Print ISSN: 2288-4637 / Online ISSN 2288-4645
doi:10.13106/jafeb.2021.vol8.no4.0263

The Effect of International Capital Flows on Corporate Capital Structures: Empirical Evidence from Vietnam

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Received: November 30, 2020 Revised: February 22, 2021 Accepted: March 02, 2021

Abstract

This study examines the effect of international capital flows on corporate capital structures in Vietnam by analyzing panel data from all non-financial listed firms from 2005 to 2014 using pooled ordinary least square (OLS) with a variance estimator. The analysis includes a comparison of the signs and significance of the variable coefficients from the perking order and static trade-off theories to the empirical results to determine the optimum approach to the corporate capital structure given Vietnam's high-inflation environment. The results indicate that international capital flows have a positive relation to the debt ratio in the long term, and the relationship is more robust for 2005–2009 than for 2010–2014. Corporate capital structures adjusted to changes in the business environment in different sub-periods (2005–2009 and 2010–2014). When the economic environment became more favorable, the pecking order theory's predictive power increased, and that of trade-off theory lessened. Manufacturing and non-manufacturing firms required different capital structure decisions to fuel their operations and grow under foreign competition. The analysis demonstrates that firms should intensify their use of long-term debt relative to the availability of capital, which is an implication not only for firms in particular but also for industrial innovation overall.

Keywords: Capital Structure, Financial Integration, Capital Flows, Listed Firms, Vietnam

JEL Classification Code: G30, G32, K22, F21, F43

1. Introduction

The ambiguous impact of financial integration has led to various issues for policymakers in emerging countries (Korinek & Sandri, 2016). Forbes and Warnock (2012) reported that capital flows increase over time but slump during crises, and fail to return to pre-crisis levels. After the 2008 global financial downturn, emerging economies experienced a drop in their financial flows, which remained low in 2016 (Institute of International Finance, 2016). Meanwhile, international capital flows to emerging countries decreased, and their share of global GDP improved (Kose et al., 2006). Multinationals also affect capital flows by shifting their taxable earnings to avoid taxes (Jones & Temouri, 2016). Hence, changes in net capital flows affect firms' output and capital structures, and this effect is particularly important in emerging countries.

Foreign firms have more advantages than domestic firms, and their foreign indirect (FII) and direct investment (FDI) affect the output of domestic firms through FDI-linked spillover effects (Dunning, 1988). Foreign firms increase market competition and reduce the profitability and growth opportunities of domestic firms, and affect their capital structure (Jiraporn & Liu, 2008; Meyer & Sinani, 2009). The capital structure is the particular combination of debt and equity used by a company to finance its overall operations and growth. Besides, profitability and growth opportunities are important determinants of corporate capital structure (Khan, et al., 2020). Brander and Lewis (1986) demonstrated an important link between output and financing decisions, and an empirical study by Campello (2006) examined this relationship and confirmed that moderate debt-financing positively correlates to an increase in market share.

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Before 1986, all firms and organizations in Vietnam were state-owned and received funding from the government. After the economic transformation program began in 1986 and the establishment of the Vietnamese stock markets in 2000, capital structure decisions were a major concern for managers. This is because the government heavily regulates the financial sector, and half of the top ten largest banks are state-controlled, comprising 42% of the sector's assets (Reuters, 2017). The financial market lacks important financial instruments, and managers desire suitable policies and guidance from government agencies to determine their optimal financing structure (World Bank, 2011). As Vietnam receives large FDI inflows, accounting for 7% of GDP, it is important to understand the implications of capital flows on corporate capital structure (World Economic Forum, 2014), and the effect of capital structure decisions in a transition economy remains unclear.

We tested this relationship using a comprehensive dataset from Datastream collected from 2005 to 2014. Like Le and Phan (2017), we removed the financial sector from our sample due to their unique financial structures and performance characteristics. This dataset allowed us to systematically examine corporate capital structures through the lenses of trade-off theory (Kraus & Litzenberger, 1973) and perking-order theory (Myers & Majluf, 1984). We also investigate the differences in capital structure decisions between manufacturing and non-manufacturing firms over different periods.

This research contributes to the broad literature by providing evidence of the impact of capital flows because of financial integration on capital structure decisions. Our results highlight that the relationship depends on capital development activity and the firm's industry. Unlike prior research on emerging economies (Booth et al., 2001; Köksal & Orman, 2015; Nguyen & Tran, 2020), we posit that capital structure decisions correspond to changes in the economic environment and policies. When the economic environment becomes more favorable, the pecking order theory's predictive power increased, and the trade-off theory lessened. Our study is also the first to examine the difficulties of borrowing against the intangible prospects of manufacturing firms, which relate to both agency and informational asymmetry problems in transition economies and the nature of undeveloped bond markets.

2. Literature Review

2.1. Capital Flows and Capital Structure Decisions

Capital flows are an important determinant for capital market development in emerging economies. Alfaro et al. (2004) confirmed the contribution of FDI in economic growth by examining cross-country data for the period 1975–1995. However, well-developed economies better exploit the benefits of FDI (Korinek & Sandri, 2016). Countries with ill-regulated financial markets are likely to face 'sudden stops', like the turnaround of capital flows (Forbes & Warnock, 2012). International capital flows can create financial instability in transition economies (Korinek & Sandri, 2016), and emerging economies need to reform their domestic financial systems to benefit more from increased capital flows. As Vietnam's trade as a percentage of GDP reached over 170% in 2014, the impact of capital flows on the development of financial markets and listed firms increased (World Bank, 2016).

