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Do Corporate Groups Accrue Higher Leverage? Emerging Market Evidence

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Abstract

This article explores the capital structure composition of group-affiliated firms employing panel data for non-financial companies listed on the Pakistan Stock Exchange. Specifically, we examine various motives that may induce corporate group-affiliated firms to accrue higher levels of debt relative to those of the stand-alone firms. Preliminary empirical results corroborate the conjecture that group-affiliated firms choose to accrue higher debt ratios compared to independent firms. Further disentangling the higher debt ratios of group-affiliates, our empirical evidence tends to support the hypothesis of the risk-sharing or co-insurance effect whereby business groups enable the member firms to share risks through income-smoothing and intra-group reallocation of resources. Empirical results also corroborate the 'financing advantage' of the corporate groups, and our empirical evidence is consistent with the view that business groups act as internal capital markets, assist affiliated firms to overcome financial constraints, and ease the access to external capital. These results are further confirmed by an extensive application of robustness checks and controlling for endogeneity concerns. Lastly, business group affiliation appears to positively contribute to a firm's better financial performance relative to the stand-alone firms.

Keywords*:* corporate group, capital structure, ownership structure
JEL Classification: G32

Introduction

Mounting literature documents that corporate groups—confederations of legally independent firms tied together through

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multiple formal and informal social connections—is a pervasive corporate ownership phenomenon (Faccio, Larry, & Lang, 2002; La Porta, Lopez-de-Silanes, & Shleifer, 1999). The vastly different and complex structures of corporate groups in emerging economies have generated a large theoretical and empirical work that not only examines the economic relevance of the ownership and governance structures of these groups for firm performance but also for the corporate financial and investment policies (Almeida & Wolfenzon, 2006; Fama & Jensen, 1985; Khanna, 2000; Tan & Ma, 2018). This literature has documented both the bright and dark sides of corporate groups (see Khanna & Yafeh (2007) for an excellent description of business groups). One of the key positive aspects of corporate groups concerns their ability to substitute for market frictions (Khanna & Palepu, 1997). For instance, firms facing constraints in accessing intermediate funds can benefit from the financial inter-linkages in the group-affiliation, particularly when faced with negative cash-flow shocks (Hoshi, Kashyap, & Scharfstein, 1991). In contrast, ownership and governance structures of corporate groups exacerbate expropriation risks through various means as tunneling (Bertrand, Mehta, & Mullainathan, 2002), self-dealing, and sub-optimal levels of debt (Varma, 1997). Stulz (1988) argues that higher levels of corporate debt allow the controlling shareholders to control corporate resources without ownership dilution in the firm. Nevertheless, empirical work is less clear on whether higher corporate debt facilitates expropriation (Atanasov, Black, Ciccotello, & Gyoshev, 2010; Laeven, 2001), or corporate groups maintain it for other purposes such as avoiding control dilution (Ellul, 2010; Facio, Lang, & Young, 2010; Stulz, 1988), tax considerations (Walsh & Ryan, 1997) or risk considerations (Byun, Choi, Hwang, & Kim, 2013; Ferris, Kim, & Kitsabunnarat, 2003; Jia, Shi, & Wang, 2013). In this paper, we contribute to this line of research by examining if the debt-to-asset ratios of group-affiliated firms are different from that of the independent firms. We then explore if the group-affiliates are motivated by tax-savings and/or the risk-sharing incentives for accruing higher debt ratios. Third, we test whether the well-known internal capital market role (also known as the 'financing advantage hypothesis') of corporate groups is utilized by group-affiliates to mitigate their financial constraints concerning access to intermediate funds. Finally, we assess whether

group-affiliation creates value by inducing better financial performance compared to non-group counterparts.

We conduct our study in the context of a developing economy and focus on Pakistan's market because the features of corporate groups are quite similar to those of many Asian countries (Abdullah, Shah, & Khan, 2012; Cheema, 2003). Since the seminal work of Leff (1976), extensive empirical work has focused on the question of the pervasive existence and survival of business groups around the world. One of the arguments centers on the way these member firms are organized to influence their governance structure and how they raise the capital (Khanna & Palepu, 2000). The central argument in Leff's "market failure" theory is that business groups have thrived in developing economies because they are substitutes for weak and underdeveloped institutions and market failures. It is interesting to explore how particular features of Pakistani business groups influence capital structure policies of the group-affiliates.

We contribute to the literature on corporate groups in three distinct ways. First, we find support for the risk-sharing and co-insurance hypothesis. Corporate groups enable the member firms to share risks through income-smoothing, intra-group transfer of resources and mutual-insurance. Second, empirical results corroborate the "institutional voids theory (Keister, 1998; Khanna, 2000) that business groups serve to act as internal capital markets as a response to the poorly functioning capital markets and prevailing market inefficiencies. Within-group the internal capital markets are mechanisms that assist the distressed firms in overcoming their financial problems. Third, consistent with the risk-sharing effect, group affiliation seems to positively affect a firm's financial performance.

The remainder of the paper is organized in the following pattern. Section 2 formulates testable hypotheses in light of the relevant literature. Econometric specifications and discussion of results are presented in section 3 while section 4 concludes the paper.

2. Literature Review and Hypotheses

2.1. Business Groups and Corporate Leverage

Stulz (1988) argues that higher levels of leverage allow the controlling shareholder to exercise greater control over resources

without ownership dilution in the firm. In contrast, agency theory (Jensen & Mackling, 1976) suggests that debt can mitigate agency problems and constrain managerial expropriation since debt entails fixed commitments on corporate cash flows and exposes the managers to increased monitoring and scrutiny by external investors (Easterbrook, 1984). Furthermore, lower information asymmetry (Dewenter & Warther, 1998; Hoshi et al., 1991), access to internal capital markets due to co-insurance and intra-group financing (Chang & Hong, 2000), and better access to external capital markets because of group reputation and influence (Schiantarelli & Sembenelli, 2000) may suggest that group-affiliates can raise external capital better than the independent firms.

H_1: Affiliation to a corporate group enhances a firm's access to external capital and incentivizes controlling shareholders to maintain high debt levels, ceteris paribus.

