“Leverage and corporate investment – a cross country analysis”

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LEVERAGE AND CORPORATE INVESTMENT – A CROSS COUNTRY ANALYSIS

Abstract

The paper examines the impact of a firm's financial leverage on its investment decisions in the period 2011–2019, which occurred between two financial crises (2008–2010 and 2020–2022) and was globally marked by low interest rates and high leverage. The study focuses on non-financial listed firms in world's top 13 largest economies consisting of 11 OECD+ countries and two emerging nations. The analysis explores the relationship between firm leverage and investment decisions, considering the growth opportunities and corporate risks of the firms, as well as the type of economy they operate in. The findings indicate that, overall, there is a negative relationship between leverage and investment. In developed nations, such as the OECD+ countries, this negative effect is more pronounced for firms with limited growth opportunities. Contrary to the existing literature, emerging economies exhibit a positive relationship between firm leverage and investment. Specifically, in China and India, firms with low growth opportunities display a stronger positive correlation between leverage and investment. These results suggest that in developed countries, debt continues to have a disciplining effect on firm investment, even in a high liquidity environment. However, in high-growth emerging economies, both firm management and lending institutions show less concern regarding leverage. Lastly, the study finds that firm risk has an adverse impact on investment decisions. These empirical findings highlight the non-uniform nature of the relationship between firm leverage and investment, which depends on the type of economy and the growth opportunities of the firms.

Keywords firm investment, financial leverage, corporate risk, OECD countries, emerging economies, panel regression

JEL Classification G10, G30, G31

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INTRODUCTION

In the realm of corporate finance, the decisions regarding investment choices and capital structure preferences hold immense significance at the firm level. The relationship between leverage and corporate investment has been a subject of great interest in the finance literature for many years. While the pioneering work of Modigliani and Miller (1958) suggested that leverage and investment are unrelated, subsequent theories argued that firm leverage and investment are indeed interconnected. Myers (1977) explored the impact of firm debt on investment policy, highlighting the reduced incentive for firms with high leverage to pursue valuable growth opportunities. Jensen (1986) and Stulz (1990) further observed an inverse relationship between leverage and investment, suggesting that debt limits management's discretion over free cash flows, ultimately benefiting shareholders. However, despite extensive discussions, there is no consensus on the impact of leverage on corporate investment due to conflicting theoretical perspectives and empirical evidence (Firth et al., 2008).

It is crucial to note the global context of increasing corporate debt relative to gross domestic product (GDP). As of 2021, the world's

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total debt surpassed 250% of GDP and continues to rise. Advanced economies, in particular, have witnessed a record high non-financial corporate debt-to-GDP ratio of over 95% in 2021 (IMF, 2022). This trend has accelerated since the global financial crisis of 2008–2010. Concurrently, benchmark interest rates have reached unprecedented lows, a trend that has been ongoing for several decades, with further reductions following the 2008 crisis (Borio & Gambacorta, 2017; Hall, 2017). Against this backdrop of high corporate debt and low interest rates, it becomes intriguing to explore the impact of firm leverage on investment. This paper examines the relationship between firm leverage and investment in 13 of the world's top 15 countries in terms of total market capitalization over a nine-year period (2011–2019), sandwiched between two global crisis periods. The study investigates whether firms globally increased their investment through borrowing and whether the intended outcome of boosting investment by reducing interest rates was achieved. Additionally, the paper explores if this relationship is consistent across all countries or dependent on their economic structures.

This study stands out as a pioneering examination of the impact of firm leverage on investment using multi-country data. Previous studies have either focused on individual countries or predominantly analyzed developed economies. The present study fills this gap by providing a comprehensive review of the relationship between firm leverage and investment at a global level, encompassing both developed economies (top 10 OECD countries and Taiwan) and emerging economies such as China and India. The analysis employs a panel fixed effects model, which captures country and firm effects more effectively than previous approaches. The study reveals that the impact of leverage on investment varies depending on the type of economy. Developed economies experience greater constraint on over-investment due to leverage, whereas emerging economies increase leverage to facilitate more investment. This divergence is attributed to the unique institutional and banking structures of emerging economies, coupled with their higher economic growth rates during the study period. The paper contributes to the existing literature by providing economy-specific analyses and empirical evidence.

1. LITERATURE REVIEW

Modigliani and Miller (1958), in their pioneering work, proposed that a firm's investment policy is determined by three key factors: profitability, cash flow, and net worth. According to their theory, these factors are influenced by macroeconomic conditions such as future demand, technological advancements, and market interest rates. These macroeconomic factors, in turn, impact firm-specific factors like profitability, cash flow, and net worth (Aivazian et al., 2005). Subsequent researchers have made valuable contributions to this field. Mykhayliv and Zauner (2017) emphasized the drivers of corporate investment that lead to value creation.

