The relationship between goodwill and capital structure and the moderating effect of financial market development

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Abstract

Purpose – This study empirically investigates the relationship between goodwill assets and capital structure (i.e. debt ratio) of firms and the moderating effect of financial market development on the relationship between goodwill assets and capital structure.

Design/methodology/approach – This research applied a quantitative method. The article collects large samples of listed firms from 23 developing and nine developed countries and applied the panel data techniques. This research used firm-level data from the DataStream database for both developed and developing countries. The study uses 4,912 firm-level data from 23 developing countries and 4,303 firm-level data from nine developed countries.

Findings – The findings reveal a significant positive relationship between goodwill assets and capital structure in developing countries, but goodwill assets have a significant negative relationship with capital structure in developed countries. Moreover, financial market development positively moderates the relationship between goodwill assets and the capital structure of firms in developing countries. The results inform firm managers that goodwill assets serve as additional collateral to secure debt financing. Moreover, policymakers should formulate a debt market policy that recognizes goodwill assets as additional collateral for the purpose of obtaining debt capital.

Research limitations/implications – The study has several implications. First, goodwill assets are identified as a factor of capital structure in this study. Fixed assets have been identified as one of the drivers of capital structure in previous research, although goodwill assets are seldom included. Second, this article shows that along with demand-side determinants, supply-side determinants also play an important role in terms of the

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firms' choice about the capital structure. Therefore, firms should take both the demand-side and supply-side factors into consideration when sourcing for external financing (i.e. debt capital).

Originality/value – The study considered goodwill as a component of capital structure. The study analysis includes a large sample of enterprises, including 4,912 big firms from 23 developing countries and 4,303 large firms from nine industrialized or developed countries, which adds to the current capital structure information. Furthermore, a large sample size increases the results' robustness and generalizability.

Keywords Capital structure, Goodwill, Information asymmetry, Financial market development, Panel data analysis

Paper type Research paper

1. Introduction

Firms have been working harder throughout the time to raise their goodwill assets in order to produce market value that is greater than the book value of their assets (Widnyana *et al.*, 2020). Keeping an eye on goodwill is actually vital because it represents the sum of money paid beyond the assets' book value (Widnyana *et al.*, 2020). Although the loss of goodwill generally lowers the firm value, goodwill loss can occasionally indicate overspending and careless spending. Lenders of money-to-businesses are aware of this issue and may think about including goodwill when lending borrowed financing to businesses. However, there is not much research that can confirm whether raising goodwill assets is a wise decision.

Capital structure which is the mixture of debt and equity to finance firms' operations has been extensively researched, but the fundamental question raised by Myers (1984), "how do firms choose their capital structure or what are the precise determinants of capital structure?" – remains a puzzle to date (DeAngelo, 2022). However, researchers have made an attempt to answer this question in several ways. Firstly, Myers (1984) developed a version of the trade-off and pecking order theories and Baker and Wurgler (2002) established the market timing theory to answer this question and form the theoretical basis to explain capital structure determinants. Secondly, Guizani (2020) and Frank and Goyal (2009) and other earlier researchers, used the above theories and conducted empirical studies which identified some firm-specific factors like firm size, profitability, growth opportunity, non-debt tax-shield and fixed assets as determinants of capital structure but these studies excluded goodwill assets as determinants of capital structure.

In a closely related empirical study, Matemilola and Ahmad (2015) focused on the goodwill assets as determinant of capital structure but they used only 100 listed firms from South African countries. In another related paper, Chatterjee *et al.* (2022) focused on the value-relevance of goodwill assets and they find that in the post-period, firms that include goodwill in their debt agreements seems to enjoy increase debt and value. Moreover, Çam and Ozer (2022) and Acedo-Ramírez and Ruiz-Cabestre (2014) identified financial market development – a supply-side determinant of capital structure, which might indirectly affect the relationship between capital structure and goodwill assets and this is overlooked in the capital structure literature.

In today's intangible asset-driven economies, goodwill assets are also viewed as an intriguing research topic. They are significant in both developed and developing nations with underdeveloped capital markets that are catching up to developed nations in terms of financial market development. This study offers a chance to advance our understanding of goodwill assets and how financial market growth modifies the relationship between goodwill assets and capital structure because goodwill assets are remarkably understudied (Thakur *et al.*, 2020).

The study has three important contributions: first, goodwill assets are identified as a factor of capital structure in this study. Fixed assets have been identified as one of the drivers of capital structure in previous research, although goodwill assets are seldom included. Second, this article shows that along with demand-side determinants, supply-side determinants also play an important role in terms of the firms' choice about the capital structure. Therefore, firms should take both the demand side and supply-side factors into

consideration when sourcing for external financing (i.e. debt capital). Finally, this analysis includes a large sample of enterprises, including 4,912 big firms from 23 developing countries and 4,303 large firms from nine developed countries. Furthermore, a large sample size increases robustness and generalization of the results.

Our results show that goodwill assets are connected to the capital structure of firms in developing countries in a major and productive way. However, it is both positively and adversely connected to the capital structure of firms in developed countries. These direct effect results for developing countries suggest that markets in developing countries are considering goodwill as collateralizable assets along with fixed assets. Moreover, we found evidence that financial market development positively moderates the relationship between goodwill assets and the capital structure of firms in developing countries. Equally, most of the supply-side determinants significantly impact the capital structure of firms in both developing and developed countries. Thus, we conclude that the capital structure choice of firms is affected by both the demand-side determinants and supply-side determinants such as financial market development, inflation rate, the growth rate in gross domestic product (GDP) and interest rate.

2. Literature review
2.1 Theoretical framework
Azad *et al.* (2014) theorize that financial market development in less developed and developing economies appears inefficient. If the financial market is inefficient, both insiders and outsiders of a firm will have unequal information. In other words, there will be asymmetry of information (Chakraborty, 2010). Prior studies (e.g. Sharma, 2017; Wurgler, 2000) also show that financial market development has a strong link with the level of asymmetry in the market, which ultimately affects the supply and allocation of capital. Wurgler (2000) findings reveal that the financial market's degree of development is favorably related to an improved allocation of capital.

Moreover, Chatterjee *et al.* (2022) and Hulten and Hao (2008) have shown that goodwill is recognized in the market, but it has no adequate accounting recognition. Also, firms are reluctant to share information on activities which generate the value of goodwill in the market, and it may lead to loss of competitive advantage. As a result, goodwill assets suffer from information asymmetry problems. However, as the financial market develops, information asymmetry reduces and recognition of goodwill assets as collateral to secure debt capital increases (Thakur *et al.*, 2020). This reasoning explains why financial market development positively moderates the relationship between goodwill assets and firms' capital structure.

2.2 Demand-side determinants of capital structure
Capital structure is usually proxy as the ratio of total debt to total assets because emphasis is placed on the debt component of the capital structure. The determinants of capital structure remain a puzzle to date even after over 60 years of research on capital structure (DeAngelo, 2022). The majority of capital structure research (e.g. Jaworski and Santos, 2022; Touil and Mamoghli, 2020; Bilgin and Dinc, 2019; Matemilola and Ahmad, 2015) has concentrated on firm-specific variables or determinants. They are also called demand-side determinants as they control the firms' demand for external funds. This study has conducted a literature survey (see Table 1) covering the articles published in the last 10 years. Based on our literature search (Table 1), the study found some core firm-specific factors, which are firm size, fixed assets, profitability and growth opportunities. Employing meta-regression analysis and covering the results of 100 recently published articles, Hang *et al.* (2018) found

