DOES THE BOND MARKET DISCIPLINE STATE OWNED ENTERPRISES? [1]

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Abstract

Around a tenth of the global bond market is issued by State Owned Enterprises (SOEs) that do not have shares floating on public markets. Many of them are SOE banks. Sometimes governments avoid a direct capitalization of these SOEs and instead allow them to issue debt, assuming bond markets can "discipline" the company. Nonetheless bond buyers may expect that in case the SOE defaults there will be an implicit guarantee from the Treasury, either because of "too big to fail" problems or because of contagion to the sovereign bond. In this paper we use data from global bond markets in the last 20 years finding that in fact SOEs tend to get cheaper finance, on average some 30 to 80 basis points below comparable firms. This effect seems stronger for State Owned Banks than for Industrials and part of it can be rationalized by better credit rating given fundamentals. Our central results are robust to many alternative tests and do not seem to be caused by the characteristics of the issuance or the size of the firm. The bond market perceives that holding debt SOEs is on average safer, consistent with the view of an implicit state guarantee, which has implications for banking regulation and corporate governance.

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1. Introduction

State Owned Enterprises, many of them Banks, are important organizations but tend to face characteristic problems due to the nature of their ownership and governance (e.g. IMF, 2004-2005; World Bank, 2014; Kowalski et al, 2013). Moreover, in contexts of crises they are likely to receive additional attention due to their implications for fiscal policy, systemic risks and potential for bailouts. (Levi-Yeyati et al, 2007). Overall, this makes them potentially hard to discipline with the same tools used for other institutions (e.g. Distinguin et al, 2013). This limited capacity to discipline them could be even more critical in SOE firms that are 100% owned by governments because they lack the basic feedback mechanism of having a stock price.

SOEs without shares in public markets are nonetheless important players in the international bond market and could be considered an "asset subclass" in the sense of being exposed to some common fundamentals regarding sovereign guarantee. For instance, in 2014 issuances of bonds by SOEs were $ 300 billion, representing around a tenth of global bond issuances that year.[3]

In the context of understanding SOEs discipline it is illustrative to look at a checklist used by the IMF and World Bank, which contains a simple but difficult to answer question: "*Can the SOE borrow without government guarantee and at rates comparable to private firms?*" (IMF, 2005; WB, 2014). The question is difficult because it involves taking a stand on what it means to have a guarantee. Some SOEs avoid mentioning a guarantee in their bond issuances, while some other companies go even further remarking that they do not have legally binding guarantees from the government. But the problem is that the guarantee might be implicit rather than explicit, like in the case of Fannie and Freddie in the US.

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In the context of soft budget constraints, making State Owned Enterprises accountable through market mechanisms could be important for its efficiency (Musacchio and Lazzarini, 2014; World Bank, 2014). For that reason, among others, many governments have avoided directly capitalizing these SOEs and ask them to get funding in open bond markets, under the hypothesis that bond markets can "discipline" the SOE. Nonetheless bond buyers may have the expectation that in case the SOE defaults, there will be an implicit guarantee from the Treasury. This would be the case, for example, if the SOE is "too big to fail" for the State or because the Treasury is worried that the SOE's default can spill over into worse credit conditions for the country's sovereign debt.

In this paper we use data from global bond markets in the last 20 years finding that in fact SOEs tend to get cheaper finance, on average some 30 to 80 basis points below comparable firms. This effect seems stronger for State Owned Banks than for Industrials. Our central results are robust to many alternative tests and do not seem to be caused by the characteristics of the issuance or the size of the firm.

One plausible explanation for our findings would be that SOEs are more profitable or have better assets that make them more valuable and less likely to default, independent of a government bailout. However, previous research has usually found the opposite. Dewenter and Malatesta (2001) use a large sample of SOEs and private firms to show that SOEs tend to be less profitable, more leveraged and tend to hire more people than comparable private firms, although they show that privatization by itself might not be enough to increase profitability. Regarding State-Owned banks various studies discuss the possibility of having, on average, more lending that is hard to rationalize as profit maximizing, either because the government is trying to achieve some additional development goals or because of politically connected lending (e.g. Carvalho, 2014; Sapíenza, 2004). Moreover, Cornett et al (2005) show that profitability of SOEs in Asia tended to be weaker in crises, suggesting that it is less likely that SOEs cash flows have a low correlation with the market.

Unlike previous studies we compare bonds issued by 100% state-owned enterprises and compare them with those of non-SOEs of the same industry and year of issuance, and when possible the same country. In the case of banks we almost always succeed at finding another firm with that characteristic. For companies in the real economy sometimes this is difficult. For example PEMEX is the only oil company in Mexico, by law. In those cases we use a comparable global firm of similar size.

Unlike the myriad of studies that focus on the determinants and outcomes of the privatization process (e.g. Laporta and Lopez de Silanes, 1999; Magginson and Netter, 2001; Megginson, 2005[4]; Borisova and Megginson, 2011), in this paper we focus on comparing firms that are completely state owned and that are usually left out of the analysis, beyond being usually a control group in a few studies. After many waves of privatization what has not been privatized might be because of systemic, political or fiscal relevance; so they seem unlikely to be a good comparison group for a privatization process.

Our study is close to Borisova and Megginson (2011, RFS), who explore a sample of sixty European companies that were privatized, either partially or totally. They find that as the share of government ownership decreases, then the cost of debt decreases at a rate of 7.5 basis point per each 10% of the company that the government divests. They find, however, that this behavior is only for partially privatized companies. Fully privatized companies have lower credit spreads than partially privatized firms. Our results are contrary to the findings in this previous literature.

[4] See the entire special issue of Bank Privatization in the Journal of Banking and Finance (2005); which includes this study by Megginson (2005). See for example Haber (2005) for Mexico's privatization of banks.

Despite sharing some goals and topics with Borisova and Megginson (2011, RFS), we have several differences. First is that we are particularly interested in 100% State Owned Enterprises and their behavior, which are firms that were totally absent from Borisova and Megginson (2011)'s paper. Many economies that had had significant privatization waves are currently staying with SOEs that are - for good or bad reasons - less likely to be privatized. A second difference with Borisova and Megginson (2011) is that our sample encompasses firms from all regions on the world, rather than 60 European firms, and focus on large firms that are significant players in global bond markets. Third is that by having a larger sample we can explore bond characteristics at issuance, which are truly independent observations. We know that many of these bonds are bought and held, with little trading afterwards. For that reason our preferred specifications do not rely on the time series of the same bond, which tend to contain little additional variation. A fourth difference is that we benchmark SOEs that are 100% state owned with firms that are (in almost all cases) totally private, since our goal is to compare the role of government implicit guarantees instead of focusing on the selection into privatization or the transitional dynamics of reform. A fifth relevant difference is that we are able to control for all country and year specific characteristics through the addition of fixed effects; including also comparisons from the same industry. This is relevant because without comparing firms from the same country and year, or at least comparable industry and year, one cannot identify whether the differences come from different timings to issue bonds, local market conditions or industry characteristics, instead of being a type of "treatment effect" of having the government as owner. A final and most important difference is in the findings, since we find that 100% State Owned Banks pay on average 30-70 basis points less than equivalent fully private firms.

Our result is also different from later follow ups in the literature. On a larger sample Borisova et al (2013) look at cases when governments invest in publicly traded firms, finding that they tend to get more expensive debt (61 basis points) in normal years although the funding might be cheaper

(18 bp) on crisis years, concluding that in general government ownership leads to more expensive financing. Our results tend to point in the opposite direction, with SOEs getting unconditionally a cheaper financing.

Some papers explore the privatization decision (e.g. Bortolotti and Faccio, 2009, RFS)[5] and how firms' corporate governance changes with State Ownership (Boubakri et al, 2013, JFE; Borisova at al, 2012 JBF). Micco et al (2007) show that politics may be a mediating factor in the relationship between public ownership and performance. Our work is a natural complement to that literature.

The rest of the paper is structured as follows. Section 2 explains our data and the procedures followed, also displaying some basic stylized facts. Section 3 performs the regression analysis in various ways, proceeding with some robustness checks. Section 4 explores channels and heterogeneity of our effect and, finally, section 5 concludes with remarks and policy implications.

[5] They show two important trends of the privatization wave in OECD countries, where governments retained 62% of ownership after it. On the one hand the legal tradition of countries (which matter for financial development), is not systematically related to the share privatized. On the other hand, the share privatized seems to be higher in countries with more proportional electoral systems and more centralized political authorities.