2.2. Corporate Groups and Business Risk Profiling

One of the key features of the corporate groups has been the diversified nature of the entities across distinct markets that comprise the group (Guillen, 2000; Palepu & Khanna, 1999; Pan, 1999). Besides the benefit of spreading the overall risk across industries and markets, it provides group affiliates with stability in earnings in the face of unstable markets and financial distress (Anderson & Reeb, 2003). Drawing on the institutional void theory (Keister, 1998; Khanna, 2000), a large body of literature documents that corporate groups have developed internal capital markets that allow the group to allocate resources from one set of members to another, particularly in times of financial constraints (He, Mao, Rui, & Zha, 2013), or significant information asymmetry (Williamson, 1986). Hence, group affiliation could create a co-insurance (propping) effect (Lincoln, Gerlach, & Ahmadjian, 1996) that can create an efficient intra-group transfer of resources and improve the information flow. This can create value for group-affiliated firms (Jia et al., 2013), and ease of access to external capital.

H_2: Group-affiliated firms accrue more debt because of better risk profiles and lower earnings volatility as compared to their stand-alone counterparts.

2.3. Corporate Groups and Financial Performance

Whether the affiliation to a business group makes a difference in firm financial performance and value, has fascinated the researchers for quite some time. Both the empirical and theoretical work is far from conclusive, though. The institutional voids theory (Khanna & Palepu, 2000) suggests that business groups act as organizational responses to the under-developed and poorly functioning markets and institutions. Their ubiquity in emerging economies suggests that business groups are well suited to plug these voids as they have superior capabilities that can render competitive advantage and affect the economic performance of member firms (Fisman & Khanna, 2004; Purkayastha, Manolova, & Edelman, 2012). These competitive advantages could include a group's reputational capital that an affiliated firm can capitalize on to get access to a wider set of resources and managerial talent to achieve superior financial and operating performance (Peng, Lee, & Wang, 2005). Consequently, many studies document superior financial performance for group-affiliated firms relative to their independent counterparts (e.g., Chang & Choi, 1988; Ma, Yo, & Xi, 2006; Torres, Jara Bertín, & López-Iturriaga, 2017).

In contrast to these positive group-based benefits for affiliates, there are theoretical foundations and empirical work that presents the dark side of the business groups that has implications for firm performance and value. Of these dark aspects, the "expropriation perspective" has been the dominant view. This hypothesis portrays the business groups as complex organizational mechanisms designed to siphon off or expropriate minority shareholders (Claessens, Djankov, Fan, & Lang, 2002; Morck, Wolfenzon, & Yeung, 2005). Another important aspect, the rent-seeking perspective, conjectures that business group structures and the control that a handful of owners have over the firms, enable them to have access to the resources for extracting private benefits (Johnson, La Porta, Lopez-de-Silanes, & Shleifer, 2000). Given these contrasting theoretical and empirical evidence, we propose the following hypothesis.

H_3: Financial performance of group-affiliated firms is different from that of the non-group firms, ceteris paribus.

2.4. Business Groups and Financial Constraints

Information asymmetries play a central role in determining a firm's ability to access the external capital. An affiliation to a business group can significantly reduce asymmetric problems for a firm when it seeks external funds as it can capitalize on the business group's reputation and influence (Chang & Hong, 2000; Dewenter & Warther, 1998). In developing countries, the reputational effect of a business group might be a significant contributing factor, especially given the prevailing market inefficiencies and information asymmetries. Besides, business groups are organized in a way that creates strong intra-group network effects inducing firms in the group to benefit from the inter-corporate loan, co-insurance, and co-investment. This virtually helps develop deep internal capital markets (ICMs) that facilitate access to the intra-group funds for member firms. According to this 'financing advantage hypothesis', the corporate group's ICMs can thus ease financial constraints by reducing the sensitivity of investments to the firm's internal income flows.

H_4: Since group-affiliated firms can utilize intra-group resources and leverage on the internal capital markets, member firms experience lower constraints in their access to external funds, than the independent firms do, ceteris paribus.

3. Methodology and Data Description

We start our analysis by comparing the capital structure composition of group-affiliates with those of the stand-alone firms, by employing the panel data framework. A key point in the regression estimates, after controlling for leverage determinants, is the coefficient for the Group binary variable. We hypothesize that group-affiliates maintain higher debt ratios. To test our research objectives, we begin by adopting the estimation specification of Paligorova and Xu (2012) as our baseline model:

$$\begin{aligned} LEV_{it} = {} & \beta_1 GROUP_{it} + \beta_2 PRFT_{it-1} + \beta_3 TNGB_{it-1} + \beta_4 LSL_{it-1} \\ & + \beta_5 ASMT_{it-1} + \beta_6 SIZE_{t-1} + \beta_7 CAPX_{it-1} \\ & + \beta_8 OCSF_{it-1} + \beta_9 NDT_{it-1} + \beta_{10} NDT_{it-1} \\ & * GROUP_{it} + \epsilon_{it} \end{aligned} \quad (1)$$

Where LEV_{it} is the total debt-to-asset ratio. Several studies prefer to use long-term debt as a measure of leverage (see e.g., Ibhaguia & Olokoyo, 2018) since short-term debt is mainly linked to the working capital finance and has little relevance to the long-term investments. Nevertheless, as argued by several authors (see e.g., Shah & Khan, 2007), short-term debt constitutes a significant part of the overall corporate debt in developing markets. Operational definitions of other explanatory variables are described in Table 1. Pecking Order theory predicts negative relation for profitability ($PRFT_{it}$) as firms may rely on internal funds first before resorting to external capital. This may induce profitable firms to sustain lower debt ratios. A higher ratio of tangible assets ($TNGB_{it-1}$) can serve as collaterals allowing the firm to accrue more debt. Larger firms ($SIZE_{t-1}$) face lower bankruptcy costs as they are more diversified (Warner, 1977), have lower information asymmetry (Harris & Raviv, 1991), and consequently have better access to external capital. Asset maturity (*ASMT)* can influence the choice of debt structure under asymmetric information (Goswami, 2000). Investment rates $(CAPX_{it-1})$, a proxy for growth opportunities, affects demand for external funds (Gul, 1999; Smith & Watts, 1992). Signaling theory predicts that debt ratios increase in the investment opportunity set available to a firm since such firms experience greater information disparities, and the firm will issue more debt to signal high quality. Another control variable, *OCSF*, represents operating cash flows, scaled by total assets. Lastly, *NDTS* is an abbreviation for a Non-debt tax shield. Tradeoff theory posits an inverse relationship between non-debt tax shield (e.g., depreciation) and debt ratios (Bennett & Donnelly, 1993) since the former can be a substitute for the marginal benefit of tax savings from additional borrowing. Hence, these firms have less need to issue debt for tax-incentive (De Angelo & Masulis, 1980; Wald, 1999). In contrast, Bradley, Jarrell, and Kim (1984) argue that investing profoundly in fixed assets, and thus generating higher levels of depreciation (and investment tax credit), are likely to accrue higher debt ratios since physical assets can serve as debt collaterals. This may suggest a positive coefficient for the *NDTS* in the leverage regression specifications.

