Corporate Firms' Financial Conditions and Investment in Latin America: Determinants and Measurement

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Abstract

For our research, we used a large dataset of nonfinancial firms from ten Latin American countries to assess leverage determinants and their dynamics. The results seem to be consistent with elements of both the trade-off and pecking order views. Also, the regression results show the presence of significant adjustment costs. According to our results, a firm's leverage is significantly reduced in the face of rising interest rates, with feed-back effects. Furthermore, we observed that reducing tangible assets induces more volatility in the interest rates paid by firms in the future. Essentially, when we separate firms according to leverage level, it appears that these effects are stronger for the highly leveraged

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enterprises. Dynamically, in the case of increasing rates, there seems to be more risk associated with higher leverage. Our results show that this effect is manifested in higher volatility of interest rates and reduced collateral levels, potential asset liquidation and rapid deleveraging. The segments most likely affected are medium size firms and large firms with high costs of liquidation and high sunk costs, especially in the service sector. Firms operating in markets with unique products would also suffer. Traditional market-based indexes of financial conditions could be complemented by corporate indicators underlying the role of collateral, cash flows, and risk. Based on these findings we propose and calculate an index of corporate financial conditions for the region.

Keywords: corporate finance; Latin American firms, pecking order, trade-off theory, financial distress.

JEL classification: G3, G30, G31.

1. INTRODUCTION

Over the last decade, the patterns of financial intermediation have dramatically changed in emerging economies. First, there has been a change in the characteristics of financial intermediation between bank and market, the base source of corporate funding. This process happened after the global financial crisis and in tandem with the increase in global liquidity, which was a result of nonorthodox monetary policy in advanced economies. Also, many emerging economies (EMEs) shifted their source of funding to corporate deposits (a less stable form of funding that tends to emerge from debt issuance), which translates into a close relation between nonfinancial firms' leverage and banks' funding.

There has been substantial growth in the number of total debt securities, in particular those of foreign ownership. In parallel, emerging economies have become more financially integrated with the rest of the world, especially regarding global corporate debt markets. While this is seemingly a welcoming phenomenon, some market observers and researcher have warned about potential pitfalls in the process of monetary

policy reversal. Easier access to funding may have distorted corporate investment decisions. Also, currency mismatches might be exposed. Even if firms are naturally or financially hedged, they might be still exposed to changes in global financial conditions, directly by interest-rate shocks or indirectly by falling commodity prices (Hattori and Takáts, 2015).

For example, Fuertes and Serena (2014) examined after-crisis financial vulnerabilities for 2,773 debt-issuer nonfinancial firms in 36 EMEs, for 2000-2014. They do not find in general issuers financial ratios to have dramatically worsened. However, they did find particular segments, high leveraged, low profitability, low interest coverage ratio (ICR), and low liquidity firms, to be worrisome. Latin American trends do not differ from these global trends. As a consequence, their potential exposure to some risks, related to profitability, currency mismatches, rollovers, and global markets conditions, might have had risen.

In this article, we examine these issues by modelling the possible determinants of nonfinancial firms leverage ratios, by using a firm-level dataset of ten Latin American economies and then assessing the influence of firm-level indicators reflective of market financial conditions. Further research on these patterns showed how this model could contribute to informing the creation of a better calibrated, higher frequency financial condition indexes, comprised of both financial and nonfinancial information. After this step, we evaluated leverage determinants in a panel data frame and estimate in a more dynamic framework the effects of financial factors proxies on a firm's leverage, using a panel VAR methodology (Abrigo and Love, 2016; Love and Zicchino, 2006).

Overall, our results show that Latin American nonfinancial firm's leverage determinants are stable across countries, coherent with the standard theory and other cross-sectional studies on the topic. Our more-dynamic approach give us preliminary evidence on the existence of significant and robust interactions between the fundamental determinants of

nonfinancial firms' capital structure and the firm-level proxy indicators of financial conditions. These new findings support the fact that nonfinancial firm's indicators yield useful information to construct better calibrated, high-frequency indexes of financial conditions.

To that end, we calculate a simple index of financial conditions in the corporate sector. We also extend our dynamic analysis by including investment as an endogenous variable in our dynamic panel model. Implicit in our exercise is to representing financial variables in terms of their contribution to creating real investment impulses. By controlling for fundamental factors in the investment equation, we use the coefficients for the financial variables as factor loadings in the construction of a financial condition index for nonfinancial firms.

The rest of the paper is structured as follows. In Section 2, we review the related literature and present our research hypotheses. Section 3 explains the methodological aspects of the empirical exercise. The data elaborations are presented in Section 4. The empirical results are contained in Section 5, for the financial panel VAR, and 6, for our investment panel model. Section 7 concludes the research study.

2. LITERATURE REVIEW

According to Jensen and Meckling (1976), firm behavior should be seen as a conundrum of conflicting objectives in equilibrium, with a nexus of complex contractual relations as the outcome. The principal-agent problems are of primary importance in those equilibria in the context of pervasive asymmetric information environments. The literature on modelling nonfinancial debt ratio determinants has been done according to two prevailing approaches: *trade-off* and *pecking order* hypotheses.

Under the static version of the *trade-off* hypothesis, the optimal leverage reflects a single period trade-off between the benefits of debt tax shields and the deadweight costs of financial

distress caused by an excessive debt ratio (DeAngelo and Masulis, 1980; Bradley et al., 1984). Meanwhile, under the dynamics *trade-off* view, firms exhibit dynamic target adjustment behavior, with the presence of short-term costs of adjustment, as deviations from individual target levels of leverage are gradually removed over time (Flannery and Rangan, 2006; Lemmon et al., 2008; Frank and Goyal, 2007, Huang and Ritten, 2007).

On the other hand, under the *pecking order* hypothesis, the costs of issuing risky debt or equity overwhelm the forces that determine optimal leverage in the trade-off model. To minimize asymmetric information costs and other financing costs, firms establish a hierarchy over their sources of funding: financing investments first with internal funds (i.e., retained earnings), then with safe debt, followed by risky debt, and finally equity (Myers, 1984; Myers and Majluf, 1984). Table 1 summarizes the implications for several leverage determinant variables, regarding the two competing views.

A very important implication of the pecking order view is that firms would prefer internal rather than external sources of funding. Regarding external funding, firms would prefer debt financing over equity financing. In this regard, the variable "Internal financing deficit" (IFD) is quite relevant, as it indicates the firm's needs for external funding. Thus, the equilibrium corporate financing mix for any firm, at any point in time, would depend critically on where the firm is located in the hierarchy of funding. Thus, cross-sectional estimates would be unable to capture funding optimal patterns. Indeed, we find evidence suggesting that the internal financing deficit is a critical determinant of leverage for forms in the region. In a final section, we use these findings to propose and calculate an index of financial conditions for the corporate sector in the region.

Table 1

LEVERAGE DETERMINANTS ACCORDING TO COMPETING HYPOTHESES

Variable	*Trade-off hypothesis*	*Pecking order hypothesis*
Tax rate	Since there is a debt tax shield, a positive relation is expected between corporate tax rates and leverage (Fama and French, 2002).	
Other nondebt tax shields	Considering this is a substitute for the debt tax shields, there is a negative relation between nondebt tax shields and leverage (DeAngelo and Masulis, 1980).	
Profitability	Given that highly profitable firms are likely more able to payback their debts, this justifies a positive relation between profitability and leverage (Fama and French, 2002). However, in a dynamic model, profitability could proxy growth opportunities, so in this context the relation is ambiguous.	Since firms may be constrained due to asymmetric information problems, and thus adopt a hierarchy in selecting sources of funding, using retained profits firstly, there is a negative relation between profitability and leverage.
Growth opportunities	Since firms with high expectations for growth opportunities tend to be likely more exposed to bankruptcy and agency costs, and therefore may not use higher amounts of debt, there is a negative relation between growth opportunities and leverage (Myers, 1977, 1984; Rajan and Zingales, 1995).	Firms with high growth opportunities must undertake major investment projects, so their need for funding is greater. When internal funding is exhausted, firms prefer financing through debt rather than equity. Therefore, a positive relation is forecasted between growth opportunities and leverage (Shyam-Sunder and Myers, 1999; Ramalho and Silva, 2009).

Collateral value (tangible or intangible fixed assets)	Tangible assets can be used as collaterals in the case of a firm's bankruptcy, so the firms with tangible assets tend to have easier access to external finance. Therefore, there is a positive relation expected between tangibility and leverage (Titman and Wessels, 1988; Michaelas et al., 1999).	On the one hand, tangible/intangible assets can be used as collaterals, which can help diminish asymmetric information problems between managers and creditors (Michaelas et al., 1999; Sogorb-Mira, 2005). In contrast, Harris and Raviv (1991) argue that this contributes to make equity less costly. Therefore, the relation between tangibility and leverage is ambiguous.
Size	Larger firms tend to increase their leverage and to take advantage of debt tax shields (Smith and Stulz, 1985) which results in a lower likelihood of bankruptcy (Titman and Wessels, 1988).	On the one hand, since larger firms tend to accumulate retained earnings, making debt less necessary (López-García and Sogorb-Mira, 2008). On the other hand, larger firms tend to have fewer problems with asymmetric information, and can obtain external funding on more favorable terms (Myers, 1984). Therefore, the relation between size and leverage is ambiguous.
Age	Older firms with better reputations tend to have lower costs of external funding. Therefore, there is a positive relation between age and debt (Ramalho and Silva, 2009).	Older firms with better reputation tend to have more capacity to retain and accumulate earnings. Therefore, a negative relation between age and leverage is expected (La Rocca et al., 2011).
Mean reversion	There is an optimal leverage ratio, where tax shield benefits are comparable to financial distress costs. Whenever firms deviate from their optimal ratios, the existence of adjustment costs prevents firms from making a total adjustment to that ratio. Therefore, firms make short-term partial adjustments of leverage towards the optimal ratio (López-García and Sogorb-Mira, 2008).	

Table 1 (cont.)

LEVERAGE DETERMINANTS ACCORDING TO COMPETING THEORIES

Variable	*Trade-off hypothesis*	*Pecking order hypothesis*
Internal financing deficit		Firms with high internal financing deficit tend to rely more heavily on external debt to finance their investment projects. Therefore, there is a positive relation between internal financing deficit and leverage.
Volatility of earnings	For *reasonable* parameter values, Bradley et al. (1984) state that a firm's optimal leverage is a decreasing function of the volatility of its earnings.	When net cash flows are low, firms with more volatile net cash flows are likely to have lower dividend payouts and less leverage (Fama and French, 2002).
Uniqueness	Customers, workers, and suppliers of firms that produce unique or specialized products probably suffer from relatively high costs (imposed by the firm) in the event of a firm's liquidation. This attribute may be negatively related to the observed debt since it is correlated with non-debt tax shields and collaterals.	
Industry classification	Firms manufacturing machines and equipment should be financed relatively less, since they will find liquidation relatively costly.	

Sources: Titman and Wessels (1988), Frank and Goyal (2007, 2008), and Serrasqueiro y Caetano (2012).

3. METHODOLOGY

3.1 Breaking Down the Debt Ratio Model

As suggested by the literature, we use a dynamic partial adjustment model to capture the cost of adjustments and other leverage determinants. The introduction of a lagged dependent variable among the right-hand side variables creates an endogeneity problem since the lagged dependent variable might be correlated with the disturbance term. To solve this problem, Arellano and Bond (1991) developed a difference GMM estimator for the coefficients in the equation mentioned above, where the lagged levels of the regressors are the instruments for the first differential equation. Further, Arellano and Bover (1995) and Blundell and Bond (1998) suggest differentiating the instruments instead of the regressors in order to make them exogenous from fixed effects. This leads to the differences between the GMM and the system GMM estimator, which is a joint estimation of the equation in levels and in first differences. Hence, we use the two-step system GMM estimators, with Windmeijer (2005) corrected standard error.

3.2 Examining How the Debt Ratio Model Is Influenced by Financial Conditions

Further, and considering the results from the previous partial adjustment model, we examine how equilibrium leverage ratios are impacted by financial conditions in a more dynamic setting. For doing so, we implement a panel vector autoregression (panel VAR) methodology. This approach treats all variables as endogenous (VAR) and incorporates the unobserved individual heterogeneity in the panel. We present the results of the panel VAR estimations as well as well as the corresponding impulse-response functions.

Following closely the instrumental variables system-GMM methodology suggested by Love and Zicchino (2006) and

Abrigo and Love (2015), we estimate a first order panel VAR as follows:

$$Y_{it} = \alpha + \theta Y_{it-1} + f_i + d_{ct} + e_{it},$$

where Y_{it} and Y_{it-1} are (5×1) vectors of variables (profitability, tangibility, leverage, tax shield and a proxy of financial conditions), for firm i, at a time t and $t-1$, respectively; θ is a (5×5) matrix of coefficients which are homogeneous for all firms; f_i denotes for firms' fixed effects and d_{ct} are country effects which are homogeneous for each firm in country c at time t. Finally, e_{it} is the vector of the respective white-noise disturbances.

Eliminating firms fixed effect f_i by differencing will create correlation with the lagged dependant variables, generating bias in the estimators. Also, the specification include country effects d_{ct} to account for country-specific macro shocks that affect all firms in country c at the same time, wich also would create estimators' bias. Thus, following Love and Zicchino (2006), we perform a two-way standardization of the variables used in the panel VAR, in order to eliminate f_i and d_{ct} effects. First, with regard to the country effects, we subtract the means of each variable for every country and year. Secondly, regarding the endogeneity of fixed effects and lagged dependent variables, we use the *Helmert procedure* for each variable by forward mean-differencing (Arellano and Bover, 1995). This method removes from the regressors the mean of all available future observations, thus preserving orthogonality between the resulting transformed variables and lagged regressors.

Also, following Abrigo and Love (2015), we also perform a Granger-causality Wald test for each equation of the panel VAR, to check for the empirical order of the VAR. As in a standard VAR model, we check for the presence of eigenvalues outside the unitary circle, thus assessing the stability of the panel VAR system. Also, we calculate and show Cholesky impulse-response functions and forecast-error variance decompositions. Then,

we use the evidence from the Granger-Wald causality tests to inform the ordering of the variables in the Cholesky decompositions. The confidence intervals for the impulse-response exercises are generated by Monte-Carlo random generation of $\hat{\theta}$ and its corresponding estimated variance-covariance matrix. We present 90% confidence intervals, with 1,000 repetitions. Lastly, for the construction of a financial condition index in the final section of the paper, we extend our initial dynamic panel model, in order to incorporate investment dynamics and the role of financial conditions.[1]

4. DATA

The data we used in this study was Orbis BvD corporate dataset for ten Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Uruguay, and Venezuela. After checking the data for extreme outliers and inconsistencies, we obtained leverage information for 10,005 firms in 17 economic sectors, in the period 2006-2015. Next, we aggregated those sectors in manufacturing, services, primary sector, utilities, and public sector.[2] We counted, on average, approximately 2.03 years of observations of each of the 10,005 firms (20,315 observations). Figure 1 shows leverage distributions for the 17 sectors represented in our sample. Notably, and as reflected in our results, sectoral patterns are a clear determinant of leverage. For the panel VAR exercise, a data subset is used, comprised of 1,939 firms with information with an average period of 5.92 years. Depending on the variables used in the regression, N could be reduced. Tables A.1 and A.2 in Annex A, show descriptive statistics for the samples.