2. Data

2.1. Data Sources and Definitions

The main goal of our paper is to explore the differences in the yields of corporate bonds issued by SOEs that are 100% owned by governments and those issued by standard corporations owned by private investors. Hence, the definition of SOE we use is the one of an "Agency" in Thomson Reuters' Eikon, meaning a corporation 100% owned by the government and therefore without shares floating on public markets, on the one hand, but on the other hand that issues bond that are not considered sovereign. In that sense they capture our central idea of being close to the government but not explicitly in the government.

The first step of the data construction process is to obtain a comprehensive sample of all the available bond-level issuance information from Thomson Reuters Eikon. This platform allows us to identify several features of bonds issuances like issue date and maturity, currency, coupon rate, bond category (high yield, investment grade, not rated), bond credit rating (S&P rating, Moody's rating and Fitch rating), yield-to-maturity (YTM) and price at-issuance, issuer name, type, industry, country, among other data fields. After this primary process, we identify around 5,757 issuance events of corporate SOE bonds of which 3,442 belong to banks and 2,375 to industrial firms. In the same way we obtain 33,793 issuances of corporate bonds of listed firms around the world, in which 13,599 are from Banks.

As a preliminary filter, we eliminate all Agencies that belong to "Public Administration" segment since they do not have an obvious private counterpart. Following Datta et al. (1999) and Elton et al. (2001), we also eliminate all bonds with special features, like bonds with options (callable or sinking fund bonds), floating rate bonds, coupon zero bonds, zero then fixed bonds and zero then floating bonds, as well as bonds with maturities at issuance below than 4 years and above to 99 years[6]. The latter is because we mainly center our analysis in medium to long term debt rather than short term liquidity management. Having said that, some robustness checks include bonds with maturities below 4 years without much qualitative difference in the results. In some cases we also lose observations from if information to calculate the variables at-issuance are not available, despite being available from some later date in the life of the bond. Historical information of bond prices and their YTM come from Thomson Eikon.

Since our SOE firms are not publicly listed companies we get for all firm-level fundamentals one by one trough a long process extracting information from Standard & Poor's Capital IQ platform. The difficulty stems from the previously mentioned fact that the SOEs in our sample are not publicly listed companies.

Once we obtain firm-level data we focus on having a comparable control group. For that we dropped non-SOEs belonging to industries that are not present in the sample of SOEs and also dropped non-SOEs that are below a given size, since SOEs tend to be on average bigger than publicly listed companies. We winsorize each variable at 1%level on each tail. Finally, given the different nature of banks and industrial firms in terms of financials statements and indicators, we divide the dataset into two subsets: (1) Banking sector and (2) Industrials. For each one we have both SOEs and non-SOE companies that are publicly traded and almost always have 0% state-ownership.

2.2. DESCRIPTIVE STATISTICS

The final sample has 14,619 bonds observations using only the information at issuance in Table 1. A bit more than half of the bonds were issued by Banks (8,030) of which around a third (2,841) are SOEs. Industrial bonds at issuance are 6,589 of which 904 come from SOEs. Overall SOEs tend to be relatively more important in the banking sector, although when comparing the amounts issued industrial SOEs, these are also important as fraction of SOEs (see Table 9 in the Appendix). Using only information at issuance makes us feel more comfortable about our standard errors, since absent general factors there use to be little variation over time in these corporate bonds. These bonds are associated with 1,836 firms that belong to 61 countries, between the years 1994 and 2015 (since 1996 for industrials). Table 8 in the Appendix shows the variables definition while the rest of Table 1 zooms in the descriptive statistics of bond issuances by geographical category and issuer type. Panel A displays the data for Banks (SIC 2 digit codes 60 and 61); while Panel B displays the descriptive statistics for industrial firms, which are all other SIC codes.

As shown in Panel A, the largest sample of banks issuances corresponds to East Asia with 2,864 bonds issued, followed by Europe with 2,148 bond issuances and North America with 1,790 bonds issuances. In terms of yield-to-maturity, as a preliminary highlight we observe that on average SOE-banks have lower YTM than their non-SOE counterparts for all geographic regions (e.g., North America shows an average YTM of 4.01% in Non-SOE Banks and 3.57% in SOE Banks). Additionally, in the most regions SOE Banks tends to issue longer-term. Regarding firm-level features SOE banks show considerably higher leverage for almost all regions. Overall SOE banks tend to be larger than non-SOE banks, but in North America the pattern reverses, with SOE banks looking on average smaller than non-SOE. In terms of issuance size SOE banks usually raise larger amount of capital. Our preferred estimations correct for that factor.

Regarding the industrial subset in Table 1's Panel B we observe that corporate bonds of SOEs also tend to have lower YTM than non-SOEs for all geographic regions (e.g., North America shows an average YTM of 5.27% in Non-SOE and 4.54% in SOE); while SOEs tends to issue longer-term and issue larger amounts, although not in North America. Note that we only consider non-SOE firms that are similar in terms of size by drop non-SOE firms that are below/over the minimum/maximum value of Log(assets) SOE sample distribution. Despite of this treatment, SOE firms are still bigger than non-SOE firms in all regions**.**

In sum, the basic descriptive statistics already suggest that SOEs get cheaper funding, potentially supporting the view of a perceived implicit guarantee.

tics of firms and bonds (at issuance)

Obs.			YTM (%)		Log Maturity		Log Issue Amount (USD)		Log Assets		Liabilities to assets	
features at Issue (Banking Sector)												
Private	SOE	Total	Private	SOE	Private	SOE	Private	SOE	Private	SOE	Private	SOE
1,526	1,338	2,864	3.25	2.05	1.83	2.32	4.25	5.02	9.42	11.90	0.66	0.94
939	1,209	2,148	3.32	3.26	2.03	2.08	4.07	5.01	9.59	11.53	0.62	0.94
115	88	203	4.47	4.11	2.09	1.92	4.11	5.93	9.16	11.15	0.62	0.94
0	41	41	-	1.15		2.28	-	2.48	-	9.74	-	0.92
1,656	134	1,790	4.01	3.57	2.33	2.32	2.85	1.48	13.14	10.09	0.91	0.98
876	13	889	9.73	4.18	2.19	1.72	3.12	5.99	9.19	9.38	0.69	0.90
77	18	95	7.03	7.90	2.10	1.90	2.40	4.49	7.84	9.11	0.90	0.36
5,189	2,841	8,030	4.68	2.73	2.10	2.20	3.55	4.88	10.57	11.67	0.74	0.94
features at Issue (Industrial Sector)												
Obs.			YTM (%)		Log Maturity		Log Issue Amount (USD)		Log Assets		Liabilities to assets	
Private	SOE	Total	Private	SOE	Private	SOE	Private	SOE	Private	SOE	Private	SOE
1,716	445	2,161	3.44	2.19	2.06	2.40	4.90	4.94	8.57	9.05	0.61	0.53
627	225	852	4.87	3.44	2.30	2.55	5.98	5.11	9.24	10.25	0.61	0.77
141	179	320	6.00	5.77	2.20	2.56	4.32	5.89	8.16	11.06	0.63	0.75
12	0	12	4.14	-	2.15	-	6.67	-	10.07	-	0.73	-
3,062	47	3,105	5.27	4.54	2.57	3.05	5.79	5.18	9.12	10.49	0.62	0.88
117	1	118	9.51	4.01	2.09	2.30	3.33	6.21	8.72	9.80	0.50	0.74
10	7	17	9.47	7.27	2.36	2.83	5.17	5.66	8.26	7.61	0.58	
5,685	904	6,589	4.79	3.37	2.36	2.51	5.46	5.16	8.94	10.30	0.61	0.72
10,874	**3,745**	**14,619**	**4.74**	**2.89**	**2.24**	**2.27**	**4.55**	**4.94**	**9.72**	**11.46**	**0.67**	**0.91**

at-issue was collected from S&P Capital IQ and the Bond Issuances features was obtained from Thomson Eikon. We eliminate all the s that could biased our results, as “coupon zero”, “zero then Fixed” and “Zero then Floating”, as well as maturities below than 4 years and riable was winsorized at 1% on each tail. The word “Private” does not mean the company is privately held and out of publicly traded non state-owned.

