INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research

International Journal of Economics and Business Research

ISSN online: 1756-9869 - ISSN print: 1756-9850
https://www.inderscience.com/ijebr

Modelling the relationship between bond issuance and firm performance in the dynamic Indian scenario

Gaurav Singh

DOI: 10.1504/IJEBR.2025.10075084

Article History:

Received:	04 March 2025
Last revised:	20 June 2025
Accepted:	30 June 2025
Published online:	06 January 2026

Modelling the relationship between bond issuance and firm performance in the dynamic Indian scenario

Gaurav Singh

VIT Business School,
Vellore Institute of Technology,
Vellore, Tamil Nadu, India
Email: gst.iitdhn@gmail.com

Abstract: The debt issuance and firm performance of an organisation have a contradictory relationship. The current study uses the matched sample to establish a relationship between bond issuance and firm performance. The data is collected from the CMIE database and verified with Bloomberg. The period taken for the study is seventeen years, from 2004 to 2020 and the sample is matched through coarsened exact matching (CEM) and analysed through difference-in-difference (DID) estimator. The study found that in the Indian economic scenario, there is a negative association between bond issuance and firm performance.

Keywords: bond market; corporate bond market; debt issuance; firm performance; coarsened exact matching; CEM; difference-in-difference; DID; India.

Reference to this paper should be made as follows: Singh, G. (2025) 'Modelling the relationship between bond issuance and firm performance in the dynamic Indian scenario', *Int. J. Economics and Business Research*, Vol. 29, No. 19, pp.1–19.

Biographical notes: Gaurav Singh is working as an Assistant Professor at VIT Business School, VIT, Vellore. He completed PhD from the prestigious Indian Institute of Technology (ISM), Dhanbad. His interest areas of research are financial market, fixed-income securities, econometrics, international finance and corporate bond market. His teaching interests are financial accounting, corporate finance, financial management, geopolitical risk and fixed-income securities.

1 Introduction

This link between capital structure and firm performance is a crucial aspect of finance, and many studies explain it differently. Majorly, studies concluded that issuing more debt has a significant negative relation with a firm's value and financial performance. The foundational theory for firm performance and capital structure, the Modigliani-Miller (MM) approach given by Modigliani and Miller (1958), states otherwise while it holds that there is no implication of capital structure on the firms' value. However, MM theory is impractical due to its establishment on the unrealistic assumptions of a flawless capital market. Other theories have been proposed as alternate options for the MM theory, such as agency theory, trade-off theory and pecking order theory, to account for an imperfect

market. The pecking order theory posits that a firm's financial needs are funded hierarchically through internal funding, with debt and equity as the last option (Myers and Majluf, 1984; Ross, 1977). According to the agency theory proposed by Hart and Moore (1994), Jensen (1986) and Jensen and Meckling (1976), the ideal capital structure of a firm should formed in a way that maximises the financial value of a firm. It minimises the stakeholders' conflict of interest.

The trade-off theory states that to maximise the firm value, a company will trade off the cost and benefit of the debt, as proposed by Myers and Majluf (1984) and Kraus and Litzenberger (1973). The primary objective of this theory is to create a tax shield by decreasing the revenue by paying more interest on the debt (Modigliani and Miller, 1963). The direct and indirect bankruptcy cost derives from the cost of debt, which is derived from the rise in financial risk (Kraus and Litzenberger, 1973; Kim and McConnell, 1977).

On the firm level, several theories on debt issuance exist; however, no single theory has comprehensively been able to interpret firm performance based on capital structure. Considering the corporate bond issuance as the debt, there is a dearth of studies in this field, precisely in the Indian scenario. All these theories are rooted in several imperative assumptions that may or may not reflect reality, although the real financial market is highly diversified and complex (Ardalan, 2017). These theorists are unable to thoroughly consider the complex, multifaceted nature of a society or its financial and social culture and traditions followed over generations. In addition, a functionalist paradigm managed to retain the majority of finance researchers, even though each paradigm, such as the radical humanist, interpretive, radical structuralist paradigms and functionalist, presents scope to a unique research approach.