Study	Sample period	Country of study	Dependent variable	Independent/Control variables												MC GDP	GDPG	INF
				Sz	Pr	Tg	Gr	FR	IL	Lq	Id	TR	NDTS	EFC	Ag			
Frank and Goyal (2009)	1950–2003	USA	TDTAM	+[a]	−[a]	+[a]	−[a]			+[a]								+[a]
Vo and Ellis (2017)	2006–2015	Vietnam	LDTA	+[b]	+	+[a]	+			+								
Khémiri and Noubbigh (2018)	2006–2016	5 Sub-Saharan countries	LDTA	+[a]	−[a]	+[a]	−[a]	−[a]		−[a]	+[a]	−[a]	+[a]	−[a]	+[a]	−[a]	−[a]	+[a]
Chakrabarti and Chakrabarti (2019)	2006–07 to 2016–17	India	TDTA	+[a]	−	+	−				−[b]			−			−[a]	
Jermias and Yigit (2019)	1989–2012	Turkey	TDTA	+[a]	−[a]	−[a]	−[b]			+[a]								
Haron (2018)	2000–2014	Indonesia	TDTA	−	−[a]	−[b]	+[a]	+		−[b]			−			−[a]		
M'ng et al. (2017)	2004–2013	3 Asian countries	TDC	+[a]	−[a]	+[a]							−[a]					+a
Alves and Ferreira (2011)	1991–2001	31 countries			−[a]	−[a]	−[a]	+[a]										
Matemilola et al. (2019)	2008–2012	Malaysia	TDTA	+[a]	+[a]	+[a]	−		−[a]				−[a]					
Bilgin and Dinc (2019)	2012–2017	Turkey	TDTC	+[a]	−[c]	+[b]				+[a]	−[a]			+			+	−
Rajan and Zingales (1998)	1987–1990	G7 countries	−	+[a]	−[a]	+[a]	−[a]											
Harrison and Wisnu Widjaja (2014)	2004–2011	USA	LTD	+	−[a]	+[a]	−[a]				−[c]							
Al–Najjar and Hussainey (2011)	1991–2002	UK	TDC*	+[c]	−[c]	−[c]	−[c]	+										
Acedo-Ramírez and Ruiz-Cabestre (2014)	1998–2008	5 European	TDTA	+[a]	−							+[a]	−					
Matemilola and Ahmad (2015)	2004–2009	South Africa	TDTA*	−	−[a]	+[b]												

Study	Independent/Control variables																			
	INT	OWS	ATR	DSC	Ig	SPP	OC	Uf	IdD	IdC	LS	CR	SR	EFWA	ME	Ft	FDC	Inv	CF	GA
Frank and Goyal (2009)																				
Vo and Ellis (2017)																				
Khémiri and Noubbigh (2018)	+[a]	−[a]																		
Chakrabarti and Chakrabarti (2019)				−[a]	−															
Jermias and Yigit (2019)																				
Haron (2018)						−[b]	−		−[b]	−[a]	−[b]	−								
M'ng et al. (2017)																				
Alves and Ferreira (2011)												−[a]	+[a]	−	−[a]					
Matemilola et al. (2019)																+[b]				
Bilgin and Dinc (2019)																	+a			
Rajan and Zingales (1998)																				

Table 1.
Review of past studies on determinants of capital structure

(*continued*)

Study	Independent/Control variables																			
---	INT	OWS	ATR	DSC	Ig	SPP	OC	Uf	IdD	IdC	LS	CR	SR	EFWA	ME	Ft	FDC	Inv	CF	GA
Harrison and Wisnu Widjaja (2014)																				
Al–Najjar and Hussainey (2011)																				
Acedo-Ramírez and Ruiz-Cabestre (2014)															−[b]	+[c]	−[a]			
Matemilola and Ahmad (2015)			+																	+[b]

Note(s): SZ= Firm size, Pr= Profitability, Tg = Tangibility, FR=Firm risk, IL=Industry leverage, Lq = Liquidity, TR=Tax rate, NDTS=Non-debt tax shield, EFC = External financing cost, Ag=Firm age, MCGDP = Market capitalization to GDP(Capital Market Development), GDPG = GDP growth rate, INF=Inflation Rate, INT=Interest rate, OWS=Ownership structure, ATR=Asset turnover ratio, DSC = Debt service capacity, Ig = Intangibility, SPP= Share price performance, OC=Ownership concentration, Uf = Munificence, IdD = Industry dynamism, IdC=Industry concentration, LS = Legal system, CR=Creditors' Right, SR=Shareholders' Right, EFWA = External Finance Weighted Average M/B, ME = Managers' Experience, Ft = Factoring, FDC=Financial distress cost, Inv = Investment, CF=Cash flow, GA = Goodwill assets. TDTA = Total debt to total assets, LDTA = Long term debt to total assets, TDC = Total debt to total capital, LTD = Long term debt, TDTAM = Total debt to total asset based on market values. a, b and c represent level of significance at 1, 5 and 10%, respectively
Source(s): Table by Thakur

Table 1.

three major capital structure determinants, which are fixed assets, growth and profitability. Applying similar techniques and data collection strategies, Kumar *et al.* (2017) found a slightly longer list of determinants, which are, profitability, fixed assets, size, firm age, growth opportunities, liquidity, non-debt tax shield and risk. However, the nature of the relationship and the level of significance are not consistent among these literature surveys and within the results of developed and developing countries.

Focusing on goodwill assets and fixed assets as a demand side factor, Matemilola and Ahmad (2015) applied the trade-off theory to investigate the impact of goodwill assets and fixed assets on debt ratios of South African firms from 2004 to 2009. They found that goodwill assets and fixed assets increase debt ratios of firms in South Africa and concluded that goodwill assets serve as additional collateral to secure debt capital in South Africa. Unlike Matemilola and Ahmad (2015) which focused on a single country and used 100 listed firms, our study focuses on the impact of goodwill assets on debt ratios using 4,912 listed firms from 23 developing countries and 4,303 listed firms from nine developed countries. Recently, Chatterjee *et al.* (2022) applied the debt contracting theory and discovered that for businesses that include goodwill in debt agreements in the post-new law period, the value-relevance of goodwill is higher. Additionally, they discover that companies that include goodwill in their debt arrangements seem to benefit from increased debt and value in the post-period.

The first hypothesis of this study in alternative form is:

H1. Goodwill assets have a significant positive impact on the capital structure (debt ratio) of firms in developing and developed countries.

2.3 Supply-side determinants of capital structure

Along with the factors which affect the demand for the debt capital of a firm, some supply-side considerations may also help to determine a company's capital structure. However, studies on the supply-side determinants are less common compared to the studies on firm-specific or demand-side determinants. Among the few studies are (Demirgüç-Kunt and Maksimovic, 1999; De Jong *et al.*, 2008; Fan *et al.*, 2012; Acedo-Ramírez and Ruiz-Cabestre, 2014; Mc Namara *et al.*, 2017; Thakur *et al.*, 2020, 2022, 2023; Henrique *et al.*, 2021). They have considered supply-side factors and have mostly looked at the direct link between supply-side

factors and capital structure. Following that, Demirgüç-Kunt and Maksimovic (1999) attempted to investigate the effect of supply-side determinants on the maturity of debt used by enterprises in both developed and developing nations. Results of their study show that (1) in contrast to the general expectation, in countries where equity markets are more developed, large firms have higher debt ratios, (2) size of the banking sector in a country does not have a significant impact on the debt ratios of large firms in that country and (3) firms in developed as well as developing countries significantly differ in terms of their use of long-term debt. This study suggests that factors such as stock market and banking sector developments, legal systems and degree of government subsidies are responsible for relatively lower use of debt by firms in developing countries.

Subsequently, Fan et al. (2012), taking a sample from many countries (39) and covering both developed and developing economies, showed that more influence has the macroeconomic factors on a firm's capital structure than industry-related factors. This study examined a wide range of institutional factors, some of which were not taken into consideration by previous researchers. This study found that a country's level of corruption, its legal system and tax codes and the preferences of the suppliers of the fund have a tremendous impact on the firms' capital structure and debt maturity choice. Later, Acedo-Ramírez and Ruiz-Cabestre (2014) tried to examine how supply-side determinants of capital structure affect firms' debt ratios through company-specific factors. Taking a sample from five major European countries and applying GMM technique, this study showed that significant differences exist in the debt ratios of firms across these countries. Like De Jong et al. (2008), this study also provides evidence that supply-side factors have an indirect effect on the interrelationship between debt ratios and firm-specific factors.