The relationship between firm leverage and investment can be explained in two ways. The first is the under-investment theory, which suggests that highly leveraged firms are more likely to miss growth opportunities due to debt overhang (Myers, 1977). Highly leveraged firms tend to invest less, even when there are growth opportunities, as the benefits of positive net present value (NPV) projects primarily accrue to debt holders. This phenomenon, known as the liquidity effect, is widely observed in the literature (Aivazian et al., 2005). However, in the real world, capital market imperfections exist, and firm investment policies are influenced by financing alternatives (Kang et al., 2000). Lang et al. (1996) found an inverse relationship between a firm's leverage and its future growth, particularly for firms with low Tobin's Q. This suggests that firms with high growth opportunities are not constrained by leverage when it comes to investment. Denis and Denis (1993) demonstrated that a significant increase in leverage leads to a substantial reduction in capital expenditure. Peyer and Shivdasani (2001) documented that after recapitalization, firms allocate higher capital to business units that generate superior cash flows.

The over-investment theory provides another perspective on the relationship between leverage and investment. This theory arises from the agency problem between firm managers and equity holders. Managers may be inclined to expand a firm's operations at the expense of equity holders' interests. To address this issue, equity holders tend to limit the firm's free cash flow, forcing management to raise capital through debt issuance. Consequently, interest payments restrict the firm's ability to invest in profitable ventures. Therefore, an inverse relationship between leverage and investment may arise due to the over-investment problem. However, empirical studies exploring this relationship have yielded mixed findings. For instance, Aivazian et al. (2005) found a negative relationship for low-growth firms, while Umutlu (2010) found the relationship to be statistically insignificant.

Furthermore, studies have examined the relationship between firm risk and investment. Rosenberg (2004) discovered a negative relationship between firm risk and investment, a view shared by Garcia and Lorente (2014). A firm's risk appetite influences its investment behavior (Kraiczy et al., 2015), with higher growth opportunities leading to increased risk appetite and investment.

Based on the existing literature, the following hypotheses are proposed: First, firm leverage has a negative relationship with firm investment. Second, the growth opportunity of a firm positively moderates the relationship between firm leverage and investment. Third, the relationship between firm leverage and investment is contingent on the type of economy. Finally, the study explores the influence of firm risk on investment by considering it as an additional control variable that may affect the relationship between firm leverage and investment.

2. METHOD

2.1. Data

The sample in the study consists of 13 out of 15 world's leading countries in terms of their total market capitalization (refer to Table 1).

Table 1. Top 15 countries in the world in terms of total market capitalization

Source: Bloomberg, February, 2022.

Sl. No.	Country	Total Market Capitalization (in billion USD)
01	United States	44,300
02	China	11,178
03	Hong Kong	7,077
04	Japan	6,886
05	United Kingdom	3,298
06	France	2,862
07	India	2,695
08	Canada	2,655
09	Germany	2,534
10	Saudi Arabia	2,367
11	South Korea	2,171
12	Switzerland	2,019
13	Taiwan	1,894
14	Australia	1,676
15	Sweden	1,165

From Table 1, 13 out of top 15 countries were chosen in terms of total market capitalization. Saudi Arabia is excluded due to non-availability of data; whereas Hong Kong is excluded as it is considered to be a proxy for China. These 13 countries have well developed capital markets and contribute a large chunk of the global output.

Data was obtained from Bloomberg and Thompson Reuters databases for a period of 9 years between 2011 and 2019. The time period lies between two global crises: the global financial crises of 200820–2010; and the global COVID-19 pandemic of 2020–2022. In the aftermath of the financial crisis of 2008–2010, central banks, world over, brought extraordinary benign interest rate regimes that resulted in high leverage across firms. Thus, the selected time frame represents an era of low interest rates and high leverage across countries suitable for the study.

The data is winsorized at a 5% level to remove the outliers. After adjusting for incomplete data, in the final sample there were 17,254 firm-year observations for 1917 non-financial firms across 13 countries for 9 years (refer to Figure 1).

For the purpose of analysis, the sample is further bifurcated into two subgroups:

I. OECD+ group, where the Organization for Economic Cooperation and Development

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Source: Authors' computations.