According to the pecking order theory, more holdings in a company cause information asymmetry between managers and owners of the firm. Information asymmetry can lead to decision manipulation and if the holdings are significantly high, it can lead to market manipulation. Information asymmetry can also cause sensitive issues such as insider trading. In the Indian corporate bond market, private placement is very dominant; according to the Securities and Exchange Board of India (SEBI), as of 31 March 2012, around 95% of issuance of a corporate bond is private placement and the rest nearly 5% is a public issue according to volume. A large amount of private placement increases the holding amount and can cause information asymmetry.

A vast amount of available literature extrapolates the impact of different financial instruments, such as equity and debt, on firm performance. Most of these studies postulate the agency theory, which is evident in most parts of the world, including developed and underdeveloped countries. However, tenets of the Indian market and the performance of these firms should be seen from a different perspective, as in India, where bond markets are yet to flourish and the primary source of corporate funding rests with the banking sector (Dawar, 2014). This is also evident from the capital structure of the firms in developing countries, which has a negative impact on the firm performance, unlike most developing and developed countries (Le and Phan, 2017).

Agency theory is evident in several economies due to better financial market structure, transparency, efficient trading mechanism and the presence of order-matching platform. One of the major concerns is transparency, as Indian CBM is dominated by private placement, and its dependency on it has increased further (Shukla and Prabu, 2014). Pecking order theory also indicates that more holdings in the company can lead to information asymmetry and influence decision making (Myers and Majluf, 1984). This

influence can lead to sensitive issues in the financial market, rampant in various areas, such as economics, management, commerce, trade, and finance. In financial markets, these sensitive issues are identified as insider trading, tax evasion, money laundering, and manipulating investors to buy and sell securities through the wrong projection of financial information (Jebur and Yehya, 2021; Nanda and Barai, 2020).

Consequently, this leads to the generation of distinct understanding (Lagoarde-Segot, 2016; Burrel and Morgan, 1979). The prediction of these theories and the results of any model can be changed if the underlying assumptions of any theory are changed. Specifically, the effect of capital structure or debt issuance on the valuation of the company may differ significantly over the change of context, and these capital structure theories can be questionable due to changes in conditions or different structures. Previously, Lagoarde-Segot (2016) and Lagoarde-Segot and Leoni (2013) similarly suggested that diversification of modern finance is possible through new paradigms, metaphors and puzzle-solving rigour.

2 Literature review

Jensen and Meckling (1976) proposed agency theory. Since then, empirical research has been abundant in virtually all nations, exploring the link between financial leverage and organisational performance. This leads to new findings on agency costs and highlights the conflict between firm management and shareholders. Agency cost is caused by the fact that the corporate resources of the firm are majorly invested by the managers for personal benefit-focused projects instead of the company's profit (Jensen, 1986). Even though it is in the best interests of shareholders, firm management is usually unwilling to cede control and resists liquidation (Harris and Raviv, 1988). Agency expenses could be reduced by the issuance of more debt by restraint or encouragement of managers to take actions which favour the best interest of shareholders through the inclusion of numerous investment products and options, undertaken risk and situations which can resort to the liquidation of the firm (Myers, 1977; Jensen and Meckling, 1976; Harris and Raviv, 1990; Grossman and Hart, 1982). This indicates that through leverage, agency cost can be reduced and have a positive effect on firm profitability and performance. Later, Williamson (1988) and Grossman and Hart (1982) supported the findings and showed that a firm's higher leverage increases its value and reduces agency costs by incentivising managers to work in favour of shareholders.

A review of the current literature demonstrates that many academicians have made substantial contributions towards leverage and establishing its relation with the agency cost, firm performance and profitability. Most of the studies have focused on the direct influence of leverage or debt financing on profitability measures such as return on total assets (ROTA), return on equity (ROE), return on assets (ROA), or its impact only on the assets utilisation efficiency of firms or on general and administrative expenses (G&AE) (Matusin et al., 2014; Abor, 2005; Krishnan and Moyer, 1997). However, many studies employ a comprehensive methodology to explore the proper relationship among these variables.