Prior research supports the relationship between capital market development and capital structure. A well-regulated market provides liquidity, alternative financing, and less asymmetric information for investors. Firms can consider equity as an option for long-term debts, which affects financing decisions. Baum et al. (2017) posited that the stock market helps creditors provide less risky loans.

Size and market structure are important determinants of capital allocation to different firm types in an economy, and international capital flows shape the domestic capital markets in transition economies (Kose et al., 2006). While inflows of capital expand the size of capital markets, outflows decrease the market size. During banking crises in emerging economies, the stock market infrastructure may provide an alternative to other long-term finance sources for large firms (Demirgüç-Kunt et al., 2020). This study explores the impact of capital flows on the corporate capital structure by including the ratio of net capital flows to GDP as an explanatory variable.

2.2. Capital Structures in Emerging Economies

Since the introduction of Modigliani and Miller's (1958) capital structure irrelevance principle, many theoretical and empirical works have explored the logic behind the corporate capital structure. The main idea of the M&M theory is that the capital structure. A firm's capital structure of a company does not affect its overall value. By the 1980s, these efforts resulted in two major capital structure theories. Corporate capital structures in static trade-off theory are of interest as they reflect asset types, business risks, and profitability. In contrast, transaction costs and asymmetric information in the pecking order model establish a link between the firm's ability to take on new investments and its internal funds.

Although most capital structure research involved data on firms in developed countries (Rajan & Zingales, 1995; Wald, 1999; Baum et al., 2017), works on developing countries reveal differences in institutional systems from those in developed countries. Booth et al. (2001) tested the explanatory power of capital structure models in 631 firms from ten developing countries and showed that the same

variables affected capital structure decisions as in developed countries.

In Vietnam, prior research did not investigate corporate capital structure because most sample periods were relatively short at less than five years (Biger et al., 2008). Empirical results from these studies match predictions of the pecking order theory more in terms of the signs and significance of the coefficients than those of the trade-off theory to understand the capital structure decisions (Nguyen & Tran, 2020; Thai & Hoang, 2019).

Besides, few studies investigated corporate capital structure across industries (Miao, 2015) and industry-specific determinants of capital structures (Li & Islam, 2019). Firms in manufacturing and non-manufacturing industries react differently to changes in government policies and markets, so they should not have the same capital structures (Le & Phan, 2017).

2.3. Determinants of Capital Structure

Increases in growth opportunities lead to higher agency costs in acquiring debt. Öztekin's (2015) work supported a negative correlation between leverage and growth opportunities, while Titman and Wessels (1988) also indicated a negative relationship between leverage and R&D expenses as a proxy for growth opportunities. The costs of financial distress described in the static trade-off relate to important factors in agency theory, as they are allowances for entering a distressed situation. Thus, a higher proportion of tangible assets improves a firm's borrowing capacity, consequently reducing distress costs and growth opportunities, which minimizes the agency costs of managerial decisions.

The tangibility of firm assets and firm growth represents the costs of financial distress: the more tangible the asset, the less the loss in firm value when the firm experiences financial distress. Further, the more tangible the firm's asset, the greater the firm's ability to issue debt and avoid revealing information about future profits to external investors; thus, the tangibility positively relates to long-term leverage (Köksal & Orman, 2015). Alternatively, faster-growing firms have greater intangible assets, and it is more difficult to borrow against intangible than tangible assets (Booth et al., 2001). Thus, firms with higher growth lose more value when they experience distress. Further, larger firms tend to have a higher proportion of tangible assets. As larger firms have more branches and subsidiaries, they have lower bankruptcy risks, and larger firms have higher leverage (Rajan & Zingales 1995; Thakolwiroj & Sithipolvanichgul, 2021).

Demirgüç-Kunt et al. (2020) stated that firms could minimize the effects of asymmetrical information by turning to external financing only when they cannot finance growth through their retained earnings. As firms prefer internal funding sources such as cash and other liquid assets over debt financing, these funds' availability impacts their leverage. For example, De Jong et al. (2008) demonstrated that liquidity negatively impacts leverage.

If external financing is necessary, then firms first rely on the safest financing method: debt. They then can issue convertible bonds and equity as a final option, as transaction costs and asymmetrical information link the firm's ability to take on new investments with its internal funds, and debt financing results in smaller information asymmetry effects. Asymmetric information subsequently results in hierarchical financing decisions. Pecking-order financing depends on the firm's growth opportunities and profitability, and profitable firms tend to finance their growth through internal funds to stabilize their debt levels. Tahir et al. (2020) noted that profitable companies have high tax advantages and are less likely to pay financial distress costs. However, less profitable firms must resort to debt financing to fuel their growth.

Corporate taxes are difficult to define, as each firm is unique and the tax rate value should be larger than or equal to zero for all firms. Moreover, no certain explanations exist for the tax code's effects on debt ratios; for example, Frank and Goyal (2008) were unable to find a suitable substitute for tax effects.

DeAngelo and Masulis (1980) first presented the concept of the non-debt tax shield. Corporate tax shields that substitute for debt include accounting depreciation, depletion allowances, and investment tax credits. The presence of non-debt tax shields implies that firms have a unique optimum capital structure regardless of debt-related costs. Therefore, firms with larger amounts of these substitutes tend to have less debt.

Chang et al. (2019) indicated the difficulty of observing the inflation rate's effects on optimum leverage decisions. However, Taggart (1985) argued that the tax code in the United States increases tax-shield advantages when inflation increases.