3. Regression Analysis

This section estimates an empirical model aiming to measure the effect of being a public bank on the yield to maturity at which banks get bond funding in global markets. The main estimated equation goes as follows.

$$y_{bfct} = \beta^{SOE}\, SOE_{fc} + \gamma X_{bfct} + \mu_{ct} + \epsilon_{ct} \qquad \text{(Eq 1)}$$

; where on the left hand side y_{fct} is the yield to maturity of a bond b, issued by firm f from country c in year t; on the right hand side we have SOE_{fc} , which is a dummy variable equals to one if the bank State Owned and zero otherwise. For simplicity, at this stage we work only with banks that are 100% state Owned and do not consider partial privatizations. So that part of our sample is not listed, although they issue bonds. We benchmark SOEs with standard companies, most of them owned by private investors and listed in global markets.

Additional control variables included in the regression are X_{fct}, which can potentially vary by firm, country and year. Here we control, among many others, for size of the company and characteristics of the issuance.

Importantly, although we also include the subindex t for each bond, our sample is not a panel of bonds followed over time. Each bond appears only once in our sample, and the subindex t aims to reflect the time of issuance. This is important because we take out all country specific variation in a year with a fixed effect, μ_{ct}.

The main parameter of interest is β^{SOE} which represents the differential bond yields obtained by State Owned Enterprises.

Different theories provides us with priors about the size and sign of the β^{SOE}. If one assumes that bond markets can fully discipline a State Bank, as if it were a Private Bank, then one would expect a

β not statistically different from zero. In contrast, if investors in the bond market expect that a default from a Public Bank triggers some insurance, then we should expect that, everything else constant, the required return on that SOE bond would be lower than the required return on a comparable company. This means a negative β^{SOE} coefficient.

3.1. Baseline Results

We begin our explanatory analysis with the results of the estimations of the baseline model of Eq. (1). Since Banks and industrial firms are structurally different in terms like size and leverage, among others, we run two separate sets of regressions, on for each for these two groups.

Baseline estimations for Banks

Panel A of Table 2 reports the estimates of the Eq (1) for sample of corporate bonds issued by banks. All the estimates include a set of interacted country-year-currency fixed effects, which controls for concerns regarding depreciation and market conditions, among other. That means that we are not comparing bonds issued in dollars with bonds issued in Euros by French companies, since we are comparing within those in Dollars and within those in Euros within a country and year.

Table 2. Baseline regression of SOE effect on Yield to Maturity at issuance for Banking and Industrial sector

Panel A. Banking

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
SOE	-0.08	-0.61***	-0.60***	-0.59***	-0.51***	-0.61***
	(0.14)	(0.10)	(0.10)	(0.10)	(0.10)	(0.15)
Log(Maturity)		1.13***	1.13***	1.13***	1.15***	1.21***
		(0.11)	(0.11)	(0.12)	(0.12)	(0.13)
Log(Issue Amount)			-0.00	-0.00	-0.00	-0.00
			(0.02)	(0.03)	(0.03)	(0.03)
Liabilities to Assets				0.04	0.21**	0.14
				(0.10)	(0.10)	(0.15)
Log(Total Assets)					-0.06**	-0.07**
					(0.02)	(0.03)
Operating Margin						0.10
						(0.14)
Constant	4.02***	1.77***	1.80***	1.76***	2.20***	2.04***
	(0.05)	(0.22)	(0.29)	(0.31)	(0.35)	(0.44)
Observations	8,030	7,758	7,596	7,042	7,042	5,216
R-squared	0.85	0.88	0.87	0.87	0.87	0.86
Country-Year-Currency FE	YES	YES	YES	YES	YES	YES

Panel B. Industrials

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SOE	-0.21	-0.38**	-0.44**	-1.22***	-0.97***	-0.98***	-1.11***
	(0.20)	(0.19)	(0.19)	(0.24)	(0.24)	(0.24)	(0.28)
Log(Maturity)		0.59***	0.58***	0.57***	0.60***	0.60***	0.57***
		(0.07)	(0.07)	(0.08)	(0.09)	(0.09)	(0.09)
Log(Issue Amount)			-0.09***	-0.10***	-0.06**	-0.06**	-0.05
			(0.02)	(0.03)	(0.03)	(0.03)	(0.04)
Liabilities to Assets				0.37***	0.63***	0.62***	0.65***
				(0.14)	(0.18)	(0.17)	(0.22)
Log(Total Assets)					-0.22***	-0.22***	-0.18***
					(0.05)	(0.05)	(0.05)
Tangibility						0.03	0.19
						(0.09)	(0.15)
Operating Margin							-0.41
							(0.35)
Constant	4.62***	3.23***	3.75***	3.79***	5.29***	5.27***	4.88***
	(0.03)	(0.16)	(0.19)	(0.24)	(0.35)	(0.34)	(0.39)
Observations	6,589	6,589	6,448	5,782	5,782	5,782	4,346
R-squared	0.80	0.81	0.81	0.79	0.80	0.80	0.84
Country-Year-Currency FE	YES	YES	YES	YES	YES	YES	YES

This table provides estimated coefficients from the fixed effect regression $y_{b,f,t} = \beta\, SOE_{f,c} + \gamma X_{b,f,t} + \mu_{c,t,x} + \epsilon_{b,f,t}$; where $y_{b,f,c,t}$ is the bond Yield to Maturity at issuance for the subsample of banks. $SOE_{f,c}$ takes value 1 if firm is an State Owned Enterprise, and zero otherwise. Log(Maturity) is the natural logarithm of bond maturity at issuance, Log(Issue Ammount) is the natural logarithm of the issue amount, Liabilities to Assets represents the total liabilities over total asset's replacement value, Log(Total Assets) is Natural logarithm of Total Assets, Tangibility is the ratio of property, plants, and equipment over total assets and Operating margin is the operating income over total revenue. $\mu_{c,t,x}$ is the country-year-currency fixed effect, and $\epsilon_{b,f,c,t}$ represents the individual error term. All the regressions were performed clustering the standard errors in country-year-currency groups. Robust standard errors are in parentheses. ***, **, and * represent a level of significance lower than 1%, 5%, and 10%, respectively.

Column (1) displays the raw average within each country and year of issuance, without the inclusion of additional control variables, not even the yield curve effect of maturity. In columns (2) to (3) introduce bond-level controls while columns (4) to (6) introduce firm-level controls.

The estimated coefficients across all specifications that control for yield curve show that SOE firms are negatively associated with the yield to maturity at issuance of the bond. The yield discount of SOE banks goes between 8 and 60 basis points in columns (1) and (3). When we introduce firms-level controls to the estimations in columns (4) and (6) the discount remains on a similar range, between 59 and 61 basis points, respectively. This evidence suggest that, on average, corporate bonds of banks are valued with a premium that comes from a potentially safer positions in default scenarios, which are the scenarios to which bonds pricing is sensitive to.

BASELINE ESTIMATIONS FOR INDUSTRIALS

Panel B of Table 2 reports the estimates for industrials, introducing bond level and firm level controls in ways similar to the estimates in banking that were previously mentioned. Like banks, industrial SOEs are traded at a discount in their YTM in comparison to non-SOE industrial firms. The coefficient of SOE is significant in all the regressions that include a control for maturity of the bond, with point estimates that go between 38 and 122 basis points.

We also estimate but do not report the basic equation on a region by region basis. When we split the sample region, results are similar of those observed on Table 2. In those cases, when we introduce all control variables the estimated coefficients are significant for almost all regions and the average discount is around 40 basis points.