The studies that try to discover the relationship between corporate or financial success and financial leverage cannot reach a common result and have contradictory and inconsistent findings. However, very few studies are visible in developing economies.

Majumdar and Chhibber (1999) attempted to study the relationship between financial performance and debt issuance of Indian firms and discovered a negative association. A similar conclusion was made by Chiang et al. (2002) when they analysed the relationship between capital structure and firm performance of Hong Kong real estate and construction firms. Consecutively, Abor (2005) conducted a study on the Ghana Stock Exchange (GSE) over five years and discovered a contradiction that the relationship between companies' profitability and leverage is favourable for short-term debt yet unfavourable for long-term debt. Later on, Abu-Tapanjeh and Abdussalam (2006) made a similar attempt to investigate the relationship between Jordanian publicly traded companies and discovered a significant positive relationship between leverage and profitability, a similar result found by Kyereboah-Coleman (2007) for microfinance enterprises in sub-Saharan Africa. Abor (2007) extended his previous study and included the medium and small-sized enterprises of South Africa and Ghana, and again, he found a negative correlation between business performance and long- and short-term debt. Zeitun and Tian (2014) found that debt level and firm performance are adversely related to the market and accounting performance metrics in the study of Jordanian firms. Ebaid (2009) made a further detailed study and included three accounting-based metrics of financial performance, namely gross profit margin (GM), return on equity (ROE) and return on assets (ROA) and concluded that capital structure has marginal or no influence on firm performance. Dare and Olorunfemi (2010) conducted a study on the Nigerian petroleum industry and concluded a positive relationship between corporate performance and capital structure. In another study on companies listed on the Nigerian Stock Exchange, Onaolapo and Kajola (2010) found that a company's financial performance is influenced by capital structure. They observed the detrimental influence of leverage on proxies of a company's financial performance, namely ROE and ROA. In India, studies related to CBM are still very low; a recent study by Pandey and Sahu (2019) attempted to study the relationship between debt and firm performance and found a significant adverse effect of debt on firm performance. However, no study has attempted to study the role of a significant debt tool, corporate bonds, on firm performance, especially in India. The current study discovered the fundamental connection dynamics by analysing the impact debt and corporate bond issuance have on a firm's performance. In this study, one of the objectives is to empirically examine the effect of corporate bond financing as a proxy of debt financing or leverage on the performance of Indian firms.

3 Hypothesis development

As stated in the literature review chapter, Modigliani and Miller's (1958) theory is recognised as the basic theory for the relationship of capital structure with firm performance. According to this theory, capital structure does not impact a firm's value. The value of a firm is determined by holdings of assets, not by the firm's capital mix (mix of equity and debt). While MM theory is based on some critical assumptions, including no bankruptcies, transaction costs, and taxes, investors are perfectly informed; all managers' objectives are aligned and are value maximisation. MM theory also suggests that organisations that can issue debts have more excellent value. There is no transaction cost; thus, the arbitrage process will become risk-free. This process lasts until the stock prices of these firms (without or with debt) become equivalent. This process occurs rapidly in the perfect market; hence, the MM theory concluded that the value of a

firm is independent of the capital structure. However, the result will significantly differ in imperfect markets, showing that leverage affects firm value. Several other theories state the relationship between capital structure and firm performance, such as the trade-off theory (Kraus and Litzenberger, 1973; Myers and Majluf, 1984) and the pecking order theory. As India is an imperfect market that is still growing a solid capital structure, this can affect the value of a firm. Some studies have analysed capital structure; however, no study has considered the Indian corporate bond market in order to analyse its relationship with the firm's performance. The present study attempts to address this issue and understand the relationship empirically. The hypotheses of the study are:

H_1 Impact on the firm performance.

H_0 Bond issuance does not affect the firm performance.