Table 1 summarises the definitions of the variables and predictions of the relationships between the independent and dependent variables from the pecking order and trade-off theories.

Table 1: Variable Descriptions and Theory Predictions

	Definitions	Predictions	
		Pecking Order theory	Trade-Off Model
Leverage ratios			
Total leverage	Total liabilities/(total liabilities + net worth)	N/A	N/A
Long-term leverage	Long-term liabilities/(long-term liabilities + net worth)	N/A	N/A
Long-term market leverage	Long-term liabilities/(long-term liabilities + equity market value)	N/A	N/A
Firm-specific determinants			
Size	Natural logarithm of total sales divided by 100	Negative	Positive
Profitability	Earnings before tax (EBT)/total assets	Negative	Positive
Tangibility	(Total assets - current assets)/total assets	Negative	Positive
Growth	Market value of equity/book value of equity	Positive	Negative
Business risks	Standard deviation of earnings before tax (EBT)/total assets	Negative	Negative
Tax-related determinants			
Corporate taxes	Average tax rate from before and after-tax income	?	Positive
Non-debt tax shields	Depreciation/total assets	?	Negative
Country-specific determinants			
Inflation	Percentage of change in CPI	?	Positive
GDP growth rate	Percentage of change in real GDP	Positive	Negative
Capital flows	Net capital flows/GDP	?	?

Notes: This table describes the dependent and independent variables and theoretical predictions for the relationships between them. '?' denotes an uncertain association with leverage and 'N/A' indicates no association with leverage.

3. Data and Method

3.1. Data

Data was collected from the Thomson Reuters Corporation and the World Bank from 2005 to 2014, with an average of 640 firms each year in our sample. Firm-specific and tax-related variables were calculated using DataStream's dataset. The sample includes non-financial firms listed on such stock exchanges such as the Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) as well as the over-the-counter (Upcom) market. The firms listed on the HOSE and HNX vary in size due to each market's listing requirements. In Vietnam, Government Decree 58/2012/ND-CP mandates that firms have at least one year of operations as a joint-stock firm (HNX) or two years of operations (HOSE) before submitting a listing application. The minimum capital requirement to be listed on the HNX is a book value of VND 30 billion (= USD 1.27 million) at the time of application, while the requisite for HOSE is at least VND 120 billion (=USD 5.1 million). The applicants' minimum return on equity (ROE) is at least 5%.

Our study focused on two industry categories: 'manufacturing' and 'non-manufacturing. While the former includes 13 sub-industries comprising 41% of all sample firms, the latter includes eight sub-industries and 59% of all sample firms. The manufacturing industries are (1) food producers, (2) chemicals, (3) beverages, (4) pharmaceuticals and biotechnology, (5) electronic equipment, (6) paper industry, (7) tobacco, (8) automobiles and parts, (9) general industrial, (10) leisure goods, (11) personal goods, (12) industrial metals and mining, and (13) industrial engineering. The non-manufacturing industries are (1) fixed-line telecommunications, (2) general retailers, (3) industrial transportation, (4) home construction, (5) construction and materials, (6) software and computer services, (7) travel and leisure, and (8) support services. We omitted the following industries from our analyses as they receive government incentives that alter the effects of market forces: (1) oil and gas; (2) electricity, gas, and water supply (utilities);

(3) financial services; (4) oil and gas equipment; (5) healthcare and equipment; (6) mining; (7) agriculture, hunting, and forestry; (8) fishing; (9) real estate, renting, and business activities; (10) education; and (11) health and social work. Our country-specific data are obtained from the World Bank's (2016) "Global Financial Development Database", and the final sample is an unbalanced sample with 6,405 firm-year observations.

3.2. Model Specifications

To examine whether capital flows affected by financial integration influence the corporate capital structure in Vietnam, we estimate the following pooled OLS model:

$$\text{Lev}_{i,t} = \alpha + \beta * Z_{i,t} + \varepsilon_{i,t} \quad (1)$$

As the changes in the business environment affect each industry differently, our empirical model considers the impact of a high-inflationary environment like Vietnam to test the marginal significance of the explanatory variables. To capture the industry- and year-specific fixed effects, we employ the following robustness models:

$$\text{Lev}_{i,t} = \alpha + \beta * Z_{i,t} + i.\ \text{year} + \varepsilon_{i,t} \quad (2)$$

$$\text{Lev}_{i,t} = \alpha + \beta * Z_{i,t} + i.\ \text{industry} + \varepsilon_{i,t} \quad (3)$$

where $\text{Lev}_{i,t}$ one of the measures of leverage (long-term leverage, long-term market leverage, or total leverage ratio) of firm i in year t; $Z_{i,t}$ is the z^{th} control variable of the firm-specific, tax-related, and country-specific determinants, specifically capital flows for the i^{th} firm at time t; α is the intercept; and α_i can vary across companies; $\varepsilon_{i,t}$ is the random error term for firm i at time t; $i.$ industry and $i.$ year are the industry- and year-specific dummies. We estimate equation (1) using standard errors that are robust to heteroskedasticity, serial correlation, and cross-sectional dependence calculated using Driscoll and Kraay's (1998) variance estimator.

4. Empirical Results

4.1. Descriptive Statistics

Table 2 presents the descriptive statistics for all of the variables for 2005 to 2014, with a median below the mean for the long-term leverage ratios. The divergence between the mean and median is greater for the long-term market leverage ratio because most firms have little or no long-term debt. Further, the non-debt tax shield exhibits the largest variance, as the mean is considerably greater than the median.