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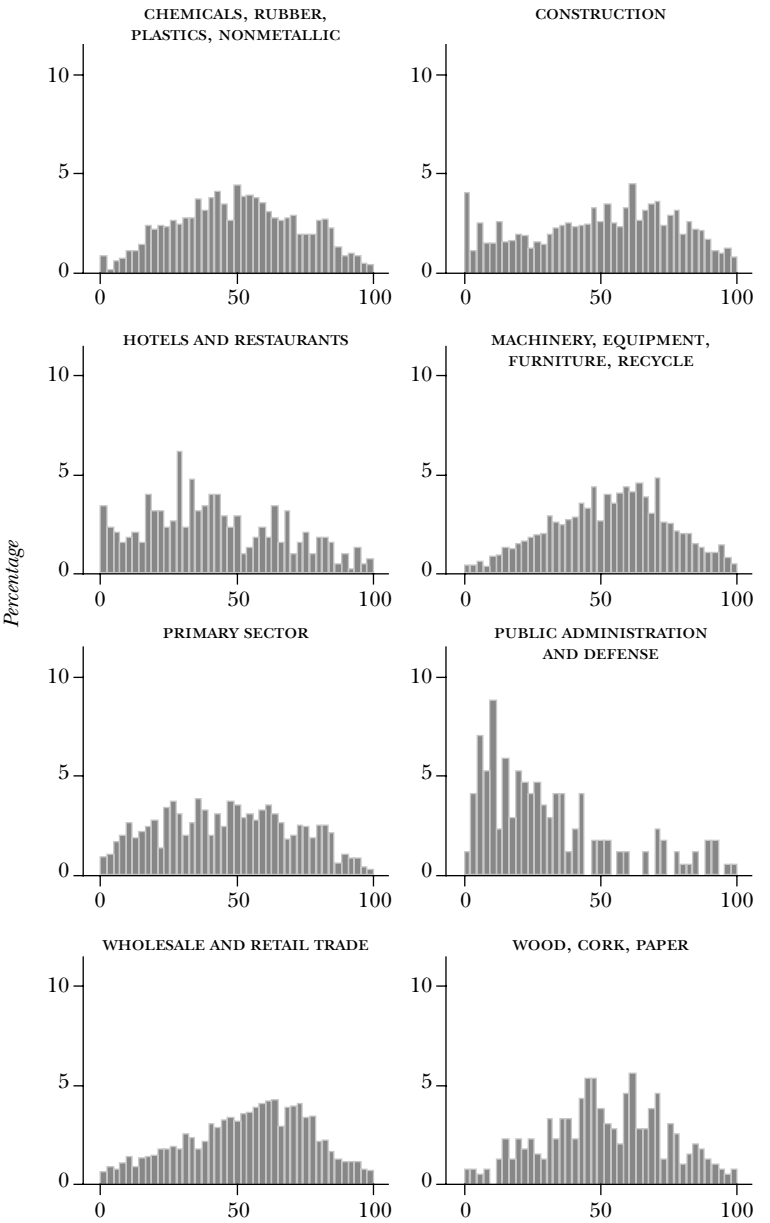
[1] All calculations were perfomed using the following Stata's user-written comands *pvar*, *pvarsoc*, *pvargranger*, *pvarirf* and *pvfevd*, developed by Abrigo and Love (2015).

[2] We show table results only for the manufacturing, services, and primary sectors, the bulk of our sample.

Figure 1

LEVERAGE DISTRIBUTIONS BY SECTORS

Overall sample, 2006-2015

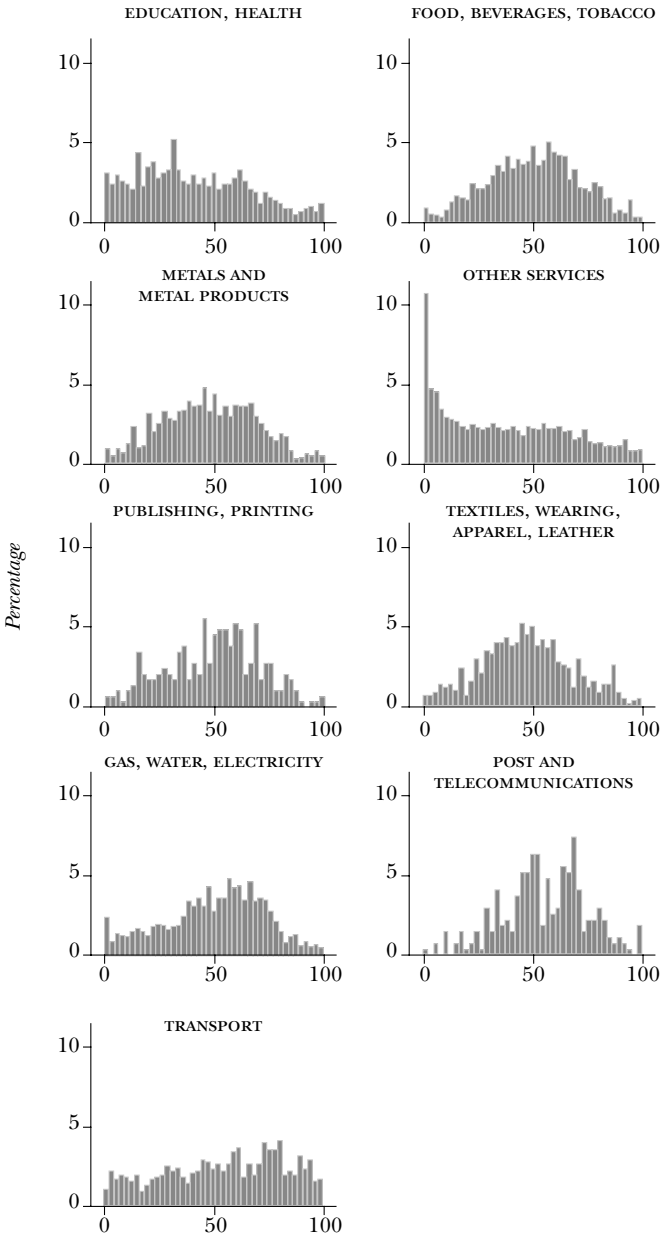


Leverage ratio = total liabilities to total assets (%)

Figure 1

LEVERAGE DISTRIBUTIONS BY SECTORS

Overall sample, 2006-2015



Leverage ratio=total liabilities to total assets (%)

5. RESULTS

Tables B.1 and B.2[3] show Blundell-Bond system-generalized moments method (GMM) estimation results for the determinants of leverage in manufacturing, services, and the primary sectors.[4] Similar to other corporate finance studies the results obtained seem to be consistent with the elements of the two main theories (Rajan and Zingales, 1995). Regression results show the presence of significant adjustment costs. To the extent that firms have unobservable target levels, firms face low speed of adjustment. This would be consistent with the trade-off dynamic theories. Additional evidence supporting the trade-off theory is provided by variable's tax shield results, which is positively correlated with leverage.

For manufacturing and service firms, the ratio of tangible assets to total assets is negatively correlated with leverage. Also, tangible assets are found to be correlated with growth opportunities.

On the other hand, these assets can be used as collateral. Thus, this piece of evidence seems to be supportive of both the *trade-off* and the *pecking order* hypotheses. Furthermore, our results suggest that medium-sized firms in manufacturing and services tend to be significantly more leveraged than the small firms in these sectors, while very large and large companies in the services sector are significantly more leveraged than their counterparts in the medium-sized-firms group (see Annex A.3 for variables description). This is in line with the trade-off hypothesis, as well as with Myers (1984). Regarding the uniqueness indicator,[5] we found that it affects leverage positively and

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[3] Henceforth, all the statistical tables not displayed in the body of this document can be located in the Annex B.

[4] In Table B.2 we use ROAA as measure of cash flow effects, instead of our IFD variable.

[5] Uniqueness, measured as costs of goods sold to operating revenue, is related to the extent to which the market for a good depends on retaining a significant customer base. To that regard,

significantly only for firms in the primary and service sectors, which is contrary to the trade-off hypothesis. Uniqueness, as pointed out by Gilchrist et al. (2016), is critical to understanding a firm's ability to increase prices; thus, it is connected to the financial distress during episodes of aggregated shocks. Firms that produce unique products are more vulnerable to interest rate shocks while being highly leveraged, since they tend to have less flexibility to increase prices.

Three variables' estimates are quite consistent with the pecking order hypothesis, namely the internal financing deficit,the dichotomic variable equal to one if the firm is listed (and zero otherwise), and the pofitability variable (return on average assets, or ROAA). Leverage is higher for firms with a larger financing deficit. On the one hand, listed firms or firms with higher profitability tend to have lower leverage ratios, likewise for smaller firms, so they are also consistent with this hypotheses.

In order to examine the possibility of multiple endogeneity of the regressors, our empirical strategy also includes estimating panel VARs and impulse-response functions for the subsample of firms with larger time series dimension.

In this regard, we reproduce previous specifications as much as possible, considering panel VAR stability conditions.[6] Then we augment the regressions in two variables to show the effects of financial conditions at the individual firm's level. In one case, we include the previous year's implicit interest rate paid on liabilities. In the other, we calculated the rate's previous 3-year rolling window standard deviation. Figures 2a and 2b show the evolution of median and inter-quartile ranges for the implicit interest rates and its standard deviation for the ten countries examined. Most countries have experienced episodes of high

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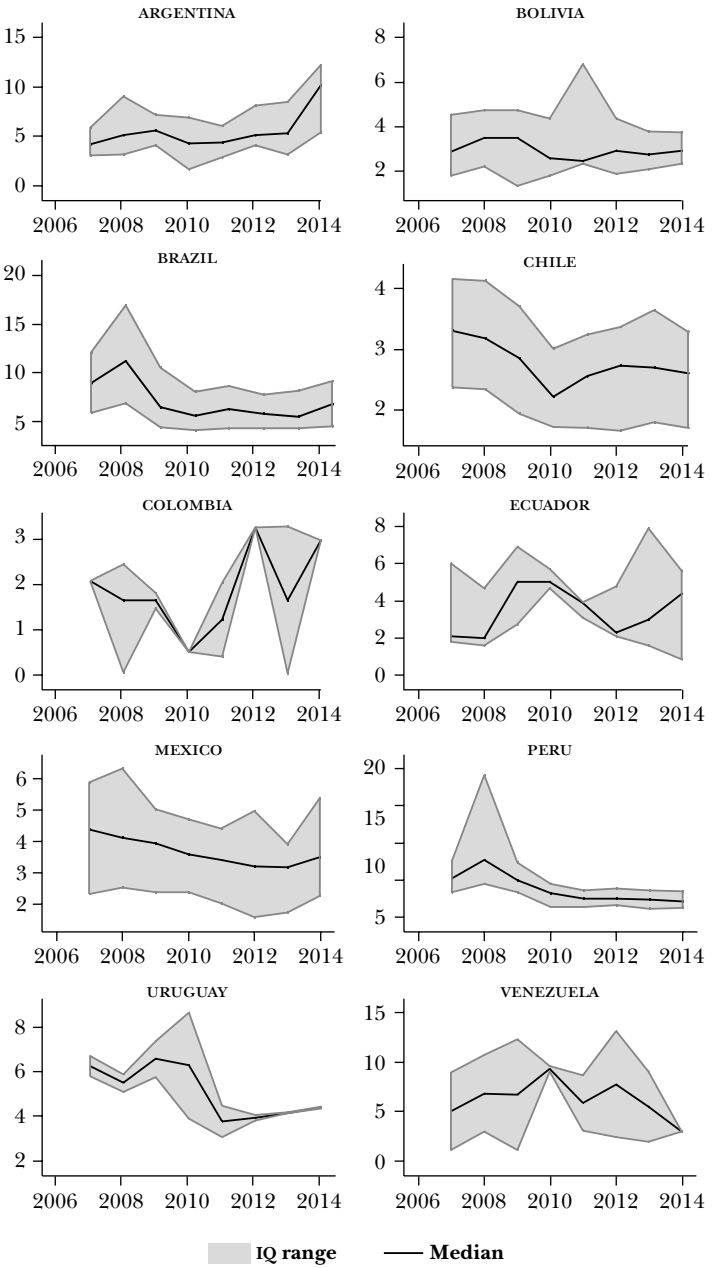
firms deploy marketing and sale forces resources to convey the special and unique nature of their product. In that regard, the customer base becomes a valuable asset in this kind of markets, with price competition playing a secondary role.

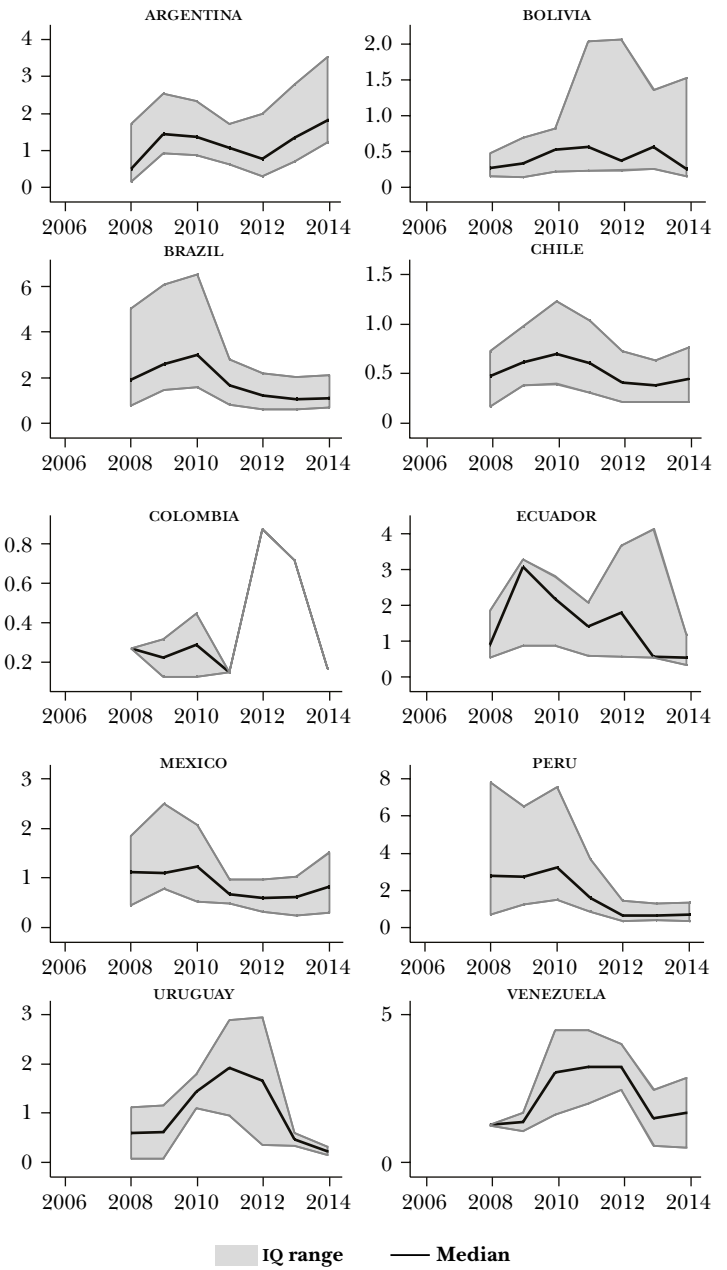
[6] We use instead tangibility in this set of results, calculated as the ratio of fixed to total assets.

Figure 2a

AVERAGE AND INTER-QUARTILE IMPLICIT INTEREST RATE EVOLUTION



AVERAGE AND INTER-QUARTILE VOLATILITY
3-Year Rolling SD of Implicit Interest Rate



interest rate volatility and level, especially in the immediate post global financial crisis.

Table 2 shows the panel VAR results for the interest rate variable. In Table 3 and Figure 4, the corresponding variance decomposition and impulse-responses are displayed. Our results suggest the presence of a bidirectional causality between interest rates and leverage. Previous year interest rates reduce leverage at a time *t*, whereas a rise in the previous year's leverage reduces the future rate charged on a firm's liabilities. The impulse-response functions (figure 4) shows that a shock increasing *Leverage* tend to have negative and significant effects over the future interest rate lasting about four years, while a shock increasing the implicit interest rate has negative and significant effects over *Leverage* lasting about five years.

When including the volatility (standard deviation) of the implicit interest rate as an endogenous component of the panel var (Table 4), we find that firms with larger collateral (tangible assets) face lower future interest rate volatility. Also, under this specification, higher previous leverage seems to be associated with higher future profitability (ROAA). As shown by impulse-response functions (Figure 5), a shock increasing leverage has an immediate negative effect on profitability, compensated onwards with a significant increase in the second year wich lasts for about the fifth year.

Overall, our results seem to indicate that leverage is affected by previous interest rates, an obvious result, but with feedback effects involved. Conversely, collateral values seem to be important determinants of the future interest rate volatility facing firms. As shown by variance-decomposition results (Table 3), around 10% of the implicit interest variance is explained by leverage. Also, the tangibility of assets explains about 45% of volatility-of-interest-rate variance. The impulse responses for the effect of previous interest rates on leverage last for at least five years. Of similar duration is the reverse causality effect. Also, the effect of the tangibility of the future volatility of interest rates lasts for five years Figure 5).