4 Data collection

Annual data for all the matched sample criteria and control variables is collected from the ProwessIQ, a data terminal by the Central for Monitoring Indian Economy (CMIE). CMIE is a reputed Indian government data source that provides annual financial statements and data on the NSE and BSE registered companies. The comparative list of the companies is collected from Bloomberg. Moreover, the company list is rechecked from the Bombay Stock Exchange (BSE) database. The sample size is collected for 126 issuers and 571 non-issuer firms. For better results, data cleaning was done, and firms that may be delisted, added, or removed from the database during the study period are forbidden from the study. Firms that do not have a complete record of firm performance consisting of three proxies (ROA, ROE, ATOR) are removed; the companies with observations of less than three consecutive years are also removed (Guariglia, 2008). Henceforth, the final sample after the data cleaning remains for 36 corporate bond issuer companies and 103 non-corporate bond issuers firms.

5 Statistical tools and techniques

5.1 Pre-tests

To control and confound the impact of the pre-treatment control variable, matching is used as the non-parametric strategy. The primary objective is to exclude observations so that final observations have a more equitable distribution of variables across the treatment and control groups (Blackwell et al., 2009). The present study employs coarsened exact matching (CEM), a novel strategy that minimises the imbalance in variables between the control and treatment groups to enhance the estimate of the causal relationship. This matching approach is based on the monotonic imbalance reduction, which states that the balance between the control and treatment group is determined ex-ante by the user instead of using another verification process according to the fact, procedure adjustment and continuous re-estimation.

Due to curse-of-dimensionality concerns, precise matching generally yields few matches despite providing perfect balance. For instance, adding one continuous variable to a dataset eliminates precise matching because it is improbable that two observations

would have identical values on a continuous measure (Abadie, 2005). On the other hand, CEM is based on temporarily coarsening each variable into substantively relevant groups, performing an exact match on this coarsened data, and then retaining only the original (un-coarsened) values of the matched data. As coarsening is a fundamental measurement technique, many analysts understand how to coarsen variables into information-preserving groups.

Strata serve as the basis for treatment effect. CEM reflects the intrinsic trade-off of matching: using larger bins (more coarsening) to create X will result in fewer strata. The fewer layers will cause different observations in each stratum, resulting in a more significant imbalance. Both treated and untreated groups are prunes by CEM. In the subsample, the amount of interest in the treatment effect after matching this method varies. This modification is acceptable if the choice is apparent (Crump et al., 2006).

The CEM method contains additional advantages to lessen the disparity between the control and treated groups. The congruence principle is adhered to by CEM, specifying that analysis space and data space must be the same. Avoiding this criterion can produce unusual and counterintuitive outcomes. On the other hand, this concept enables data to discover better matches. The CEM automatically filters the matched data to places with empirical evidence in common. This is required for model-dependent extrapolations of the causal impact to eliminate the potential of difficult-to-justify (King and Zeng, 2006). Even with massive datasets, CEM is computationally efficient. CEM provides an option that is quicker and simpler to comprehend. It temporarily coarsens the data according to the researcher's preferences (e.g., in age categories rather than specific birthdays) and then searches for exact matches (Blackwell et al., 2009; Iacus et al., 2012).

CEM is connected to a multitude of sub-classification (or 'stratification') methods, including complete matching, frequency matching and sub-classification based on the propensity score, among others. By allowing it to be adjusted individually for each variable, CEM is conceptually related, but not methodologically, to numerous innovative combinations of methodologies, such as Rosenbaum and Rubin (1983). By appropriately coarsening into these categories, CEM may incorporate a variable like 'years of education' (Iacus et al., 2012).

5.2 Regression analysis

Estimating the average effect on an outcome variable of interest is the primary objective of an evolution study. Researchers aim to focus on estimating the average effect on the treated. In the ideal conditions of an evolution study, the researchers observe a dependent variable. The primary challenge for the evaluation studies is to find a suitable sample from the untreated firms. Considering that the distribution or scattering of the dependent variable of the untreated firms can be considered as a probable distribution, the distribution followed by the outcome variable 'Yi' counterfactually, which would have been followed by the treated firms even if they did not undergo the policy change (treatment) (Abadie, 2005).