One of the recent studies, Antzoulatos et al. (2016), tried to find out the impact of financial development on the debt ratios of firms. This study is unique in terms of the analytical method used. While using the data convergence technique, this study showed that most of the firms converged in terms of the debt ratio, and this convergence is affected by financial development. However, they also found another convergent group whose debt ratios are not affected by financial development since firms in this group do not have adequate access to capital markets. Most of the studies reviewed here show that supply-side factors have a significant impact on firms' debt ratios or capital structure. Supply-side factors include capital market development, the legal system, GDP growth, creditors' protection, legal enforcement, interest rate and inflation rate.

2.4 Financial market development, information asymmetry and supply of capital (debt)
Recent studies (e.g. Ojah and Karemera, 1999; Azad et al., 2014) on capital market development show that capital markets in less developed and developing economies are inefficient. If the capital market is efficient, both insiders and outsiders of a company will have the same information; in other words, there will be no asymmetry of information (Chakraborty, 2010). Past studies also show that capital market development, one of the supply-side factors, has a strong connection with the level of asymmetry in the market, which ultimately affects the supply and allocation of capital.

One of the very early studies, Akerlof (1970), has shed light on the information asymmetry problem. He suggested that asymmetry in information in the capital market can seriously affect its smooth functioning and in extreme cases, it may even lead to a breakdown. Afterward, Sufi (2007) using 12,672 USA syndicated loan data shows evidence that information asymmetry in the syndicated loan market affects the composition of the members of a syndicate and the structure of it. The results suggest that information asymmetry has a significant impact on the channeling of funds from savers to ultimate investors. Finally, Pang and Wu (2009) explored a

particular channel through which finance stimulates growth, i.e. capital allocation. While using international industrial data, this study finds that countries, where the capital market is developed, attract more funds.

According to Sharma (2017), a high level of information asymmetries still exists in the credit markets, which creates opportunities for the borrower to act immorally. This risk of immoral behavior can result in undesirable market outcomes, such as poor resource allocation and market failure (Akerlof, 1970; Atakan and Ekmekci, 2014). Past studies (e.g. Black et al., 2000; Hulten and Hao, 2008) have shown that goodwill is recognized in the market, but it has no adequate accounting recognition. Also, companies are reluctant to share information on activities or conditions (such as R&D, development of human capital, improved process and loyal customer base), which generate the value of goodwill in the market as sharing that information may lead to loss of competitive advantage and further, there is no regulatory requirement to disclose that information. Due to these reasons, goodwill assets and factors leading to the generation of it, both suffer from information asymmetry problems. Despite these characteristics, if a higher level of market efficiency exists in the financial market, this information asymmetry problem may be reduced. As the financial market develops, information asymmetry reduces and recognition of goodwill assets as collateral to secure debt capital increases. Therefore, financial market development should positively moderate the relationship between goodwill assets and firms' capital structure.

The study's second alternate hypothesis is the following:

H2. Financial market development moderates the relationship between goodwill assets and capital structure (debt ratio) of firms in developing and developed countries.
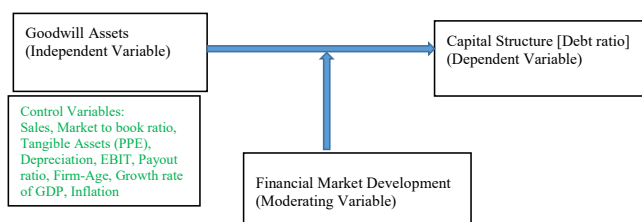
3. Method
3.1 Data
This research used two data sets: first, the firm-level data from the DataStream database for developed countries and at a time for developing countries. In total, the firm-level data were collected from 23 developing countries and nine developed countries. Bangladesh, Brazil, Chile, Egypt, Ghana, Kenya, Malaysia, Mauritius, Mexico, Morocco, Nigeria, Pakistan, Peru, the Philippines, Poland, South Africa, Sri Lanka, Thailand, Tunisia and Turkey are among the developing nations. Canada, Denmark, France, Germany, Italy, the Netherlands, Singapore, South Korea and the UK make up the developed countries. The 23 developing countries selected have functioning financial markets, where forces of demand determine the prices of financial assets. Moreover, the nine developed countries selected have strong functioning financial markets and are mostly used in the capital structure literature (Antoniou et al., 2008; Matemilola et al., 2019). A total of 4,912 and 4,303 exchange-listed firms were selected from the developing and developed countries, respectively. To avoid the impact of the 2008 financial crisis, the starting year of data collection was 2010 and covered up to the latest available year 2018. After the final screening process, this study succeeded in having a balanced panel of 9,212 firms for the developed countries and developing countries over nine

years. Two sources of macroeconomic information were used to compile the statistics: the
World Bank's open database and the IMF's World Economic Outlook data.

As in previous studies (e.g. Gaud *et al.*, 2005) on capital structure, we excluded
financial firms such as a bank, insurance and leasing firms as they have quite different
financing patterns from the nonfinancial firms. Moreover, the study excluded both
financial and utility firms from our sample because they are highly regulated and exhibit
a different pattern of capital structure from the rest of the firms. Further, the firms with
missing values during the study period were excluded. Thus, the total final sample for
this study was 9,215 firms from 32 countries. The selection of countries was based on data
availability and the presence of well-functioning capital markets that determine the
prices of financial assets. The sample size of the study is sufficiently large for both the
developing and developed countries as there are over 4,000 firms in each category.
Specifically, a total number of 4,912 listed firms from developing countries are used while
a total of 4,303 listed firms are used from developed countries. Stata software is used to
analyze the data.

3.2 Econometric model
To examine the impact of goodwill assets on capital structure and the moderating effect of
banking sector development on the relationship between capital structure and goodwill
assets, the following two models were run. Equation (1) and (2) are the fixed-effect models as
in Jermias and Yigit (2019). However, using the fixed-effect model is not automatic. The
Hausman test is used to choose between the fixed-effect model and the random-effect model
(Luo, 2015).

$$
\begin{aligned}
TDTA_{ijt} = {} & \beta_1 + \beta_2 LEVTA_{ijt} + \beta_3 LSL_{ijt} + \beta_4 MTB_{ijt} + \beta_5 PPETA_{ijt} \\
& + \beta_6 DEPTA_{ijt} + \beta_7 EBITA_{ijt} + \beta_8 Fage_{ijt} + \beta_9 POR_{ijt} + \beta_{10} GDPG_{jt} \\
& + \beta_{11} INF_{jt} + \beta_{12} INT_{jt} + \beta_{13} MCGDP_{jt} + \eta_i + \alpha_t + \mu_{ijt}
\end{aligned}
\tag{1}
$$

$$
\begin{aligned}
TDTA_{ijt} = {} & \beta_1 + \beta_2 LEVTA_{ijt} + \beta_3 PCDBM_{jt} + \beta_4 (LEVTA * PCDBM)_{ijt} + \beta_5 LSL_{ijt} \\
& + \beta_6 MTB_{ijt} + \beta_7 PPETA_{ijt} + \beta_8 DEPTA_{ijt} + \beta_9 EBITA_{ijt} + \beta_{10} Fage_{ijt} + \beta_{11} POR_{ijt} \\
& + \beta_{12} GDPG_{jt} + \beta_{13} INF_{jt} + \beta_{14} INT_{jt} + \eta_i + \alpha_t + \mu_{ijt}
\end{aligned}
\tag{2}
$$

where:

   TDTA = Total debt to total assets ratio;

   LEVTA = Excess of enterprise value over total assets;

   LSL = Log of sales;

   MTB = Market-to-book ratio;

   PPETA = Property, plant and equipment, scaled by total assets;

   DEPTA = Depreciation to total assets;

   EBITA = Earnings before interest and tax scaled by total assets;

   FAge = Current year minus year of establishment;

   POR = Payout ratio;

   GPDG = Growth rate of GDP (%);

INF $=$ Inflation rate (%);

INT $=$ Bank lending rate (%);

PCDBM $=$ Private credit by deposit money bank as a percentage of GDP;

β $=$ Slope coefficients;

η_i $=$ the unobservable firm-specific effects;

α_t $=$ the year fixed effects;

μ_{ijt} $=$ the residual term and

$_{i\,j,t}$ $=$ firm, country and time, respectively.

3.3 Variables of the study
We have taken capital structure (debt ratio) as the dependent variable and goodwill assets as the independent variable. In addition to these, we have ten control variables and one moderating variable.