Table 1
Variables Description and Measurement

Variable	Measurement	Description of symbols
LEV	$= \frac{(LTD + STD)}{Total\ Assets}$	LTD = Long Term Debt, STD = Short Term Debt,
GROUP	Dummy variable that equals one if a firm belongs to a business group, zero else	
$PRFT_{it}$	$= \frac{(EBITDA)}{Total\ Assets}$	EBITDA= Earnings Before Interest, Taxes, Depreciation and amortization
$TNGB$	$= \frac{(PPENT)}{Total\ Assets}$	PPENT = Net Property, Plant and Equipment
LSL	$= Ln(Sales)$	Ln = Natural logarithm
$ASMT_{it}$	$AST = \left(\frac{PPEGT}{AT}\right) \times \left(\frac{PPEGT}{Dep}\right) + \left(\frac{ACT}{Dep}\right) \times \left(\frac{ACT}{COGS}\right)$	ASMT is an abbreviation for asset maturity. PPEGT =Property; Gross Plant and Equipment; DEP (Depreciation expense); ACT (Current Assets) and COGS (Cost of Goods Sold).
SIZE	$= Ln(Assets)$	Natural logarithm of total assets.

Variable	Measurement	Description of symbols
$CAPX_{it}$	$= \frac{Capital\ expenditures}{Total\ assets}$	
$OCSF_{it}$	$\frac{(IB + DP - TXT - XINT - WCA}{Total\ assets}$	Operating cash flows. IB = Earnings Before Extra-ordinary items; DP = Deprecation; TXT = Taxes; XINT = Interest expense; WCAPCH = Changes in net working capital
LDT	$= \frac{(Long\ term\ debt)}{Total\ Assets}$	Ratio of long-term debt-to-assets.
SDT	$= \frac{(Short\ term\ debt)}{Total\ Assets}$	Ratio of short term debt-to-assets.
NDT_{it}	$= \frac{Depreciation\ Expense}{EBITDA}$	EBITDA = Earnings Before Interest, Taxes, Depreciation, and amortization
SGTH	Sales in year scaled by previous year sales.	A measure of sales growth.
V_PRFT_i	$= std\ (\frac{EBITDA}{Total\ Assets})$	EBITDA as defined above; std = Standard Deviation
$SIZE\_MEA$	Average size for firm i	
$LEV\_ME\ AN$	Average leverage for firm i	

Measurement of variables for equation (3)

Variable	Measurement	Description of symbols
$INVSTT_{it}$	$= \frac{Capital\ expenditure}{PPENT_{t-1}}$	PPENT = Property, Plant and Equipment at time t-1
CF_{it}	$\frac{(NI + DP + TXDB)}{CAPX_{t-1}}$	NI = Net Income, DP = Depreciation Expense, TXDB = Changes in Deferred Taxes
CF_{it-1}	$\frac{CF_{it-1}}{CAPX_{t-2}}$	
$CF_{it-1} * GROUP_t$	Interaction term of GROUP and CF_{it-1}	
CH	$= \frac{CHE}{Total\ Assets_{t-1}}$	CHE = Cash and Short-Term Investments
LQDT	Current assets (net of inventory) scaled by current liabilities. LQDT is a measure of liquidity.	

Notes: Table 1 provides operational definitions and measurements of the variables used in the study. First column presents abbreviations of the variables, followed by their measurement (column 2) and descriptions (column 3).

Next, we consider formal tests to examine hypothesis 2 that corporate groups act as a mechanism to provide risk-sharing and co-insurance. As in He et al. (2013), we use the variability of operating profit as a measure of business risk as specified in equation (2):

$$V\_PRFT_i = \alpha + \beta_1 PRFT\_MEAN_i + \beta_2 GROUP_i + \beta_3 SIZE\_MEAN_i + \beta_4 LEV\_MEAN_i + \epsilon_i \quad (2)$$

Where V_PRFT_i is the standard deviation of each firm's operating profit. All control variables are at their mean values and then scaled by total assets. Their operational definitions are reported in Table 1. We use a weighted least squares regression (WLS) estimation by taking the number of observations for the individual firms as the weight. WLS is an efficient specification that takes care

of unbalanced datasets and minimizes the sum of weighted squared residuals to generate residuals with constant variance. A negative coefficient on the variable, *GROUP,* suggests lower volatility of operating profitability for the group-affiliated firm. This would imply an income-smoothing effect of business groups and a co-insurance function in times of unstable markets.

Lastly, we follow the econometric specifications of Moyen (2004) and He et al. (2013) for examining the role of business groups as a means to reduce the firm's financial constraints and ease its access to the external capital market (H4: the financing advantage hypothesis). The econometric specification is represented by the following specification:

$$INVST_{it} = \alpha + \beta_1 CF_{it} + \beta_2 CF_{it-1} + \beta_3 CF_{it} * GROUP + \beta_4 CH_{it-1} + \beta_5 LSL_{it-1} + \beta_6 LEV_{it-1} + \varepsilon_{it} \quad (3)$$

Where *INVST* stands for investment-to-capital ratio, measured as capital expenditure in year t scaled by fixed assets at t-1. Operational definitions of other explanatory variables are described in Table 1. CF_{it} is operating cash flows ($\frac{CF_{it}}{CAPX_{t-1}}$) while CF_{it-1} is measured as: $\frac{CF_{it-1}}{CAPX_{t-2}}$. An interaction term, $CF_{it} * GROUP_{it}$, is measured *as:* $\left[\left(\frac{CF_{it}}{CAPX_{it-1}} + \frac{CF_{it-1}}{CAPX_{it-2}}\right) * GROUP\right]$. Cash holdings (*CH)* is included to control for the effect of corporate liquidity. Natural logarithm of sales (LSL_{it-1}) accounts for the positive relation of output with investments (Hoshi et al., 1991). Lastly, the debt ratio (LEV_{it-1}) controls for the close finance-investment nexus. The predicted sign of the Leverage on capital investment is ambiguous. Agency theory predicts a negative relationship because of the underinvestment problem (Myers, 1977) caused by the debt overhang problem. While the disciplining role of the debt perspective (Grossman & Hart, 1982) can improve investment efficiency and reduce managerial shirking. We are mainly interested to examine the coefficient of the interaction term of a corporate dummy variable (*GROUP*) and a measure of operating cash flows. Hence, a negative (positive) β_3 coefficient implies that firms affiliated to a corporate group will have their capital investments less (more) sensitive to the firm's internally generated cash flows as compared to their independent counterparts.