Occasionally, when obtaining an appropriate sample from an untreated group is not feasible, the difference in outcome variable distribution between untreated and treated groups is not only the final effect of the treatment but also the effect of ineradicable differences between the treated and untreated or control group. This problem is addressed by the difference-in-difference (DID) estimator. The basic assumption of the DID estimator is that the outcome of the variable Y_i of the treated and untreated sample groups

is considered roughly constant if the treatment is absent. Thus, the difference in the average outcome of the untreated and treated sample group prior to the treatment can be used as part of the approximation after the treatment of the outcome variable. That is the final output of the ineradicable difference between the untreated and treated group, not caused by the treatment. The DID estimators are commonly used to evaluate the impact of treatments when the experimental data is missing (Abadie, 2010). Difference-in-difference (DID) estimators are widely used in almost all areas of economics to study various issues. For instance, Card and Krueger (1994), Card (1990), Garvey and Hanka (1999), Gruber and Poterba (1994), Guo and Fraser (2015) and several other researchers have used the DID estimator for the study of a variety of issues.

For the study of whether the firm performance of corporate bond issuer firms and non-issuers firms is different, the following equation is estimated:

$$OUTCOME_{i,t} = a_0 + a_1 CBISSUANCE_{i,t} + \sum_{n=2}^{7} a_n X1(n)_{i,t} + a_t year_t + a_i sector_i + e_{i,t}$$

where $OUTCOME_{i,t}$ indicates the outcome variables or the dependent variable. For the present study, outcome measures of the performance indicator are (ROA, ROE and ATOR) of the firm i and time t. $CBISSUANCE_{i,t}$ takes the value 0 if the firm has not issued the corporate bond market or until the firm does not issue. Otherwise, after the issuance, it takes value 1. In the above equation, a_1 coefficient displays the performance difference between corporate bond issuers and non-issuers (matched) firms. The vector $X1(n)$ indicates the firm-level control variables i.e., firm age, size, leverage, liquidity, sales growth and return on capital employed. The term indicated as $year_t$ represents year dummy variables from 2004 to 2020. A total of 17-year time period was taken to capture the time effect, given that the longitudinal study includes a large number of years (Levine and Toffel, 2010; Ullah et al., 2014; Calza et al., 2018).

6 Estimation of variables

6.1 Dependent variables for the firm-level study

The present study considers three performance indicators: asset turnover ratio (ATOR), measured as the ratio of sales to total assets; return on assets (ROA), measured as operating income to total assets and return on equity (ROE), measured as the net income to equity ratio. Whereas for the financial performance indicators, ROE indicates how efficiently the investors' fund or capital is invested, ROA indicates the profitability to total assets. In contrast, ATOR is an efficiency indicator of how the total asset is utilised.

A firm's financial performance can be measured at the firm level (Corbett et al., 2005; Benner and Veloso, 2008). Various indicators, such as ROE, ROA and ATOR, capture the firm's performance. ROE is an indicator of the profitability measure attributed to the shareholders; on the other hand, ROA is the profitability measure of operating income relative to the total assets. More importantly, ROA shows a firm's profitability to the total assets, while ROE indicates a firm's efficiency in using invested capital. The primary reason for taking ROA in the analysis is its wide acceptance and use in various relevant studies (e.g., Lo and Yeung, 2018; Corbett et al., 2005; Martinez-Costa and Martinez-Lorente, 2007; Wayhan et al., 2002) establishes the

importance as an indicator of firm performance. Furthermore, ROA can be separated into two key driver ratios: PM and ATOR. These ratios can be used relatively to get valuable insight into a firm's financial performance (Soliman, 2008; Fairfield and Yohn, 2001).