3.2. Robustness of baseline regressions

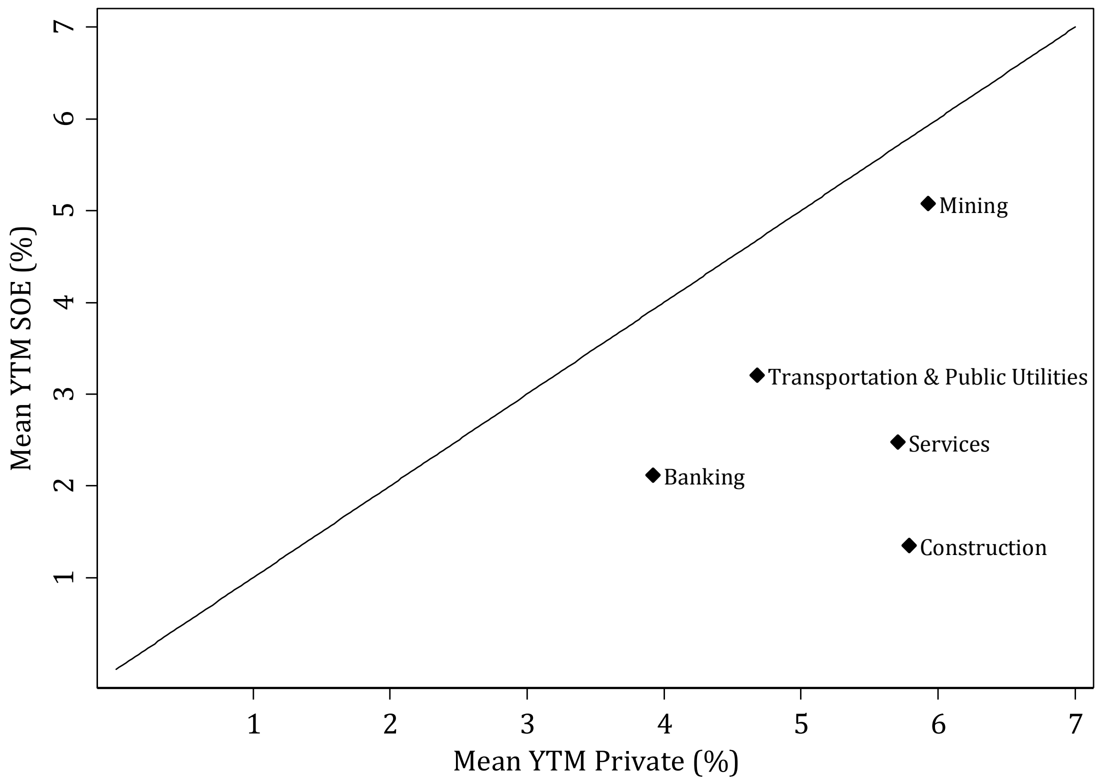
Having established that our estimates are robust to various definitions we would like to explore potential confounding channels. To test for various types of non-linearities in the variables we use matching methods, then we try various polynomials in the yield curve and finally we attempt a fully interacted model in which all control variables are interacted by the SOE dummy. In all cases our results remain qualitatively robust.

3.2.1. Nearest-Neighbor Matching

We run a nearest-neighbor matching analysis, where the "treatment" is being an SOE, controlling also for assets and maturity.

While we get a positive and statistically significant estimate for all industries, our preferred way to explain that the effect is consistent across industries is to plot for each industry the average YTM for SOEs on the vertical axis and the YTM for non-SOEs on the horizontal axis. The results are displayed on Figure 2, where all the industries lie below the 45 degree line, meaning that the mean YTM of SOEs is lower than the average for non-SOEs of the same matched characteristics. Interestingly, the widest differences in the average , measured as distance to the 45 degree line, is Construction, while mining companies seem relative closer to the 45 degree line, suggesting that on average there might be fewer differences between SOE and non-SOE. Still, all averages lie below the line.

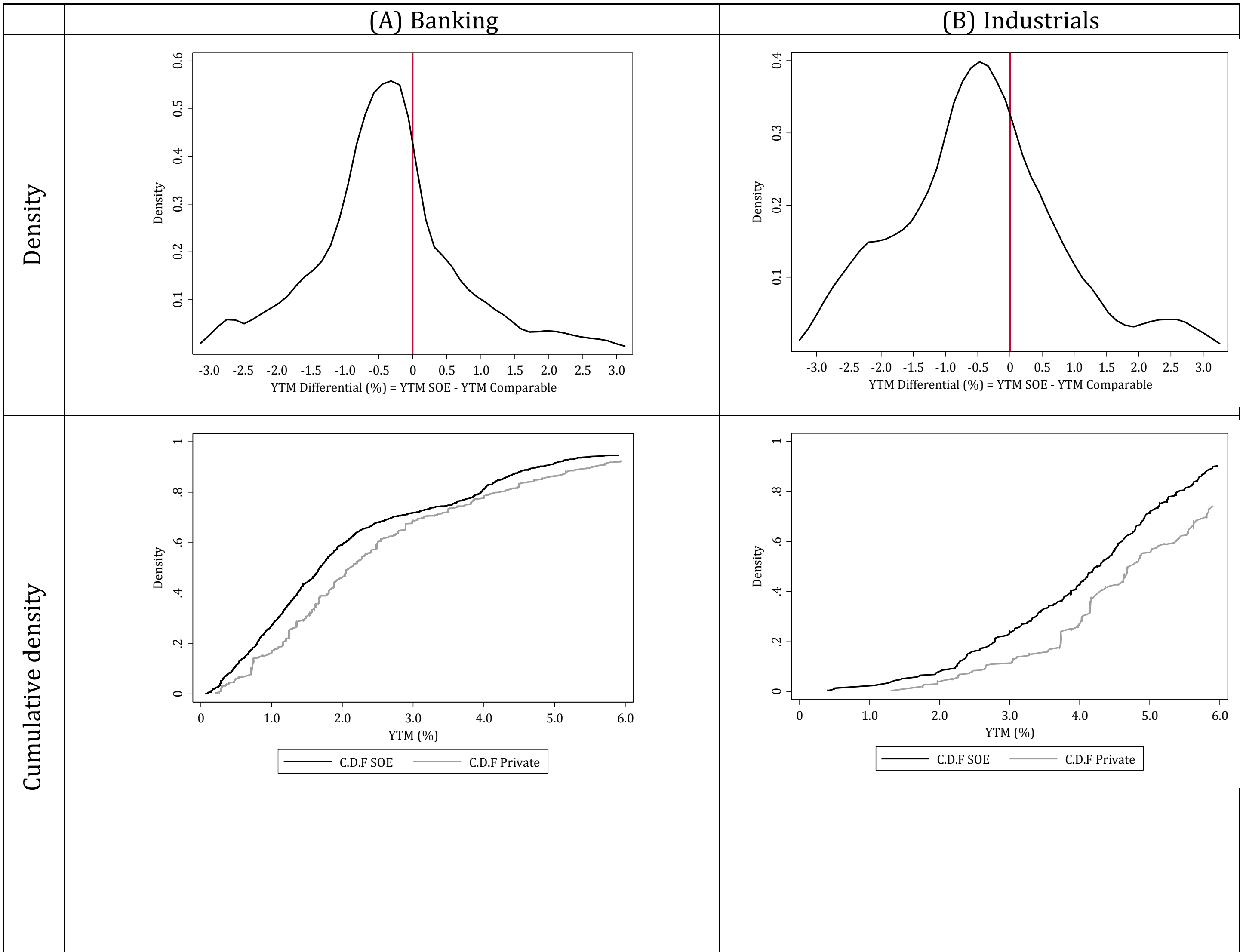
Figure 1. Mean yield to maturity in each industry for both SOE and non-SOE after nearest neighbor matching



Notes: This scatter plot reflect the nearest-neighbor matching estimation between SOE and Non-SOE, controlled by assets and bond's maturity (and exact matching by year/currency for banking sector, and by year/currency/industry at SIC 2 digit for industrial sector). We do not report the results for sectors like Agriculture, Forestry & Fishing, Manufacturing, Retail trade & Wholse Trade because it does not exist issuances by SOE firms.

Instead of showing the average treatment effect of matching we plot the whole distribution of treatment effects available on the first row of Figure 2. On both the banking and industrial subsample one can distinguish that the majority of the cases the estimated effect of SOE is negative, but still with relevant heterogeneity. When in the second row of Figure 2 we plot the cumulative density function of SOE and non-SOE groups we observe some clear first order stochastic dominance for banking sector (left side) and also for the industrial sector (right side). The results of the NN-matching seems to suggest that the existence of a SOE discount in yield is more pronounced on industrials and the center of the kernel distribution is around 49 basis point of yield discount on industrials SOEs and 41 basis points of yield discount on banking SOEs.

Figure 2. Kernel Density estimate for YTM differential between SOE and comparable firms, and cumulative distribution function (C.D.F) for YTM after Nearest Neighbor matching.