Table 2

Summary Statistics of Group-afiliated and Independent Firms

Panel A: Firm Characteristics	Number of observations	Mean	Std.Dev	25th percentile	Median	75th percen-tile
Leverage	2,769	0.333	0.243	0.119	0.324	0.518
Short-Term Debt	2,933	0.777	1.625	0.0291	0.181	0.671
Long-Term Debt	2,789	0.146	0.169	0.00176	0.0925	0.222
Profitability	2,769	0.134	0.108	0.0668	0.124	0.190
Sales (Log)	2,886	8.150	1.535	7.099	8.032	9.084
Size	2,785	8.258	1.514	7.171	8.156	9.246
Panel B: Mean Difference	Leverage	Short Term Debt	Long Term Debt	Profitability	SALES	Tangibility
GROUP-Affiliated firms	0.3793	0.7231	0.1611	0.0957	8.1546	0.497
Independent firms	0.2839	0.8332	0.13	0.078	16.2632	0.4559
Mean Difference	0.0954***	-0.11*	0.0311***	0.0177	-8.899***	0.0411***
Number of Group-affiliated firms	140					
Number of Independent firms	132					

Notes: Panel A of Table 2 reports descriptive summary statics for all firms and panel B reports t-test for the mean difference of corporate leverage, corporate profitability, sales and asset tangibility between the business group-affiliated and independent firms. The sample period of the study is from 2001 to 2014 with 2933-yearly observations and 272 non-financial firms consisting of 140 group-affiliated firms and 132 independent firms. Table 1 reports a detailed description of these and other variables used in the study.

3.1. Data Description

We source accounting data from the annual reports for 272 non-financial listed firms for a period from 2001 to 2014 yielding 2933-yearly observations. Of the total sample, 51% of the firms are group-affiliated while 49% (132 in total) are independent ones. As in He et al. (2013), we describe a firm to be affiliated to a corporate group if that firm's ultimate controlling entity has more than one firm in the group. As a robustness check, as in Paligorova and Xu (2012), we define group affiliation as one where a firm has an ultimate owner who controls directly and/or indirectly more than one subsidiary company, with the threshold level of ownership as 10%. The results based on this definition, not reported here, do not change and qualitatively remain the same.

Summary descriptive statistics are shown in Table 2. On average, group-affiliated firms have higher debt-to-asset ratios (9.54%). This means that the difference is statistically different from zero as well. Financial performance, as represented by return on assets, appears relatively marginally higher for group-affiliates. In contrast, independent firms are considerably larger as revealed by sales figures. Group-affiliates, on average, have higher long-term debt-to-asset ratio while independent firms rely more on short-term debt as compared to the group-affiliates.

3.2. Empirical Results

First, we report empirical results for the model of Paligorova and Xu (2012) to examine hypothesis 1 (Table 3). Our main variable of concern, *GROUP*, is positive and statistically significant. This positive sign of the group dummy coefficient is in line with our earlier predictions that group affiliation enhances a firm's capacity to have better access to external capital. In particular, group-affiliated member firm's debt ratios are 4.97 percent higher than those of their independent counterparts. This preliminary result is consistent with Manos, Murinde, and Green (2007) for the Indian market and Schiantarelli and Sembenelli (2000). Our second variable of interest is the Non-Debt Tax Shield (*NDTS*). As predicted, the negative coefficient for *NDTS* suggests that a non-debt tax shield can substitute for the marginal benefit of tax savings from additional borrowing (Bennett & Donnelly, 1993; Graham,

2013). The positive coefficient of the interaction term of *NDTS* with the corporate group dummy variable ($NDT_{it-1} * GROUP_{it}$) suggests that leverage decisions of the group-affiliated firms are more sensitive to the availability of the non-debt tax shield and can serve as substitutes for alleviating tax liability. Finally, other explanatory variables have corresponding positive or negative coefficients consistent with theoretical predictions for these variables.

Next, we show results for hypothesis 3 (column 3 of Table 3). Hausman test, as reported in the table, prefers fixed effects estimation specification. The main variable of concern, group dummy, captures the differential impact of group-affiliation on the firm's financial performance in comparison with the independent firms. Hence, the positive and statistically significant coefficient indicates that group-affiliated firms outdo their non-group counterparts in terms of operating performance.

Table 3
Comparision of Corporate Leverage, Financial Performance and Tests for Tax-Saving Hypothesis

	(1) Group Vs Non-Group Leverage Comparison	(2) Tax-Saving Hypothesis	(3) Financial Performance Comparison
GROUP	0.0497***		0.0405***
	(0.00927)		(0.00929)
$PRFT_{t-1}$	-0.618***	-0.326***	0.3788***
	(0.0520)	(0.0753)	(0.03208)
$TNGB_{t-1}$	0.217***	0.291***	
	(0.0268)	(0.0344)	
LSL_{t-1}	-0.0245**	-0.0616***	
	(0.0104)	(0.0129)	
$SIZE_{t-1}$	0.0211**	0.0472***	0.0112***
	(0.00973)	(0.0128)	(0.0043)
$CAPX_{t-1}$	0.137***	0.201***	-0.1278***
	(0.0484)	(0.0715)	(0.020147)
$OCSF_{t-1}$		-0.224***	
		(0.0544)	

	(1) Group Vs Non-Group Leverage Comparison	(2) Tax-Saving Hypothesis	(3) Financial Performance Comparison
NDT_{t-1}		-0.0066	
		(0.0077)	
$NDT_{t-1} * GROUP_{it}$		0.0258**	
		(0.0123)	
LDT			-0.112467***
			(0.02212)
SGTH			0.26025***
			(0.03388)
LQDT			-0.0086***
			(0.00228)
Constant	0.099**	0.149**	0.251***
	(0.0503)	(0.0751)	(0.0357)
N	2,538	1,136	2,594
R-Squared	0.412	0.556	0.094
Year and industry Dummies	YES	YES	YES
Hausman Test			77.50***
Fixed Effects			YES

Notes: In Table 3, Column 1 reports coefficient estimates (standard errors in parenthesis) for the H1: group-affiliated firms maintain higher debt ratios. Column 2 and column 3 report results for the tax-saving hypothesis and the comparison of financial performance (hypothesis 3), respectively. The dependent variable for the first and second column is Leverage (total debt-to-assets ratio) while the dependent variable for column 3 is the firm's operating profit measured as Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA), scaled by total assets. Robust standard errors are in parenthesis. Table 1 reports a detailed description of the other variables. *** and ** represent significance at 1% and 5%, respectively.