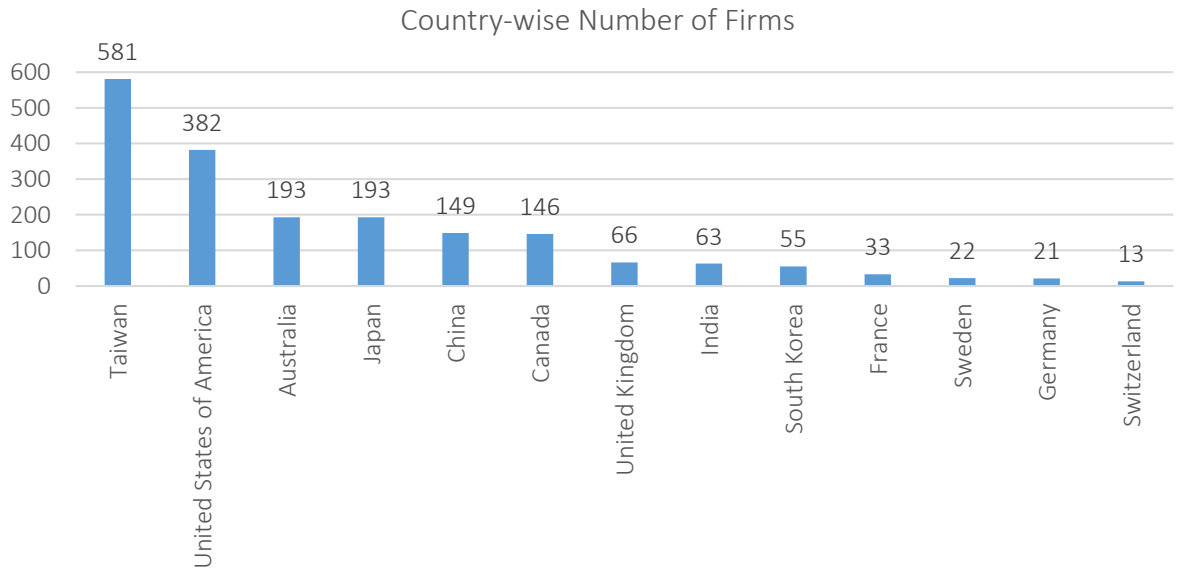

Figure 1. Country-wise number of non-financial firms included in the sample

(OECD) group includes countries in the G6 group: Canada, France, Germany, Japan, UK and USA, along with five other countries: Australia, South Korea, Sweden, and Switzerland, a total of 10 developed economies along with Taiwan. Among the G7 countries, Italy is not part of the list of top 15 countries in terms of market capitalization and hence excluded from the sample.

II. Emerging group containing emerging economies like China and India. It should be noted that China and India are structurally different as state owned lenders dominate these two economies (Firth et al., 2008; Ganguly & Deb, 2021).

2.2. Theoretical model

For the purposes of this study, the frameworks of Aivazian et al. (2005) and Vo (2019) were considered to construct the following models:

$$INV_{i,t} = \beta_0 + \beta_1 BLEV_{i,t-1} + \beta_2 TQ_{i,t-1} + \\ + \beta_3 CF_{i,t-1} + \beta_4 SR_{i,t-1} + \beta_5 CRA_{i,t-1} + \varepsilon_{i,t}, \quad (1)$$

$$INV_{i,t} = \beta_0 + \beta_1 BLEV_{i,t-1} + \beta_2 TQ_{i,t-1} + \\ + \beta_3 CF_{i,t-1} + \beta_4 SR_{i,t-1} + \beta_5 CRA_{i,t-1} + \varepsilon_{i,t}, \quad (2)$$

where, i and t stand for firm and year respectively. Here, the dependent variable $INV_{i,t}$ represents the investment made by firm i at year t.

Following Ding et al. (2016), $INV_{i,t}$ is estimate as

$$INV_{i,t} = \frac{I_{i,t}}{K_{i,t-1}}, \quad (3)$$

where $I_{i,t}$ = Book value of fixed tangible assets of firm i at year t – Book value of fixed tangible assets of firm i at year t–1 + Depreciation of firm i at year t; and $K_{i,t-1}$ = Net fixed assets of firm i at year t–1.

$BLEV_{i,t-1}$ and $MLEV_{i,t-1}$ are lagged leverage of the firm i at year t–1. The paper uses both book value of leverage (BLEV) and market value of leverage (MLEV). Book value of leverage is calculated two ways (*i*) long term debt divided by total assets (reported in Tables 4a-4c) and (ii) total liabilities divided by total assets (used in robustness test). Market value of leverage of a firm is calculated as market value of total debt divided by market value of total assets. In case debt is in the form of bank lending, book value of the debt is taken. The market value of total asset is calculated as stock price times the number of shares outstanding plus market value of debt plus market value of preference share.

$TQ_{i,t-1}$ is lagged Tobin's Q of the firm i at year t–1. It signifies the relationship between market value and intrinsic value of the firm. Tobin's Q is cal-

culated as a firm's total asset in terms of market value, scaled down by book value of the firm's total assets. It is taken as a proxy for a firm's growth opportunity as well. Additionally, as discussed in the extant literature, the measurement of Tobin's Q in the context of China is appropriately adjusted to consider illiquidity discounts of 70% in the Chinese market (Chen & Xiong, 2002). Specifically, the amount of tradable shares is multiplied by the market price and the amount of non-tradable shares by 30% of the market share price to obtain the value of equity to calculate Tobin's Q.