Notes: After performing the nearest-neighbor matching between soe and private controlling for asset, country credit rating level (between 1 and 22) and maturity (exact matching in year and currency for banking sector, and year, currency and industry at SIC 1 digit for industrial sector), the matched samples were bounded to YTM Differential between +300bp and -300bp resulting in a sample with pairs 2,302 of observations YTM SOE – YTM Comparable for banking sector and 256 observations for industrial sector. 73.9% (1,700 of 2,302) of spreads for banking distributions are negative and the median of this distribution is close to -41bp. 69.5% (178 of 256) of spreads for industrial sector distributions are negative and the median of this distribution is close to -49bp. Epanechnikov kernel function was used to estimate the density function. Two-sample Kolmogorov-Smirnov test for equality of distribution functions was performed for banking and industrial sector; the result for banking sector indicates that the biggest difference between the SOE c.d.f and the Private c.d.f is 0.000 (p-value 1.00), the biggest difference between the Private c.d.f and the SOE c.d.f is -0.156 (p-value 0.00) and the combined test have a p-value of 0.00; while for the industrial sector these indicates that the biggest difference between the SOE c.d.f and the Private c.d.f is 0.016 (p-value 0.94), the biggest difference between the Private c.d.f and the SOE c.d.f is -0.191 (p-value 0.00) and the combined test have a p-value of 0.05.

3.2.2. *Controlling by nonlinear yield curve and including short term bonds*

One possibility is that the SOE is being confounded by some non-linearity in the yield curve, a possibility that we were not considering since we forced the baseline regressions to have only a linear term on maturity.

To give more flexibility to our regression model we corroborate the existence of a SOE discount in yield by introducing controls for non-linear effect on the yield curve. In that sense, we introduce to our model the square and cube of log maturity. We also introduce in this section estimations of equation (1) considering also those bonds with maturity at issuance below than 4 years (all sample).

Results on Table 3 display coefficients for both the banking and industrial subsamples, showing that the main effect is robust to the concern of non-linear yield curves, even when we include bonds up to 4 years. The estimated coefficient show that, after controlling for nonlinearities of the yield curve, the SOE banking discount in yield is around 46 and 52 basis points (columns 1 to 6). Note that this result is robust to the inclusion of the maturities below than 4 years. Furthermore, industrials display an SOE discount between 87 and 92 basis points, larger than for banking and very stable across specifications (columns 7 to 12).

d – Flexible Yield Curve Controls

	Banking						Industrials					
	Maturity>4			All maturities			Maturity>4			All maturities		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	-0.49***	-0.49***	-0.52***	-0.46***	-0.49***	-0.51***	-0.87***	-0.87***	-0.92***	-0.88***	-0.88***	-0.88***
	(0.11)	(0.12)	(0.11)	(0.11)	(0.11)	(0.11)	(0.17)	(0.17)	(0.14)	(0.18)	(0.18)	(0.17)
	1.17***	1.68***	-10.29**	0.91***	-0.02	-1.89**	0.57***	0.50	10.22***	0.65***	0.76***	0.99***
	(0.12)	(0.62)	(4.26)	(0.12)	(0.24)	(0.77)	(0.11)	(0.49)	(2.99)	(0.11)	(0.28)	(0.33)
	-0.00	-0.00	0.00	-0.02	-0.01	-0.01	-0.07*	-0.07**	-0.08**	-0.12**	-0.12**	-0.12**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)	(0.06)
	0.00	-0.03	-0.05	0.51*	0.33	0.20	0.90***	0.90***	0.89***	0.81***	0.81***	0.80***
	(0.29)	(0.28)	(0.29)	(0.27)	(0.25)	(0.26)	(0.30)	(0.30)	(0.30)	(0.28)	(0.28)	(0.28)
	-0.13***	-0.13***	-0.14***	-0.12***	-0.13***	-0.13***	-0.20***	-0.20***	-0.20***	-0.19***	-0.18***	-0.18***
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)
	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.48	-0.48	-0.48	-0.46	-0.46	-0.46
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.40)	(0.39)	(0.40)	(0.36)	(0.36)	(0.35)
		-0.11	5.10***		0.24***	1.35***		0.02	-4.02***		-0.02	-0.18
		(0.13)	(1.95)		(0.06)	(0.47)		(0.08)	(1.23)		(0.05)	(0.23)
			-0.73**			-0.19**			0.53***			0.03
			(0.28)			(0.08)			(0.16)			(0.04)
	3.26***	2.74***	11.58***	3.43***	4.46***	5.50***	5.11***	5.20***	-2.25	5.25***	5.13***	5.06***
	(0.45)	(0.83)	(2.92)	(0.41)	(0.43)	(0.54)	(0.43)	(0.83)	(2.29)	(0.41)	(0.52)	(0.49)
	5,733	5,733	5,733	6,749	6,749	6,749	4,346	4,346	4,346	4,754	4,754	4,754
	0.90	0.90	0.90	0.91	0.91	0.91	0.82	0.82	0.82	0.82	0.82	0.82
	1,670	1,670	1,670	1,,882	1,,882	1,882	309	309	309	311	311	311
	4,063	4,063	4,063	4,867	4,867	4,867	4,037	4,037	4,037	4443	4443	4443
	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
y FE	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

ed coefficients from the fixed effect regression $y_{b,f,t} = \beta\, SOE_{f,c} + \gamma X_{b,f,t} + \mu_{c,t,x} + \epsilon_{b,f,t}$; where . $y_{b,f,c,t}$ is the bond Yield to Maturity at
of banks and industrial sector. $SOE_{f,c}$ takes value 1 if firm is an State Owned Enterprise, and zero otherwise. Log(Maturity) is the natural
at issuance, Log(Issue Ammount) is the natural logarithm of the issue amount, Liabilities to Assets represents the total liabilities over total
og(Total Assets) is Natural logarithm of Total Assets, and Operating margin is the operating income over total revenue. $\mu_{c,t,x}$ is the country-
d $\epsilon_{b,f,c,t}$ represents the individual error term. All the regressions were performed clustering the standard errors in country-year-currency groups.
parentheses. ***, **, and * represent a level of significance lower than 1%, 5%, and 10%, respectively.

3.2.3. *ESTIMATING A COMPLETELY INTERACTED MODEL*

Our last robustness check in this section deals with the possibility that SOEs could have different slopes on every control variable we include, so our analysis so far might be biased for not considering these differential sensitivities. Thus, here we estimate a model in which all interactions between controls variables are included, which can be defined in the regression:

$$y_{b,f,t} = \sum \delta\, X_{b,f,t} + \sum \gamma\, SOE \times X_{b,f,t} + \mu_{c,t,x} + \epsilon_{b,f,t} \quad (2)$$

Instead of looking at a Table with all the interactions, that are difficult to interpret, we compute the marginal effect of SOE on yield to maturity at issuance, evaluated as the SOE subsample average considering all interacted variable with SOE.

The estimated marginal effects of SOE on YTM are displayed on Table 4, with standard errors computed using the Delta Method. Estimates are all negative and statistically significant at 95%, consistent with the previously documented discount of SOE on bond yields at issuance. The only exception is in the industrial subsample when we include also the short term maturities, in which case the coefficients are significant at 90% confidence, which is maybe related to the more heterogenous nature of the sectors included in the industrial subset. Overall the estimates of these fully saturated models are around 55 bp for banking and 0.78 to 0.88 bp for industrials.

Table 4. Marginal effect of SOE on Yield (Saturated Model)

Sector	Database	SOE effect	Delta-method Std. Err.	[95% Conf. Interval]
SOE Banks	Maturity>4	-0.564	0.174	-0.907 ; -0.221
	All maturities	-0.575	0.158	-0.886 ; -0.264
SOE Industrial	Maturity>4	-0.886	0.413	-1.699 ; -0.073
	All maturities	-0.744	0.408	-1.546 ; 0.059

4. CHANNELS AND HETEROGENEITY

Having established that the main effect of SOE-status lowering the YTM is robust to multiple specifications we may want to ask what are the channels behind it. In this subsection we first explore how much of the effect goes through some form of explicit guarantee and also tries to account for how much of the reported discount comes from differences in credit rating. Then we explore heterogeneity across countries and across levels of creditworthiness. Overall we document that implicit guarantees are very important and that credit rating agencies seem to explain only part of the puzzle of why SOE have cheaper bond financing.