3.4 Measures of the main variables
3.4.1 The measure of capital structure (dependent variables). Past studies on capital structure differ in several ways in terms of their use of debt measures. First, in terms of measurement, some used market-based measures, while others used book-based measures (Matemilola *et al.*, 2012) and second, based on maturity, short term, long term or total debt. Market-based measures of leverage are considered as forward-looking, while book value-based measures are supported based on the logic that those are more aligned with the assets of the company. The researchers Rodrigues *et al.* (2017) and Khémiri and Noubbigh have employed book value-based measurements of leverage (2018). In this analysis, we used total debt to total assets as the leverage ratio, following studies that employed book value-based measurements.

3.4.2 The measure of goodwill (independent variables). Few studies have examined the impact of goodwill on capital structure. The majority of goodwill research has been on its development or identification as an intangible asset. The few studies that looked at goodwill as a driver of capital structure included Matemilola and Ahmad (2015) and Chatterjee *et al.* (2022), who calculated goodwill as the log of the difference between market and book value of assets divided by total assets. The value of goodwill (intangible assets) in Malaysian markets was examined by Salamudin *et al.* in 2010. They examined the relationship between a company's market value and its book value of a net asset (book value of operating assets less book value of operational liabilities, a proxy for goodwill). This study calculates goodwill as the log of the difference between enterprise value and book value of assets, scaled by book value of assets, following the methodology used in the previous two studies.

$$Goodwill = \log \frac{Enterprise\ Value - Total\ Assets}{Total\ Assets}$$

Where enterprise value is calculated by the DataStream database as:

Market Capitalization at fiscal year-end date $+$ Preferred Stock $+$ Total Debt.

3.5 Financial market development measures (moderating variable)
On the issue of channeling of private credits to firms and individuals, two determinants are suggested by economic theories: creditors' right (power) and information available to the lender (Djankov *et al.*, 2007). When additional information about a borrower, such as the

borrower's credit history or other institutions which have provided credit to this borrower, is available to the lender, the lender faces less information asymmetry, and thus more credits could be extended. To test the information theory, Djankov et al. (2007) employed the data on "the existence of public and private credit registries" in the sample countries. They found that the 'private credit to GDP' ratio improves with the introduction of credit registries in a country. The existence of credit registries in a country has also been proved to be an important determinant of the availability of credit (Jappelli and Pagano, 2002) suggesting that private credit to GDP – a proxy for financial market development reduces information asymmetry.

Çam and Özer (2022) and Rajan and Zingales (1998) suggest that the variable, financial market development should be able to measure how smoothly savers and borrowers can interact with each other and one group's level of trust in the other group. Rajan and Zingales (1998) used the ratio of domestic credit plus equity market capitalization to GDP as a proxy for financial market development. According to Pang and Wu (2009), a financial market development measure should have the ability to cover important financial market functions such as ensuring the flow of funds from surplus unit to deficit unit, motivating both parties to share risk in actual investment and monitoring and guiding the market participants to minimize information asymmetry (Pang and Wu, 2009). Unfortunately, there is not a measurement that can encompass all of these functions. The "ratio of private sector credit provided by domestic money banks and other financial institutions to GDP (Credit/GDP)" was, therefore, employed as a proxy for the development of the financial market. The "ratio of private credit by deposit money banks to GDP" and "the ratio of stock market capitalization plus private credit to GDP" are further indicators of financial development.

To examine the moderating effect of financial market development, following Çam and Özer (2022) and Pang and Wu (2009), the current study also uses ratio of private credit by deposit money bank to GDP as a proxy of financial market development due to more than half of the sample countries selected for this study are developing countries. The traditional borrowing and lending activities are the key business in financial intermediation, and the stock markets are either underdeveloped or nonexistent, according to Demirgüç-Kunt et al. (2013), making private credits to GDP a good indicator of financial development in developing countries.

3.6 Justification of control variables

Size, profitability, growth prospects, firm age, non-debt tax shelters, business risk and tangible assets are the most common control variables or determinants of capital structure (Frank and Goyal, 2009; Myers, 1984). The market measures of leverage were applied to a large dataset, and (Frank and Goyal, 2009) discovered six determinants of leverage that account for more than 27% of the variation in leverage. They designated those elements as "fundamental factors." The average industry leverage, tangibility, earnings, business size, market-to-book asset ratio and anticipated inflation are some of these characteristics. They are also supported by Öztekin (2015). These variables were classified as "reliable determinants" by Öztekin (2015), who also identified a list of five variables: inflation, tangibility, profitability, firm size and industry leverage.

Çam and Özer (2022) and Matemilola et al. (2019) also studied the determinants of capital structure and identified profitability, fixed assets, size, growth opportunity, non-debt tax-shield, interest rate, stock market development and banking sectors development. According to Akhtar and Oliver (2009), these variables represent the risk faced by different stakeholders and the value of the company. Each variable also relates to either one or more of the capital structure theories. Recently, Jaworski and Santos (2022) and Henrique et al. (2021) also used

size, profitability, growth opportunity, firm age and fixed assets as control variables for determinants of capital structure which they found to be statistically significant.

As in Çam and Özer (2022) and Chakrabarti and Chakrabarti (2019), the ratio of property, plant and equipment to total assets is used to calculate fixed assets. According to the trade-off theory, fixed assets lead to a rise in debt consumption since they can be utilized as security for debt capital (Çam and Özer, 2022; Frank and Goyal, 2009). Numerous empirical research studies have found a positive correlation between fixed assets and debt (e.g. Çam and Özer, 2022; Matemilola *et al.*, 2019; Frank and Goyal, 2009). According to Jaworski and Santos (2022) and Jermias and Yigit, the ratio of operational earnings to total assets is used to calculate EBITA, which measures a company's profitability (2019). The trade-off theory holds that when businesses are prosperous, they may borrow more money and repay it with interest, which leads to the use of greater debt in their capital structures. The pecking order theory contends that because firms prefer retained profits to debt because of the costs associated with knowledge asymmetry, profitable businesses minimize the amount of debt they utilize in their capital structures. Profitable businesses, therefore, use more profits and less debt (Jaworski and Santos, 2022; Jermias and Yigit, 2019).

Sales volume, like in Bilgin and Dinc (2019) and Frank and Goyal, is a measure of firm size (2009). The trade-off argument states that larger firms will employ more debt because they are more stable and less likely to have bankruptcy issues (Frank and Goyal, 2009). The market-to-book ratio, as with DeAngelo (2022) and Matemilola *et al.* (2019), is calculated as the ratio of the firm's market value to its total assets. According to the trade-off argument, businesses with high market-to-book ratios tend to utilize less debt because these businesses have more development potential and intangible assets that do not have any value as collateral in the event of bankruptcy (Myers, 1984). This article predicts enterprises with high market-to-book ratios to minimize debt usage because it is an intangible asset without collateral value based on the trade-off principle.

The ratio of depreciation to total assets is known as depreciation. Depreciation replaces tax shelters and should result in less debt usage (Jaworski and Santos, 2022). This study anticipates that depreciation will lower debt since other tax-shield sources make debt less alluring. The payout ratio, as defined by Matemilola *et al.* (2019) and Frank and Goyal, is the proportion of dividend payments to total profits (2009). Dividend-paying businesses have less debt in their capital structure (Bilgin and Dinc, 2019; Frank and Goyal, 2009). Conversely, companies that pay higher dividends utilize more debt, which suggests that management is increasing dividends to exhaust the available debt capacity (Frank and Goyal, 2009; Bhaduri, 2002). Because it denotes sound financial health and more debt-issuing capacity, this study anticipates that businesses with higher dividend payout ratios will employ debt more frequently. Age of the company reduces debt usage, suggesting that older companies prioritize financial flexibility (Matemilola *et al.*, 2019).