$CF_{i,\,t-1}$ represents cash flow of firm *i* at year *t–1* adjusted for lagged net fixed asset of the firm.

$SR_{i,\,t-1}$ is sales ratio of firm *i* at year *t–1*, lagged sales adjusted for lagged net fixed asset of the firm.

$CRA_{i,\,t-1}$ is the lagged measure of corporate risk derived from a firm's return on assets

$$CRA_{i,t} = \frac{ROA_{i,t} - ROA_{m,t}}{\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}\left(ROA_{i,t} - ROA_{m,t}\right)^2}}, \quad (4)$$

$$\text{and} \quad ROA_m = \frac{1}{n}\sum_{i=1}^{n} ROA_i.$$

The paper follows the framework proposed by Faccio et al. (2011) to measure corporate risk, *CRA*, where the ratio of a firm's profitability, as compared to the market, to the volatility in its profitability depicts risk taking behavior of a firm. The study considers return on assets, *ROA*, as the measure of profitability and standard deviations of *ROA* as the measure volatility of earnings (John et al., 2008). Here, $CRA_{i,\,t}$ depicts corporate risk arising out of inefficient utilization of assets of firm *i*, at the end of financial year *t* with respect to the market *m*. Since *CRA* is the ratio of two deviations: deviation from the market average and volatility captured by standard deviation, a positive increase in value of *CRA* indicate either the firm earning more returns as compared to the market or having less volatility with respect to the market or both (and vice-versa). Thus, a higher value of *CRA* will indicate lower risk and better utilization of a firm's resources (i.e., assets) and vice-versa. *CRA* as it is measured, is a depiction of risk appetite of large shareholders and managers, as the measurement technique of *CRA* make sure that the factors external to the firm unable to influence the value of *CRA* (Faccio et al., 2011)

Next, the relationship between the leverage of a firm and its investment has different implications based on whether the firm is high growth or low growth (Aivazian et al., 2005). The above proposition is tested using the following models:

$$\begin{aligned} INV_{i,t} &= \beta_0 + \beta_1 BLEV_{i,t-1} + \\ &+\beta_2 D_{i,t-1}\cdot BLEV_{i,t-1} + \beta_3 TQ_{i,t-1} + \\ &+\beta_4 CF_{i,t-1} + \beta_5 SR_{i,t-1} + \beta_6 CRA_{i,t-1} + \varepsilon_{i,t}, \end{aligned} \quad (5)$$

$$\begin{aligned} INV_{i,t} &= \beta_0 + \beta_1 MLEV_{i,t-1} + \\ &+\beta_2 D_{i,t-1}\cdot MLEV_{i,t-1} + \beta_3 TQ_{i,t-1} + \\ &+\beta_4 CF_{i,t-1} + \beta_5 SR_{i,t-1} + \beta_6 CRA_{i,t-1} + \varepsilon_{i,t}, \end{aligned} \quad (6)$$

where *D* is a dummy variable, which takes the value of 1 if Tobin's Q is larger than 1 and 0 otherwise. In Models 2a and 2b, the third term is an interacting dummy variable created to capture the joint effect of firm growth (Low, high) and firm leverage. For firms with $TQ \leq 1$, $D = 0$; thus, the coefficient of the second term β_1 represents a partial impact of leverage on investment for low growth firms. For firms having $TQ > 1$, $D = 1$; thus, the combined value of $\beta_1 + \beta_2$ represents the impact of leverage on investment for high growth firms. The coefficient of the third term β_2 represents the differential impact of leverage on investment due to change in firm growth.

For estimation, prior studies like McConnell and Servaes (1995) and Lang et al. (1996) used pooling regression methodology, as a result, these studies ignored individual firm effects and underestimated the impact of leverage on investment. Hence, for the present study, panel data regression is used with fixed effect method to control for firm and country effects. Hausman test result in Table 4 indicated panel fixed effect as the appropriate model.

3. RESULTS

First, the descriptive statistics of all seven variables used in the models is presented in Table 2.

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Table 2. Descriptive statistics of model variables

Variable	Mean	Std. Deviation	Median	Max	Min
INV	0.659	0.392	0.489	5.218	–0.079
BLEV	0.521	0.098	0.415	0.814	0.002
MLEV	0.627	0.249	0.583	0.829	0.001
TQ	1.082	1.959	1.071	18.721	0.125
CF	0.821	2.881	0.985	3.912	–0.054
SR	0.816	7.716	0.705	5.663	0.055
CRA	0.051	0.885	0.49	0.215	0.003

Table 3. Correlation analysis of model variables

	INV	BLEV	MLEV	TQ	CF	SR	CRA
INV	1						
BLEV	–0.045	1					
MLEV	–0.019	0.827*	1				
TQ	–0.137	0.192	0.057	1			
CF	0.078	0.061	0.201	0.316*	1		
SR	0.091	0.103	0.092	0.088	0.084	1	
CRA	0.047	0.207	0.103	0.075	0.191	0.063	1

Note: * Significant at the 5% significance level.