Next, the empirical results of equation 2 for the risk-sharing hypothesis are reported in column 1, Table 4. The negative coefficient for *GROUP* suggests that operating earnings volatility

for group-affiliated firms is lower compared to those of their counterpart non-group firms, all else equal. This lends credence to the conjecture that group affiliation enables member firms in sharing risks through income-smoothing and intra-group re-allocation of resources. This mutual-insurance and propping help member firms to have better risk profiles (Khanna & Yafeh, 2005; Paligorova & Xu, 2012;).

Table 4
Risk-Sharing Hypothesis and Internal Capital Markets Hypothesis

Variables	(1) Risk Sharing Hypothesis	(2) Conditional variance of Profitability	(3) Internal Capital Market Hypothesis
PRFT_MEAN	0.0590***		
	(0.01371)		
GROUP	-0.0105***		
	(0.00204)		
SIZE_MEAN	-0.0055***		
	(0.00072)		
LEV_MEAN	0.0129**		
	(0.00518)		
CF_{it}			0.0020***
			(0.00061)
CF_{it-1}			0.0053*
			(0.00288)
$CF_{It} * GROUP_{it}$			-0.0019**
			(0.00081)
CH_{t-1}			1.1620***
			(0.13412)
LSL_{it-1}			0.0468***
			(0.01043)
LEV_{it-1}		-0.0376***	-0.211***
		(0.00027)	(0.02915)
$SIZE_{t-1}$		0.0012***	
		(0.00029)	
GROUP		-0.0005***	
		(0.00008)	
$CAPX_{t-1}$		-0.0304***	

Variables	(1) Risk Sharing Hypothesis	(2) Conditional variance of Profitability	(3) Internal Capital Market Hypothesis
		(0.00059)	
SGTH		0.0532***	
		(0.00055)	
Constant		-0.0218***	0.1163*
		(0.00067)	(0.06785)
Observations	222		2,378
R-squared			0.1720
Industry and year Dummies	YES		YES

Notes: Column 1 of Table 4 reports coefficient estimates (standard errors in parenthesis) for the risk-sharing hypothesis. The dependent variable for this column is V_PRFT: standard deviation of operating profit. Column 2 presents coefficient estimates for equation (4) where the squared residuals from equation (4) are regressed on the corporate group dummy variable (GROUP). Column 3 reports coefficient estimates (Business groups and financial constraints). The dependent variable for this column is "INVST", measured as the capital expenditures scaled by total assets at time t-1. Table 1 reports a detailed description of other variables. ***, **, and * represent significance at the 1%, 5%, and 10%, respectively.

Equation (2) raises a few theoretical and econometric concerns. First, several forms of risk sharing, or mutual insurance, may not be captured in the smooth operating profitability. Second, group-affiliated firms may systematically choose risky investments if they are "insured" by other members of the group. This investment behavior can cause differences in the operating profit volatility to be less observable, even in the presence of mutual insurance (Khanna & Yafeh, 2005). We address this issue in the econometric specification that assumes profitability as endogenously determined by the firm- and group-specific characteristics. Consequently, we estimate the following fixed effect equation:

$$PRFT_{it} = \alpha + \gamma_1 SIZE_{it} + \gamma_2 CAPX_{it} + \gamma_{it} LEV_{it} + SGTH_{it} + yearDummies + \epsilon \quad (4)$$

Where $PRFT_{it}$ is the operating profitability as measured by Earnings Before Interest, Taxes, Depreciation, and Amortization and scaled by total assets. Operational definitions and measurements of other control variables are provided in Table 1.

Fixed effects estimation captures time-invariant firm attributes including the group-affiliations. The kind of risk-sharing that equation (4) attempts to capture implies that the unexplained portion of the profitability (as explained by residuals) should be smaller for the group-affiliated firms. To test this conjecture, we regress the squared residuals from equation (4) on the group dummy along with other controls. The negative coefficient for the group dummy variable (column 2, Table 4) is similar to the one reported from the previous estimation, suggesting considerable evidence of a significant risk sharing in the group-affiliated firms.

Table 5
Robustness Tests: Leverage Comparison, Financial Performance Comparison and Debt Tax Shield Hypothesis

VARIABLES	(1) Group Vs Non-Group Leverage Comparison	(2) Tax-saving hypothesis	(3) Financial Performance comparison
GROUP	0.0496***		0.03976***
	(0.00925)		(0.009967)
$PRFT_{t-1}$	-0.6570***	-0.412***	0.371811***
	(0.04603)	(0.0696)	(0.032189)
$TNGB_{t-1}$	0.2280***	0.310***	
	(0.025923)	(0.0347)	
LSL_{t-1}	-0.0127***	-0.0315***	
	(0.00481)	(0.00617)	
$SIZE_{t-1}$	0.0363***	0.0624***	-0.00344
	(0.01192)	(0.0173)	(0.00578)
$CAPX_{t-1}$	0.1290***	0.189***	-0.12025***
	(0.04882)	(0.0714)	(0.02028)
NDT_{t-1}		-0.00828	
		(0.00795)	
$NDT_{t-1} * GROUP_{it}$		0.0232*	

VARIABLES	(1) Group Vs Non-Group Leverage Comparison	(2) Tax-saving hypothesis	(3) Financial Performance comparison
		(0.0124)	
$OCSF_{t-1}$		-0.239***	
		(0.0556)	
LDT			-0.159***
			(0.0247)
SGTH			0.21416***
			(0.023544)
LQDT			-0.0092**
			(0.00226)
Constant	0.192***	0.329***	0.167***
	(0.0557)	(0.0729)	(0.01462)
Observations	2,538	1,136	2,594
R-squared	0.413	0.555	0.089
Year and industry Dummies	YES	YES	YES
Fixed Effects			YES

Notes: The first column of this table reports coefficient estimates (standard errors in parenthesis) for hypothesis 1 while column (2) and (3) reports results for OLS estimates and fixed effects model tax-savings hypothesis, and the comparison of financial performance between corporate group-affiliated firms and independent firms. We use separate regression estimates for large and small firms instead of using firm size as a control variable. Hence, we re-estimate equation (1) by including a dummy variable where it takes a value of one (zero) if firm size (natural logarithm of total assets) is greater (lower) than the median value. Table 1 reports a detailed description of other variables. ***, **, and * represent significance at the 1%, 5%, and 10%, respectively.