Macroeconomic considerations influence how businesses choose their capital structures (e.g. Çam and Özer, 2022; Khémiri and Noubbigh, 2018). The enterprises would modify their capital structure in response to positive or unfavorable changes in macroeconomic conditions, such as changes in interest rates, inflation rates and GDP growth rates. According to Matemilola *et al.* (2019) and Khémiri and Noubbigh, the interest rate is the bank lending rate to businesses (2018). Higher interest rates raise the cost of borrowing money and discourage businesses from taking on more debt. According to Khémiri and Noubbigh (2018), inflation rates are calculated as the percentage change in the consumer price index, and they serve as a proxy for an economy's ability to be managed by the government (Çam and Özer, 2022). Lower debt utilization is caused by lenders being reluctant to supply loan capital when inflation rates rise and lending to businesses becomes riskier. Additionally, as shown in Çam and Özer (2022) and Bilgin and Dinc, the economic growth rate is calculated as percentage changes in GDP (2019). Due to its correlation with company growth, the GDP growth rate also

influences capital structure decisions (Çam and Özer, 2022; Khémiri and Noubbigh, 2018). Businesses are encouraged to employ more debt as higher economic growth rates indicate positive economic prospects.

4. Results
4.1 Descriptive statistics
The value that falls in the center of a data set for each variable means that 50% of the data points have values that are lower or equal to the median and 50% of the data points have values that are higher or equal to the median. Instead, the sum of all values in a data collection is divided by the total number of values to determine the mean of each variable. The mean can be used to determine how centrally located a random variable is. If the mean for any given variable is greater than the median, the variable is said to be favorably skewed. On the other hand, it shows that the variable is negatively skewed if the mean is lower than the median. All the variables, with the exception of the GDP growth rate, are favorably skewed, according to the descriptive statistics of the sample of emerging nations. In contrast, the developed countries sample's descriptive statistics show that only the total debt to total assets ratio, sales, market-to-book ratio, tangibility, depreciation, payout ratio, enterprise value and inflation variables are positively skewed, while the growth rates of the GDP, bank lending rates and private credit by deposit money banks are negatively skewed. The standard deviation calculates the variance or dispersion of each variable's values relative to its mean value. For instance, the lowest standard deviation among all the variables shows that inflation is the least volatile.

The average of the long-term debt as a percentage of total assets is higher in the developing countries (25.05%) compared to that of developed countries (20.61%). The averages of firm size (LSL) are almost the same in both developing and developed datasets (see Tables 2 and 3). Growth opportunities, measured as the market-to-book ratio (MTB), is slightly higher in developed countries in comparison to the developing counterpart which suggests that on average firms in developed countries grow faster. Like the findings of the past studies, firms in developing countries have a quite high percentage of property plant and equipment to total assets ratio (PPETA) which suggests that on average firms in developing countries have more assets to pledge as collateral. Depreciation as a percentage of the total assets (DEPTA) is almost the same in both samples. Operating income as a percentage of total assets (EBITA) is quite high

Variable	Definition	Mean	Median	SD	Z-test calculated for means
TDTA	Total debt to total assets (%)	25.05	23.11	20.09	−11.04
LSL	Log of sales	6.35	6.32	1.42	6.39
MTB	Market-to-book ratio	1.90	1.25	2.17	0.38
PPETA	Property, plant and equipment, net, scaled by total assets (%)	36.18	34.00	22.97	−19.13
DEPTA	Depreciation to total assets (%)	3.02	3.00	2.76	0.32
EBITA	Earnings before interest and tax scaled by total assets (%)	9.40	7.00	8.49	−23.53
FAge	Year of establishment	33.09	29.00	19.83	−49.73
POR	Payout ratio (%)	18.43	0.00	25.59	0.50
EVTA	Enterprise value to total assets	1.29	0.76	2.90	2.89
GPDG	Growth rate of GDP (%)	5.58	5.90	2.37	6.57
INF	Inflation rate (%)	5.58	4.91	3.57	−7.17
INT	Banks' lending rate (%)	10.09	9.67	6.72	−28.05
PCDBM	Private credit by deposit money bank (%)	57.73	49.54	27.50	124.3

Source(s): Table by Thakur and modified by Matemilola

Table 2.
Summary of descriptive statistics for developing-country full sample

Variable	Definition	Mean	Median	SD
TDTA	Total debt to total assets (%)	20.61	17.95	18.04
LSL	Log of sales	6.12	5.94	2.00
MTB	Market to book ratio	2.03	1.38	2.22
PPETA	Property, plant and equipment, net, scaled by total assets (%)	27.00	23.00	23.00
DEPTA	Depreciation to total assets (%)	3.00	2.00	3.00
EBITA	Earnings before interest and tax scaled by total assets (%)	3.00	5.00	2.95
FAge	Year of establishment	10.76	0	22.86
POR	Payout ratio (%)	18.69	4.62	17.03
EVTA	Enterprise value to total assets	1.45	0.78	1.41
GPDG	Growth rate of GDP (%)	2.69	2.67	1.90
INF	Inflation rate (%)	1.71	1.50	1.10
INT	Banks' lending rate (%)	2.77	3.00	2.01
PCDBM	Private credit by deposit money bank (%)	118.39	124.52	27.03

Note(s): Critical value for testing the difference between two means is 1.96. If the Z-test calculated is greater than the Z-critical value, the null hypotheses that there is no difference between the mean of variables of developed countries and developing countries is rejected
Source(s): Table by Thakur and modified by Matemilola

Table 3.
Summary of
descriptive statistics
for developed
countries' sample

in developing countries (9.40%) compared to that in developed countries (3.00%). Moreover, inflation has the lowest standard deviation indicating that it is the least volatile among all the variables. Additionally, we test the null hypothesis that there is no difference between the mean of variables of developed countries and developing countries. The null hypothesis was rejected for all the variables (except for DEPTA and pay-out ratio).

The growth rate in GDP (GDPG) is more than double in developing countries compared to that of developed countries. A huge gap exists between the average inflation rate in developing countries and developed countries (5.58 and 1.71%). In a similar vein, interest rates in developing nations are significantly higher than in wealthy nations. The average value of capital market development as assessed by "private credit by deposit money bank as a percentage of GDP" is 57.73 in emerging nations compared to 118.39 in developed nations.

4.2 Correlation
Among the demand-side determinants of capital structure (in the developing countries, Table 4), the highest correlation (0.43) exists between asset tangibility (PPETA) and non-debt tax shield (DEPTA). The second highest correlation (0.32) found is between profitability (EBITA) and growth opportunities (MTB). The third highest correlation (0.31) is between

	TDTA	EVTA	LSL	MTB	PPETA	DEPTA	EBITA	POR	Fage
TDTA	1.00								
EVTA	−0.07*	1.00							
LSL	0.17*	0.01*	1.00						
MTB	−0.04*	0.31*	0.31*	1.00					
PPETA	0.21*	0.00	0.09*	−0.04*	1.00				
DEPTA	0.09*	0.05*	0.08*	0.07*	0.43*	1.00			
EBITA	−0.20*	0.22*	0.12*	0.32*	−0.08*	0.04*	1.00		
POR	−0.20*	0.07*	0.15*	0.15*	0.01*	0.03*	0.23*	1.00	
Fage	−0.03*	−0.02*	0.15*	0.03*	0.03*	0.00	0.02*	0.11*	1.00

Note(s): *Significant at 5% level
Source(s): Table by Thakur

Table 4.
Estimated correlation
between demand side
determinants for
developing-country
full sample

growth opportunities and firm size. The rest of the correlation values are less than 0.31. In the developed countries dataset (Table 5) the highest correlation (−0.30) exists between profitability (EBITDA) and dividend payout ratio (POR). Therefore, no serious threat of multicollinearity exists in both the data sets. Moreover, the mean VIF values (Tables 8–11) also confirm these findings. Correlation results (developing countries' dataset, Table 6) between supply-side determinants show that the highest correlation (−0.45) exists between inflation rate and private credit by deposit money bank. The remaining correlation values are less than 0.33. In the developed countries dataset (Table 7) the highest correlation (0.51) is found between interest rate (INT) and the growth rate of GDP (GDPG). Again, multicollinearity does not seem to be a problem in this dataset.