Table 3 provides the Pearson correlation coefficients among the variables in our study. The correlation between book and market long-term debt ratio is high, at 0.852. Examining each type of leverage separately minimizes the multicollinearity problem. Other correlation coefficients are below 0.5 and suitable in the regression equation.

4.2. Main Empirical Results

Table 4 reports the Equation (1) estimation and summarises the results based on the theoretical hypotheses and empirical findings.

4.2.1. Determinants of Capital Structure

Size positively correlates to all three leverage ratios, suggesting that larger firms have higher debt in their capital structures. In contrast, the correlation between profitability and the three-leverage measure is negative, revealing that more profitable firms have less debt. Our result for size is consistent with the trade-off theory, while profitability is consistent with the pecking order theory.

Tangibility is negatively associated with total leverage but positively associated with the two long-term leverage measures. This result fits the traditional matching argument, in that long-term assets are financed with long-term liabilities and the observation that firms can borrow more with short-term assets than with long-term assets. Thus, firms with more tangible assets in their asset composition use more long-term debt and less short-term debt. Öztekin (2015) reported similar results in their sample of developing countries.

Liquidity is negatively correlated with total leverage but positively associated with long-term leverage, implying that firms with more liquid assets prefer internal to external financing, and thus have less total debt. However, liquidity varies in the same way as tangibility; firms with more liquid assets tend to have higher tangible assets.

The growth variable is positively correlated with total and long-term leverage but is negatively associated with long-term market leverage. This is because most rapidly growing firms cannot fund their investments through their retained earnings, and thus higher firm growth requires more debt financing. The contrasting findings in our book leverage ratios and market leverage ratio can be explained by Choi et al. (2018) who demonstrated the spurious correlation caused by the presence of equity market values in the growth variable numerator and the leverage ratio's denominator. Short and sudden market movements without instant and direct firm responses cause a negative correlation between the leverage ratios and the growth variable.

Finally, business risks positively correlate with both total and long-term market leverage. Thus, higher-

Table 2: Descriptive Statistics for Vietnamese Non-financial Firms Between 2005 and 2014

Variable	Observation	Mean	Standard Deviation	Min.	Max.
Leverage ratios					
Total leverage ratio	6.405	0.541	0.238	0.032	1.272
Long-term leverage ratio	6.405	0.175	0.221	0	0.969
Long-term market leverage ratio	6.405	0.201	0.247	0	0.978
Firm-specific determinants					
Size	6.405	0.195	0.015	0.123	0.243
Profitability	6.405	0.073	0.152	–5.435	1.158
Tangibility	6.405	0.366	0.215	0.011	0.945
Liquidity	6.405	2.07	2.457	0.226	22.378
Growth	6.405	1.044	0.925	–5.88	11.75
Business risks	6.405	0.046	0.122	0	2.701
Tax-related determinants					
Corporate taxes	6.405	0.183	0.13	0	0.921
Non-debt tax shields	6.405	0.057	0.188	0	6.614
Country-specific determinants					
Inflation	10	0.101	0.056	0.041	0.231
GDP	10	0.062	0.008	0.052	0.075
Capital flows	10	0.055	0.02	0.033	0.094

Notes: Total leverage = Total liabilities/(total liabilities + net worth); Long-term leverage = Long-term liabilities/(long-term liabilities + net worth); Long-term market leverage = Long-term liabilities/(long-term liabilities + equity market value); size = Natural logarithm of total sales divided by 100; Profitability = Earnings before tax (EBT)/total assets; Tangibility = (Total assets – current assets)/total assets; Growth = Market value of equity/book value of equity; Business risks = Standard deviation of earnings before tax (EBT)/total assets; Corporate taxes = Average tax rate from before and after tax income; Non-debt tax shields = Depreciation/total assets; Inflation = Percentage of change in CPI; GDP growth rate = Percentage of change in real GDP; Capital flows; Net capital flows/GDP.

risk firms increase the level of leverage in their capital structures. These findings are compelling, as they are inconsistent with the view that firms perceived as risky by creditors face difficulties in long-term borrowing (Baum et al., 2017).

Our result for long-term leverages positively correlates with the corporate taxes variable because the tax is effective for periods of more than one year due to the absence of tax-loss carry backs. These carry backs allow considerable tax payments from successful years to offset difficult years. The lack of loss carry backs lessens the tax advantage of debt financing for high-risk companies.

Alternatively, the non-debt tax shield is negatively associated with leverage measures in three regression equations. Therefore, companies with high non-debt tax shields, which can include accounting depreciation and depletion allowances for fixed assets, have less debt. This is consistent with the findings of Chen (2004). Our results concerning non-debt tax shields can be understood within a trade-off theory framework.

4.2.2. Impact of Capital Flows

Overall, capital flows impact the capital structure decisions as the coefficients of capital flows significantly correlate with leverage ratios. In particular, capital flows are significantly and negatively correlated with long-term market leverage. To illustrate, higher capital flows decrease long-term market leverage, with two explanations for this finding. First, the World Bank (2016) notes that Vietnam's stock market capitalizations reached 24.7%, nearly a threefold increase from 9.6% in 2008. Second, fluctuating interest rates led to unreliable debt financing. Capital flows also have some limitations that can cause economic overheating and significant currency appreciation or inflation, as well as credit booms and asset price bubbles, as in 2008.