Table 2

PANEL VECTOR AUTOREGRESSIOM FOR DETERMINANTS OF CORPORATE FINANCING AND THE PREVIOUS IMPLICIT INTEREST RATE

	Response to				
Response of	*ROAA (t−1)*	*Leverage (t−1)*	*Tangibility (t−1)*	*Imp. int. rate (t−1)*	*Tax shield (t−1)*
ROA (t)	0.3744[c]	0.0609	−0.0417	0.0004	0.2178
	(0.0686)	(0.0379)	(0.0346)	(0.0331)	(0.1412)
Leverage (t)	−0.1891	0.8051[c]	−0.0135	−0.0857[a]	0.1794
	(0.0793)	(0.0644)	(0.0607)	(0.0459)	(0.2139)
Tangibility (t)	−0.1252	−0.0660	0.8286[c]	−0.0910	0.0068
	(0.0777)	(0.0769)	(0.0837)	(0.0587)	(0.2075)
Imp. int. rate (t)	0.0291	−0.1209[c]	−0.0005	0.2944[b]	−0.0557
	(0.0432)	(0.0378)	(0.0311)	(0.1157)	(0.0916)
Tax shield (t)	0.0601[b]	−0.0042	0.0126	−0.0034	0.3312[c]
	(0.0240)	(0.0156)	(0.0142)	(0.0103)	(0.0738)

Number of observations (N): 2,400

Number of firms (N): 669

Average number of years: 3.587

Final GMM criterion Q(b): 7.52e−34

Initial weight matrix: identity

GMM weight matrix: robust

[a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Standard errors in parenthesis. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. This panel VAR satisfies the stability condition proposed by Hamilton (1994) and Lütkepohl (2005).

Table 3

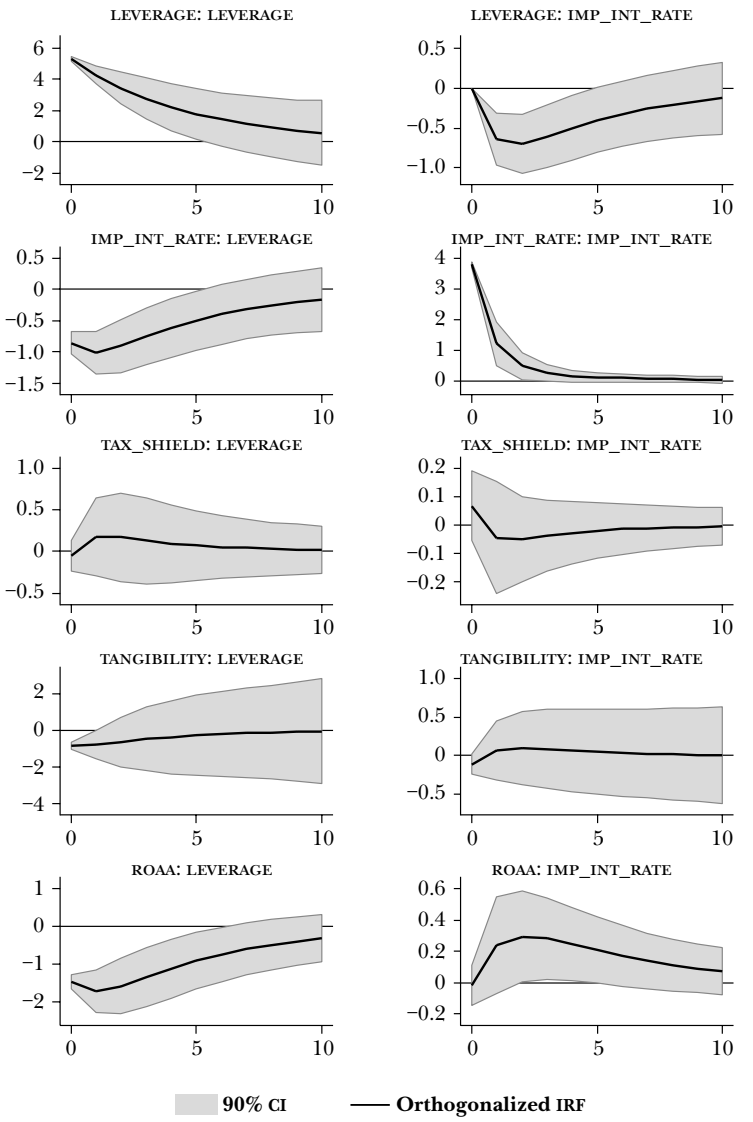
VARIANCE DECOMPOSITION OF THE PANEL VAR FOR DETERMINANTS OF CORPORATE FINANCING AND THE PREVIOUS IMPLICIT INTEREST RATE

Response variable	*Impulse variable*				
	ROAA	*Tangibility*	*Tax shield*	*Imp. int. rate*	*Leverage*
ROAA	0.8911	0.0508	0.0086	0.0017	0.0477
Tangibility	0.0271	0.9515	0.0001	0.0012	0.0201
Tax shield	0.2379	0.0160	0.7457	0.0002	0.0003
Imp. int. rate	0.0213	0.0023	0.0006	0.8721	0.1036
Leverage	0.1293	0.0239	0.0010	0.0427	0.8030

Percent of variation in the row variable (10 years ahead) explained by the column variable. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. The variables were sorted following Granger-Wald causality test criteria.

Figure 4

IMPULSE-RESPONSES OF THE PANEL VECTOR AUTOREGRESSION FOR DETERMINANTS OF CORPORATE FINANCING AND THE PREVIOUS IMPLICIT INTEREST RATE AS A PROXY OF FINANCIAL CONDITIONS



Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

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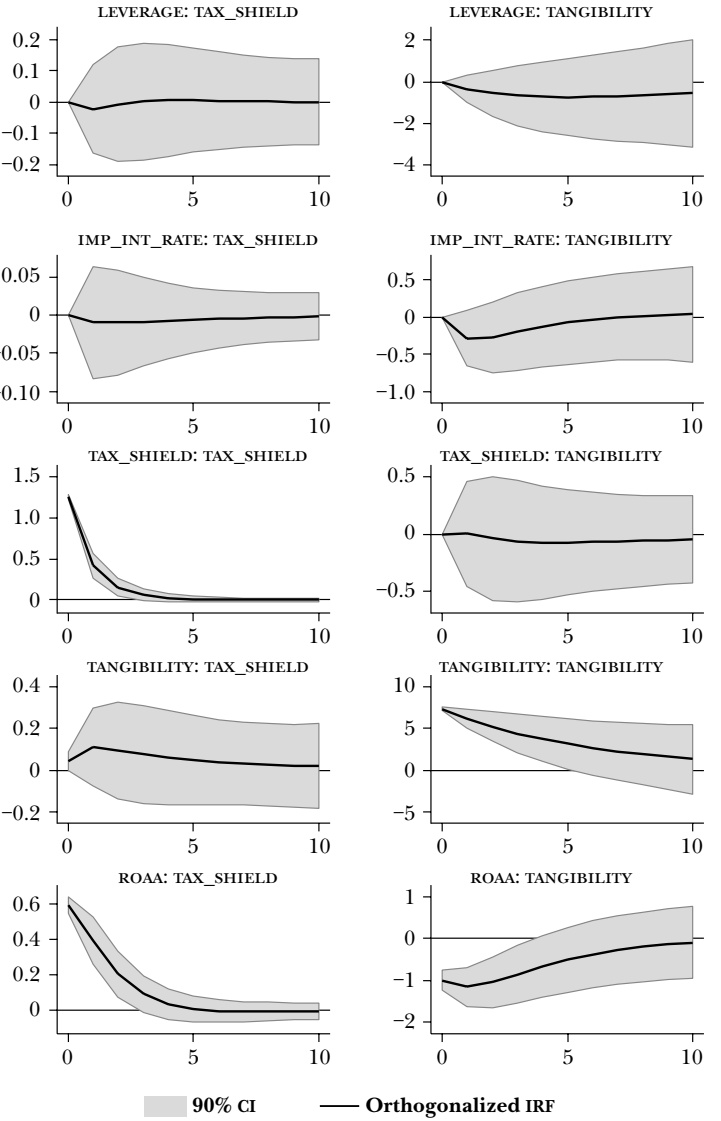

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Figure 4 (cont.)

IMPULSE-RESPONSES OF THE PANEL VECTOR AUTOREGRESSION FOR DETERMINANTS OF CORPORATE FINANCING AND THE PREVIOUS IMPLICIT INTEREST RATE AS A PROXY OF FINANCIAL CONDITIONS

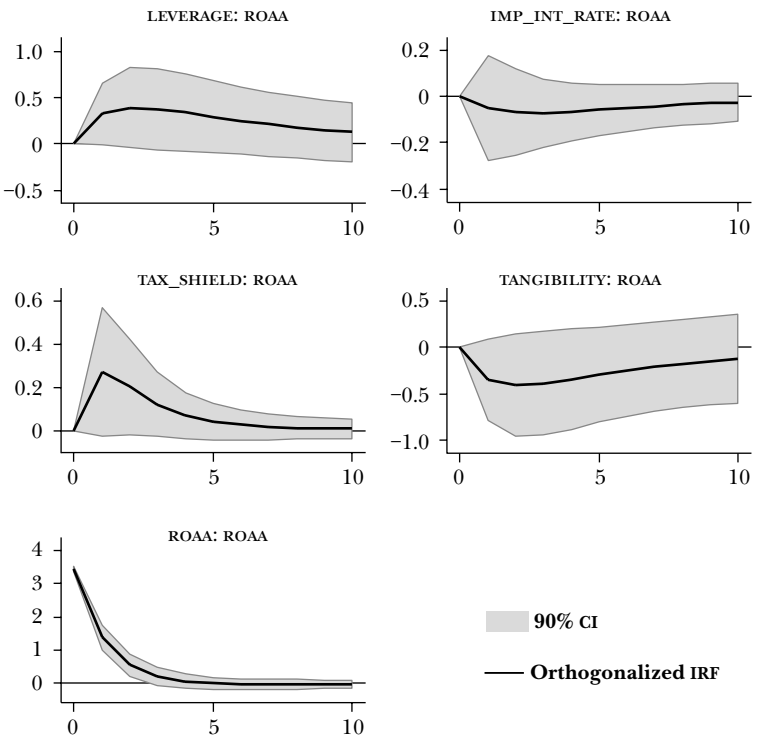

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Table 4

PANEL VECTOR AUTOREGRESSION FOR DETERMINANTS OF CORPORATE FINANCING AND THE 3-YEAR ROLLING SD OF THE IMPLICIT INTEREST RATE

	Response to				
Response of	*ROAA (t−1)*	*Leverage (t−1)*	*Tangibility (t−1)*	*SD imp. int. rate (t−1)*	*Tax shield (t−1)*
ROAA (t)	0.3420[c]	0.1058[b]	−0.0330	−0.0006	−0.0398
	(0.0790)	(0.0457)	(0.0472)	(0.0675)	(0.2213)
Leverage (t)	−0.1181	0.7694[c]	−0.0470	−0.0662	−0.0626
	(0.1049)	(0.0775)	(0.0782)	(0.0906)	(0.3259)
Tangibility (t)	−0.1359	-0.0889	0.8497[c]	−0.0315	0.0724
	(0.1172)	(0.0890)	(0.1093)	(0.0938)	(0.3358)
SD. imp. int. rate (t)	0.0105	−0.0120	−0.0586[c]	0.8131[c]	0.0742
	(0.0293)	(0.0208)	(0.0224)	(0.0940)	(0.0680)
Tax shield (t)	0.0334	−0.0071	−0.0011	−0.0104	0.3727[c]
	(0.0321)	(0.0194)	(0.0214)	(0.0176)	(0.1208)

Number of observations (N): 1,745

Number of firms (N): 537

Average number of years: 3.25

Final GMM criterion Q(b): 4.24e−34

Initial weight matrix: identity

GMM weight matrix: robust

[a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Standard errors in parenthesis. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. This panel VAR satisfies the stability condition proposed by Hamilton (1994) and Lütkepohl (2005).

Table 5

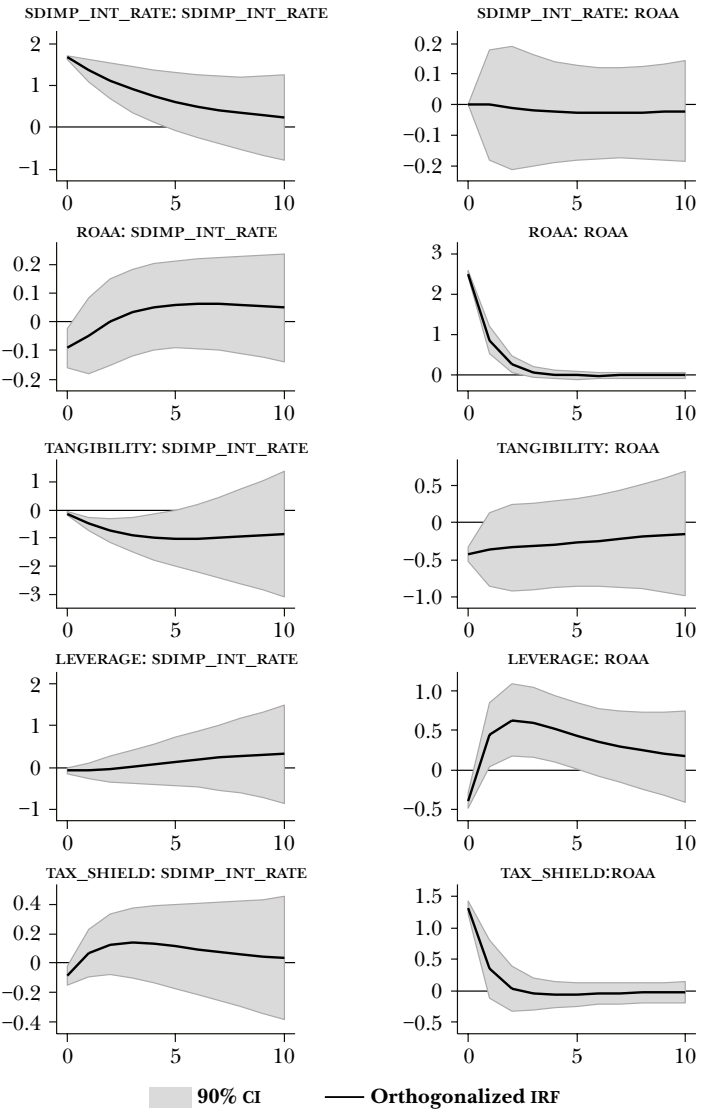
VARIANCE DECOMPOSITION OF THE PANEL VAR FOR DETERMINANTS OF CORPORATE FINANCING AND THE 3-YEAR ROLLING SD OF THE IMPLICIT INTEREST RATE

	Impulse variable				
Response variable	*Tax shield*	*Leverage*	*Tangibility*	*ROAA*	*SD imp. int. rate*
Tax shield	0.9912	0.0017	0.0005	0.0059	0.0008
Leverage	0.0240	0.9523	0.0156	0.0045	0.0036
Tangibility	0.0013	0.1063	0.8895	0.0027	0.0002
ROA	0.1607	0.1610	0.0737	0.6042	0.0004
SD imp. int. rate	0.0063	0.0190	0.4584	0.0020	0.5143

Percent of variation in the row variable (10 years ahead) explained by the column variable. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. The variables were sorted following Granger-Wald causality test criteria.