4.3 Regression results

4.3.1 Direct relationship between goodwill assets and capital structure. We chose between pooled OLS and random-effect models for the data from developing or emerging nations and

	TDTA	EVTA	LSL	MTB	PPETA	DEPTA	EBITA	POR	Fage
TDTA	1.00								
EVTA	−0.04*	1.00							
LSL	0.20*	−0.18*	1.00						
MTB	−0.02*	0.25*	−0.15*	1.00					
PPETA	0.28*	−0.06*	0.15*	−0.15*	1.00				
DEPTA	0.12*	0.03*	−0.01	−0.01*	0.41*	1.00			
EBITA	−0.05*	−0.00	0.26*	−0.03*	0.02*	−0.03	1.00		
POR	−0.07*	−0.04*	0.11*	0.05*	−0.03*	−0.02*	−0.30*	1.00	
Fage	−0.03*	−0.02*	−0.06*	0.03*	0.00	0.00	0.06*	0.17*	1.00

Table 5.
Estimated correlation between demand side determinants for developed-country full sample

Note(s): *Significant at 5% level
Source(s): Table by Thakur

	TDTA	GDPG	INF	INT	PCDBM
TDTA	1.00				
GDPG	0.07*	1.00			
INF	0.11*	0.23*	1.00		
INT	0.10*	−0.23*	0.32*	1.00	
PCDBM	−0.11*	−0.20*	−0.45*	−0.30	1.00

Table 6.
Estimated correlation between supply side determinants for developing-country full sample

Note(s): *Significant at 5% level
Source(s): Table by Thakur

	TDTA	GDPG	INF	INT	PCDBM
TDTA	1.00				
GDPG	−0.01*	1.00			
INF	−0.01*	0.31*	1.00		
INT	0.08*	0.51*	0.24*	1.00	
PCDBM	−0.05*	−0.13*	−0.01*	−0.11*	1.00

Table 7.
Estimated correlation between supply side determinants for developed-country full sample

Note(s): *Significant at 5% level
Source(s): Table by Thakur

the data from industrialized countries using the findings of the Breusch and Pagan Lagrangian Multiplier (LM) test. Because the results justify the adoption of a random-effect model rather than a pooled OLS and the test p-values are less than 0.01. For greater certainty, we determined whether to use a fixed-effect model or a random-effect model using the Hausman Tests on both datasets. Additionally, a fixed-effect model appears to be sufficient according to the Hausman Tests. The issue of heteroscedasticity and serial correlation in the datasets was discovered using the Modified Wald test for group-wise heteroscedasticity and the Wooldridge test for autocorrelation once more. The results of these tests show both autocorrelation and heteroscedasticity. So, using pooled OLS with heteroscedasticity and serial correlation adjusted standard error, the fourth model was created (OLSHSCSE).

The regression analyses (Tables 8 and 9) based on data from developing and developed countries reveal that goodwill (LEVTA) has a considerable positive influence in all four models as a demand-side predictor. Some control variables, such as business size, asset tangibility, profitability and dividend payout ratio, are remarkably constant across models and datasets. Other variables produce inconsistencies in outcomes, either among models or across datasets. However, in both emerging and established countries, the bulk of the variables have a strong link with debt ratio. Private Credit by Deposit Money Bank (PCDBM): Results based on the developing countries' data show that financial market development measured by private credit by deposit money bank as a percentage of GDP has a significant positive impact (except in RE model) on debt ratio. However, in the developed countries' sample, PCDBM has significant negative impact on debt ratio (except in the FE model).

4.3.2 Moderating impact of financial market development on the relationship between goodwill-assets and capital structure. The fixed-effect (FE) model's output (Table 10, Column 4) based on samples from emerging countries demonstrates that the development of financial markets significantly modifies the link between goodwill assets and firms' debt ratios. In other words, the development of the financial industry affects the effect of goodwill assets on debt ratio in the sample of emerging countries. The growth of the financial markets has a sizable moderating influence on the relationship between goodwill assets and firms' debt ratio, according to the ordinary least squares (OLS) with heteroscedasticity and serial correlation adjusted. While the OLS with heteroscedasticity and serial correlation corrected results show that financial market development has an insignificant moderating effect on debt ratio in the sample of developed countries, the results for the fixed-effect model show that the relationship between goodwill assets and firms' debt ratio is negatively moderated by the development of financial markets. This suggests that the impact of goodwill assets on firms' debt ratio is unconditional on the financial market.

5. Discussion of results
The findings indicate that debt ratios in developing nations are positively correlated with the growth of financial markets. In contrast, the growth of the financial markets has little bearing on the debt levels of wealthy nations. Matemilola *et al.* (2019) demonstrate a favorable impact of financial market growth on debt ratios of enterprises in developing nations, which is consistent with the findings for developing countries. Debt ratios of businesses are impacted by the growth of financial markets because financing methods through banks or stock markets suit the governance structure in that those individuals receive the greatest ability to influence business strategies and are also the largest capital suppliers (Matemilola *et al.*, 2019; Fan *et al.*, 2012). As financial markets (i.e. the banking sector) expand, borrowing costs decline and businesses are more inclined to raise debt through banks, which results in a rise in debt consumption. The results are in line with Antoniou *et al.* (2008) findings that macroeconomic factors and whether firms operate in bank-based economies or capital-based economies affect their debt financing decisions. Antoniou *et al.* (2008) note that empirical studies generally

Variables	(Pooled OLS) TDTA	(RE) TDTA	(FE) TDTA	(OLS with hetero and serial corr.) TDTA	Two-step system GMM TDTA
L.TDTA					0.736***
					(0.012)
LEVTA (Excess of enterprise value over total assets)	0.479***	0.551***	0.637***	0.579**	0.638***
	(0.111)	(0.10)	(0.109)	(0.284)	(0.107)
PCDBM (Private credit by deposit money bank as % of GDP)	0.024***	0.006	0.074***	0.024***	0.075***
	(0.004)	(0.007)	(0.014)	(0.009)	(0.012)
LSL (Log of sales)	2.780***	1.782***	1.273***	2.780***	1.275***
	(0.067)	(0.098)	(0.120)	(0.179)	(0.118)
MTB (Market-to-book ratio)	0.181***	0.176***	0.184***	0.181*	0.185***
	(0.048)	(0.037)	(0.038)	(0.109)	(0.037)
PPETA (Property, plant and equipment, net, scaled by total assets)	15.550***	15.310***	14.990***	15.550***	14.992***
	(0.430)	(0.533)	(0.602)	(1.084)	(0.599)
DEPTA (Depreciation to total assets)	7.080**	−1.012	−0.852	7.080	−0.853
	(3.536)	(3.043)	(3.144)	(7.747)	(3.139)
EBITA (Earnings before interest and tax to total assets)	−47.200***	−26.530***	−23.520***	−47.200***	−23.518***
	(1.165)	(0.885)	(0.904)	(3.431)	(0.899)
Fage (Year of establishment)	−0.052***	−0.048***	−0.081***	−0.052***	−0.083***
	(0.004)	(0.009)	(0.016)	(0.011)	(0.013)
POR (Payout ratio)	−0.137***	−0.073***	−0.060***	−0.137***	−0.061***
	(0.004)	(0.003)	(0.003)	(0.008)	(0.001)
GDPG (Growth rate of GDP)	0.485***	−0.075**	−0.115***	0.485***	−0.117***
	(0.041)	(0.035)	(0.039)	(0.077)	(0.034)
INF (Inflation rate)	0.369***	0.252***	0.236***	0.369***	0.239***
	(0.029)	(0.020)	(0.021)	(0.047)	(0.019)
INT (Banks' lending rate)	0.294***	0.104***	−0.0368	0.294***	−0.039
	(0.015)	(0.024)	(0.032)	(0.035)	(0.028)
Constant	1.014	11.120***	12.940***	1.014	12.938**
	(0.716)	(1.032)	(1.292)	(1.700)	(1.290)
Observations	43,866	43,866	43,866	43,866	43,866
R-squared	0.163		0.052	0.163	
Number of id		4,906	4,906		
Breusch–Pagan LM test		(0.000)			
Hausman test			(0.000)		
Multicollinearity (VIF)			1.25		
Heteroscedasticity (χ^2 stat)			(0.000)		
Serial correlation (F-stat)			(0.000)		
AR (2)					0.235
Hansen test					0.493

Note(s): (a) See Table 1 for the definition of variables and measurements. Asterisks indicate significance at 1 (***), 5 (**) and 10% (*)
(b) The standard errors are reported in parentheses
Source(s): Table by Thakur and modified by Matemilola

Table 8.
Regression results based on 4,912 nonfinancial listed firms from 23 developing countries

focus on the firm specific factors or demand side factors that financial managers should consider when making debt financing decisions but overlook the possible implications of macroeconomic factors that may affect the choice of debt financing mix.