It is to be noted that all the seven variables used in the study are ratios and hence have small range. Investment (INV) and Cash Flow (CF) variables have negative values, while all other variables lie in the positive range. All variables except Corporate Risk due to under-utilization of Assets (CRA) display mild positive skewness.

Next, the correlation analysis of the model variables is displayed in Table 3.

Barring the pair of Cash Flow (CF) and Tobin's Q (TQ), and the pair of leverage variables: Book and Market Value of Leverage (BLEV, MLEV), all other variables have statistically insignificant relationship with each other, indicating the absence of multi-collinearity. Although, the high correlation between the leverage variables is expected of a firm, they however do not affect the analysis as they are used in separate models. It is interesting to note that, although not statistically significant, Investment (INV) has a negative relationship with the leverage variables (BLEV & MLEV), whereas Cash Flow is positively related to Tobin's Q.

The results of Model 1 (1a & 1b) and Model 2 (2a & 2b) are presented in the following manner: Table 4 displays the result of all countries in the sam-

Table 4. Impact of leverage on firm investment: result based on the complete sample

	Model 1				Model 2			
	Model 1a		Model 1b		Model 2a		Model 2b	
	Coef.	P-Val.	Coef.	P-Val.	Coef.	P-Val.	Coef.	P-Val.
C	0.110*	0.000	0.103*	0.000	0.107*	0.000	0.102**	0.064
BLEV (–1)	–0.163*	0.005			–0.144*	0.000		
MLEV (–1)			–0.282**	0.069			–0.215**	0.069
D*BLEV (–1)					0.021*	0.001		
D*MLEV (–1)							0.062**	0.071
TQ (–1)	0.246*	0.000	0.292*	0.000	0.149*	0.000	0.127*	0.000
CF	0.091*	0.000	0.085*	0.000	0.089*	0.000	0.067*	0.000
SR (–1)	–0.162*	0.000	0.167*	0.000	0.182*	0.000	0.167*	0.000
CRA (–1)	–0.059*	0.000	–0.060*	0.000	–0.105*	0.000	–0.204*	0.000
Adj. R-Sq.	0.025		0.023		0.024		0.022	
Hausman Test	179.05*		161.78*		129.12*		141.16*	
Obs.	17,253		17,253		17,253		17,253	

Note: * Significant at the 5% level of significance. ** Significant at the 10% level of significance.

Table 5. Impact of leverage on firm investment: result based on OECD+ countries

	Model 1				Model 2			
	Model 1a		Model 1b		Model 2a		Model 2b	
	Coef.	P-Val.	Coef.	P-Val.	Coef.	P-Val.	Coef.	P-Val.
C	0.828	0.158	0.713	0.183	0.174*	0.000	0.151*	0.000
BLEV (–1)	–0.204*	0.044			–0.782*	0.004		
MLEV (–1)			–0.173**	0.091			–1.247*	0.012
D*BLEV (–1)					0.053*	0.000		
D*MLEV (–1)							0.048*	0.047
TQ (–1)	0.092**	0.100	0.138*	0.000	0.155	0.405	0.137	0.380
CF	0.086*	0.000	0.064*	0.000	0.094*	0.000	0.081*	0.000
SR (–1)	–0.544	0.129	–0.308*	0.000	0.031	0.437	0.035	0.381
CRA (–1)	–0.828*	0.000	–0.787*	0.000	–0.974*	0.000	–0.769*	0.000
Adj. R-Sq.	0.048		0.039		0.028		0.051	
Obs.	10,116		10,116		10,116		10,116	

Note: * Significant at the 5% level of significance. ** Significant at the 10% level of significance.

ple. Tables 5 and 6 display sub-sample results for the OECD+ countries and the emerging countries, respectively.

Table 4 reports the impact of leverage on firm investment in the context of the entire dataset, i.e., all 13 countries taken together. The result for Model 1 (1a & 1b) shows that book value of leverage (BLEV), Tobin's Q (TQ), cash flow (CF), sales ratio (SR), and corporate risk (CRA) are significant at the 5% level, whereas market value of leverage (MLEV) is significant at the 10% level. The result of Model 2 (2a & 2b), which represents the impact of leverage on firm investment given the growth opportunity, shows that book value of leverage (BLEV), Tobin's Q (TQ), cash flow (CF), sales ratio (SR), corporate risk (CRA), and the interaction variable of TQ's dummy and book value of leverage (D*BLEV) are significant at the 5% level, whereas market value of leverage (MLEV) and interaction variable of TQ's dummy and market value of leverage (D*MLEV) are significant at the 10% level.