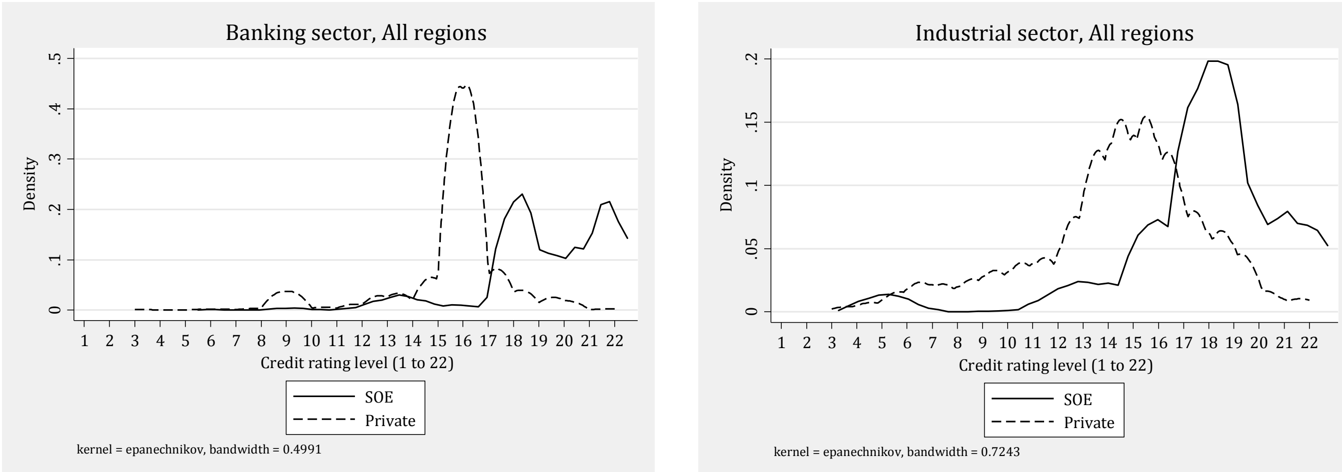
4.1. HOW MUCH OF THE EFFECT IS THROUGH EXPLICIT GUARANTEES OR BECAUSE CREDIT RATING AGENCIES TEND TO GIVE HIGHER GRADES TO SOEs?

One can think that the discount in yield of SOE firms is due to better credit ratings since agencies can capture the implicit guarantees and report a higher credit quality for that bond. In that case there main effect is still there, but the story behind it may have to do with the rating process.

The rating of bonds comes from the three main credit rating agencies: Standard and Poor's, Moody's and Fitch ratings. We follow Afonso et al. (2012) to transform the sovereign credit rating information using a linear scale to group the 22 categories, where AAA rating takes value 22 so the higher the number the better the rated quality of the bond.

Credit ratings are indeed higher for SOEs as shown on Figure 3 which displays the kernel density ratings.

Figure 3. Kernel density estimates of credit rating scores for SOE and non-SOEs in banking and industrials



The figures above report the kernel density estimated for banking (on the left) and industrials (on the right). The SOE subsample is the thicker full line while the comparable set of non-SOE is the dotted line. An immediate inspection of the graph shows that the distribution of SOEs is to the right, meaning better credit ratings.

Additionally, our main argument so far is that of an implicit guarantee by the government. Thus, it is natural to ask whether the effect is solely driven by some explicit guarantees in the debt contract, which would still be relevant To implement this test we introduce to our model the dummy variable Guarantee that takes the value one if the bond documents display an explicit guarantee and zero otherwise.

Table 5 reports the estimations results of the equation (1) for banking sector introducing now an additional interaction in the fixed effects, namely the country-year-currency-credit-rating 4-tuple; where the innovation is the credit rating. Also, the specification contains an additional dummy for guaranteed debt. Panel A reports the results for banking. As usual, column (1) of table 4 shows the raw average within each country, year, currency and credit rating, without the inclusion of control variables. In columns (2) to (3) introduce control variables related to the bond-level issuance while columns (4) to (6) introduce firm-level control variables. In all specifications that include yield curve controls we find that the SOE is significant and negative between 50 and 75 bp. In sum, since the inclusion of the credit-rating fixed effect did not dramatically change the estimates of β^{SOE}, we can conclude that for banking the SOE discount in YTM come from a different sensitivity of the market to a similar credit rating.

This contrasts with Panel B which shows the results for industrial companies. I fact, for non-financial corporations $\hat{\beta}^{SOE}$ are still negative, but not statistically significant and smaller in magnitude than in the baseline specifications where we do not control for credit rating. This suggests that for industrials a relevant portion of the SOE discount can be accounted by a differential behavior of credit rating agencies. Maybe this could be related to the fact that for industrials the reting agencies may have more room than for banking, where benchmarking and reporting of key performance indicators tends to be more standardized.

Table 5. SOE effect on Yield including dummies for guarantee and bond credit rating

Panel A. Banking

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
SOE	-0.17	-0.54***	-0.56***	-0.52***	-0.50***	-0.75***
	(0.16)	(0.10)	(0.10)	(0.10)	(0.11)	(0.16)
Log(Maturity)		1.13***	1.13***	1.13***	1.13***	1.23***
		(0.12)	(0.13)	(0.13)	(0.13)	(0.14)
Log(Issue Amount)			-0.02	-0.02	-0.02	-0.00
			(0.02)	(0.02)	(0.02)	(0.02)
Liabilities to Assets				0.05	0.09	0.03
				(0.09)	(0.09)	(0.16)
Log(Total Assets)					-0.02	-0.04
					(0.02)	(0.03)
Operating margin						0.21
						(0.14)
Guarantee (Yes=1, No=0)	-0.11	0.08	0.09	0.06	0.06	0.07
	(0.11)	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)
Constant	4.06***	1.76***	1.87***	1.82***	1.95***	1.74***
	(0.05)	(0.25)	(0.31)	(0.32)	(0.39)	(0.49)
Observations	7,758	7,758	7,596	7,042	7,042	5,216
R-squared	0.88	0.90	0.90	0.90	0.90	0.90
Country-Year-Currency-Bond credit rating FE	YES	YES	YES	YES	YES	YES

Panel B. Industrials

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SOE	0.37**	-0.01	-0.07	-0.34	-0.30	-0.37	-0.54
	(0.18)	(0.12)	(0.09)	(0.75)	(0.75)	(0.77)	(0.70)
Log(Maturity)		0.90***	0.89***	0.88***	0.88***	0.88***	0.84***
		(0.08)	(0.08)	(0.09)	(0.09)	(0.09)	(0.10)
Log(Issue Amount)			-0.05	-0.05	-0.04	-0.05	-0.05
			(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Liabilities to Assets				0.13	0.17	0.21	0.35
				(0.19)	(0.19)	(0.19)	(0.23)
Log(Total Assets)					-0.02	-0.02	-0.02
					(0.02)	(0.02)	(0.03)
Tangibility						-0.18	-0.17
						(0.11)	(0.12)
Operating margin							-0.49
							(0.33)
Guarantee (Yes=1, No=0)	0.09	0.10	0.11	0.14	0.14	0.14	0.02
	(0.09)	(0.08)	(0.08)	(0.09)	(0.09)	(0.09)	(0.13)
Constant	4.52***	2.43***	2.69***	2.84***	3.02***	3.10***	3.22***
	(0.03)	(0.18)	(0.29)	(0.34)	(0.36)	(0.36)	(0.47)
Observations	6,435	6,435	6,305	5,644	5,644	5,644	4,239
R-squared	0.93	0.95	0.94	0.94	0.94	0.94	0.95
Country-Year-Industry-Currency-Bond credit rating FE	YES	YES	YES	YES	YES	YES	YES

This table provides estimated coefficients from the fixed effect regression $y_{b,f,t} = \beta\ SOE_{f,c} + \gamma X_{b,f,t} + \mu_{c,t,x,r} + \epsilon_{b,f,t}$; where . $y_{b,f,c,t}$ is the bond Yield to Maturity at issuance for the subsample of banks. $SOE_{f,c}$ takes value 1 if firm is an State Owned Enterprise, and zero otherwise. Guarantee takes value 1 if debt bond contracts specify guarantees, and zero otherwise, Log(Maturity) is the natural logarithm of bond maturity at issuance, Log(Issue Ammount) is the natural logarithm of the issue amount, Liabilities to Assets represents the total liabilities over total asset's replacement value, Log(Total Assets) is Natural logarithm of Total Assets, and Operating margin is the operating income over total revenue, $\mu_{c,t,x}$ is the country-year-currency-bond credit rating fixed effect, and $\epsilon_{b,f,c,t}$ represents the individual error term. All the regressions were performed clustering the standard errors in country-year-currency-bond credit rating groups. Robust standard errors are in parentheses. ***, **, and * represent a level of significance lower than 1%, 5%, and 10%, respectively.

4.2. HETEROGENEITY BASED ON COUNTRY CHARACTERISTICS

In previous estimations we estimate the average impact of SOE banks and SOE industrial firms on the discount in yield to maturity at issuance. One may wonder whether these effects are different around the world in some systematic way.