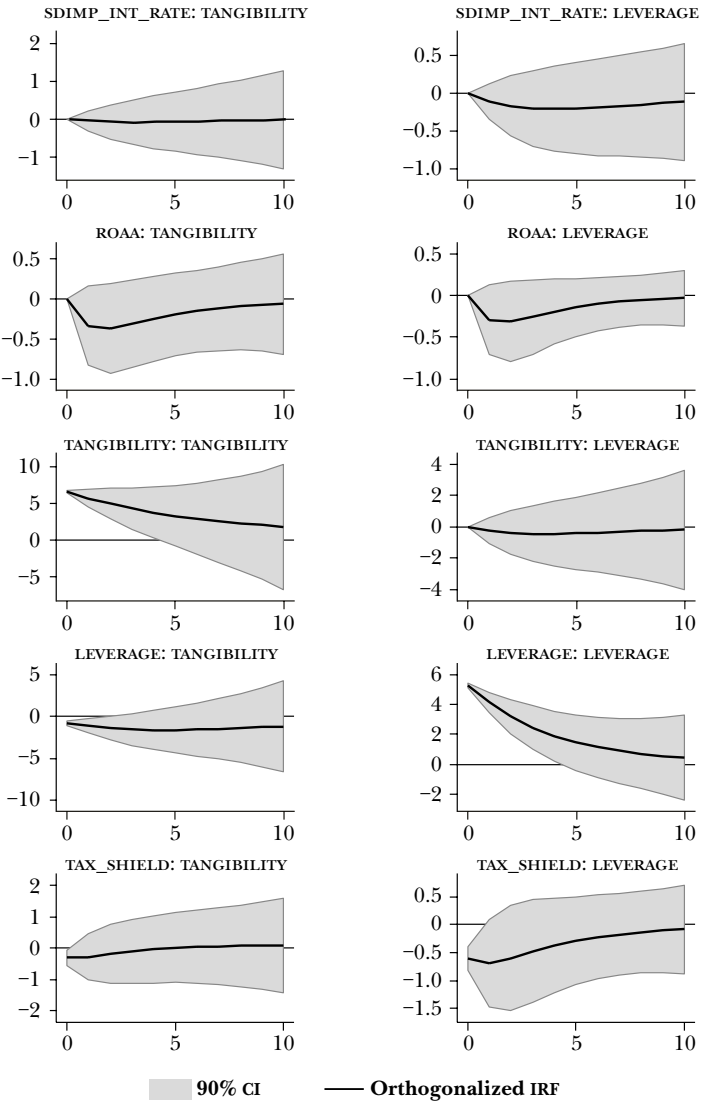
Figure 5

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE 3-YEAR ROLLING SD OF THE IMPLICIT INTEREST RATE



Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

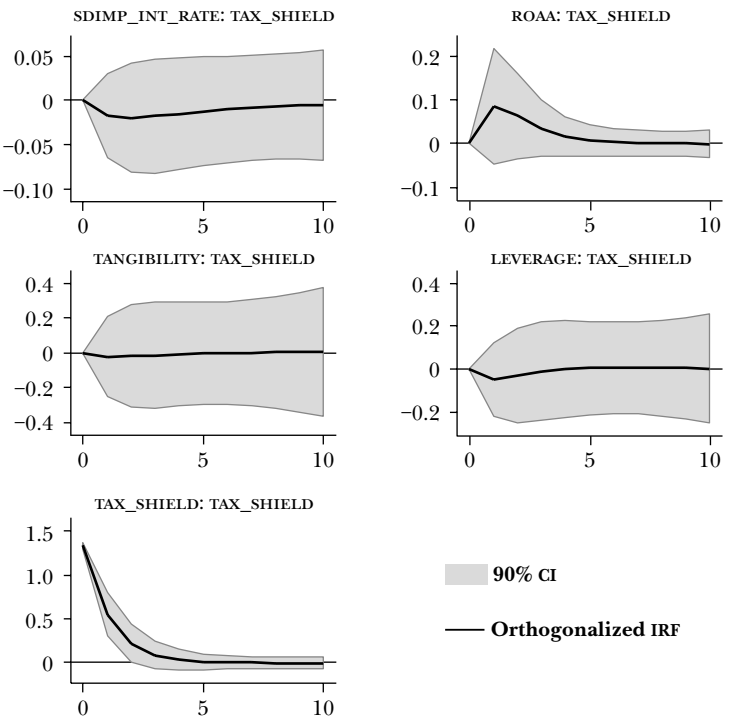
IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE 3-YEAR ROLLING SD OF THE IMPLICIT INTEREST RATE



Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure 5 (cont.)

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE 3-YEAR ROLLING SD OF THE IMPLICIT INTEREST RATE



Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

We further look at threshold effects in the leverage distribution by dividing firms into above and below median leverage. Results are shown in Tables B.3-B.4 and Figures B.1-B.2,[7] for previous implicit interest rates; and Tables and Figures B.5-B.6 and Figures B.3-B.4 show results for the volatility of implicit interest rates.

The first part of Table B.3 reports the panel VAR estimates for firms whose mean leverage ratio is lower than the median and where the bidirectional causal relation between leverage and implicit interest rate found in the baseline model is reproduced. Interchangeably, results for the highly leveraged group of firms are presented in the bottom part of Table B.3. As the opposite of low-leveraged firms, in the case of high-leveraged the feed-back effect between implicit interest rates is no longer held, since only the one-year lagged leverage impacts the implicit interest rate significantly and negatively. Also important is the fact that, for this group of firms, implicit interest rates are negatively associated with the future collateral measured by tangibility, which means that an increases in previous rates reduces significantly the tangible assets of the firm in the next five years (with regards to impulse-response functions presented in Figure B.2). We presume this result is driven by the fact that already highly leveraged firms tend to face relevant price effects in their balance sheets when interest rates increase, and additionally, they are induced to liquidate asset positions in the face of interest rate shocks.

Regarding the impulse-response functions for highly leveraged firms (Figure B.2), then the future profitability grows up significantly from the second year after the leverage increases, up to about to the fifth year (Figure B.2). In turn, a positive shock of the implicit interest rate at year t leads to a significant decrease of the future collateral values, while the collateral itself is found to cause an increase in the future volatility of

[7] Henceforth, all figures not displayed in the body of this document can be located in the Annex B.

rate (as shown at the bottom of Table B.5, for highly leveraged firms). This fact constitutes a negative spiral, in which financial conditions for firms are further deteriorated. The compensating mechanism to end up this harmful process seems to operate at lower leverage and profitability, as firms engage in a new leverage cycle. This is reflected in the negative and significant coefficient of the lagged profitability on future leverage.

6. AN AGGREGATED INDEX OF CORPORATE FINANCIAL CONDITIONS FOR TEN LATIN AMERICAN COUNTRIES

In this section, we extend our previous analysis by including investment as an endogenous variable in our dynamic panel model. Implicit in our exercise is representing of financial variables in terms of their contribution with the goal of creating real investment impulses. By controlling for fundamental factors in the investment equation, we use the coefficients for the financial variables, as factor loading in the construction of a corporate financial condition index.

We derive our intuition for our proposed index from the literature on micro-level real investment measuring. Investment dynamics within a PVAR firm-level have been estimated with the inclusion of financial variables (Love and Zicchino, 2006; Gilchrist and Himmelberg, 1998). Love and Zicchino (2006) estimated an investment PVAR using firm-level data from 36 countries. In their model, they included *fundamental factors* such as a measure of the marginal productivity of capital and Tobin's *q*. Their financial factors variable is represented by cash flows scaled by capital. Thus, their exercise is determining the dynamic function of investment that is augmented by a financial variable. They found the friction effect of the financial variable on investment to be larger for the group of countries with less developed financial systems. Also, a series of papers have looked at the elasticity of investment to cash flow and other financial variables, generally in a static or dynamic panel data

context (Gomes, 2001; Balfoussia and Gibson, 2016; Hernando and Martínez-Carrascal, 2008) analyzed the impact of alternative measures of firms' financial conditions on investment and employment by using a large-scale panel dataset of Spanish firms over the period 1985-2001. They then used the estimated coefficients of the investment equation as factor loadings in the construction of a corporate financial conditions index. As Hernando and Martínez-Carrascal (2008), we estimate an error-correction investment model, as suggested by Bond et al. (1999). We follow this latest approach in the construction of our index of corporate financial conditions.

In this sense, we estimate a dynamic system-GMM panel model for fixed investment ratio at firm-level assuming the existence of additive year-specific effects, μ_t, country-specific effects, τ_k, and industry specific effects, γ_f, which could be expressed as follows:

$$\begin{aligned}\frac{I_{it}}{K_{i,t-1}} = \rho_1\left(\frac{I_{i,t-1}}{K_{i,t-2}}\right) + \omega_0\Delta y_{it} + \omega_1\Delta y_{i,t-1} + \theta(k-y)_{i,t-2} + \beta_0 Lev_{it} + \\ + \beta_1 Lev_{i,t-1} + \beta_2 IDB_{it} + \beta_3 IDB_{i,t-1} + \beta_4 (Zscore)_{it} + \beta_5 (Zscore)_{i,t-1} \\ + \beta_6 (IFD)_{it} + \beta_7 (IFD)_{i,t-1} + \beta_8 (Tangibility)_{i,t} + \\ + \beta_9 (Tangibility)_{i,t-1} + X_{i,t}\delta + \mu_t + \tau_k + \gamma_f + \varepsilon_{it}.\end{aligned}$$

We then construct indexes of financial conditions for our ten countries as follows. First, we estimate an error-correction investment model including lagged fixed investment, lagged and contemporaneous sales growth; the error-correction term, and other controls. Alternatively, we expand the investment model by including lagged and contemporaneous of several key financial variables from our previous analysis- Leverage, our internal financing deficit indicator (IFD), the interest debt burden, the tangibility of assets and the firms' Z-score, as a measure of risk. Results are shown in Table 7. A key aspect of the model is the inclusion of time and firm effects to capture capital replacement costs. Also, the model predicts the existence of significant and negative error correction component. We

then use the results for the investment equation for the construction of our financial conditions index.

Notice that about the financial variables included, only the IFD, Z-score and tangibility coefficients were found to be significant. Consistent with previous results, we used specification 2 in Table B.7, as leverage was found in previous sections to be caused by both tangibility and IFD. Accordingly, in the specification 1, lagged leverage is found to significantly explain investment when excluding these two of its determinants. In specification 3, we use profitability (ROAA) instead of IFD, and get similar results. For the variables of interest, the contemporaneous effects are significantly positive, and the lagged effects are significantly negative. However, the sum of both coefficients is found to be significantly different from zero and positive for Z-score and the IFD, the variables with the largest effects, indicating a positive relation between the index loadings and investment financial conditions. Accordingly, we propose the following financial conditions index (FCI) for nonfinancial firms:

$$FCIit = \widehat{\beta_4}\left(Zscore\right)_{it} + \widehat{\beta_5}\left(Zscore\right)_{i,t-1} + \widehat{\beta_6}\left(IFD\right)_{it} + \widehat{\beta_7}\left(IFD\right)_{i,t-1} + \\ + \widehat{\beta_8}\left(Tangibility\right)_{it} + \widehat{\beta_9}\left(Tangibility\right)_{i,t-1}.$$

FCI can be interpreted as the predicted *financial* value of the investment. In order to have a country index, we aggregate at country-time level by calculating percentile 25, 50 and 75 statistics for the index. Figures B.5 and B.6 show the resulting lags of country-time FCI pair as compared to gross fixed capital formation and GDP growth.

The index is constructed so that increasing/decreasing values imply improving/deteriorating financial conditions for investment. The figures convey, at the simple examination, the potential for a positive correlation. We further explore these patterns as follows. First, we estimate a simple first order panel VAR model including FCI, gross fixed capital formation, and

GDP growth, for the ten countries in the sample. As an initial step, and test for Granger causality. The results are shown in Table B.8.

Granger causality Wald tests indicate IFC to Granger cause both gross fixed capital formation and GDP growth. The reverse causality is not found. Also, GDP growth Granger causes gross fixed capital formation. At a final exercise, we show in Figure 9, resulting impulse-response functions assuming a Cholesky variance decomposition with ordering given by the obtained Granger criteria. A one-standard deviation positive shock in FCI results in an increase in both gross fixed capital formation and GDP future growth, which is significant and lasting for about 12 months, with 90% confidence levels. Thus, these preliminary results, albeit restricted about its simplicity and extent of the series, provides some evidence on the potential explanatory relevance of the financial conditions index constructed thus far, using firm level data. It is also worth to notice that the financial shock implicit in the exercise is common across countries, given the nature of the exercise. Thus, the real impulses obtained must be interpreted accordingly, as the average national real effects to a common financial shock.

7. CONCLUSIONS

In this article, we use a large dataset of nonfinancial firms from ten Latin American countries to assess leverage determinants and their dynamics. We then use that information to inform the specification of a new index of corporate financial conditions.

With regard to the first set of issues, our results seem to be consistent with elements of the two main theories, the trade-off, and pecking order views. Regression results show the presence of significant adjustment costs. To the extent that firms have unobservable target levels, firms face low speed of adjustment. Furthermore, our results suggest that medium-sized firms in manufacturing and services tend to be significantly more leveraged than their small firms in these sectors, whereas

very large and large companies in the services sector are significantly more leveraged than their counterparts in the medium-sized-firms group. Regarding the uniqueness indicator, we found that it affects leverage levels positively and significantly, only for firms in the primary and service sectors, which is evidence against the trade-off hypothesis. With regard to our dynamics determinants of leverage, we observe that a firm's leverage is significantly reduced in the face of rising interest rates, with feed-back effects. Also, firms' collateral resulted to be critical, as reductions in tangible assets bring about future volatility in the interest rates paid by the firms. When we separate firms according to the leverage level, it turns out that these effects are stronger for highly leveraged firms.

Dynamically, the risk seems to be associated with high leverage in the context of rate increases. It is manifested in higher rate volatility and reduced collateral levels, potential asset liquidation and rapid deleveraging. These dynamics are probably more likely in the context of policy rate changes and capital outflows. According to our results, segments most likely affected are medium size firms and large firms with high costs of liquidation as well as high sunk costs, especially in the service sector. Firms operating in markets with unique products would also suffer.

Our results ultimately suggest that traditional market-based indices of financial conditions could be complemented by corporate indicators. As mentioned, collateral levels, indicators of corporate distress and firms' cash flow positions are natural candidates for an index. To that end, we calculated a simple index of financial conditions in the corporate sector (FCI). Granger causality Wald tests indicate ICFC to Granger-cause both gross fixed capital formation and GDP growth. According to resulting impulse-response functions, a one-standard deviation positive shock in IFC results in an increase in both gross fixed capital formation and GDP future growths, which is significant and lasts for about 12 months. Thus, these preliminary evidence suggests the potential predictive relevance of the index proposed here.

Annex A

Table A.1

DESCRIPTIVE STATISTICS FOR THE INITIAL LEVERAGE DETERMINANTS EXERCISE

Variable	*Description*	*Type*	*Observations*	*Panels (firms)*	*Mean*	*Std. dev.*	*Min*	*Max*
Leverage	Total liabilities to total assets (%)	Firm-level	20,315	10,005	48.059	25.012	0.000	100.000
Intangibility	Intangible assets to total assets (%)	Firm-level	17,457	8,969	5.182	13.580	0.000	99.948
Tangibility	Tangible assets to total assets (%)	Firm-level	20,315	10,005	32.834	28.339	0.000	100.000
Internal financial déficit (IFD)	Operative expenditures (investment+working capital) minus the cash flow (which is assumed to be equal to 110% of the net income) to total assets (%)	Firm-level	20,315	10,005	–2.968	23.299	–99.885	99.819
Uniqueness	Costs of goods sold to operating revenue	Firm-level	13,359	3,960	65.389	22.346	0	199.633
Listed	(1): if the firm is publicly listed, (0): otherwise (source: Orbis and own calculations)	Firm-level	20,315	10,005	0.213	0.409	0	1
ROAA	Net income to average of total assets (%)	Firm-level	20,315	10,005	5.115	11.643	–96.000	98.425
Tax shield	Total taxes to total assets (%)	Firm-level	16,643	8,744	3.474	5.324	0.000	99.579

Source: Orbis and own calculations.

Table A.2

DESCRIPTIVE STATISTICS FOR THE PANEL VAR LEVERAGE DETERMINANTS EXERCISE

Variable	*Description*	*Type*	*Observations*	*Panels (firms)*	*Mean*	*Std. dev.*	*Min*	*Max*
Leverage	Total liabilities to total assets (%)	Firm-level	11,487	1,939	49.994	22.739	0.005	100.000
Tangibility	Tangible assets to total assets (%)	Firm-level	11,487	1,939	29.097	24.548	0.000	99.080
ROAA	Net income to average of total assets (%)	Firm-level	11,487	1,939	4.637	8.326	−92.576	85.797
Tax shield	Total taxes to total assets (%)	Firm-level	9,206	1,851	4.243	5.370	0.000	94.073
Imp. interest rate	Interest paid to total liabilities (%)	Firm-level, proxy of financial conditions	5,183	849	5.639	5.363	0.013	115.096
SD of imp. interest rate	3-year rolling standard devation of the implicit interest rate (with the exception of year 2008, in which we imputed a 2-year rolling standard deviation)	Firm-level, proxy of financial conditions	4,122	832	2.003	3.473	0.001	78.814

Source: Orbis and own calculations.

Table A.3

FIRM'S CLASSIFICATION

Variable	*Description*	*Arellano-Bond GMM*		*Panel VAR (only 849 firms with data for imp. interest rate)*	
		Observations	*Panels (firms)*	*Observations*	*panels (firms)*
By size (Orbis criteria):					
Very large and large	Firms that match at least one of the following conditions: operating revenue ⩾ USD 13 M; total assets ⩾ USD 26 M; employees ⩾ 150.	11,849	5,747	5,131	831
Medium	Firms that match at least one of the following conditions: operating revenue ⩾ USD 1.3 M; total assets ⩾ USD 2.6 M; employees ⩾ 15; not very large or large.	6,076	1,288	48	17
Small	Firms that are not included in any of the above categories.	2,390	2,970	4	1
By industrial qualification (Bureau Van-Dijk main sector criteria):					
Manufacturing	Firms classified in any of the following sectors: "Chemicals, rubber, plastics, non-metallic products," "Food, beverages, tobacco," "Machinery, equipment, furniture, recycling," "Metals and metal products," "Publishing, printing," "Textiles, wearing apparel, leather," "Wood, cork, paper."	6,110	2,568	2,170	336

Table A.3 (cont.)