Table 5 reports the impact of leverage on firm investment in the context of the selected 11 OECD+ countries (Australia, Canada, France, Germany, Japan, Korea, Sweden, Switzerland, UK, USA and Taiwan). The result for Model 1 (1a & 1b) shows that book value of leverage (BLEV), cash flow (CF), sales ratio (SR) in Model 1b, and corporate risk (CRA) are significant at the 5% level, whereas market value of leverage (MLEV) is significant at the 10% level. Tobin's Q (TQ) is significant both at 5% and 10% levels for Model 1b and 1a, respectively. The result for Model 2 (2a & 2b), which represents the impact of leverage on firm investment given the growth opportunity, shows that book and market value of leverage (BLEV, MLEV), cash flow

Table 6. Impact of leverage on firm investment: results based on emerging countries

	Model 1				Model 2			
	Model 1a		Model 1b		Model 2a		Model 2b	
	Coef.	P-Val.	Coef.	P-Val.	Coef.	P-Val.	Coef.	P-Val.
C	0.828	0.158	0.441*	0.021	0.110*	0.000	0.498*	0.009
BLEV (–1)	0.092**	0.095			–0.524*	0.000		
MLEV (–1)			0.077**	0.062			–0.798**	0.094
D*BLEV (–1)					–0.009	0.276		
D*MLEV (–1)							–0.003**	0.097
TQ (–1)	0.388**	0.100	0.247**	0.103	0.409*	0.000	0.350**	0.086
CF	0.056*	0.000	0.059*	0.000	0.063*	0.000	0.071*	0.000
SR (–1)	0.138	0.116	0.085**	0.061	0.182*	0.000	–0.261**	0.087
CRA (–1)	–0.428*	0.000	–0.385*	0.000	–0.117*	0.000	–0.237*	0.000
Adj. R-Sq.	0.048		0.043		0.025		0.067	
Obs.	1,908		1,908		1,908		1,908	

Note: * Significant at the 5% level of significance. ** Significant at the 10% level of significance.

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(CF), corporate risk (CRA), and the interaction term between dummy variable of TQ with book and market value of leverage (D*BLEV, D*MLEV) are significant at the 5% level.

Table 6 depicts the impact of leverage on firm investment in the context of the two largest emerging economies: China and India. The result for Model 1 (1a & 1b) shows that only Tobin's Q (TQ), cash flow (CF), corporate risk (CRA), and sales ratio (SR) in Model 1b are significant. The result for Model 2 (2a & 2b), which represents the impact of leverage on firm investment considering the growth opportunity, shows that book value of leverage (BLEV), cash flow (CF) and corporate risk (CRA) are significant at the 5% level, whereas market value of leverage (MLEV) and the interaction term between dummy variable of TQ and market value of leverage (D*MLEV) are significant at the 5% level. Tobin's Q (TQ) and sales ratio (SR) are significant both at 5% and 10% levels for Model 2a and 2b, respectively.

Lastly, in addition to the above estimation, an alternative book value of leverage (total liabilities divided by total assets) was used in the analysis as a test of robustness. The results are more or less identical, hence confirming the appropriateness of the measurement model and the proxy variables.

4. DISCUSSION

The results of Models 1 and 2 reveal that both book leverage and market leverage have a negative relationship with firm investment in the full sample and OECD+ economies. However, in emerging economies, this relationship is positive. In OECD+ countries, it is expected that firms would have a negative relationship between leverage and investment. These countries have mature developed economies, and as a result, firms tend to be conservative in their investment decisions. Additionally, between 2011 and 2019, the growth rate of OECD+ countries was much lower compared to emerging economies like China and India. During the low interest rate and high leverage regime of 2011–2019, the inverse relationship between firm leverage and investment was dampened. Although these findings align with previous studies (e.g., Aivazian et al., 2005) in terms of the direction of the relationship in the full sample and for OECD+ countries, the negative impact of leverage on investment is relatively smaller. Several factors contribute to this outcome. Firstly, the study timeframe falls in the aftermath of the global financial crisis (2008–2010), during which central banks globally lowered interest rates to stimulate investment. Therefore, it is worth noting that in emerging economies, the impact of leverage on investment is positive. This suggests that while developed economies were cautious about investing through leverage, given the recent financial crisis, emerging economy firms were more aggressive in their investment by taking on increased levels of debt provided by state-owned public sector banks.

Lagged Tobin's Q exhibits a positive relationship with investment, indicating that firms with higher growth opportunities require more investment. This relationship is even more pronounced in emerging economies (China and India) compared to advanced economies (OECD+ countries). This phenomenon can be attributed to the gradual transformation of advanced economies from being investment-intensive industrial sectors to less investment-intensive service sector-driven economies (OECD, 2015)[1]. In the case of emerging economies, China is an industrial sector-driven economy while India is dominated by the service sector. Both being high-growth economies, firms in these countries require higher investment.