Finally, we present results for the financial constraints hypothesis (equation 3) in the third column of Table 4. First, we consider the lagged variable of sales. The positive sign of the coefficient suggests that investment rates tend to increase with an increase in output and sales, although this sensitivity of investment

rates is quite low in absolute terms (only 0.047 units for one unit increase in sales). Our key variable of concern is the liquidity variable (i.e., cash-flow-to-capital ratio) and its interaction term with business group dummy ($CF * GROUP_{it}$). As in Behr (2005), and Gorodnichenko, Schaefer, and Talaverac (2009), the sensitivity of investment rates to a firm's internal cash flows for all firms in the sample is quite low in absolute terms (0.0053). On the other hand, the investment rate for group-affiliated entities is less sensitive to internally generated cash flows, as compared to the independent counterparts. To be specific, one unit increase in the cash-flow variable increases the sensitivity of investments by $\beta_1 + \beta_2 + \beta_3 = 0.00546$. In other words, the sensitivity is around 74% lower for the group-affiliated firms relative to their independent counterparts. Furthermore, this difference is statistically different from zero suggesting that business groups help alleviate the extent of financial constraints for the affiliated firms. These results are in line with those of He et al. (2013), Byun et al. (2013), Lundstrum (2003), and Gorodnichenko et al. (2009).

Table 6
Fixed Effects Estimations

	(1) Tax-saving Hypothesis	(2) Financial Performance comparison	(3) Internal Capital Market Hypothesis
GROUP		0.0592***	
		(0.00708)	
$TNGB_{t-1}$	0.104**		
	(0.0446)		
LSL_{t-1}	-0.0394***		0.0763***
	(0.0141)		(0.0254)
$ASMT_{t-1}$	-0.00005		
	(0.00013)		
$SIZE_{t-1}$	0.0305*	0.0021	
	(0.0168)	(0.00888)	
$CAPX_{t-1}$	0.239***	-0.126***	
	(0.0728)	(0.0293)	
NDT_{t-1}	-0.00464		
	(0.00587)		

	(1) Tax-saving Hypothesis	(2) Financial Performance comparison	(3) Internal Capital Market Hypothesis
$NDT_{t-1} * GROUP_{it}$	0.0239*		
	(0.0122)		
TAX_RATE	-0.0032*		
	(0.00177)		
CF_{it}			0.0015**
			(0.000751)
CF_{it-1}			0.0053*
			(0.00287)
$CF_{It} * GROUP_{it}$			-0.0032***
			(0.00101)
CH_{t-1}			0.441***
			(0.124)
LEV_{it-1}			-0.347***
			(0.0662)
LDT		-0.142***	
		(0.0384)	
SGTH		0.176***	
		(0.0442)	
LQDT		0.00740**	
		(0.00326)	
Constant	0.431***	0.243***	0.0618
	(0.12823)	(0.0710)	(0.0732)
Observations	1,096	1,203	2,378
R-squared	0.228	0.176	0.132
Year Dummies	YES	YES	YES
Fixed Effects Model	YES	YES	YES
Hausman test	51.51***	77.52***	36.79***

Notes: Column 1 reports results for the tax-saving hypothesis employing equation (1). Dependent variable is leverage (total debt

to assets ratio). Column 3 reports results for the internal capital market hypothesis. The dependent variable for column 3 is investment measured as capital expenditure scaled by fixed assets at time t-1. Robust standard errors are in parenthesis. Table 1 reports a detailed description of other variables. ***, **, and * represent significance at the 1%, 5%, and 10%, respectively.

As additional tests, we also employ fixed effects estimation. This specification can produce consistent parameter estimates if the unobservable characteristics are time-invariant. Results of the fixed-effects estimations (Table 6) for tax-saving hypothesis (column 1), financial performance (column 2), and finally, for financial constraints hypothesis (column 3) are qualitatively similar to those reported in Tables 3 and 4, reassuring that empirical results are robust to unobservable firm heterogeneity problems. However, fixed-effects panel estimations account only for the unobserved heterogeneity and are, therefore, inadequate control for all sources of endogeneity. Hence, we perform additional tests described in the following paragraphs.

3.3. Robustness Tests and Endogeneity

The literature on corporate ownership structure widely documents the presence of endogeneity problems associated with firm ownership (Demsetz & Lehn, 1985; Denis & Kruse, 2000). We perform robustness checks to address this in four ways. First, we use system Generalized Methods of Moments (GMM) of Blundell and Bond (1998). This model generates parameter estimates that are consistent and accounts for the bias induced by endogeneity and unobservable heterogeneity (Schultz, Tan, & Wash, 2010; Wintoki, Linck, & Netter, 2008). The Durbin–Wu–Hausman (DWH) test, reported in Table 7, indicates the presence of significant endogeneity and confirms the need to apply the dynamic system GMM specifications. Column 1 (Table 7) provides results for the leverage comparison (hypothesis 1). We observe changes in significance levels for our main variable (*GROUP*) and some control variables including capital expenditures and profitability. For instance, significance for these variables has dropped from 1% (5%) levels to 5 percent (10 percent) levels. Overall, these results still support our earlier findings of relatively higher debt ratios accrued by the group-

affiliated firms. Column 2 reports results for the financial performance comparison (hypothesis 3). Significance levels for the main variable (group dummy) and other controls are consistent using OLS, FE and system GMM. These results support our earlier findings of superior financial performance by group-affiliated firms as compared to their independent counterparts. Column 3 outlines the results of the internal capital market hypothesis. Again, the coefficient for our main interaction variable, *CF*GROUP*, is negative and statistically significant at the 1 percent level. These results support our earlier findings and show that results are robust to alternative parameter estimations.