FIRM'S CLASSIFICATION

Variable	*Description*	*Arellano-Bond GMM*		*Panel VAR (only 849 firms with data for imp. interest rate)*	
		Observations	*Panels (firms)*	*Observations*	*panels (firms)*
Services	Firms classified in any of the following sectors: "Construction," "Education, health," "Hotels and restaurants," "Post and telecommunications," "Transport," "Wholesale and retail trade."	11,368	6,290	1,701	302
Primary	Firms classified in the following sector: "Primary sector."	934	233	367	62
Public administration	Firms classified in the following sector: "Public administration and utilities."	170	69	11	2
Utilities	Firms classified in the following sector: "Gas, water, electricity."	1,733	845	934	147

Annex B

Table B.1

BASELINE GMM (BLUNDELL-BOND) REGRESSIONS FOR LEVERAGE

	Manufacturing	*Services*	*Primary sector*	*Manufacturing*	*Services*	*Primary sector*
Leverage (–1)	0.667[c]	0.644[c]	0.790[c]	0.664[c]	0.650[c]	0.761[c]
	(0.0417)	(0.0453)	(0.0924)	(0.0423)	(0.0437)	(0.0990)
Tangible assets	0.0375[b]	–0.0481[c]	0.0389	0.0377[b]	–0.0436[c]	0.0442
	(0.0164)	(0.0159)	(0.0379)	(0.0162)	(0.0159)	(0.0342)
IFD	0.0661[c]	0.0981[c]	0.0516[a]	0.0633[c]	0.0975[c]	0.0575[a]
	(0.0124)	(0.0123)	(0.0311)	(0.0126)	(0.0124)	(0.0321)
Listed	–2.061[b]	–2.157[b]	–3.435	–2.180[b]	–2.432[c]	–3.875[a]
	(0.882)	(0.888)	(2.262)	(0.908)	(0.933)	(2.027)
Tax shield	0.0524	0.0577	0.0768	0.107[a]	0.0903	0.183
	(0.0482)	(0.0662)	(0.0990)	(0.0568)	(0.0654)	(0.117)
Small	–1.499	–3.781[c]	–2.412	–1.012	–3.590[c]	–3.088
	(1.454)	(1.151)	(2.141)	(1.423)	(1.122)	(1.960)
Very large	0.931	2.230[c]	0.279	0.864	1.820[b]	–0.453
	(0.974)	(0.830)	(2.075)	(0.944)	(0.815)	(2.014)
Uniqueness				0.0703[c]	0.0438[c]	0.114[c]
				(0.0170)	(0.0152)	(0.0403)
Constant	18.81[c]	24.66[c]	12.31[a]	14.62[c]	22.46[c]	8.409
	(2.769)	(3.631)	(6.907)	(2.695)	(3.524)	(6.120)

Table B.1 (cont.)

BASELINE GMM (BLUNDELL-BOND) REGRESSIONS FOR LEVERAGE

	Manufacturing	*Services*	*Primary sector*	*Manufacturing*	*Services*	*Primary sector*
Country	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	3697	3774	606	3622	3562	601
Firms	835	1127	167	799	1053	165
J	74	68	65	75	69	66
Hansen	57.42	42.34	37.78	57.46	38.96	38.12
Hansen-p	0.0696	0.289	0.571	0.0691	0.426	0.555
AR1	–8.117	–7.124	–3.711	–8.123	–7.059	–3.552
AR1-p	4.79e–16	1.05e–12	0.000206	4.55e–16	1.68e–12	0.000382
AR2	1.056	–0.452	1.940	1.134	–0.386	2.004
AR2-p	0.291	0.651	0.0524	0.257	0.700	0.0451

Standard errors in parentheses [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Columns 1, 2 and 3 represent the regressions for manufacturing, services, and primary industry conglomerates. The Hansen is a test of the over-identifying restrictions for the GMM estimators. AR1 and AR2 are tests for the first-order and second-order serial correlation. N denotes the number of observations and J number of instruments. Country, Year and Industry denote if their respective dummy variables were introduced in the regressions. Variables are listed as follows: Lending(-1) represents the lagged value of the firm's leverage ratio (%); Listed is dummy variable for firms that participate in the stock market; Tangible assets is the firm's tangible fixed assets to total assets(%); IFD is the firm's internal financing deficit to total assets (%); Tax shield is the firm's taxes to total assets(%); Small and Very large are dummies for small and very large firms according to Orbis disaggregation; and Uniqueness is the firm's cost of goods sold to operating revenue(%).

Table B.2

BASELINE REGRESSIONS FOR LEVERAGE

	Manufacturing	*Services*	*Primary sector*	*Manufacturing*	*Services*	*Primary sector*
Leverage(–1)	0.481[c]	0.445[c]	0.633[c]	0.545[c]	0.490[c]	0.674[c]
	(0.0469)	(0.0377)	(0.0720)	(0.0414)	(0.0411)	(0.0721)
Tangible assets	0.0638[c]	–0.0153	0.0666[a]	0.0416[b]	–0.0404[c]	0.0692[a]
	(0.0186)	(0.0145)	(0.0349)	(0.0168)	(0.0146)	(0.0360)
ROAA	–0.365[c]	–0.328[c]	–0.206[c]	–0.310[c]	–0.366[c]	–0.201[c]
	(0.0381)	(0.0319)	(0.0671)	(0.0376)	(0.0393)	(0.0542)
Listed	–3.340[c]	–4.915[c]	–7.186[c]	–3.406[c]	–5.445[c]	–5.740[b]
	(1.155)	(1.083)	(2.479)	(1.000)	(1.123)	(2.379)
Tax shield	0.0846[a]	0.0403	0.0270	0.0980[b]	0.0269	0.174[b]
	(0.0436)	(0.0373)	(0.0524)	(0.0494)	(0.0490)	(0.0813)
Small	–4.134[c]	–5.705[c]	–4.889[b]	–3.018[b]	–4.150[c]	–3.277
	(1.340)	(1.007)	(2.294)	(1.305)	(1.020)	(2.311)
Very large	–0.0293	4.107[c]	0.525	0.0209	3.072[c]	–0.228
	(1.262)	(1.029)	(3.183)	(1.088)	(0.968)	(2.825)
Uniqueness				0.0315[a]	0.0277[b]	0.0847[c]
				(0.0183)	(0.0128)	(0.0245)
Constant	29.23[c]	38.56[c]	24.23[c]	25.17[c]	37.47[c]	15.59[c]
	(3.806)	(3.981)	(6.756)	(3.185)	(3.915)	(5.887)

Table B.2 (cont.)

BASELINE REGRESSIONS FOR LEVERAGE

	Manufacturing	*Services*	*Primary sector*	*Manufacturing*	*Services*	*Primary sector*
Country	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	4,851	6,765	923	4,396	5,434	835
Firms	1,134	1,964	232	1,004	1,614	212
J	74	72	66	75	72	67
Hansen	60.94	57.24	32.86	64.62	42.21	30.72
Hansen-p	0.0370	0.0586	0.814	0.0181	0.418	0.879
AR1	–7.604	–9.476	–4.180	–8.370	–8.285	–4.278
AR1-p	2.88e–14	2.63e–21	0.0000292	5.74e–17	1.18e–16	0.0000189
AR2	0.863	0.824	0.332	1.300	0.335	1.279
AR2-p	0.388	0.410	0.740	0.194	0.738	0.201

Standard errors in parentheses [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Columns 1, 2 and 3 represent the regressions for manufacturing, services, and primary industry conglomerates. The Hansen is a test of the over-identifying restrictions for the GMM estimators. AR1 and AR2 are tests for the first-order and second-order serial correlation. N denotes the number of observations and J number of instruments. Country, Year and Industry denote if their respective dummy variables were introduced in the regressions. Variables are listed as follows: Leverage (–1) represents the lagged value of the firm's leverage ratio (%); Listed is dummy variable for firms that participate in the stock market; ROA is firm's return on assets (%); Tangible assets is the firm's tangible fixed assets to total assets (%); Tax shield is the firm's taxes to total assets (%); Small and Very large are dummies for small and very large firms according to Orbis disaggregation; and Uniqueness is the firm's cost of goods sold to operating revenue (%).

Table B.3

PANEL VECTOR AUTOREGRESSION (GMM ESTIMATION) FOR DETERMINANTS OF CORPORATE FINANCING AND THE IMPLICIT INTEREST RATE AS A PROXY OF FINANCIAL CONDITIONS–BY GROUPS OF FIRMS REGARDING LEVERAGE RATIO (TOTAL LIABILITIES TO TOTAL ASSETS)

	Response to				
Response of	*ROAA (t–1)*	*Leverage (t–1)*	*Tangibility (t–1)*	*Imp. int. rate (t–1)*	*Tax shield (t–1)*
	a) Firms with a mean leverage ratio lower than the median (<51.02%)				
ROAA (t)	0.3944[c]	–0.0149	–0.0201	0.0199	0.2484
	(0.0974)	(0.0650)	(0.0526)	(0.0326)	(0.1946)
Leverage (t)	–0.0975	0.9575[c]	–0.1012	–0.1698[c]	0.2877
	(0.1111)	(0.1104)	(0.0994)	(0.0394)	(0.2705)
Tangibility (t)	–0.0656	–0.0237	0.8316[c]	–0.0288	–0.1909
	(0.1021)	(0.1531)	(0.1202)	(0.0572)	(0.2430)
Imp. int. rate (t)	0.0353	–0.1505[a]	–0.0575	0.307[b]	–0.135
	(0.0831)	(0.0779)	(0.0588)	(0.1503)	(0.1705)
Tax shield (t)	0.0872[c]	–0.0323	0.0068	–0.0022	0.1519[a]
	(0.0285)	(0.0242)	(0.0169)	(0.0115)	(0.0806)

Number of observations (N): 1,106

Number of firms (N): 291

Average number of years: 3.801

Final GMM criterion Q(b): 4.45e–34

Table B.3 (cont.)

	Response to				
Response of	*ROAA (t–1)*	*Leverage (t–1)*	*Tangibility (t–1)*	*Imp. int. rate (t–1)*	*Tax shield (t–1)*
ROAA (t)	0.3704[c]	0.1111[b]	–0.0573	–0.0228	0.1477
	(0.0991)	(0.0478)	(0.0457)	(0.0888)	(0.2037)
Leverage (t)	–0.2754[b]	0.7171[c]	0.0527	0.1084	0.1586
	(0.1175)	(0.0813)	(0.0800)	(0.1474)	(0.3218)
Tangibility (t)	–0.1999[a]	–0.1131	0.7985[c]	–0.3252[b]	0.1733
	(0.1125)	(0.0766)	(0.1139)	(0.1376)	(0.3237)
Imp. int. rate (t)	0.0166	–0.0926[c]	0.0513[a]	0.2717[c]	0.0205
	(0.0401)	(0.0297)	(0.0312)	(0.0600)	(0.1033)
Tax shield (t)	0.0418	0.0129	0.0176	0.0034	0.4610[c]
	(0.0348)	(0.0209)	(0.0223)	(0.0272)	(0.1131)

Number of observations (N): 1,294

Number of firms (N): 378

Average number of years: 3.423

Final GMM criterion Q(b): 3.25e–34

Initial weight matrix: identity

GMM weight matrix: robust

[a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Standard errors in parenthesis. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. This panel VAR satisfies the stability condition proposed by Hamilton (1994) and Lütkepohl (2005).

Table B.4

P-VAR VARIANCE DECOMPOSITION FOR DETERMINANTS OF CORPORATE FINANCING AND THE IMPLICIT INTEREST RATE AS A PROXY OF FINANCIAL CONDITIONS– BY GROUPS OF FIRMS REGARDING LEVERAGE RATIO (TOTAL LIABILITIES TO TOTAL ASSETS)

a) Firms with a Mean Leverage Ratio Lower than the Median (<51.02%)

Response Variable	*Impulse variable*				
	ROAA	*Tangibility*	*Imp. int. rate*	*Leverage*	*Tax shield*
ROAA	0.9498	0.0039	0.0073	0.0306	0.0084
Tangibility	0.0351	0.9611	0.0003	0.0016	0.0019
Imp. int. rate	0.0221	0.0302	0.7027	0.2429	0.0021
Leverage	0.0247	0.1939	0.0925	0.6845	0.0045
Tax shield	0.2340	0.0507	0.0215	0.1517	0.5421

b) Firms with a mean leverage ratio higher than the median or equal to the median (>51.02%)

Response Variable	*Impulse variable*				
	Tax shield	*Leverage*	*ROAA*	*Tangibility*	*Imp. int. rate*
Tax shield	0.9533	0.0066	0.0066	0.0331	0.0004
Leverage	0.0247	0.7952	0.0703	0.1076	0.0022
ROAA	0.1584	0.1454	0.6583	0.0363	0.0016
Tangibility	0.0007	0.0365	0.0524	0.8926	0.0178
Imp. int. rate	0.0063	0.1539	0.0226	0.0438	0.7734

Percent of variation in the row variable (10 years ahead) explained by the column variable. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. The variables were sorted following Granger-Wald causality test criteria.

Table B.5

PANEL VECTOR AUTOREGRESSION (GMM ESTIMATION) FOR DETERMINANTS OF CORPORATE FINANCING AND THE 3-YEAR ROLLING SD. OF IMPLICIT INTEREST RATE AS A PROXY OF FINANCIAL CONDITIONS–BY GROUPS OF FIRMS REGARDING LEVERAGE RATIO (TOTAL LIABILITIES TO TOTAL ASSETS)

	Response to				
Response of	ROAA *(t–1)*	*Leverage (t–1))*	*Tangibility (t–1)*	SD *imp. int. rate (t–1)*	*Tax shield (t–1)*
a) Firms with a mean leverage ratio lower than the median (<51.02%)					
ROAA (t)	0.4022[c]	0.0319	–0.0092	–0.0091	0.0779
	(0.1161)	(0.0619)	(0.0651)	(0.0844)	(0.3005)
Leverage (t)	–0.1334	0.9129[c]	–0.1269	–0.084	0.4354
	(0.1526)	(0.1216)	(0.1071)	(0.1146)	(0.4123)
Tangibility (t)	–0.1752	–0.0101	0.7109[c]	–0.1038	0.0702
	(0.1646)	(0.1480)	(0.1326)	(0.1015)	(0.3314)
SD imp. int. rate (t)	0.0595	–0.0198	–0.0371	0.8741[c]	–0.0267
	(0.0656)	(0.0403)	(0.0278)	(0.1137)	(0.1305)
Tax shield (t)	0.0793[a]	–0.0446[a]	0.0074	0.0052	0.1797
	(0.0425)	(0.0258)	(0.0248)	(0.0188)	(0.1205)

Number of observations (N): 829

Number of firms (N): 243

Average number of years: 3.412

Final GMM criterion Q(b): 1.96e–33

Table B.5 (cont.)

PANEL VECTOR AUTOREGRESSION (GMM ESTIMATION) FOR DETERMINANTS OF CORPORATE FINANCING AND THE 3-YEAR ROLLING SD. OF IMPLICIT INTEREST RATE AS A PROXY OF FINANCIAL CONDITIONS–BY GROUPS OF FIRMS REGARDING LEVERAGE RATIO (TOTAL LIABILITIES TO TOTAL ASSETS)

	Response to				
Response of	*ROAA (t–1)*	*Leverage (t–1))*	*Tangibility (t–1)*	*SD imp. int. rate (t–1)*	*Tax shield (t–1)*
b) Firms with a mean leverage ratio higher than the median or equal to the median (>51.02%)					
ROAA (t)	0.3408[c]	0.1812[b]	–0.0602	–0.0259	–0.3205
	(0.1135)	(0.0729)	(0.0676)	(0.1260)	(0.3636)
Leverage (t)	–0.1628	0.6629[c]	0.0587	–0.067	–0.2643
	(0.1523)	(0.1035)	(0.1129)	(0.2171)	(0.5654)
Tangibility (t)	–0.1585	–0.12	0.9836[c]	0.2273	0.2578
	(0.1810)	(0.1177)	(0.1691)	(0.2232)	(0.6302)
SD imp. int. rate (t)	–0.034	–0.0275	–0.0556[b]	0.606[c]	0.1205
	(0.0290)	(0.0201)	(0.0250)	(0.0978)	(0.0880)
Tax shield (t)	0.0068	0.0179	–0.0068	–0.0535	0.4555[b]
	(0.0446)	(0.0289)	(0.0338)	(0.0530)	(0.2131)

Number of observations (N): 916

Number of firms (N): 294

Average number of years: 3.116

Final GMM criterion Q(b): 7.13e–34

Initial weight matrix: identity

GMM weight matrix: robust

[a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Standard errors in parenthesis. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. This panel VAR satisfies the stability condition proposed by Hamilton (1994) and Lütkepohl (2005).

