the government side, in line with the argument that developed sovereigns have greater capacity to resist fiscal retrenchment upon changes in market sentiment than developing ones. This article has analyzed a specific model of market discipline (bond spreads – fiscal consolidation). Clearly, there are more channels of market discipline that call for further study. Government responsiveness for instance goes beyond fiscal retrenchment (see monetary policy or labor market/structural reforms). The need for safe-assets (bonds) to serve as collateral for shadow money creation has lowered yields on sovereign debt repo with clear implications for

governments as well as other market participants. An extended model of sovereign bond holders should then not only distinguish between foreign and domestic, but also consider the role that shadow banks as bond holders play in the dynamics of market discipline, structural and infrastructural power (Braun and Gabor, 2019). Finally, it would be interesting to assess whether governments' interpretations of 'what investors want' is more accurate for different investor groups. The in this article identified gap between market behavior and government responsiveness leads credence to accounts of governments' rallying around the altar of deities whose preferences they do not know well.

Endnotes

[1] Similarly, the abstracted perspective structural power provides, is prone to sidelining the different actors operating in bond market structures (cf. Knafo 2010).

[2] The period from the early-1970s till the mid-2000s during which public debt of advanced economies rose substantially despite comparatively sunny economic weather (Abbas et al. 2014).

[3] The state-led repo project is another example of how government agents shaped this internationalization. As Daniela Gabor (2016: 968) chronicles, starting in the 1980s governments responding to mounting competition for international investors 'embarked on a project of creating modern government bond markets'. A liberalised repo market in particular was seen as a means to increase foreign investors demand for sovereign bonds (i.e. collateral) and thus to ease governments' funding costs (see also Ban and Gabor 2016).

[4] The co-dependence of sovereign states and banks has been further problematized by inter alia Adler (2012) and Gabor (2016).

[5] Mark to market reporting records the price or value of an assets as its current market value and not its book value. This means that trading positions are revalued as market prices fluctuate. However, there is reason to question the allegedly limited ability to exit of banks. Pepper Culpepper and Raphael Reinke (2014) argue that the mobility of UK domiciled banks effectively enabled them to avoid the types of bail out conditions that were forced onto healthy US banks during the financial crisis of 2008.

[6] Jeremy Green and Scott Lavery (2018) call this a 'dynamic policy pairing between selective fiscal discipline and monetary indiscipline'.

[7] Whether bond gods appreciate this offering is another matter (see McMenamin et al. 2014).

[8] I also consider whether government responsiveness is lagging behind by using the t-1 and t-2 lag of bond spreads respectively. Results are very similar, although the marginal effect is slightly weaker. Given that bond spreads are highly correlated with past years this does not come as a surprise and the contemporaneous bi-directional model is preferred. In the 3SLS model all dependent variables are explicitly taken to be endogenous to the system and are treated as correlated with the disturbances in the system's equations. 3SLS thus has the advantage of modeling the contemporaneous feedback effects between consolidation and market signals.

[9] This analogy may be biologically incorrect however; there is evidence that all but about a tenth of lobsters caught in a lobster trap is able to escape (Chesler 2017).

[10] In the bond market the bulk of trading takes place over-the-counter and not on exchanges. This means that no direct measurement of liquidity is available. Studies on liquidity risk thus usually approximate liquidity by using bid-ask spreads, transaction volumes and the level of or the share of a country's debt in global/local sovereign debt markets (e.g. Favero, et al. 2010; Arghyrou and Kontonikas, 2012). Liquidity is not only a concern for financial market participants and the debt arm of government, but also for central banks where the effectiveness of its market transactions depends on liquid markets for money and securities.

[11] The time-inconsistency problem inherent in the tension between a short-term reduction in interest rate payments and an increase in sovereign risk is discussed by Lucas and Stokey (1983).

[12] https://www.imf.org/en/Publications/FM/Issues/2018/04/06/fiscal-monitor-april-2018

[13] The maturity profile of government debt may also disguise the potential short-termism of investors following a riding-the-yield-curve investment strategy. This strategy takes advantage of the higher returns on longer-term bonds and involves purchasing bonds with maturities longer than the investment horizon and the sale of these bonds before they mature. In this scenario the investment horizon of investors is short-term, but the maturity profile of government debt indicates long-term. The maturity of an investment does furthermore not map well-onto investor types given that investors often invest in both to manage interest rate risk. What is more, bond investors with a hold to maturity perspective, like pension funds and insurers, do not contribute to market liquidity and thus may raise the cost of borrowing by depressing liquidity. This is for instance evident with respect to the liquidity premium in the yield of inflation-indexed bonds favored by long-term hold-to-maturity investors. Bond investors selling before maturity do not necessarily spell trouble for sovereigns. If bond yields have declined and consequently a bond has appreciated in value, an investor may want to realize a capital gain by selling before maturity. Realizing this gain does usually not lead to higher borrowing costs for newly issued sovereign debt in such a low yield market environment.

[14] Jean-Claude Juncker (2016), then as Prime Minister of Luxembourg, referred to the unpopularity of fiscal consolidation by pointing out at that 'we [politicians in government] all know what to do; we just don't know how to get re-elected after we have done it'.

Language complexity dummies are taken from the ranking of the Foreign Service Institute's Foreign Language Difficulty score. *Group1* is equal to 1 (and 0 otherwise) for Australia, Canada, the UK, Ireland, and the US. *Group2* is equal to 1 (and 0 otherwise) for Belgium, Spain, France, the Netherlands, and Sweden. *Group3* is equal to 1 (and 0 otherwise for Germany, and *Group4* is equal to 1 (and 0 otherwise) for Japan only. The dummy *Group4* is not included as instrument, but used as the base-group.

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