4.3. Sub-Period Examinations

We split the sample into two five-year periods—2005 to 2009 and 2010 to 2014—to examine firms' capital structures

Table 3: Correlation Coefficients between Variables used in the Regression Models

	Total leverage	Long-term market leverage	Long-term leverage	Size	Profitability	Tangibility	Liquidity	Business risks	Growth	Corporate taxes	NDTS	Inflation	GDP growth rate	Capital flows
Total leverage	1													
Long-term market leverage	0.484*	1												
Long-term leverage	0.217*	0.852*	1											
Size	0.138*	0.125*	0.074	1										
Profitability	–0.373*	–0.232*	–0.075	0.08	1									
Tangibility	–0.100*	0.376*	0.157*	–0.06	–0.066	1								
Liquidity	–0.034	–0.136*	–0.006	–0.226*	–0.005	–0.026	1							
Business risks	0.092	0.032	–0.015	–0.06	–0.369*	0.057	0.016	1						
Growth	–0.129*	–0.219*	0.001	0.107*	0.217*	0.002	0.02	–0.02	1					
Corporate taxes	0.022	0.131*	0.008	–0	–0.091	0.009	–0.01	0.004	–0.116*	1				
NDTS	–0.056	–0.029	–0.011	–0.1	0.005	0.025	–0.005	0.043	–0.014	–0.033	1			
Inflation	–0.03	0.001	–0.005	–0.01	0.012	0.017	–0.005	–0.012	–0.004	–0.019	–0.01	1		
GDP growth rate	0.049	–0.099	0.029	–0.09	0.071	–0.024	0.024	–0.03	0.353*	–0.110*	0.035	–0.133*	1	
Capital flows	–0.086	–0.134*	–0.029	–0.04	0.074	0.002	0.024	–0.046	0.387*	–0.06	–0.03	0.520*	–0.159	1

Notes: Total leverage = Total liabilities/(total liabilities + net worth); Long-term leverage = Long-term liabilities/(long-term liabilities + net worth); Long-term market leverage = Long-term liabilities/(long-term liabilities + equity market value); size = Natural logarithm of total sales divided by 100; Profitability = Earnings before tax (EBT)/total assets; Tangibility = (Total assets - current assets)/total assets; Growth = Market value of equity/book value of equity; Business risks = Standard deviation of earnings before tax (EBT)/total assets; Corporate taxes = Average tax rate from before and after-tax income; Non-debt tax shields = Depreciation/total assets; Inflation = Percentage of change in CPI; GDP growth rate = Percentage of change in real GDP; Capital flows = Net capital flows/GDP. * indicates significant at the 10% level.

Table 4: Determinants of leverage: Regression results

	Total Leverage	Long-Term Leverage	Long-Term Market Leverage
Firm-specific determinants			
Size	3.374***	1.258**	1.699**
	(–0.372)	(–0.588)	(–0.682)
	[9.075]	[2.140]	[2.491]
Profitability	–0.454***	–0.221***	–0.241***
	(–0.076)	(–0.052)	(–0.058)
	[–5.957]	[–4.236]	[–4.166]
Tangibility	–0.137***	0.308***	0.320***
	(–0.018)	(–0.015)	(–0.029)
	[–7.648]	[20.266]	[10.963]
Liquidity	–0.029***	0.003***	0.002*
	(–0.002)	(–0.001)	(–0.001)
	[–7.950]	[2.790]	[1.777]
Growth	0.011**	0.006**	–0.034**
	(–0.004)	(–0.003)	(–0.014)
	[2.411]	[2.262]	[–2.429]
Business risks	0.056**	0.029	0.086**
	(–0.023)	(–0.040)	(–0.0360)
	[2.410]	[0.726]	[2.365]
Tax-related determinants			
Corporate taxes	0.003	0.027**	0.063***
	(–0.008)	(–0.011)	(–0.012)
	[0.404]	[2.541]	[5.157]
Non-debt tax shields	–0.133***	–0.067***	–0.096***
	(–0.014)	(–0.017)	(–0.020)
	[–9.489]	[–3.911]	[–4.833]
Country-specific determinants			
Inflation	0.036	0.02	0.176***
	(–0.039)	(–0.066)	(–0.034)
	[0.902]	[0.301]	[5.108]
GDP growth rate	–0.261	1.006**	–0.121
	(–0.408)	(–0.502)	(–0.392)
	[–0.641]	[2.007]	[–0.309]
Capital flows	0.021**	0.351*	–0.885***
	(–0.230)	(–0.233)	(–0.254)
	[2.090]	[1.706]	[–3.479]
Constant	0.0379***	0.072***	0.052**
	[3.243]	[4.331]	[1.901]
Number of observations	2.490	2.460	2.460
Number of firms	493	492	492
Adjusted R^2	0.372	0.291	0.468
F-test	43.251	60.162	58.224
Prob > *F*	0	0	0

Notes: The first row indicates the coefficient. Standard errors and *t*-statistics were noted in parentheses and brackets, respectively. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. This table presents the leverage ratios for the independent variables for firms operating in Vietnam. The leverage ratios are total liabilities over the sum of total liabilities and net worth (total leverage), long-term liabilities over the sum of long-term liabilities and net worth (long-term leverage), and long-term liabilities over the sum of long-term liabilities and equity market value (long-term market leverage). The control variables are firm-specific, tax-related, and country-specific determinants.

in both the pre- and post-crisis periods. The results in Table 5 indicate that firm-specific and tax-related determinants exhibit similar patterns of signs and significance as those obtained for the full sample. The deviant is growth, which is only significant for the 2005 to 2009 period. Additionally, the significance of profitability in all equations relates to the agency and informational asymmetry problems in Vietnam, and the nature of its undeveloped bond markets. It is possible that profitability correlates with growth potential, such that the negative relationship between profitability and leverage represents firms' problems in the period from 2005 to 2009 in borrowing against intangible or future growth prospects.