Table B.6

P-VAR VARIANCE DECOMPOSITION FOR DETERMINANTS OF CORPORATE FINANCING AND THE 3-YEAR ROLLING SD OF IMPLICIT INTEREST RATE AS A PROXY OF FINANCIAL CONDITIONS–BY GROUPS OF FIRMS REGARDING LEVERAGE RATIO (TOTAL LIABILITIES TO TOTAL ASSETS)

a) Firms with a Mean Leverage Ratio Lower than the Median (<51.02%)

Response variable	*Impulse variable*				
	ROAA	*Leverage*	*Tangibility*	*SD imp. int. rate*	*Tax shield*
ROAA	0.9594	0.0328	0.0056	0.0006	0.0016
Leverage	0.0066	0.8939	0.0868	0.0053	0.0074
Tangibility	0.0310	0.0437	0.9130	0.0122	0.0001
SD imp. int. rate	0.0180	0.0313	0.0900	0.8599	0.0008
Tax shield	0.2751	0.1762	0.0232	0.0017	0.5238

b) Firms with a Mean Leverage Ratio Higher than the Median or Equal to the Median (>51.02%)

Response variable	*Impulse variable*				
	Leverage	*Tangibility*	*Tax shield*	*SD imp. int. rate*	*ROAA*
Leverage	0.7852	0.1904	0.0113	0.0010	0.0121
Tangibility	0.0681	0.9095	0.0118	0.0069	0.0038
Tax shield	0.0294	0.0198	0.9435	0.0071	0.0003
SD imp. int. rate	0.0330	0.6676	0.0085	0.2872	0.0037
ROAA	0.2300	0.0991	0.0943	0.0059	0.5708

Percent of variation in the row variable (10 years ahead) explained by the column variable. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. The variables were sorted following Granger-Wald causality test criteria.

Table B.7

GMM (BLUNDELL-BOND) REGRESSIONS FOR INVESTMENT

Percent of the change in fixed assets

	(1)	*(2)*	*(3)*
Investment (–1)	–0.0285	0.0734[a]	–0.0524[a]
	(0.0303)	(0.0390)	(0.0292)
Sales growth	27.89[c]	9.304[c]	32.68[c]
	(3.110)	(1.875)	(3.704)
Sales growth (–1)	13.59[b]	10.88[a]	15.42[b]
	(6.929)	(6.554)	(6.674)
Leverage	0.205		
	(0.134)		
Leverage (–1)	–0.292[b]		
	(0.139)		
(k–y) (–2)	–6.999[c]	–5.957[c]	–7.913[c]
	(1.411)	(1.227)	(1.679)
Interest debt burden	0.374[c]	–0.00290	0.385[c]
	(0.0979)	(0.0619)	(0.113)
Interest debt burden (–1)	–0.0316	–0.0228	–0.152
	(0.105)	(0.0517)	(0.111)
Z-score	0.487	10.53[c]	
	(2.335)	(1.266)	
Z-score (–1)	0.418	–8.515[c]	
	(2.351)	(1.260)	
Listed	1.271	1.112	1.786[a]
	(0.994)	(0.709)	(1.022)

Table B.7 (cont.)

GMM (BLUNDELL-BOND) REGRESSIONS FOR INVESTMENT

Percent of the change in fixed assets

	(1)	*(2)*	*(3)*
Small	−9.489	0.242	−12.08
	(8.215)	(6.393)	(10.70)
Very large	0.492	−0.454	−3.940
	(4.020)	(6.046)	(4.352)
IFD		1.074[c]	
		(0.0289)	
IFD (−1)		−0.175[c]	
		(0.0409)	
Tangibility		0.278[c]	0.251[c]
		(0.0488)	(0.0650)
Tangibility (−1)		−0.258[c]	−0.226[c]
		(0.0425)	(0.0591)
Uniqueness		−0.0605[b]	−0.0169
		(0.0305)	(0.0587)
Uniqueness (−1)		−0.115[c]	−0.131[b]
		(0.0249)	(0.0545)
ROAA			−0.228[b]
			(0.103)
ROAA (−1)			0.288[c]
			(0.103)
Constant	22.03[b]	31.28[c]	34.89[c]
	(8.651)	(8.158)	(10.07)

Table B.7 (cont.)

GMM (BLUNDELL-BOND) REGRESSIONS FOR INVESTMENT

Percent of the change in fixed assets

	(1)	*(2)*	*(3)*
Country	Yes	Yes	Yes
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	5443	3990	5172
N_g	1219	893	1080
J	74	78	76
Hansen	44.90	38.01	42.18
Hansen-p	0.0810	0.252	0.131
AR1	–9.738	–7.643	–9.547
AR1-p	2.07e–22	2.12e–14	1.33e–21
AR2	–0.989	0.751	–1.330
AR2-p	0.323	0.453	0.183

Standard errors in parentheses [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Columns 1, 2 and 3 represent the regressions for manufacturing, services, and primary industry conglomerates. The Hansen is a test of the over-identifying restrictions for the GMM estimators. AR1 and AR2 are tests for the first-order and second-order serial correlation. N denotes the number of observations and J number of instruments. Country, Year and Industry denote if their respective dummy variables were introduced in the regressions. Variables are listed as follows: Investment represents the lagged value of the firm's fixed investment; Leverage is the firm's indebtness ratio; Interest debt burden is the ratio of interest paid to operating revenue (%); Sales growth is the annual variation of operating revenue; Listed is a dummy variable for firms that participate in the stock market; ROA is firm's return on assets (%); Z-score is the firm profitability deviation from its capital ratio divided by ROAA's standard deviation, this indicator is expressed in log-transformation ; Tangibility assets is the firm's tangible fixed assets to total assets (%); IFD is the firm's internal financing deficit to total assets (%); k-y is the error correction term that reflects how firms adjust their capital towards a target; Small and very large are dummies for small and very large firms according to Orbis disaggregation; and Uniqueness is the firm's cost of goods sold to operating revenue (%).

Table B.8

PANEL VECTOR AUTOREGRESSION FOR FINANCIAL CONDITIONS INDEX AND MACROECONOMIC VARIABLES

Response of	*Response to*		
	Gross fixed investment growth (t–1)	*FC index (t–1)*	*GDP growth (t–1)*
Gross fixed investment growth(t)	–0.861[b]	0.421[b]	3.108[b]
	(0.350)	(0.194)	(1.497)
FC index–country median (t)	0.196	–0.150	–0.536
	(0.377)	(0.229)	(1.622)
GDP growth (t)	–0.145	0.130[b]	0.447
	(0.0976)	(0.0551)	(0.403)
Number of observations (N):	53		
Number of countries (N):	10		
Average number of years:	5.30		
Final GMM criterion Q(b): 3.04e–32			
Initial weight matrix: identity			
GMM weight matrix: robust			

[a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Standard errors in parenthesis. This panel VAR satisfies the stability condition proposed by Hamilton (1994) and Lütkepohl (2005).

Panel VAR-Granger causality Wald test
Ho: Excluded variable does not Granger-cause equation variable
Ha: Excluded variable Granger-causes equation variable

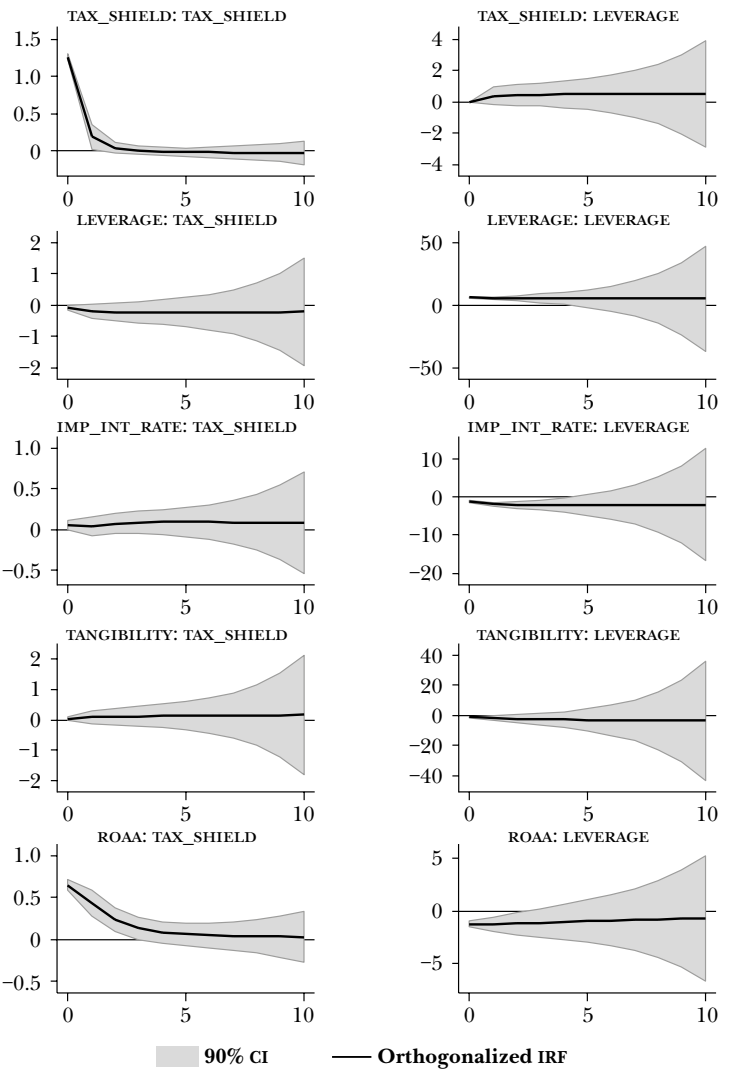
Equation	*Excluded*	*Chi-sq*	*df*	*Prob > Chi-sq*
Gross fixed investment growth (%)	FC index–country median	4.714	1	0.030
	GDP growth (%)	4.310	1	0.038
	All	7.135	2	0.028
FC index–country median	Gross fixed investment growth (%)	0.270	1	0.603
	GDP growth (%)	0.109	1	0.741
	All	0.359	2	0.836
GDP growth (%)	Gross fixed investment growth (%)	2.217	1	0.136
	FC index–country median	5.578	1	0.018
	All	6.721	2	0.035

Figure B.1

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio lower than the median (<51.02%)



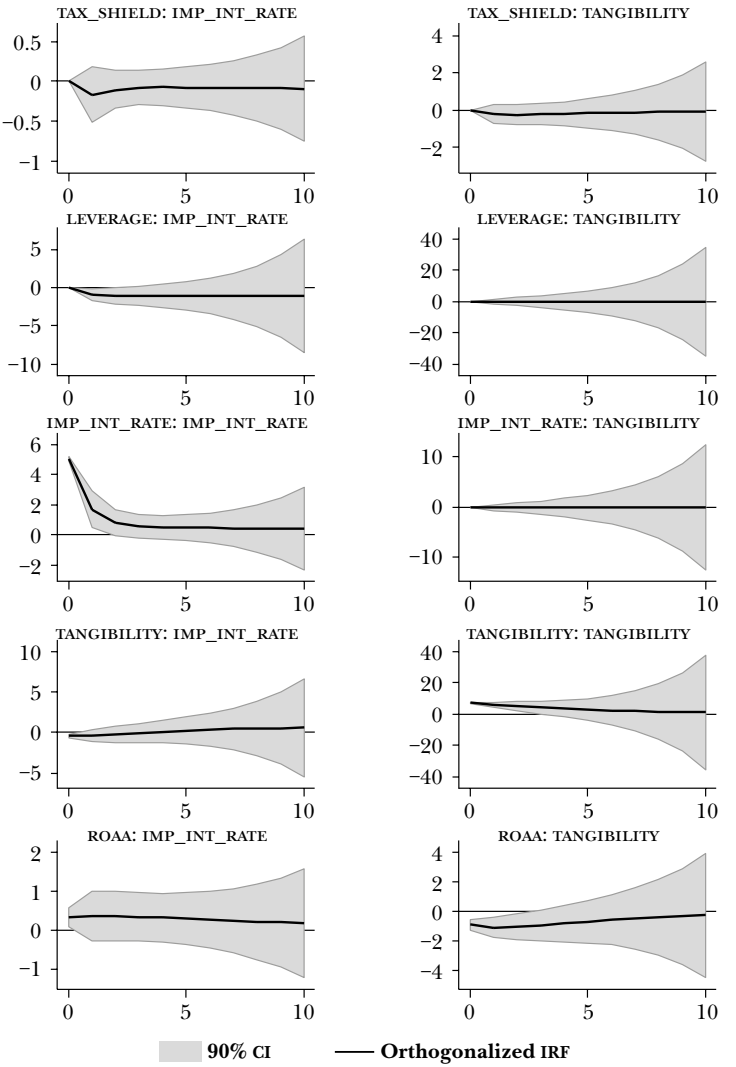
Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.1 (cont.)

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio lower than the median (<51.02%)



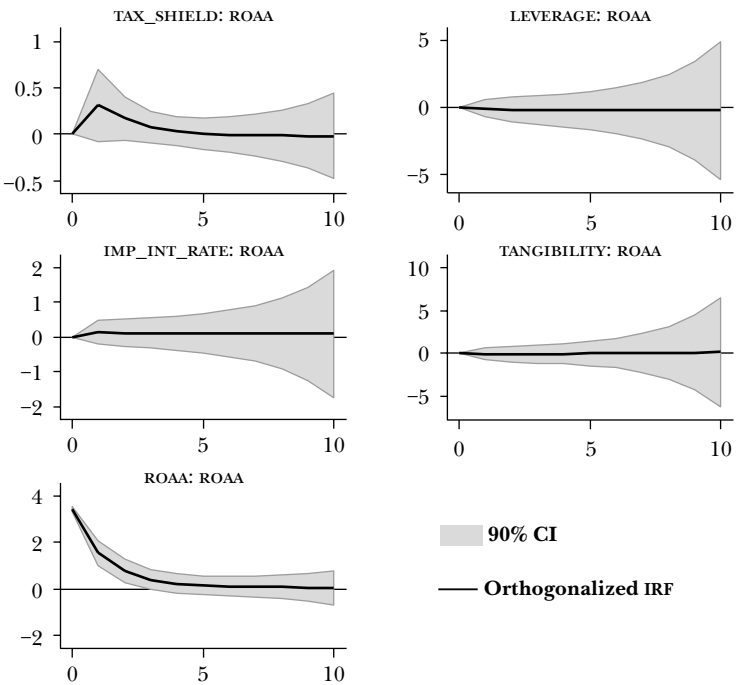
Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.2 (cont.)