Table 6 explores interacted model with macroeconomics factors that proxy for creditworthiness of the government (Debt to GDP and GDP per capita) and also institutional factors such as rule of law.

For banking the only significant interaction is Column 3, rule of law, that has a moderating factor on the SOE discount. The standard SOE coefficient is negative a statistically significant but it is counterbalanced by the positive coefficient of the interacted term SOE*Rule of law. So the better the institutions in a country, the smaller is the SOE discount. Regarding to the industrial subset, the results obtained in columns 5 to 8 of panel A are not significant on an individual basis, which may be due to higher heterogeneity within the industrial subsample. [7] Overall, there does not seem to be a clear pattern across countries, besides that SOEs from institutionally developed countries tend to get less of a discount in YTM.

[7] Panel B of Table 6 shows the joint significance of the estimated coefficients. As is shown, we observe that the SOE marginal effect on yield is only negative and statistically significant in banking sector and not in industrial sector.

Table 6. Heterogeneity of the SOE effect on Yield (Banking and Industrial sector) – Sensitivity to country characteristics

Panel A: Estimated Coefficient of heterogeneous response to macroeconomic and institutional factors

	Banking Sector				Industrial Sector			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SOE	-0.587***	-0.414	-0.726***	-0.295	-0.699**	-1.522	-0.189	15.209**
	(0.097)	(0.322)	(0.251)	(1.780)	(0.292)	(1.140)	(0.524)	(6.111)
Log(Maturity)	1.152***	1.294***	1.163***	1.201***	0.797***	0.883***	0.805***	0.848***
	(0.131)	(0.159)	(0.131)	(0.144)	(0.114)	(0.111)	(0.113)	(0.115)
Log(Issue Amount)	-0.002	0.005	-0.009	0.006	-0.064**	-0.026	-0.073**	-0.068**
	(0.020)	(0.023)	(0.020)	(0.022)	(0.030)	(0.035)	(0.031)	(0.031)
Liabilities to Assets	0.129	0.043	0.113	0.136	0.065	-0.002	0.043	0.022
	(0.091)	(0.112)	(0.090)	(0.104)	(0.099)	(0.118)	(0.100)	(0.103)
Log(Total Assets)	-0.033	-0.001	-0.030	-0.028	-0.039**	-0.068***	-0.038**	-0.053***
	(0.021)	(0.026)	(0.020)	(0.023)	(0.019)	(0.021)	(0.019)	(0.020)
SOE*Debt/GDP		-0.137				1.004		
		(0.207)				(1.282)		
SOE*Rule of law			0.125				-0.361	
			(0.204)				(0.336)	
SOE*Log(GDP pcp)				-0.031				-1.500***
				(0.173)				(0.578)
Constant	2.091***	1.642***	2.077***	1.955***	3.622***	3.610***	3.600***	3.865***
	(0.326)	(0.443)	(0.325)	(0.378)	(0.318)	(0.360)	(0.321)	(0.360)
Observations	7,233	5,043	7,186	6,220	5,782	3,910	5,601	4,909
R-squared	0.882	0.867	0.885	0.882	0.868	0.832	0.865	0.856
Co.-Year-Curr. FE	YES	YES	YES	YES	NO	NO	NO	NO
Co.-Year-Ind.-Curr. FE	NO	NO	NO	NO	YES	YES	YES	YES
Bond credit rating FE	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: Joint significance of the estimated coefficient.

Sector	H_0	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
Banking	$\beta_{SOE} + \beta_{SOE*Debt/GDP} * Debt/GDP$[mean = 0.94] = 0	-0.538	0.160	-3.36	0.001	-0.852 ; -0.224
	$\beta_{SOE} + \beta_{SOE*Rule\ Law} * Rule\ Law$[mean = 0.73] = 0	-0.726	0.251	-2.89	0.004	-1.218 ; -0.234
	$\beta_{SOE} + \beta_{SOE*Log(GDP\ pcp)} * Log(GDP\ pcp)$[mean = 10.03] = 0	-0.605	0.110	-5.50	0.000	-0.821 ; -0.389
Industrials	$\beta_{SOE} + \beta_{SOE*Debt/GDP} * Debt/GDP$[mean = 0.79] = 0	-0.716	0.249	-2.88	0.004	-1.204 ; -0.228
	$\beta_{SOE} + \beta_{SOE*Rule\ Law} * Rule\ Law$[mean = 0.98] = 0	-0.189	0.524	-0.36	0.719	-1.216 ; 0.839
	$\beta_{SOE} + \beta_{SOE*Log(GDP\ pcp)} * Log(GDP\ pcp)$[mean = 10.46] = 0	-0.428	0.262	-1.63	0.103	-0.942 ; 0.086

4.3. *Does the effect Depend on the Creditworthiness of the Sovereign or Rating of the Bond?*

Here we simultaneously consider the effect of country and bond characteristics. In particular we use a continuous variable to describe the (inverse of) the quality of a bond and of a sovereign. The ex ante default probabilities. To obtain the country default probabilities we obtain the country credit ratings and use the S&P "*Default, Transition, and Recovery: Sovereign Defaults And Rating Transition Data, 2010 Update*". In a similar way, the bond-level credit ratings were transformed into bond-level default probabilities trough the S&P "*Default, Transition, and Recovery: 2013 Annual Global Corporate Default Study And Rating Transitions*".

In Table 7 we introduce a triple interacted term in order to capture the specific effect of creditworthiness of the country and of the bond measured as a continuous measure coming from a credit rating; we call that **Country Default** Probability and **Bond Default Probability**; but let's be clear that they are ex ante measures . In columns (1) and (2) of Panel A we only introduce the interacted term of SOE times the ex ante probability of bond default. The observed results show that the negative relationship between SOE and Yield is reduced when bonds default spread is higher only for industrial subsample (column 2). In fact, in column 2 the coefficient for the interaction SOE*Bond Default is positive and significant. A similar effect we observe in column 4, where the interacted term SOE*Country Default is positive an significant. The SOE discount we describe in our paper is less relevant when governments are more likely to default.

The Default probability on banking sector is only relevant on column 5. In this column we observe that the higher is the Bond Default in SOE firms the higher is the difference in yield in favor to SOE (the interacted term SOE * Bond Default is negative an significant). However, this effect is dissipated by the introduction of the triple interacted term SOE * Country Default* Bond Default that is positive and significant.

To illustrate the marginal effect of the estimation from columns 3 and 4 of Table 7 we display it graphically on Figure 4, where we observe that the point estimates for both banking and industrials tend to have, in absolute value, a lower SOE discount in bonds as the government is less creditworthy. This looks again as consistent with the view that bond markets price the debt of SOEs looking at the situation of the owner and ultimate implicit guarantee.

Figure 4. Marginal Effect of ∂YTM/∂SOE (%) for differente levels of Government creditworthiness measured as ex ante Country Default probability (Banking on the left and Industrials on the right)

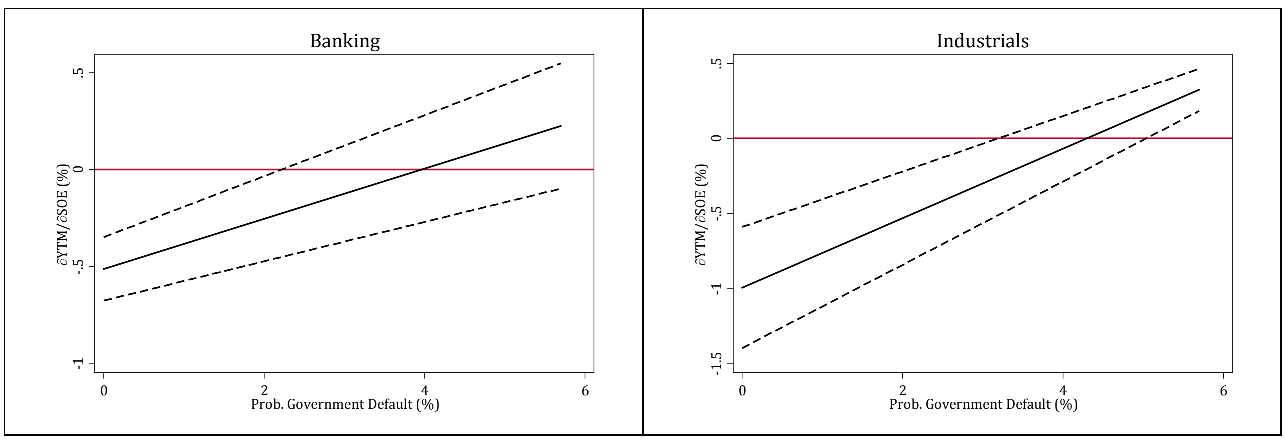


Table 7. SOE effect on Yield (country and bond default probability) – Sensitivity

Panel A: Estimated Coefficient of heterogeneous response to country and bond default probability.