Moreover, as suggested by past researchers (Ojah and Karemera, 1999; Azad et al., 2014), inefficiencies still exist in the financial markets of developing countries. Due to this inefficiency in the developing markets, there is still room for improvement and thus, further

Variables	(Pooled OLS) TDTA	(RE) TDTA	(FE) TDTA	(OLS with hetero and serial corr.) TDTA	Two-step System GMM TDTA
L.TDTA					0.639***
					(0.009)
LEVTA (Excess of enterprise	2.865***	1.614***	1.447***	2.865***	1.450***
value over total assets)	(0.110)	(0.095)	(0.100)	(0.198)	(0.099)
PCDBM (Private credit by	−0.056***	−0.022***	0.011**	−0.056***	0.012**
deposit money bank as % of	(0.003)	(0.003)	(0.005)	(0.007)	(0.003)
GDP)					
LSL (Log of sales)	2.080***	1.896***	2.257***	2.080***	2.260***
	(0.051)	(0.082)	(0.117)	(0.117)	(0.115)
MTB (Market-to-book ratio)	−0.323***	0.0157	0.0597	−0.323***	0.0600**
	(0.045)	(0.035)	(0.036)	(0.094)	(0.006)
PPETA (Property, plant and	19.930***	18.310***	17.550***	19.930***	17.552***
equipment, net, scaled by total	(0.426)	(0.535)	(0.612)	(1.121)	(0.609)
assets)					
DEPTA (Depreciation to total	4.498	6.483***	9.134***	4.498	9.136***
assets)	(2.795)	(2.365)	(2.444)	(5.794)	(2.439)
EBITA (Earnings before	−11.580***	−9.992***	−10.040***	−11.580***	−9.041***
interest and tax to total assets)	(0.581)	(0.433)	(0.442)	(1.094)	(0.438)
Fage (Year of establishment)	0.006	0.005	0.095***	0.006	0.096***
	(0.004)	(0.009)	(0.034)	(0.008)	(0.029)
POR (Payout ratio)	−0.053***	−0.038***	−0.035***	−0.053***	−0.037***
	(0.004)	(0.003)	(0.004)	(0.008)	(0.002)
GDPG (Growth rate of GDP)	−0.547***	−0.308***	−0.135***	−0.547***	−0.137***
	(0.054)	(0.036)	(0.039)	(0.074)	(0.032)
INF (Inflation rate)	0.137*	0.028	0.159***	0.137	0.161***
	(0.083)	(0.053)	(0.057)	(0.092)	(0.053)
INT (Banks' lending rate)	−0.182***	0.496***	1.544***	−0.182	1.545***
	(0.057)	(0.082)	(0.119)	(0.127)	(0.114)
Constant	13.680***	7.553***	2.512*	13.680***	2.514*
	(0.525)	(0.780)	(1.308)	(1.173)	(1.301)
Observations	38,075	38,075	38,075	38,075	38,075
R-squared	0.142		0.062	0.142	
Number of id		4,297	4,297		
Breusch–Pagan LM test		(0.000)			
Hausman test			(0.000)		
Multicollinearity (VIF)			1.50		
Heteroscedasticity (χ^2 stat)			(0.000)		
Serial correlation (F-stat)			(0.000)		
AR (2)					0.219
Hansen test					0.382

Note(s): (a) See Table 1 for the definition of variables and measurements. Asterisks indicate significance at 1% (***), 5% (**) and 10% (*)
(b)The standard errors are reported in parentheses
Source(s): Table by Thakur and modified by Matemilola

Table 9.
Regression results based on 4,303 nonfinancial listed companies from 9 developed countries

development in the financial market has the scope to enhance the impact of goodwill assets on firms' debt ratio. Conversely, financial markets in the developed countries are much more efficient compared to the developing countries' counterparts (Bas *et al.*, 2009). In addition, due to favorable property rights (Claessens and Laeven, 2003) and better protection of creditors' rights (Giannetti, 2003), the collaterizability of intangible assets (goodwill assets) is more

Variables	(Pooled OLS) TDTA	(RE) TDTA	(FE) TDTA	(OLS with hetero and serial corr) TDTA	Two-step system GMM TDTA
L.TDTA					0.725**^
					(0.007)
LEVTA (Excess of enterprise value over total assets)	1.538*** (0.221)	0.308 (0.226)	0.481** (0.241)	1.538*** (0.525)	0.482** (0.237)
PCDBM (Private credit to deposit money bank as % of GDP)	0.034*** (0.004)	0.009 (0.007)	0.074*** (0.014)	0.034*** (0.009)	0.076*** (0.010)
LEVTAPCDBM (LEVTA*PCDBM)	0.0387*** (0.004)	0.012*** (0.004)	0.006* (0.004)	0.039*** (0.008)	0.029*** (0.004)
LSL (Log of sales)	2.771*** (0.067)	1.770*** (0.099)	1.265*** (0.120)	2.771*** (0.178)	1.264*** (0.116)
MTB (Market-to-book ratio)	0.162*** (0.048)	0.176*** (0.037)	0.184*** (0.038)	0.162 (0.108)	0.187*** (0.031)
PPETA (Property, plant and equipment, net, scaled by total assets)	15.490*** (0.429)	15.300*** (0.533)	14.990*** (0.602)	15.490*** (1.083)	14.991*** (0.598)
DEPTA (Depreciation to total assets)	7.048** (3.532)	−0.797 (3.044)	−0.727 (3.144)	7.048 (7.707)	−0.727 (3.144)
EBITA (Earnings before interest and tax scaled by total assets)	−47.430*** (1.163)	−26.530*** (0.885)	−23.510*** (0.904)	−47.430*** (3.413)	−23.499*** (0.899)
Fage (Year of establishment)	−0.050*** (0.004)	−0.048*** (0.009)	−0.080*** (0.016)	−0.050*** (0.011)	−0.083*** (0.009)
POR (Payout ratio, in %)	−0.139*** (0.004)	−0.074*** (0.003)	−0.060*** (0.003)	−0.139*** (0.008)	−0.059*** (0.005)
GDPG (Growth rate of GDP, in %)	0.501*** (0.041)	−0.069** (0.035)	−0.113*** (0.039)	0.501*** (0.077)	−0.109*** (0.029)
INF (Inflation rate, in %)	0.355*** (0.029)	0.250*** (0.020)	0.236*** (0.021)	0.355*** (0.047)	0.234*** (0.018)
INT (Banks' lending rate, in %)	0.296*** (0.015)	0.105*** (0.024)	−0.036 (0.032)	0.296*** (0.036)	−0.042^ (0.023)
Constant	0.628 (0.717)	11.030*** (1.031)	12.900*** (1.292)	0.628 (1.705)	12.903*** (1.288)
Observations	43,866	43,866	43,866	43,866	43,866
R-squared	0.165		0.052	0.165	
Number of id		4,906	4,906		
Breusch–Pagan LM test (p-value)		0.000			
Hausman test (p-value)		0.000			
Multicollinearity (mean VIF)		2.05			
Heteroscedasticity test (p-value)		0.000			
F-statistics (p-value)		0.000			
AR (2)					0.316
Hansen test					0.471

Note(s): (a) See Table 2 for the definition of variables and measurements. Asterisks indicate significance at 1% (***), 5% (**) and 10% (*)
(b) The standard errors are reported in parenthesis
Source(s): Table by Thakur and modified by Matemilola

Table 10.
Regression results (moderating effect), based on 4,912 non-financial listed companies from 23 developing countries

established in the developed markets. Thus, there is a little absorption of the financial market development effect on the goodwill-capital structure relationship in the developed countries. This reasoning explains why goodwill has insignificant moderating impact on the relationship between goodwill assets and firms' debt ratios in developed countries.