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio lower than the median (<51.02%)



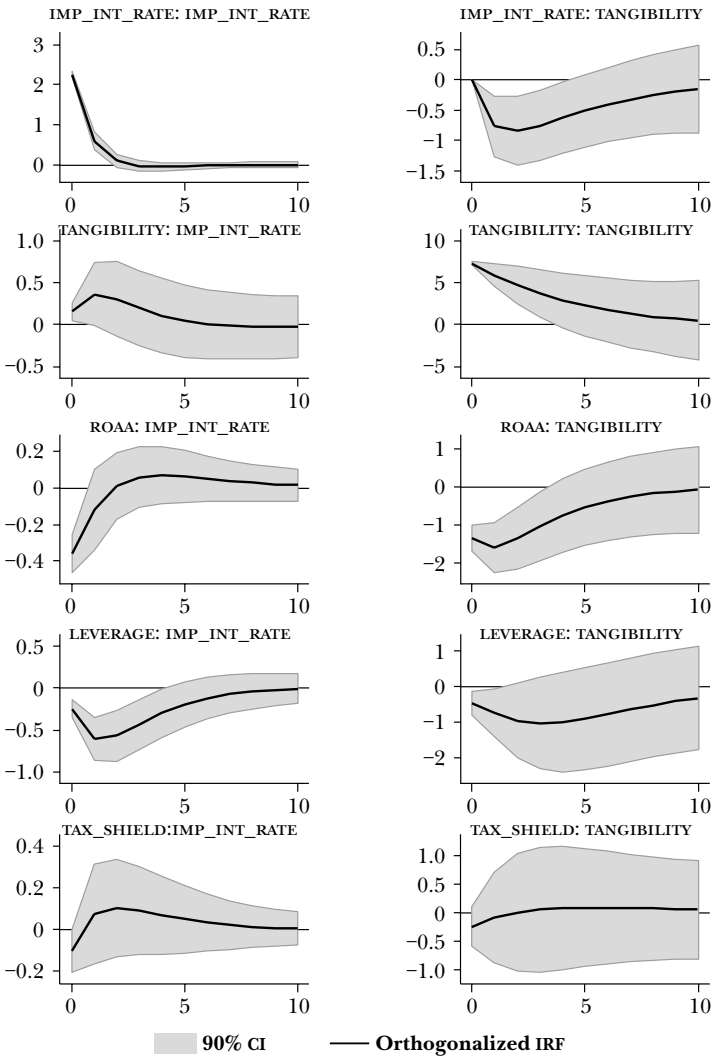
Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.2

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio higher than the median or equal to the median (>51.02%)

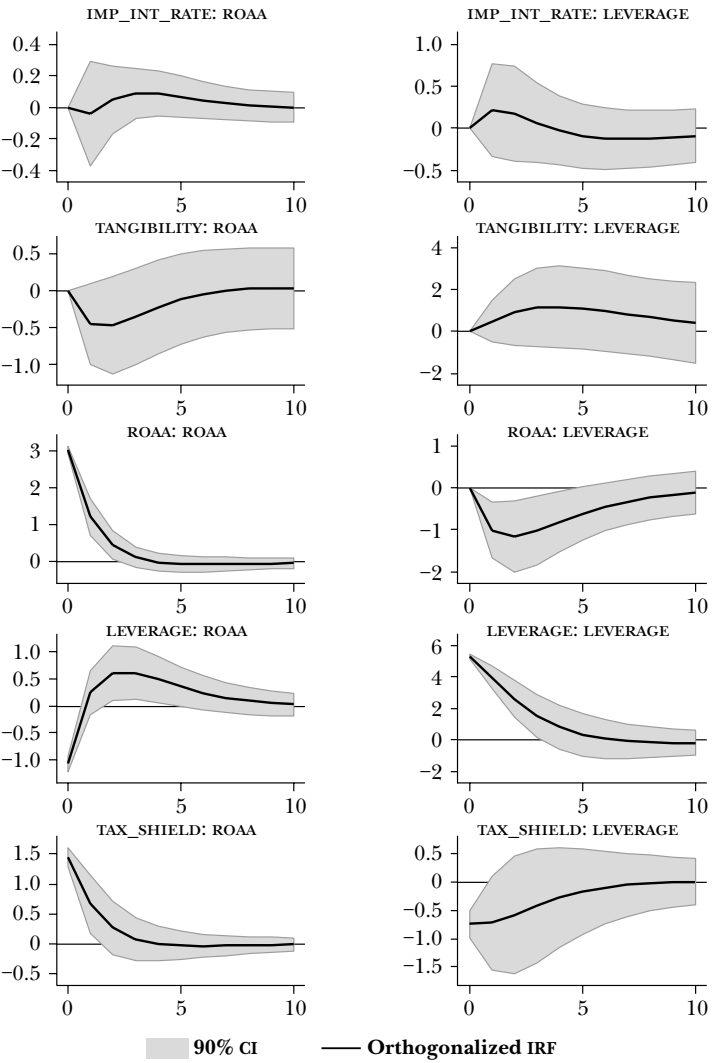


Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio higher than the median or equal to the median (>51.02%)



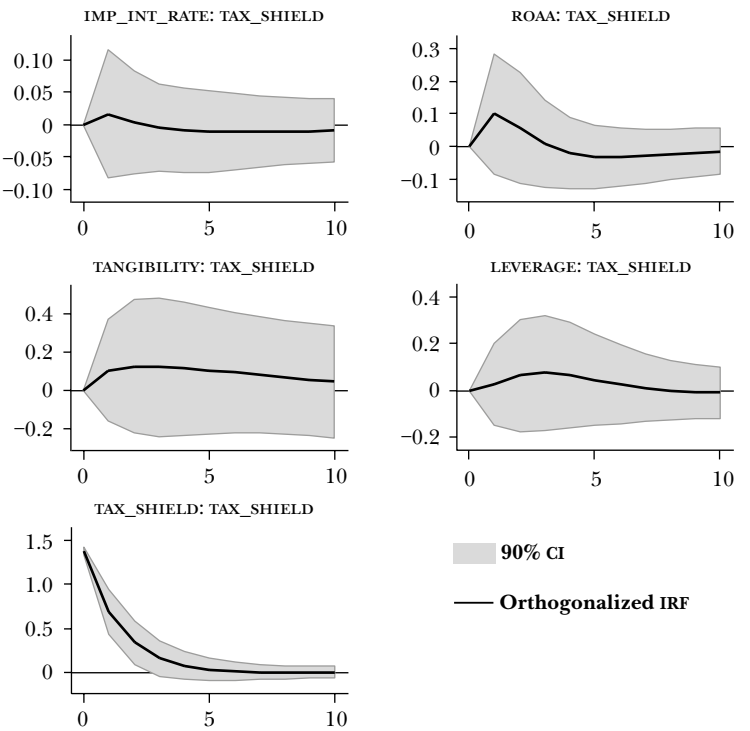
Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.2 (cont.)

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio higher than the median or equal to the median (>51.02%)



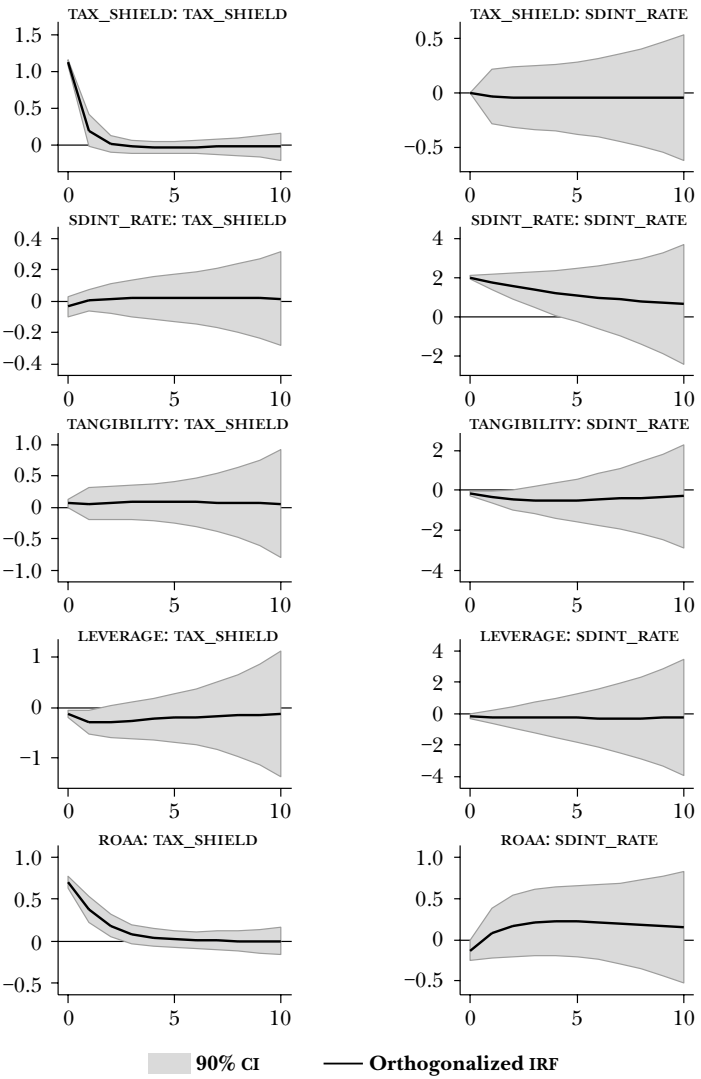
Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.3

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE SD OF IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio lower than the median (<51.02%)

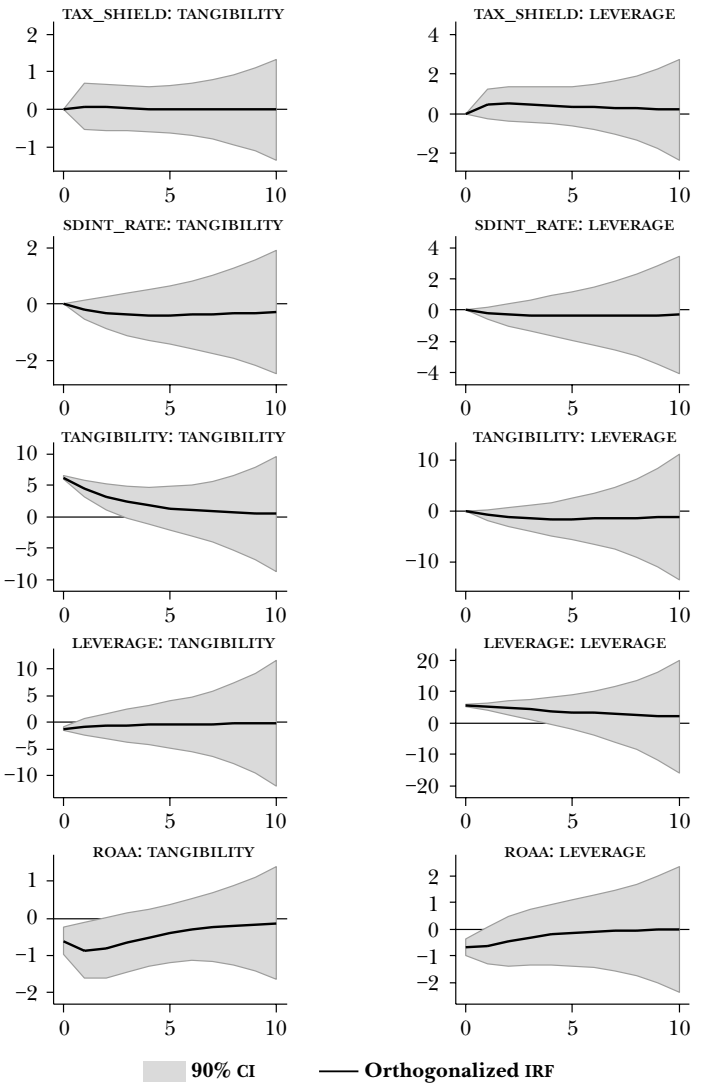


Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE SD OF IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio lower than the median (<51.02%)



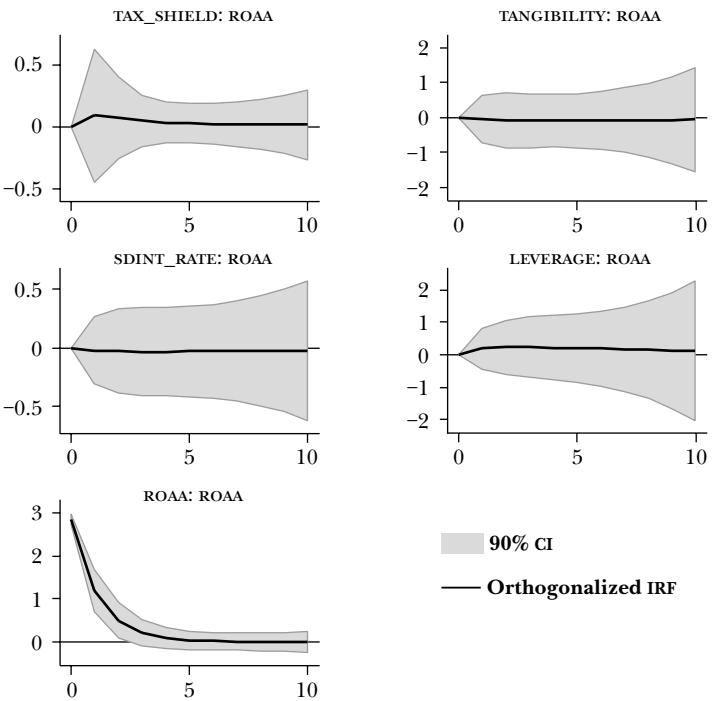
Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.3 (cont.)

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE SD OF IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio lower than the median (<51.02%)



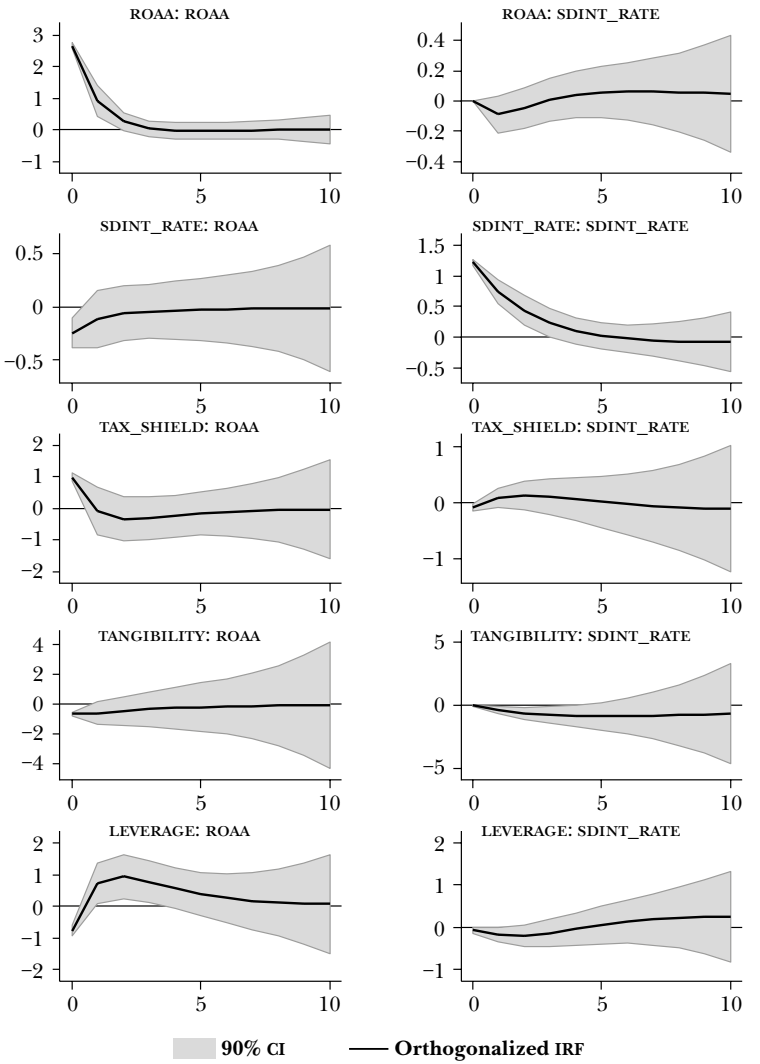
Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.4

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE SD OF IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio higher than the median or equal to the median (>51.02%)

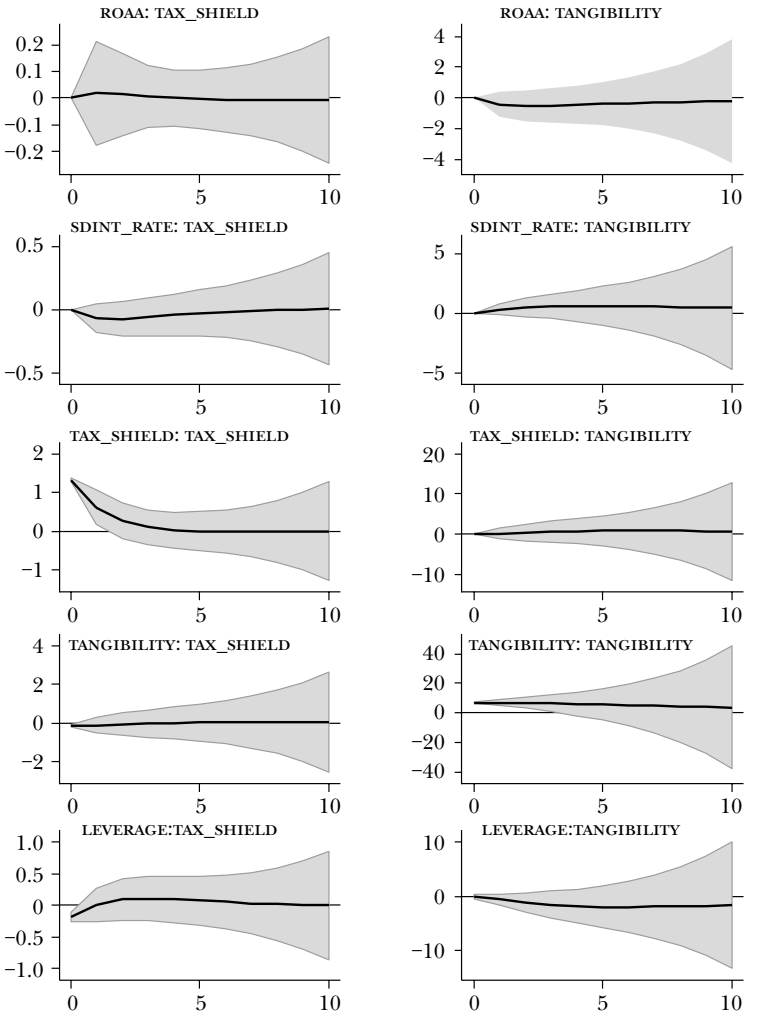


Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE SD OF IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio higher than the median or equal to the median (>51.02%)