Notably, the relative magnitude of the coefficient for non-debt tax shields is smaller in the former period (2005–2009), implying that the increase (or reduction) in tax charges through non-debt tax shields is smaller (or larger) for firms than for 2010 to 2014. Further, the coefficient of business risks in the long-term book leverage equation becomes insignificant in the 2010 to 2014 subsample, which most likely indicates the influence of short, sudden market movements on firm risks.

Finally, significant changes occur in the signs and significance of country-specific determinant coefficients. For example, the coefficient for inflation becomes significant in three regression equations in both subsamples, while the coefficient of capital flows exhibits more significance for long-term leverage in the second subsample. The capital flows are less significant in the total leverage equations from the subsample or the full sample; because the capital inflows primarily target long-term investments, and thus

might not strongly affect total leverage. The coefficients of capital flows in both sub-periods are positive in the long-term market leverage equation, in contrast to the result for long-term market leverage in the full sample. Moreover, the difference between the results for the full sample and subsample is that the book-leverage values are historical, and the market-leverage values take their valuation from the market. This might occur due to the effects of the significant average inflation rate of 8% from 2010 to 2014 (World Bank, 2016) and Vietnamese firms' high debt, making them attractive acquisition targets.

4.4. Capital Structures of Manufacturing and Non-Manufacturing Firms

Köksal and Orman (2015) argued that different determinants can affect different types of firms in different ways. Our empirical evidence further supports the pecking order theory as a framework to interpret the capital structure of non-manufacturing firms. We explore this possibility by examining the differences in capital structure decisions in manufacturing versus non-manufacturing firms.

Different determinants and methods affect firms in different industries; thus, the firm's industry classification can be an essential factor in their capital structure decisions. We conduct separate estimations for manufacturing and non-manufacturing firms to explore the impact of industry classification on capital structure. The results in Table 6 demonstrate that manufacturing and non-manufacturing firms are quite similar in their capital structures. Specifically, no changes exist in the relationship between measures of leverage and determinants, such as size, profitability, tangibility, taxes, and inflation.

The remaining determinants reveal the differences in these firm types. For example, firm growth positively correlates with total leverage and negatively correlates with long-term market leverage. This result implies that manufacturing firms use less debt financing than non-manufacturing firms to fuel their growth. Further, the significance of profitability relates to both agency and informational asymmetry problems in Vietnam as well as to the nature of undeveloped Vietnamese bond markets. Besides, profitability may correlate with growth potential, such that the negative relationship between profitability and leverage represents the difficulty in borrowing against intangible or future growth prospects.

The noticeable difference relates to the impacts of capital flows on leverage. Specifically, the estimated coefficients are significant in all non-manufacturing firms' equations. This result implies that non-manufacturing firms saw remarkable inflows of foreign capital, consequently impacting the corporate capital structure decisions in those industries to a larger extent in our sample period.

4.5. Pecking Order vs Static Trade-Off

Our findings suggest that pecking order theory better explains the capital structure choices of Vietnamese firms than trade-off theory does. This section points to differences between the predictions of the two theories and the empirical evidence, where the determinants must exhibit a significant relationship with leverage. Capital flows, size, firm growth, and business risks have a positive impact on the capital structure while profitability, tangibility, liquidity, and NDTS have negative effects on the capital structure.

Our conclusions for firm-specific determinants mirror previous studies of corporate capital structure in Vietnam. Biger et al. (2008) found that Vietnamese firms in the period from 2002 to 2003 closely resemble ours. The only exception is tangibility, for which Nguyen et al. (2012) and Le and Phan (2017) found positive estimation results.

We also compare our results with findings from other economies. Few studies of developed countries claim that pecking order theory is superior to the static trade-off theory. While empirical studies of developing countries seem to evenly support both theories (Demirgüç-Kunt et al., 2019), researchers favor the pecking order theory (Biger et al., 2008; Chen, 2004; Nguyen & Tran, 2020). However, our results reveal that in the 2010 to 2014 subsample—when the economic environment became more favorable—the pecking order theory's predictive power increased and that of trade-off theory lessened compared to the 2005 to 2009 subsample.

4.6. Robustness Checks

Several checks were performed to confirm our results' robustness. First, we performed regressions without winsorization on the data to compare them to data with winsorization of our variables at 1% for both tails of the distribution. The estimated coefficients were found to be qualitatively and quantitatively similar, indicating that our model is not sensitive to outliers, and they present no significant problems for our regressions.

Second, we also examined the possibility that year $(t-1)$ determinants relate more to the firm's capital structure in year t than year t determinants; thus, we regressed the lagged values of independent variables on the measures of leverage. The coefficient of capital flows is less significant in the total leverage regressions but has stronger relations in long-term leverage estimations, and other estimated coefficients are quantitatively similar.