Table 1 Variable notation and definition

Outcome variables (measures of the firm's financial performance)			
Variable	*Representation*	*Calculation method*	*Explanation*
Return on equity	ROE	Net income (t)/common equity (t – 1)1	Efficient use of investor's fund or capital invested
Return on assets	ROA	Operating income (t)/total assets (t –1)1	Profitability in relation to total assets
Asset turnover	ATOR	Sales(t)/total assets(t)	Asset utilisation

Table 2 Matching covariates

Matching covariates or matching criteria (previous to corporate bond issuance, pre-corporate bond issuance data, taken as the criteria for the sample matching. For the matching covariates, three variables were taken for consideration (firm age, size and earning per share)			
Variable	*Notation*	*Definition*	*Importance/use*
Firm size	SIZE	Logarithm of total assets (t – 1)	SIZE may impact the bond issuance as larger firms can diversify the debt issuance.
Age of the company	Age	Firm's foundation year	The age of a firm can influence its performance and debt issuance, as suggested by the previous literature.
Earnings per share (EPS)	EPS	Net income – preferred dividends/weighted average shares outstanding	Business performance measure

6.2 Matching covariates

Three variables were used for the matching method in the year before application (t – 1): company or firm size (SIZE), age of the firm (AGE), and profits per share (EPS). The SIZE of a firm is determined by the logarithm of the previous year's total assets. Previous studies observed that a firm's age positively influences debt issuance, which is consistent with previous research. Stinchcombe (1965) mentioned that newer companies could not avoid the hazard of newness; on the other hand, older companies can avoid it as experienced companies. Age can be used as a matching covariate as the firms of similar age are likely to issue the debt or corporate bonds. A similar result is evident for the size of a firm taken as the log of total assets. Firms with larger total asset sizes are more likely to issue debt than companies with smaller sizes. With other aspects such as information asymmetry, variance in an operational environment and market access, firm size also affects the firm performance (Sadeghian et al., 2012; Frank and Goyal, 2008; Ebaid, 2009). As the matching covariates, earning per share (EPS) is the performance indicator for the pre-matching period.

Table 3 Explanatory variable

Variable	*Notation*	*Definition*	*Importance/use*
Issue of corporate bond	CBISSUERS	Dummy for taking 1 if corporate bond issued or 0 if not.	Indicator variable

6.3 Control variables

The current study calculates the firm size by calculating the natural logarithm of total assets. The size of the firm can affect the firm's performance (Benner and Veloso, 2008) and the decision to issue a bond. The present study employs company size and age as a control variable and a matching covariate, the ratio of total debt to common equity taken as the indicator of the firm's debt financing. A firm's leverage indicates the ratio of a company's assets to finance debt. Furthermore, enterprises with a significant degree of current debt may opt not to issue further corporate bonds (Ullah et al., 2014).

Table 4 Control variables

Control variables (firm-level factors taken as the control variable in the analysis to control their effect on corporate bond issuance and firm performance)			
Variable	*Notation*	*Definition*	*Importance/use*
Age of the company	Age	Logarithm age (t – 1), age 5 year (t – 1) – firm's foundation year	The age of the firm is taken as the matching and control variable as it influences the issuance of the corporate bond of a firm.
Current ratio	LIQ	Current assets/current liability	As an indicator of firm liquidity
Firm size	SIZE	Logarithm of total assets (t – 1)	SIZE may affect the corporate bond issuance and firm performance
Leverage – total debt/equity (X)	LEV	Total debt-to-common equity ratio (DEBT/EQ)	leverage shows the firm's ability to finance debt
Sales growth	SG	Rate of change in sales between the observation year and the preceding years	This is taken as the financial performance of the firm.
Return on capital employed (%)	ROCE	EBIT/capital employed	Firm-level characteristics used for the control of firm performance and corporate bond issuance.