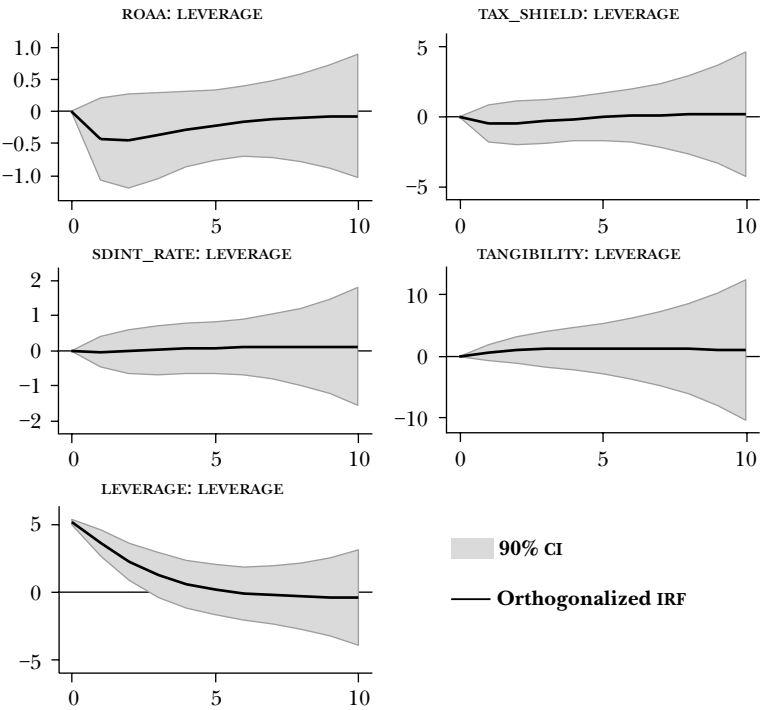
Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.4 (cont.)

IMPULSE-RESPONSE FUNCTIONS FOR DETERMINANTS OF CORPORATE FINANCING AND THE SD OF IMPLICIT INTEREST RATE

Total liabilities to total assets

Firms with a mean leverage ratio higher than the median or equal to the median (>51.02%)



Impulse-response functions derived by Cholesky's variance decomposition. All variables were transformed using forward orthogonalization suggested by Arellano and Bover (1995), through the Helmert procedure. All country effects were included by subtracting the means of each variable calculated for each country-year. Variables were sorted following Granger-Wald causality test criteria. Confidence intervals were generated by a Monte-Carlo simulation with 1,000 repetitions.

Figure B.5

LAGGED INDEX OF CORPORATE FINANCIAL CONDITIONS AND GROSS FIXED CAPITAL GROWTH

Selected ICFC quantiles for the ten sample countries, own calculations and WB-WDI

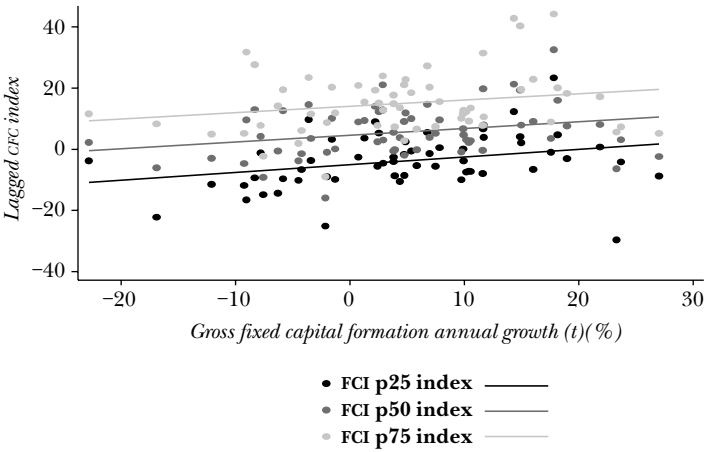


Figure B.6

LAGGED INDEX OF CORPORATE FINANCIAL CONDITIONS AND GDP GROWTH

Selected ICFC quantiles for the ten sample countries, own calculations and WB-WDI

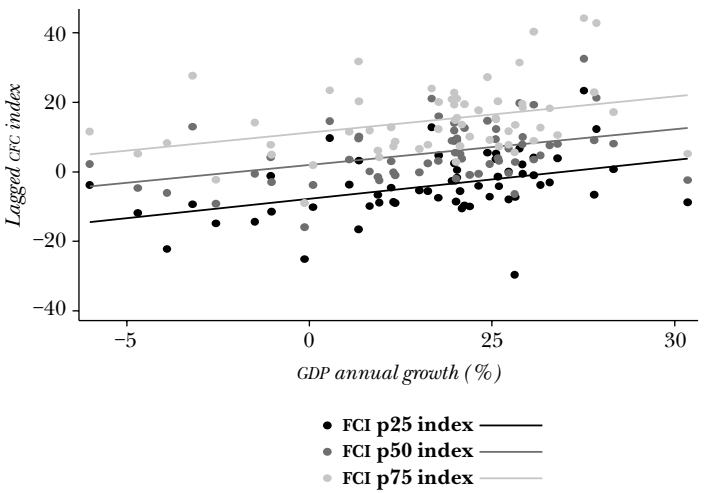
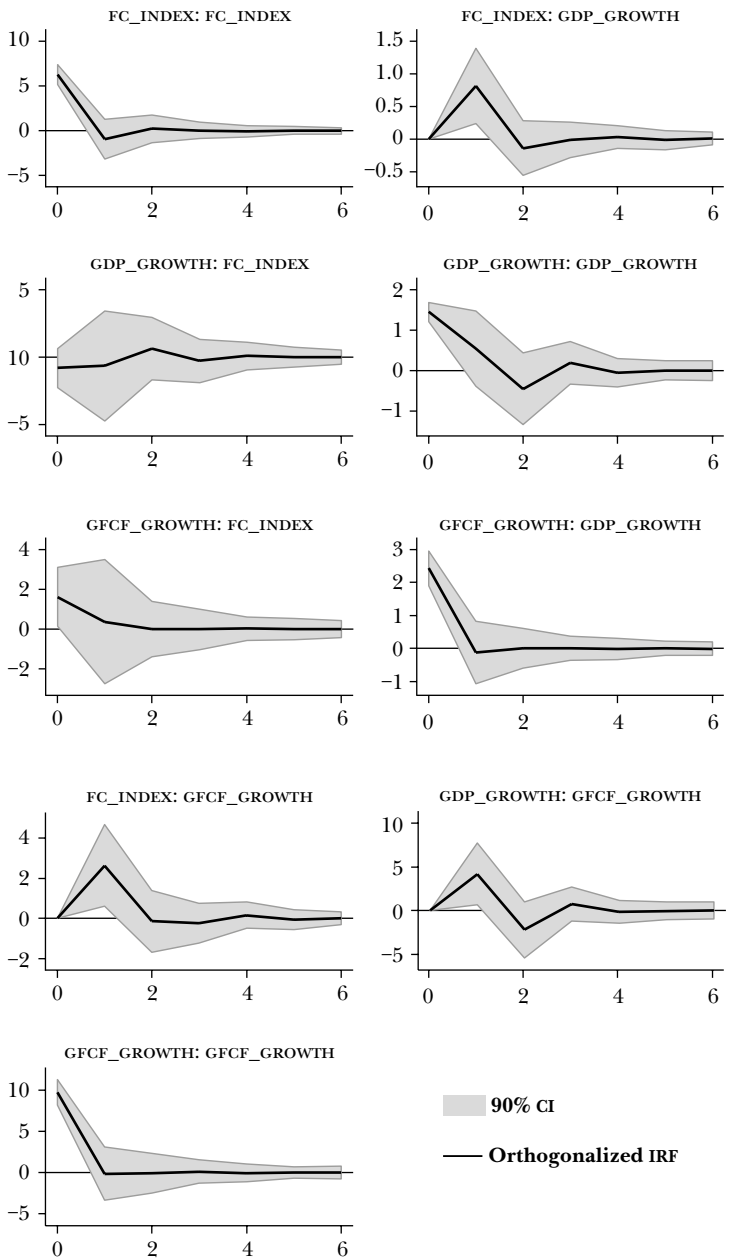


Figure B.7

IMPULSE-RESPONSES OF THE PANEL VECTOR AUTOREGRESSION FOR FINANCIAL CONDITIONS INDEX AND MACROECONOMIC VARIABLES



References

Abrigo, M. R., and I. Love (2016), "Estimation of Panel Vector Autoregression in Stata," *The Stata Journal*, Vol. 16, No. 3, pp. 778-804.

Arellano, M., and S. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *The Review of Economic Studies*, Vol. 58, No. 2, pp. 277-297.

Arellano, M., and O. Bover (1995), "Another Look at the Instrumental Variable Estimation of Error-components Models," *Journal of Econometrics*, Vol. 68, No. 1, pp. 29-51.

Balfoussia, Hiona, and Heather D. Gibson (2016), *Firm Investment and Financial Conditions in the Euro Area: Evidence from Firm-level Data*, Working Paper, No. 208, Bank of Greece.

Blundell, R., and S. Bond (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models," *Journal of Econometrics*, Vol. 87, No. 1, pp. 115-143.

Bond, S., D. Harhoff, and J. van Reenen (1999), *Investment, R&D and Financial Constraints in Britain and Germany*, Working Paper, No. 99/5, Institute for Fiscal Studies.

Bradley, M., G. A. Jarrell, and E. Kim (1984), "On the Existence of an Optimal Capital Structure: Theory and Evidence," *The Journal of Finance*, Vol. 39, No. 3, pp. 857-878.

DeAngelo, H., and R. W. Masulis (1980), "Optimal Capital Structure under Corporate and Personal Taxation," *Journal of Financial Economics*, Vol. 8, No. 1, pp. 3-29.

Fama, E. F., and K. R. French (2002), "Testing Trade-off and Pecking Order Predictions about Dividends and Debt," *Review of Financial Studies*, Vol. 15, No. 1, pp. 1-33.

Flannery, M. J., and K. P. Rangan (2006), "Partial Adjustment toward Target Capital Structures," *Journal of Financial Economics*, Vol. 79, No. 3, pp. 469-506.

Frank, M. Z., and V. K. Goyal (2007), "Trade-off and Pecking Order Theories of Debt," in B. Espen Eckbo, *Handbook of Empirical Corporate Finance*, Vol. 2 (2008), pp. 135-202.

Fuertes, A., and J. M. Serena (2014), "Firms' Financial Soundness and Access to Capital Markets," *Financial Stability Review*, Vol. 27, Banco de España, pp. 113-132.

Gilchrist, S., and C. Himmelberg (1998), *Investment, Fundamentals and Finance*, NBER Working Paper, No. 6652.

Gilchrist, Simon, Raphael Schoenle, Jae W. Sim, and Egon Zakrajsek (2015), *Inflation Dynamics during the Financial Crisis*, Finance and Economics Discussion Series, No. 2015-012, Board of Governors of the Federal Reserve System, Washington, <http://dx.doi.org/10.17016/FEDS.2015.012>.

Gomes, Joao F. (2001), "Financing Investment," *American Economic Review*, pp. 1263-1285.

Hamilton, J. D. (1994), *Time Series Analysis,* Vol. 2, Princeton University Press, Princeton.

Harris, M., and A. Raviv (1991), "The Theory of Capital Structure," *The Journal of Finance,* Vol. 46, No. 1, pp. 297-355.

Hattori, M., and E. Takats (2015), *The Role of Debt Securities Markets*, BIS Paper, No. 83c.

Hernando, Ignacio, and Carmen Martínez-Carrascal (2008), "The Impact of Financial Variables on Firms' Real Decisions: Evidence from Spanish Firm-level Data," *Journal of Macroeconomics,* Vol. 30, No. 1, pp. 543-561.

Huang, R., and J. R. Ritter (2009), "Testing Theories of Capital Structure and Estimating the Speed of Adjustment," *Journal of Financial and Quantitative Analysis*, Vol. 44, No. 02, pp. 237-271.

Jensen, M. C., and W. H. Meckling (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, Vol. 3, No. 4, pp. 305-360.

La Rocca, M., T. La Rocca, and A. Cariola (2011), "Capital Structure Decisions during a Firm's Life Cycle," *Small Business Economics*, Vol. 37, pp. 107-130.

Lemmon, M. L., M. R. Roberts, and J. F. Zender (2008), "Back to the Beginning: Persistence and the Cross-section of Corporate Capital Structure," *The Journal of Finance*, Vol. 63, No. 4, pp. 1575-1608.

López-García, J., and F. Sogorb-Mira (2008), "Testing Trade-off and Pecking Order Theories Financing SMEs," *Small Business Economics*, Vol. 31, No. 2, pp. 117-136.

Love, I., and I. Zicchino (2006), "Financial Development and Dynamic Investment Behavior: Evidence from Panel VAR," *The Quarterly Review of Economics and Finance*, Vol. 46, No. 2, pp. 190-210.

Lütkepohl, H. (2005), *New Introduction to Multiple Time Series Analysis*, Springer Science & Business Media.

Michaelas, N., F. Chittenden and P. Poutziouris (1999), "Financial Policy and Capital Structure Choice in UK SMEs: Empirical Evidence from Company Panel Data," *Small Business Economics*, Vol. 12, No. 2, pp. 113-130.

Myers, S. C. (1977), "Determinants of Corporate Borrowing," *Journal of Financial Economics*, Vol. 5, No. 2, pp. 147-175.

Myers, S. C. (1984), "The Capital Structure Puzzle," *The Journal of Finance*, Vol. 39, No. 3, pp. 574-592.

Myers, S. C., and N. S. Majluf (1984), "Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have," *Journal of Financial Economics*, Vol. 13, No. 2, pp. 187-221.

Rajan, R. G., and L. Zingales (1995), "What Do We Know about Capital Structure? Some Evidence from International Data," *The Journal of Finance*, Vol. 50, No. 5, pp. 1421-1460.

Ramalho, J.S., and J. V. da Silva (2009), "A Two-part fractional Regression Model for the Financial Leverage Decisions of Micro, Small, Medium and Large Firms," *Quantitative Finance*, Vol. 9, No. 5, pp. 621-636.

Serrasqueiro, Z., and A. Caetano (2015), "Trade-off Theory versus Pecking Order Theory: Capital Structure Decisions in a Peripheral Region of Portugal," *Journal of Business Economics and Management*, Vol. 16, No. 2, pp. 445-466.

Shyam-Sunder, L., and S. C. Myers (1999), "Testing Static Tradeoff against Pecking Order Models of Capital Structure," *Journal of Financial Economics*, Vol. 51, No. 2, pp. 219-244.

Smith, C. W., and R. M. Stulz (1985), "The Determinants of Firms' Hedging Policies," *Journal of Financial and Quantitative Analysis*, Vol. 20, No. 04, pp. 391-405.

Sogorb-Mira, F. (2005), "How SME Uniqueness Affects Capital Structure: Evidence from a 1994-1998 Spanish Data Panel," *Small Business Economics*, Vol. 25, No. 5, pp. 447-457.

Titman, S., and R. Wessels (1988), "The Determinants of Capital Structure Choice," *The Journal of Finance*, Vol. 43, No. 1, pp. 1-19.

Windmeijer, F. (2005), "A Finite Sample Correction for the Variance of Linear Efficient Two-step GMM Estimators," *Journal of Econometrics*, Vol. 126, No. 1, pp. 25-51.