Third, we also conducted an out-of-sample test in which all sectors are included. The relations between capital flows and debt ratios are not significant. Coefficients of size and tangibility are significant only at the 10% level,

Table 5: Full Sample Results for an Alternative Period

	2005–2009			2010–2014		
	Total Leverage	**Long-Term Leverage**	**Long-Term Market Leverage**	**Total Leverage**	**Long-Term Leverage**	**Long-Term Market Leverage**
Firm-specific determinants						
Size	6.480***	2.231**	3.831***	3.630***	2.487***	3.740***
	[5.663]	[2.057]	[3.799]	[9.052]	[4.106]	[7.364]
Profitability	–0.652***	–0.456***	–0.357***	–0.413***	–0.185***	–0.170***
	[–15.103]	[–23.061]	[–22.134]	[–5.759]	[–3.808]	[–5.505]
Tangibility	–0.154***	0.248***	0.245**	–0.107***	0.305***	0.326***
	[–3.786]	[3.054]	[2.510]	[–7.315]	[9.185]	[6.218]
Liquidity	–0.023***	0	–0.001	–0.030***	0.005***	0.004**
	[–6.803]	[–0.473]	[–1.282]	[–22.543]	[4.728]	[2.233]
Growth	0.015***	0.009***	–0.012***	–0.004	0	–0.068***
	[12.529]	[5.857]	[–10.483]	[–1.078]	[–0.055]	[–14.921]
Business risks	0.319***	0.341***	0.234***	0.029***	0.001	0.065***
	[4.799]	[5.446]	[3.960]	[3.863]	[0.065]	[5.290]
Tax-related determinants						
Corporate taxes	0.007	–0.044*	–0.019	0.002	0.022***	0.058***
	[0.244]	[–1.918]	[–0.629]	[0.421]	[6.314]	[5.926]
Non-debt tax shields	–0.096***	–0.070***	–0.086***	–0.135***	–0.097***	–0.108***
	[–5.218]	[–3.935]	[–11.511]	[–5.076]	[–5.311]	[–4.638]
Country-specific determinants						
Inflation	–0.129***	–0.170***	–0.094***	0.047***	0.102***	0.189***
	[–15.051]	[–46.692]	[–8.107]	[3.852]	[16.715]	[15.498]
GDP growth rate	–0.758***	–0.536	–1.265***	0.392***	0.897***	–0.042
	[–3.118]	[–1.395]	[–4.966]	[8.654]	[2.789]	[–0.073]
Capital flows	0.521*	1.345***	0.122**	0.445*	1.158***	0.145**
	[1.710]	[3.233]	[2.415]	[1.647]	[2.947]	[2.323]
Constant	0.179***	0.221*	0.312**	0.012*	0.058*	0.088***
	[3.743]	[1.923]	[2.720]	[1.822]	[2.821]	[3.821]
Number of observations	499	499	499	1,961	1,961	1,961
Number of firms	237	237	237	487	487	487
Adjusted R^2	0.451	0.582	0.631	0.522	0.431	0.645
F-test	34.343	43.252	52.751	46.784	51.123	57.652
Prob > *F*	0	0	0	0	0	0

Notes: T-statistics noted in brackets, respectively. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. This table presents the leverage ratios for the independent variables for Vietnamese firms for two periods, 2005 to 2009 and 2010 to 2014, estimated by the pooled OLS regression. The leverage ratios are total liabilities over the sum of total liabilities and net worth (total leverage), long-term liabilities over the sum of long-term liabilities and net worth (long-term leverage), and long-term liabilities over the sum of long-term liabilities and equity market value (long-term market leverage). The control variables are firm-specific, tax-related, and country-specific determinants.

Table 6: Sample Regression Results for Manufacturing and Non-Manufacturing Firms

	Manufacturing Firms			Non-Manufacturing Firms		
	Total Leverage	**Long-Term Leverage**	**Long-Term Market Leverage**	**Total Leverage**	**Long-Term Leverage**	**Long-Term Market Leverage**
Firm-specific determinants						
Size	7.093***	1.021	2.001	2.763***	1.974***	2.160***
	[10.721]	[1.034]	[1.593]	[5.411]	[3.996]	[3.994]
Profitability	–0.327***	–0.113**	–0.143**	–0.573***	–0.421***	–0.401***
	[–3.799]	[–2.125]	[–2.249]	[–8.854]	[–11.316]	[–8.744]
Tangibility	–0.148***	0.287***	0.264***	–0.104***	0.328***	0.353***
	[–11.741]	[8.875]	[7.563]	[–4.434]	[21.004]	[10.510]
Liquidity	–0.027***	0.002***	0.002*	–0.030***	0.004**	0.003
	[–5.043]	[3.051]	[1.728]	[–8.491]	[2.383]	[1.492]
Growth	0.008	–0.001	–0.031**	0.013***	0.011***	–0.034***
	[0.985]	[–0.458]	[–2.401]	[5.326]	[4.582]	[–2.766]
Business risks	–0.134***	–0.251***	–0.238***	0.092***	0.081***	0.133***
	[–2.746]	[–11.761]	[–9.652]	[5.104]	[2.733]	[6.634]
Tax-related determinants						
Corporate taxes	–0.003	–0.001	0.001	–0.003	0.027**	0.070***
	[–0.199]	[–0.024]	[0.058]	[–0.345]	[2.363]	[3.675]
Non-debt tax shields	–0.108***	–0.052***	–0.072***	–0.891***	–0.725***	–0.794***
	[–6.510]	[–3.368]	[–4.825]	[–5.601]	[–3.951]	[–3.605]
Country-specific determinants						
Inflation	0.008	–0.034	0.067*	0.031	0.026	0.221***
	[0.171]	[–1.382]	[1.767]	[0.501]	[0.283]	[4.010]
GDP growth rate	–0.62	0.873	–0.023	–0.185	1.060**	–0.261
	[–0.854]	[1.489]	[–0.032]	[–0.520]	[2.162]	[–0.555]
Capital flows	0.1	0.515**	–0.049	0.297*	0.540**	–1.064***
	[0.264]	[2.202]	[–0.169]	[1.943]	[2.232]	[–4.309]
Constant	–0.49	0.41	0.406**	1.375***	–0.570*	–0.085***
	[0.358]	[0.161]	[2.119]	[3.471]	[1.881]	[4.823]
Number of observations	886	868	868	1,601	1,589	1,589
Number of firms	180	180	180	312	311	311
Adjusted R^2	0.33	0.214	0.436	0.292	0.521	0.637
F-test	16.533	19.21	20.452	28.212	27.312	30.738
Prob > *F*	0	0	0	0	0	0