Furthermore, the negative relationship between leverage and investment is weaker for firms with low growth opportunities compared to firms with high growth opportunities in general. However, in the case of OECD+ economies, the magnitude and direction of the coefficients of the interaction terms of growth and leverage indicate a more pronounced effect. In these developed economies, where the private sector dominates, low-growth firms are constrained by leverage when it comes to investment. This finding is consistent with the results of Aivazian et al. (2005). However, in China and India, the positive relationship between leverage and investment is weaker for high-growth firms compared to low-

1 https://www.oecd.org/investment/Economic-Outlook-97-Lifting-investment-for-higher-sustainable-growth.pdf.

growth firms. It is worth noting that China's share in global GDP increased from 10.31% in 2011 to 16.51% in 2019, while India's global GDP share grew from 2.49% in 2011 to 3.27% in 2019. These outcomes can be attributed to the more robust institutional framework in developed economies compared to emerging economies. Consequently, the disciplining role of leverage is not observed in the context of emerging economies. Additionally, as emerging economies experience higher economic growth rates, firm management and investors have less concern about leverage. It is also important to note that both China and India are characterized by state-owned banks as the primary source of corporate loans. These state-owned banks, due to their welfare obligations, support low-growth firms with poor performance, but fail to effectively monitor and discipline them. This potentially creates an over-investment bias in these firms, aligning with the findings of Firth et al. (2008).

The risk appetite of firm management adversely influences firm investment across the board, with a more prominent effect in developed economies compared to emerging ones. This phenomenon in developed economies can be attributed to their lower population growth rate and the higher base effect, which leaves less room for economic expansion. In this situation, only firms with aggressive, growth-oriented management may engage in capital investment. The findings support the existing literature, which suggests that corporate risk appetite is primarily influenced by large shareholders and firm management. It is noteworthy that a higher value of corporate risk indicates lower risk and vice versa.

Next, the lagged cash flow of the firm exhibits a positive relationship with firm investment, which holds true across the full sample (all 13 countries together), OECD+ countries, and emerging economies. The impact of cash flow on investment is relatively lower in emerging economies compared to OECD+ countries, indicating that firms in emerging economies are less dependent on their own cash flow generation for investment. These findings are consistent with the results of Firth et al. (2008) and Aivazian et al. (2005). Moreover, it is worth mentioning that emerging market economies experienced faster growth than developed economies during the study period of 2011–2019, which was characterized by low interest rates. As a result, emerging economies were more willing to borrow in order to invest.

Lastly, for emerging economies, the lagged sales ratio exhibits a positive relationship with firm investment, whereas for other datasets, this relationship is negative. This suggests that in high-growth emerging economies, larger firms have a higher propensity to invest, a phenomenon not observed in low-growth developed economies (Woetzel et al., 2018)[2].

CONCLUSION

This study reveals a noteworthy relationship between leverage and investment across various country groups. In the overall sample of 13 countries, as well as among OECD+ nations, a negative association between leverage and investment is observed. However, contrary to existing literature, emerging economies display a positive relationship, indicating that firms in these countries exhibit aggressiveness in investment by utilizing higher levels of debt provided by state-owned public sector banks. These outcomes hold true for both book leverage and market leverage measures. Furthermore, the study finds that the negative correlation between leverage and investment is more pronounced among firms with limited growth opportunities within the OECD+ subset. These findings support agency theories on firm leverage and provide empirical evidence that leverage can serve as a disciplining mechanism for firms with weaker growth prospects. However, in the case of China and India, the two largest emerging economies, firms with low growth opportunities exhibit a stronger positive relationship between leverage and investment compared to firms with higher growth prospects. These results align with the notion that the disciplining effect of leverage is not observed in high-growth emerging economies. Additionally, state-

2 Outperformers: High-Growth Emerging Economies and The Companies that propel them. McKinsey Global Institute. http://surl.li/keuqb.

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owned public sector banks in emerging economies impose fewer constraints on investment spending by low-growth firms due to their welfare motives. Moreover, the risk appetite of firm management exerts an adverse influence on firm investment, particularly evident in developed countries. It should be noted that the GDP of developed OECD+ countries, as a percentage of global GDP, declined during the study period, and many of these countries experienced moderate GDP growth rates. Consequently, a firm's risk appetite becomes a primary determinant of its investment decisions.

These findings carry important implications as they empirically demonstrate the differential impact of firm leverage on investment. The nature of the economy (developed or emerging), institutional framework, and financial system structure play fundamental roles in shaping the relationship between firm leverage and investment.