VARIABLES	(1) Banking	(2) Industrials	(3) Banking	(4) Industrials	(5) Banking	(6) Industrials
SOE	-0.482***	-0.919***	-0.512***	-0.993***	-0.498***	-0.924***
	(0.128)	(0.220)	(0.099)	(0.244)	(0.127)	(0.221)
Log(Maturity)	1.425***	0.939***	1.134***	0.602***	1.429***	0.940***
	(0.137)	(0.117)	(0.120)	(0.085)	(0.137)	(0.117)
Log(Issue Amount)	0.060**	0.002	0.001	-0.060**	0.060**	0.002
	(0.028)	(0.026)	(0.026)	(0.030)	(0.028)	(0.026)
Log(Assets)	-0.002	-0.058***	-0.051**	-0.218***	-0.001	-0.058***
	(0.043)	(0.018)	(0.023)	(0.052)	(0.043)	(0.018)
Liabilities to Assets	0.227	0.067	0.214**	0.628***	0.213	0.064
	(0.242)	(0.123)	(0.093)	(0.183)	(0.242)	(0.123)
Bond Default	0.141***	0.087***			0.142***	0.087***
	(0.024)	(0.004)			(0.025)	(0.004)
Country Default * Bond Default					-0.008*	-
					(0.005)	(-)
SOE * Bond Default	-0.101**	-0.006			-0.106**	-0.040
	(0.050)	(0.116)			(0.051)	(0.120)
SOE * Country Default			0.129***	0.231***	0.091	0.175***
			(0.034)	(0.041)	(0.067)	(0.067)
SOE * Country Default* Bond Default					0.003	0.008
					(0.010)	(0.017)
Constant	-0.453	2.451***	2.332***	5.236***	-0.473	2.332***
	(0.629)	(0.345)	(0.341)	(0.352)	(0.633)	(0.363)
Observations	3,580	3,830	7,193	5,750	3,568	3,809
R-squared	0.752	0.842	0.873	0.793	0.751	0.840
Country-Year-Currency FE	YES	NO	NO	YES	YES	NO
Country-Year-Industry-Currency FE	NO	YES	YES	NO	NO	YES

Panel B: Joint significance of the estimated coefficient.

Sector	Column	H_0	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
Banking	(1)	$\beta_{SOE} + \beta_{SOE*Bond\ Default} * Bond\ Default[\text{mean}] = 0$	-0.725	0.153	-4.74	0.000	-1.025 ; -0.426
	(3)	$\beta_{SOE} + \beta_{SOE*Country\ Default} * Country\ Default[\text{mean}] = 0$	-0.298	0.102	-2.93	0.003	-0.497 ; -0.099
	(5)	$\beta_{SOE} + \beta_{SOE*Country\ Default} * Country\ Default[\text{mean}] + \beta_{SOE*Bond\ Default} * Bond\ Default[\text{mean}] + \beta_{SOE*\ Bond\ Default*\ Country\ Default} * Bond\ Default * Country\ Default[\text{mean}] = 0$	-0.726	0.149	-4.86	0.000	-1.019 ; -0.433
Industrials	(2)	$\beta_{SOE} + \beta_{SOE*Bond\ Default} * Bond\ Default[\text{mean}] = 0$	-0.968	0.937	-1.03	0.302	-2.805 ; 0.869
	(4)	$\beta_{SOE} + \beta_{SOE*Country\ Default} * Country\ Default[\text{mean}] = 0$	-0.838	0.219	-3.83	0.000	-1.267 ; -0.409
	(6)	$\beta_{SOE} + \beta_{SOE*Country\ Default} * Country\ Default[\text{mean}] + \beta_{SOE*Bond\ Default} * Bond\ Default[\text{mean}] + \beta_{SOE*\ Bond\ Default*\ Country\ Default} * Bond\ Default * Country\ Default[\text{mean}] = 0$	-1.108	0.873	1.27	0.204	-2.818 ; 0.603

5. Conclusions and Policy Implications

In this paper we show that global bond markets tend to lend between 30 and 80 basis points cheaper to State Owned Enterprises even after controlling for a large number of potential confounding factors, and using only variation coming from bond issuances within the same coun and year. To clarify, this finding comes from a contrast of fully state owned companies with its privately owned counterparts, and the results are qualitatively very different from the previous literature that has focused on privatization (e.g. Borisova and Megginson, 2011, RFS), where full privatized firms geo cheaper finance. We show state owned banks and other 0% privatized firm get indeed cheaper finance from bond markets and that this effect is stronger for governments t are more creditworthy. We find that for industrials a significant part of the effect can be attribut to better credit rating for bonds given observed fundamentals, while in banking there is still a significant SOE discount in YTM even after controlling for credit rating.

Our result that SOE banks get cheaper finance has important implications for banking policy. On the conjecture that some banking regulations might have differential effects on State and Privat banks. As illustration, maybe capital requirements for public banks should be different. Second i that some of the systemically important banks, from the point of view of macroprudential policy could be these SOE Banks. That opens a discussion about the additional monitoring tools for the banks. Finally, our results point out that the market anticipates an implicit guarantee by the government, a bit like in the "too big to fail" problem. In that case it would be prudent from a fis standpoint to either provision for that potential rescue or directly capitalize public banks to mak explicit the now implicit guarantee. Although worse for the Sovereign country in terms of narro fiscal accounting ratios, this could improve the reaction of the banking system and fiscal account systemically important crises.

6. References

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7. APPENDIX

7.3. VARIABLES DEFINITION

Table 8: Variable Definitions

Abbreviation	Variable	Definition
Dependent Variable		
YTM	Yield to maturity	Bond yield to maturity at issuance
Explanatory variables		
SOE Variable		
SOE	State Owned Enterprise dummy	1 if Firm is 100% owned by a Government, and zero otherwise
Bond-level		
Log(Maturity)	Maturity	Natural logarithm of bond maturity at issuance
Log(Issue Ammount)	Issue Amount	Natural logarithm of the issue amount (issue amount was previously converted to USD)
Firm-Level		
Liabilities to Assets	Liabilities Ratio	Total Liabilities/Total asset's replacement value
Log(Total Assets)	Firm's Size	Natural logarithm of Total Assets
Tangibility	Assets tangibility	Ratio property, plants, and equipment over total assets
Operating Margin	Operating Margin	Operating Margin Over Total Revenues
Bond Rating	Bond Credit Rating	Homologated credit rating classification using rating from S&P, Moody's and Fitch Rating.
Bond Default	Bond Default Probability	Converted probability of default using the S&P "*Default, Transition, and Recovery: 2013 Annual Global Corporate Default Study And Rating Transitions*"
Heterogeneity		
Debt/GDP	Debt to GDP ratio	Is the ratio of government debt to a country's GDP. Provided by the World Bank's WDI.
Rule of Law	Rule of Law	Is the standardized Rule of Law index provided by the Worldwide Governance Indicators
Log(GDP per Capita)	GDP per Capita	Indicator provided by the World Bank Datasets
Country Rating	Country Credit Rating	S&P Country credit rating classification.
Country Default	Country Default Probability	Converted probability of default using the S&P "*Default, Transition, and Recovery: Sovereign Defaults And Rating Transition Data, 2010 Update*"

7.4. SHARE OF SOE IN THE GLOBAL BOND MARKET

Table 9 takes stock of the global issuances using as benchmark the data of the Bank for International Settlements. Of the around $300 billion issued in 2014 in SOE bonds around four fifths of the value correspond to SOE banks and the last fifth to industrials. Nonetheless, for both banks and industrials the share of SOE is around 9%.

Table 9. Relevance of SOE among bond issuances the year 2014

	Banks		Industrials		Total	
	$ billion	(%)	$ billion	(%)	$ billion	(%)
SOE	236.1	9%	64.0	9%	300.1	9%
Private	2,410.7	91%	689.0	91%	3,099.7	91%
Total	2,646.8	100%	753.0	100%	3,399.8	100%

SOE bond issuance come from Thomson Eikon while the overall worldwide bond issuance data comes from the Bank for International Settlements.