Besides, demand side factors such as PPETA (property, plant and equipment to total assets), LSL (log of sales), earnings before interest and tax to total assets (EBITA), market-to-book ratio (MTB), firm age, pay-out ratio and depreciation to total assets (DEPTA) consistently predict debt ratios in both the developed and developing countries. These outcomes align with the outcomes of Henrique *et al.* (2021) and Kumar *et al.* (2017) who reported EBITA, PPETA, LSL, firm age, MTB and DEPTA, as determinants of firms' debt ratios in developing and developed countries. The findings of Hang *et al.* (2018), who found PPETA, MTB and EBITA as drivers of enterprises' debt ratios, are also supported by these data.

In both the emerging and developed countries, the bulk of the variables have a strong link with debt ratio. These results are consistent with the findings of Matemilola and Ahmad (2015), who reported positive impact of goodwill assets on capital structure of South African firms. These results are consistent with the findings of Matemilola *et al.* (2019) and Jaworski and Santos (2022) who reported that firm size, asset tangibility, profitability and dividend payout ratio are consistent determinants of debt ratio. In the developing countries' results, the private credit by deposit money bank variable reveal that financial market development positively impact the debt ratio, except in random-effects model. These results are consistent with the findings of Çam and Özer (2022) and Matemilola *et al.* (2019), who also reported that financial market development has positive impact on debt ratio. But, in the developed countries' sample, financial market development significantly and negatively impacts the debt ratio (except in the FE model). This result is consistent with the findings of Khémiri and Noubbigh (2018), who reported negative impact of financial market development on debt ratio of firms.

5.1 Theoretical implications
Azad *et al.* (2014) theorize that financial market development in less developed and developing economies appear inefficient because the problem of information asymmetry exists. Our results that financial market development positively moderates the link between goodwill assets and firms' debt capital ratio in developing countries contribute to the literature that argues that financial market development is strongly linked to the level of information asymmetry in the markets which ultimately influence the supply and allocation of capital (Sharma, 2017). The financial market development lowers the information asymmetry problem inherent in goodwill assets and improves it as collateral to secure debt capital. Moreover, our results that goodwill assets are positively related to firms' debt capital ratio in the developing and developed countries extends the trade-off theory of capital structure, which traditionally identifies fixed assets as one of the major factors that support firms' ability to secure debt capital from creditors. In other words, we introduced goodwill assets as an added factor to the traditional factors identified by the trade-off theory of capital structure.

5.2 Policy and managerial implications
The findings of this research have policy implications. Firstly, the results inform firm-managers that rather than focusing on only fixed assets as collateral, goodwill assets also serve as additional collateral to secure debt financing. The firm managers that have goodwill assets would benefit while formulating the financing policies of their firms. Second, creditors in the developed and developing markets will be more aware of the collaterizability of goodwill assets as they make decisions to provide credits to firms. Third, results on the impact of supply-side determinants on the capital structure will aid policymakers in both the developing and developed countries to design and implement macroeconomic policies to enhance the financing and investment decisions of firms. Finally, the study discovered that the expansion of financial markets has a moderating effect on the link between goodwill

assets and firms' debt ratios which would help policymakers in developing countries to improve the collaterizability of goodwill assets through enhancing the financial market condition in those countries and easing access to debt capital (see Table 11).

Variables	(Pooled OLS) TDTA	(RE) TDTA	(FE) TDTA	(OLS with hetero and serial corr) TDTA	Two-step system GMM TDTA
L.TDTA					0.624***
					(0.006)
LEVTA (Excess of enterprise value over total assets)	2.207***	2.024***	2.133***	2.207***	2.134***
	(0.409)	(0.332)	(0.342)	(0.693)	(0.336)
PCDBM (Private credit to deposit money bank as % of GDP)	−0.055***	−0.022***	0.011**	−0.055***	0.012**
	(0.003)	(0.004)	(0.005)	(0.007)	(0.003)
LEVTAPCDBM (LEVTA*PCDBM)	0.005*	−0.003	−0.006**	0.005	−0.005**
	(0.003)	(0.003)	(0.003)	(0.006)	(0.001)
LSL (Log of sales)	2.080***	1.893***	2.253***	2.080***	2.255***
	(0.051)	(0.082)	(0.117)	(0.117)	(0.114)
MTB (Market-to-book ratio)	−0.326***	0.017	0.063*	−0.326***	0.064**
	(0.047)	(0.036)	(0.036)	(0.094)	(0.031)
PPETA (Property, plant and equipment, net, scaled by total assets)	19.940***	18.300***	17.550***	19.940***	17.549***
	(0.426)	(0.535)	(0.612)	(1.121)	(0.598)
DEPTA (Depreciation to total assets)	4.465	−6.488***	−9.153***	4.465	−9.155***
	(2.795)	(2.365)	(2.444)	(5.795)	(2.403)
EBITA (Earnings before interest and tax scaled by total assets)	−11.610***	−9.982***	−10.030***	−11.610***	−10.029***
	(0.582)	(0.434)	(0.442)	(1.095)	(0.425)
Fage (Year of establishment)	0.006*	0.005	0.095***	0.006	0.096***
	(0.004)	(0.010)	(0.034)	(0.008)	(0.028)
POR (Payout ratio, in %)	−0.053***	−0.038***	−0.035***	−0.053***	−0.034***
	(0.004)	(0.003)	(0.004)	(0.008)	(0.003)
GDPG (Growth rate of GDP, in %)	−0.546***	−0.308***	−0.134***	−0.546***	−0.136***
	(0.054)	(0.036)	(0.039)	(0.074)	(0.035)
INF (Inflation rate, in %)	−0.152*	−0.021	−0.150***	−0.152*	−0.148***
	(0.083)	(0.053)	(0.057)	(0.092)	(0.050)
INT (Banks' lending rate, in %)	−0.180***	0.502***	1.565***	−0.180	1.566***
	(0.057)	(0.082)	(0.120)	(0.127)	(0.118)
Constant	13.630***	7.602***	−2.499*	13.630***	−2.598**
	(0.526)	(0.781)	(1.308)	(1.181)	(1.239)
Observations	38,075	38,075	38,075	38,075	38,075
R-squared	0.142		0.062	0.142	
Number of id		4,297	4,297		4,297
Breusch-Pagan LM test (p-value)		0.000			
Hausman test (p-value)		3.040			
Multicollinearity (mean VIF)		0.000			
Heteroscedasticity test (p-value)		0.000			
F-statistics (p-value)		0.000			
AR (2)					0.207
Hansen test					0.377

Note(s): (a) See Table 2 for the definition of variables and measurements. Asterisks indicate significance at 1 (***), 5 (**) and 10% (*)
(b) The standard errors are reported in parenthesis
Source(s): Table by Thakur and modified by Matemilola

Table 11.
Regression results (moderating effect) based on 4,303 nonfinancial listed companies from 9 developed countries

5.3 Limitations and future research agenda
This study has some limitations as it uses large firms only. Firstly, a similar study on small firms may give different results. But goodwill concept is currently based on the market value, and it is difficult to estimate the goodwill values of small firms because they are not publicly listed. The nature of the business or lack of data prevented all firms from being included, even in the major listed firm category. Future research on this subject can assess how many factors, such as the legal system, the state of law and order and corruption, affect the relationship between goodwill assets and capital structure.

6. Conclusions
The effect of goodwill assets on demand-side factors affecting organizations' capital structures is examined in this article. Additionally, using two sizable samples of listed nonfinancial enterprises from both emerging and developed nations, panel data approaches are used to assess the moderating effect of financial market development on the link between goodwill assets and firms' capital structures.

The findings of this panel regression demonstrate that whereas goodwill assets have a negative influence on enterprises' capital structures in rich nations, they have a considerably favorable impact on those in developing countries. The direct effect results for the developing countries are consistent with our expectation that markets in developing countries are considering goodwill as a collaterizable asset along with fixed assets. However, the results for the developed countries are inconsistent with our expectations. Moreover, we found evidence that financial market development positively moderates the relationship between goodwill assets and capital structure in developing countries, which is consistent with our expectations.

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