Notes: The first row indicates the coefficient. T-statistics are noted in brackets, respectively. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. This table presents the leverage ratios for the independent variables for the manufacturing and non-manufacturing industries, which were estimated by the pooled OLS regression. The leverage ratios are total liabilities over the sum of total liabilities and net worth (total leverage), long-term liabilities over the sum of long-term liabilities and net worth (long-term leverage), and long-term liabilities over the sum of long-term liabilities and equity market value (long-term market leverage). The control variables are firm-specific, tax-related, and country-specific determinants.

and including financial sectors could create a bias in the regression results.

Further, we included industry- and year-dummies to Eq. (1). The outcomes indicate that significant changes do not happen in variables. Specifically, when there is a 1% increase in capital flows, long-term market debt decreases by 0.92%, holding other variables constant.

5. Conclusion

Our study illustrates that capital flows have a positive relationship with the capital structure in the long-term, which indicates that firms should intensify their use of long-term debt relative to the availability of international capital. This explains the significant presence of multinationals via their direct investments over the long-term. The relationship is more robust for 2005–2009 than 2010–2014, which supports the decrease in international capital flows as of global GDP from 1.6% in 2013, which was ten times less than the GDP of 16% in 2007 (Forbes & Warnock, 2012). These findings also indicate that capital flows affect different types of firms in different ways, as non-manufacturing estimations reveal stronger effects of capital flows on capital structure. Non-manufacturing firms require regular investments, so they actively look for international capital.

Another main finding is that short-term debt finance is important in the debt structure of Vietnamese non-financial firms, which is undesirable from both financial and operational stability perspectives. Macroeconomic factors have a stronger impact on firms' market value than their book value. Further, manufacturing firms use less debt financing than non-manufacturing to power their growth as they have difficulties in borrowing against future growth prospects.

In this paper, we provide evidence that capital flows affected by financial integration impact the capital structure decision in Vietnam. Specifically, when testing the linear relation between capital flows and leverage ratios, the findings indicate that capital flows are significantly related to all ratios, including total leverage and long-term leverage in both book and market value. This outcome is consistent with the research of Köksal and Orman (2015) in the context of an emerging economy.

Increasing flows of capital have two implications. The stock markets' strong development has provided firms with a worthwhile financing alternative. If debt financing costs surpass those of equity financing, firms will adjust their capital structures accordingly. The more significant result of capital flows in the sub-period 2005–2009 supports the increases in foreign bank flows to real estate and stock markets. This caused the banking crises and asset bubbles attributed to the 2008 hyperinflation crises. When examining this relationship in samples of manufacturing and non-manufacturing firms, the research demonstrates that the inflow of capital to non-manufacturing industries has been more remarkable, consequently impacting capital structure decisions in those industries to a larger extent in our sample period.

Our conclusions for firm-specific determinants mirror previous studies of corporate capital structure in Vietnam. This difference in tangibility can be interpreted in two ways. First, Vietnam experienced a substantial economic downturn, reflected by an inflation rate that peaked at over 20% in 2008 (World Bank, 2016). This high inflation rate caused a surge in interest rates and monetary risks, and thus, firms experienced difficulties in accessing credit and were compelled to reduce their borrowing. Further, smaller firms tend to grow faster, and their retained earnings are typically insufficient to fuel their growth opportunities; consequently, they must seek external financing.

The research provides evidence for respective changes in capital structures to economic environments. Its results reveal that in the subsample from 2010 to 2014—when the economic environment became more favorable—the pecking order theory's predictive power increased, while that of the trade-off theory lessened in comparison to the case in the subsample spanning 2005 to 2009. Therefore, as the economic environment becomes more stable and favorable, the corporate capital structure relates more to the pecking order theory and less to the trade-off theory.

Further, our results imply that firms in different industries have different capital structures. Considering their equity market value, manufacturing firms use less long-term debt to fuel their investments than non-manufacturing firms. This is understandable, as Vietnam's economy was a high-inflationary environment. Plus, it takes longer for firms to recover investments in fixed costs, and the manufacturing industry relies on stable government policies to grow under pressure from foreign competition.

Our research has some implications for policymakers. Regulations play an important role in capital-intensive manufacturing sectors like high-tech industries, which require selective investment policies. Stable business environments through consistent policies provide a strong foundation for the growth of firms and markets. Improvement in financial instruments and regulations provides firms with alternative channels of funding. Providing subsidies and incentives through regulations helps industries grow.

However, future research can improve upon the present study. We did not employ a dynamic Gaussian Mixture Models (GMM) model to address endogeneity. Besides, researchers can examine the non-linear relationship between capital structures and capital flows using the quadratic function and quantile regression underpinned by Khan, et al. (2020). Adding a proxy for the subsidy policy for specialized industry zones like Van Don or Dung Quat can provide insights into the growth of the affected industries and should be considered in future research.

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