Second, leverage and ownership structure, particularly group-affiliation, may be jointly determined. In such a situation, coefficient estimates using OLS estimations may be biased. To address this endogeneity and simultaneity, we follow the methodology of Brockman, Martin, and Unlu (2010) modeling a system of simultaneous equations wherein leverage and ownership concentration are treated as endogenous. As in Laeven and Levine (2009), we use a "*fraction of business group-affiliated firms*" in the 2-digit SIC industry as an instrument for business group ownership. This variable attempts to capture the likelihood of an industry to have group-affiliated firms. While a firm's past leverage may influence the likelihood to become part of a business group, it is less likely that the debt ratio of a single group-affiliated firm may substantially influence the average proportion of business group affiliation in a given industry. Hence, to account for this endogeneity and simultaneity, first, we run a logit model where the business group dummy is employed as a dependent variable and the "industry-specific fraction of business group-affiliated firms" as a regressor, along with other controls including tangibility, firm size, and profitability. Empirical results in Table 8 show that instruments are valid having individual t-statistic of 14.80. Next, we include in equation (1) "the probability of a firm to be part of the business group" as an independent variable, obtained from the first-stage logit regression. Results also show that the group dummy coefficient is statistically significant and have larger coefficients estimates than the ones reported in Table 3.

Table 7
System Generalized Methods of Moments (GMM)Estimations

	(1) Group Vs Non-Group leverage comparison	(2) Financial Performance Comparison	(3) Internal Capital Market Hypothesis
GROUP	0.0125*	0.0074**	
	(0.00724)	(0.0127)	
$PRFT_{t-1}$	-0.133**	2.358***	
	(0.0583)	(0.207)	
LSL_{t-1}	-0.00049		-0.0061**
	(0.00639)		(0.00254)
$SIZE_{t-1}$	-0.00011	-0.00162	
	(0.00616)	(0.00468)	
$CAPX_{t-1}$	0.0992*	-0.157***	5.699***
	(0.0571)	(0.0551)	(0.107)
LEV_{it-1}	0.922***		0.0587**
	(0.0213)		(0.0299)
LDT		0.288***	
		(0.0549)	
$INVTT_{t-1}$			-0.217***
			(0.0676)
CF_{it}			0.00056*
			(0.000337)
$CF_{It} * GROUP_{it}$			-0.00108***
			(0.00024)
Constant	0.0277	-0.210***	0.336
	(0.0212)	(0.0510)	(0.359)
N	2,424	2,448	22
Number of groups	270	272	7
Arellano-Bond test for AR(2) in first differences	-1.65	0.56	1.53
Sargan test of overid. Restrictions		-0.88	-1.19
Durbin-Wu-Hausman test			23.92***

Notes: This table reports results for system GMM estimations. Dependent variables for the first and second columns are leverage (total debt-to-assets ratio) and profitability, respectively. The dependent variable for column 3 is "investment", measured as capital expenditure scaled by fixed assets. The description of other variables is outlined in Table 1. Standard errors are in parenthesis. ***, **, and * represent significance at the 1%, 5%, and 10%, respectively.

Table 8
Two-Stage Instumental variable Estimation

VARIABLES	(1) Group Vs Non-Group leverage comparison	(2) Financial Performance comparison
GROUP ^	0.0746***	0.0514***
	(0.0183)	(0.0103)
$PRFT_{t-1}$	-0.603***	
	(0.0516)	
$TNGB_{t-1}$	0.218***	
	(0.0272)	
LSL_{t-1}	-0.0279***	
	(0.0104)	
$SIZE_{t-1}$	0.0229**	-0.0096***
	(0.00984)	(0.00363)
$CAPX_{t-1}$	0.181***	-0.092***
	(0.0481)	(0.0227)
LDT		-0.158***
		(0.0243)
Constant	0.0554	0.228***
	(0.0415)	(0.0364)
Observations	2,538	2,594
R-squared	0.404	0.098

Notes: This table provides an instrumental variable estimation by employing Heckman (1979) correction specification to control for the self-selection bias and endogeneity. The description of other variables is outlined in Table 1. Parenthesis contains robust standard errors. *** and ** represent significance at 1% and 5%, respectively.

Third, prior studies (e.g., Khanna, 2000) have shown that OLS estimations are likely to suffer from the selection bias and potential endogeneity problems, particularly in cases where firms are selected based on particular group affiliations. This selection bias may be based on certain unobservable factors that can influence variations in the firm's financial constraints across firms and industries. This possibility may generate biased and inconsistent coefficient estimates. In line with previous studies (see e.g., He et al., 2013), we employ Heckman (1979) correction specification to account for the self-selection and endogeneity problem. First, the business group dummy is regressed against a set of variables considered as determinants of a firm's likelihood to be a group-affiliated firm. The second stage regression includes Lambda (Inverse Mill's Ratio), generated from the first-stage regression. Results are reported in columns 1 and 2 (debt tax shield hypothesis), columns 3 – 4 (internal capital market hypothesis) and column 5 (leverage comparison) in Table 9. The significantly negative coefficient for the interaction term of a firm's cash flow proxy and the corporate dummy (*CF*GROUP*), as reported in column 4 shows that it supports our earlier results of the business groups acting as virtual internal capital markets, thus alleviating a firm's financial constraints, and improving access to external capital. Results for other hypotheses are also consistent with those reported in Tables 3 and 4.

Finally, we may also check for the possibility of the cross-sectional dependence, since it can not be entirely ruled out because of the potential common factors among the business groups that have not been considered in our analysis. Pesaran's (2004) Cross-sectional Dependence (CD) test output of 79.549, reported in Table 10, confirms the cross-sectional dependence of FE regression residuals. Therefore, we re-estimate regression models using Driscoll and Kraay's (1998) standard errors. Empirical results, as shown in Table 9, are not different from the ones provided in Table 6 since coefficients for the main variables ($NDT_{it-1} * GROUP_{it}$ and $CF_{it} * GROUP_{it}$) have the same signs and significance. These results reaffirm our earlier findings and confirm the robustness of results to various alternate estimations.