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REFERENCES

1. Aivazian, V. A., Ge, Y., & Qiu, J. (2005). The impact of leverage on firm investment: Canadian evidence. *Journal of Corporate Finance, 11*(1-2), 277-291. https://doi.org/10.1016/S0929-1199(03)00062-2
2. Borio, C., & Gambacorta, L. (2017). Monetary policy and bank lending in a low interest rate environment: Diminishing effectiveness? *Journal of Macroeconomics, 54,* 217-231. https://doi.org/10.1016/j.jmacro.2017.02.005
3. Chen, Z., & Xiong, P. (2002). *The illiquidity discount in China* (Working paper). International Center for Financial Research, Yale University.
4. Denis, D. J., & Denis, D. K. (1993). Managerial discretion, organizational structure, and corporate performance: A study of leveraged recapitalizations. *Journal of Accounting and Economics, 16*(1-3), 209-236. https://doi.org/10.1016/0165-4101(93)90011-4
5. Faccio, M., Marchica, M. T., & Mura, R. (2011). Large shareholder diversification and corporate risk-taking. *The Review of Financial Studies, 24*(11), 3601-3641. https://doi.org/10.1093/rfs/hhr065
6. Firth, M., Lin, C., & Wong, S. M. (2008). Leverage and investment under a state-owned bank lending environment: Evidence from China. *Journal of Corporate Finance, 14*(5), 642-653. https://doi.org/10.1016/j.jcorpfin.2008.08.002
7. García, J. D. A., & Lorente, J. D. V. (2014). Istraživanje veze između menadžment ishoda i investicionih performansi preduzetnika [Exploring the link between managerial outcomes and investment performance of

entrepreneurs]. *Serbian Journal of Management, 9*(2), 183-202. (In Serbian). https://doi.org/10.5937/sjm9-6191

8. Hall, R. E. (2017). Commentary: Low Interest Rates: Causes and Consequences. *International Journal of Central Banking, 13*(3), 103-117. Retrieved from https://www.ijcb.org/journal/ijcb17q3a3.pdf
9. Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review, 76*(2), 323-329. Retrieved from https://ideas.repec.org/a/aea/aecrev/v76y1986i2p323-29.html
10. John, K., Litov, L., & Yeung, B. (2008). Corporate governance and risk-taking. *The Journal of Finance, 63*(4), 1679-1728. https://doi.org/10.1111/j.1540-6261.2008.01372.x
11. Kang, J. K., Shivdasani, A., & Yamada, T. (2000). The effect of bank relations on investment decisions: An investigation of Japanese takeover bids. *The Journal of Finance, 55*(5), 2197-2218. https://doi.org/10.1111/0022-1082.00284
12. Kraiczy, N. D., Hack, A., & Kellermanns, F. W. (2015). What makes a family firm innovative? CEO risk-taking propensity and the organizational context of family firms. *Journal of Product Innovation Management, 32*(3), 334-348. https://doi.org/10.1111/jpim.12203
13. Lang, L., Ofek, E., & Stulz, R. (1996). Leverage, investment, and firm growth. *Journal of Financial Economics, 40*(1), 3-29. https://doi.org/10.1016/0304-405X(95)00842-3
14. McConnell, J. J., & Servaes, H. (1995). Equity ownership and the two faces of debt. *Journal of Financial Economics, 39*(1), 131-157. https://doi.org/10.1016/0304-405X(95)00824-X
15. Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review, 48*(3), 261-297. http://www.jstor.org/stable/1809766
16. Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics, 5*(2), 147-175. https://doi.org/10.1016/0304-405X(77)90015-0
17. Mykhayliv, D., & Zauner, K. G. (2017). The impact of equity ownership groups on investment: Evidence from Ukraine. *Economic Modelling, 64,* 20-25. https://doi.org/10.1016/j.econmod.2017.03.005
18. Peyer, U. C., & Shivdasani, A. (2001). Leverage and internal capital markets: evidence from leveraged recapitalizations. *Journal of Financial Economics, 59*(3), 477-515. https://doi.org/10.1016/S0304-405X(00)00094-5
19. Rosenberg, M. M. (2004). Firm risk, investment, and employment growth. *Journal of Economics and Finance, 28*(2), 164-184. https://doi.org/10.1007/BF02761609
20. Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of Financial Economics, 26*(1), 3-27. https://doi.org/10.1016/0304-405X(90)90011-N
21. Umutlu, M. (2010). Firm leverage and investment decisions in an emerging market. *Quality & Quantity, 44,* 1005-1013. https://doi.org/10.1007/s11135-009-9250-y
22. Vo, X. V. (2019). Leverage and corporate investment – Evidence from Vietnam. *Finance Research Letters, 28,* 1-5. https://doi.org/10.1016/j.frl.2018.03.005

http://dx.doi.org/10.21511/imfi.20(3).2023.11