Table 9
Robustness tests: Endogeneity

	Tax-saving Hypothesis		Internal Capital Market Hypothesis		Group Vs Non-Group Leverage comparison
	(1)	(2)	(3)	(4)	(5)
	First stage	2nd stage estimation	First stage	2nd stage	
GROUP_DUMMY^					0.0746***
$PRFT_{t-1}$	-2.204***	0.276		0.830***	-0.603***
				(0.252)	(0.0516)
	(0.649)	(0.367)			
$TNGB_{t-1}$	3.861***	-0.447**			0.218***
	(0.438)	(0.213)			(0.0272)
LSL_{t-1}			0.016	0.305***	-0.0279***
			(0.0153)	(0.117)	(0.0104)
$SIZE_{t-1}$	0.0411	-0.024			0.0229**
	(0.0514)	(0.0253)			(0.0098)
$CAPX_{t-1}$	0.533	-0.0461			0.181***
	(1.452)	(0.464)			(0.0481)
NDT_{t-1}		-0.0502			
		(0.0447)			
$NDT_{t-1} * GROUP_{it}$		0.631***			
		(0.108)			
TAX_RATEt-1	-0.00988	0.00445			
	(0.0389)	(0.0161)			
$CFLW_{it}$				0.0266***	
				(0.00595)	

	Tax-saving Hypothesis		Internal Capital Market Hypothesis		Group Vs Non-Group Leverage comparison
	(1)	(2)	(3)	(4)	(5)
	First stage	2nd stage estimation	First stage	2nd stage	
CF_{t-1}			-2.357***	0.468	
			(0.566)	(0.353)	
$CF_{It} * GROUP_{it}$				-0.0354***	
				(0.0098)	
CH_{t-1}			-0.284***	-0.763	
			(0.0956)	(0.645)	
LEV_{it-1}				0.575*	
				(0.323)	
SDT			-0.0162***		
			(0.00618)		
LDT			0.430***		
			(0.0718)		
Constant	-0.8	1.87	0.338***	-0.1723	0.0554
	(0.778)	(0.241)	(0.108)	(0.1334)	(0.0415)
Observations	1,152	1,152	2,351	2,351	2,538
R-squared					0.404

Notes: This table reports robustness results by employing the Heckman two-stage method to account for the self-selection and endogeneity problem. Business group dummy is the dependent variable for the first stage regression (columns 1 &3). Standard errors are in parenthesis. A detailed description of other variables is reported in Table 1. *** and ** represent significance at 1% and 5%, respectively.

Table 10
Robustness Tests for the Tax Saving Hypothesis and Internal Capital Market Hypothesis

	(1) Tax-saving Hypothesis	(2) Internal Capital Market Hypothesis
$PRFT_{t-1}$	-0.665***	
	(0.0855)	
$TNGB_{t-1}$	0.292***	
	(0.0469)	
LSL_{t-1}	-0.0139	0.0449***
	(0.0179)	(0.00768)
$ASMT_{t-1}$	-0.00007	
	(0.00035)	
$SIZE_{t-1}$	0.00562	
	(0.0167)	
$CAPX_{t-1}$	0.149	
	(0.0936)	
NDT_{t-1}	-0.0109	
	(0.00867)	
$NDT_{t-1} * GROUP_{it}$	0.0272**	
	(0.0119)	
TAX_RATEt-1	-0.00433**	
	(0.00181)	
CF_{it}		0.0019***
		(0.00055)
CF_{it-1}		0.0056*
		(0.00314)
$CF_{It} * GROUP_{it}$		-0.0021***
		(0.000782)
CH_{it-1}		0.326***
		(0.0657)
LEV_{it-1}		-0.195***
		(0.0317)
Constant	0.398***	0.0169
	(0.0819)	(0.0619)

	(1) Tax-saving Hypothesis	(2) Internal Capital Market Hypothesis
Observations	1,096	2,339
Number of groups	23	50
Pesaran CD test		79.54***

Notes: This table provides coefficient estimates (standard errors reported in parenthesis) for Driscoll and Kraay (1998) consistent SE estimates to account for the potential presence of cross-sectional dependence in residuals for the fixed effect estimations. Column 1 (2) reports results for the debt tax shield hypothesis and internal capital market hypothesis, respectively. The description and measurement of variables are reported in Table 1. ***, **, and * represent significance at 1%, 5%, and 10%, respectively.

4. Conclusion

This paper explores the levels of corporate leverage of business group-affiliated firms and observes that group-affiliated firms have significantly different capital structure profile whereby these affiliates maintain higher debt ratios than their stand-alone counterparts. Further untangling the higher leverage ratios of corporate group-affiliated firms, we find evidence in support of the risk-sharing and co-insurance hypothesis whereby business groups assist affiliates to smooth out earnings volatility by utilizing group's financial inter-linkages and intra-group transfer of human, technical and financial resources. This also improves a firm's risk profile, alleviates financial constraints, and improve a firm's access to external funds.

Second, our results further corroborate the idea that corporate groups act as substitutes for various market frictions that may severely constrain a firm's access to external capital. The corporate group's "financing advantage hypothesis" appears to be still relevant as group-affiliates create virtual internal capital markets that help reduce member firm's reliance on costly external funds. Finally, these findings are further supported by the relatively better financial performance by group-affiliates compared to those of independent firms.

Thirdly, this study contributes to the literature on the implications of corporate leverage decisions in developing markets from the perspectives of both practitioners and policy-makers. For concerning practitioners, this study furthers their understanding of the corporate financial leverage decisions of group-affiliates and independent firms, particularly some relations that are rooted in the institutional settings in the developing markets. For instance, the implications of the "financing advantage hypothesis", the risk-sharing and the co-insurance effects associated with being affiliated to a corporate group. The interpretation underpinning these relations is that business groups can allow their member firms to accumulate debt beyond the levels allowable by competitive financial markets. Thus under the less stringent financing constraints, these group-affiliates can deploy more financial resources to improve a firm's financial performance: a result supported by the findings in this study.

From the policy-makers' perspective, the study provides insight into the institutional context of the ubiquity of the business groups in the developing markets where corporate groups are viewed as a substitution for the market frictions and weak market institutions (Khanna & Palepu, 1997). However, despite decades of reforms, capital market liberalization, and improvements in the development of capital markets, we still observe the relevance of the business groups as important intermediaries in the economy. These findings are supported by recent studies such as Larraín and Urzúa (2016), Saona, Martín and Jara (2018). Hence, from the policymaker's perspective, it is important to have better corporate governance regulations that can reduce expropriation risks in the business group's virtual internal capital markets without limiting the financing advantage effects of corporate groups.

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