7 Result

7.1 Pre-tests (normality)

Measurement error is often the justification for removing (trimming) or recoding (winsorising) observations where the dependent variable has values outside a specified range. It is observed that the means of the variables taken are significantly affected by some very large observations. Some of these firms taken for study have shown some

extreme outlier values for a few independent variables. To deal with this, the present study took winsorising into consideration as a remedial measure suggested by Lien and Balakrishnan (2005) and Kirch and Terra (2012). Card et al. (2014) winsorised the data alternatively at the 1% and 2% levels and concluded that the key coefficient estimates are very similar. In the present study, the independent variables are winsorised at the 1st and 99th percentiles, as suggested by the previous studies (Flannery and Rangan, 2006; Dang et al., 2015).

For the study of the panel data model of the hypothesis the LLC (Levin et al., 2002) test is used to test the unit root of the variables. The output of the variables suggests that all variables are stationary at the level. The alternate hypothesis shows that the data is stationary and has no unit root. To further check the robustness of the data, several tests are implemented. The heteroscedasticity of the data is checked by the Breusch-Pagan test and the null hypotheses were rejected, confirming the existence of heteroscedasticity. To check the multicollinearity variance inflation factor (VIF) test is applied and the highest obtained value of VIF is 1.11. The data is considered to have multicollinearity if the VIF value exceeds 10 (Neter et al., 1990).

Table 5 Unit root tests, LLC test results

Variables	*Test statistics value*
Size	0.009***
EPS	0.000***
ROE	0.000***
ROA	0.000***
ATOR	0.000***
Leverage (Lev)	0.000***
Liquidity (Liq)	0.000***
Sales growth (SG)	0.000***
ROCE	0.000***

Note: The *, **, *** implies significance at 10%, 5% and 1% level respectively, p-value of the variables are shown above, the null hypothesis (H0) is that series is non-stationary, and the alternate hypothesis (H1) is that series is stationary.

7.2 Empirical analysis

For the period of 17 years from 2004 to 2020, the DID regression is conducted. The output of the regression indicates that firms that issue corporate bonds have significantly less firm performance than the firms which do not issue corporate bonds. The most profitable companies are those which do not issue corporate bonds. The companies which issue equity or maybe other debts are more profitable and issuance of equity is favourable for them. From the above table, it is clear that ROA, ROE and ATOR show a significant negative impact on the corporate bond issuance.

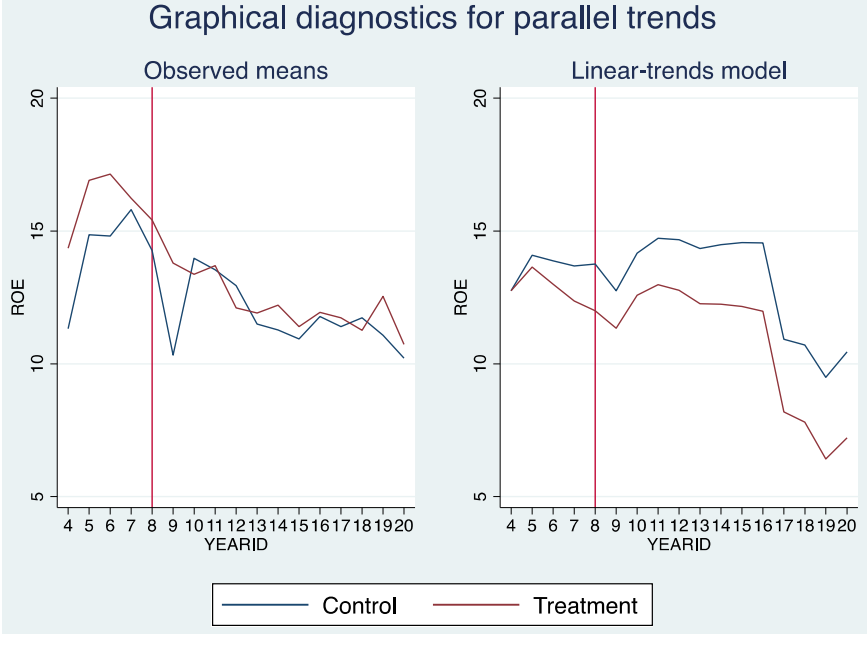
The DID estimates the unbiased impact of treatment on the treated variables if, the treatment is absent the average change ($Y1 - Y0$) would have been the same for the treated and control groups. This is a parallel trend assumption. The diagnostics parallel trend assumption graph of the dependent variables, which consists, of observed mean and linear-trends model is as follows:

Table 6 Performance differences between corporate bond issuers and non-corporate bond issuers matched control firms

	ROA	*ROE*	*ATOR*
AGE	–1.088 (0.042)**	–2.329 (0.113)	–6.688 (0.109)
SIZE	–1.122 (0.032)**	–3.149 (0.029)**	–3.007 (0.483)**
LIQ	–.555 (0.239)	–3.093 (0.025)**	–3.234 (0.330)
LEV	–0.993 (0.052)*	–3.770 (0.004)***	–5.459 (0.088)*
SG	–0.964 (0.052)*	–3.610 (0.009)***	–5.515 (0.078)*
ROCE	–1.184 (0.000)***	–4.193 (0.000)***	–6.143 (0.016)**
R^2	0.638	0.560	0.166

Note: The year dummies are included in all regressions, age, size, LIQ, LEV, SG and ROCE are firm-level control variables. All the regression equations are run with robust standard error. In parenthesis, the *p*-value of the statistics is given and the significance level is given as *** at 1%, ** at 5% and * at 10%.

Figure 1 Graphical diagnostics for the parallel trend of return on equity (ROE) (see online version for colours)



Considering the above result, it is evident that the findings of the current study complement the previous studies, which found that debt issuance is associated negatively with firm performance, such as Pandey and Sahu (2019), Rao et al. (2007), Kester (1986) have concluded same. The magnitude of corporate bond issuance has a negative impact on the financial performance of the firm. Considering the age of a firm, several previous studies have evident that it has a positive influence on firm performance. The ROA represent profitability in relation to the total assets. Five out of six control variables, namely, AGE, SIZE, LEV, SG and ROCE, have been found to exhibit a significantly

negative coefficient of –1.088, –1.122, –0.993, –0.964 and –1.184, respectively. The remaining control variable also exhibited a negative association; however, the result is insignificant.

Figure 2 Graphical diagnostics for the parallel trend of return on assets (ROA) (see online version for colours)

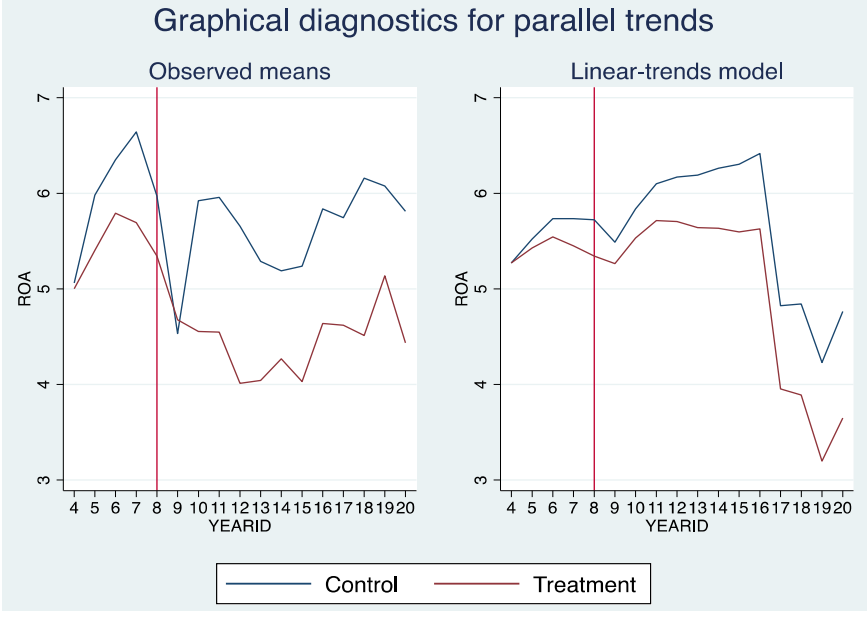
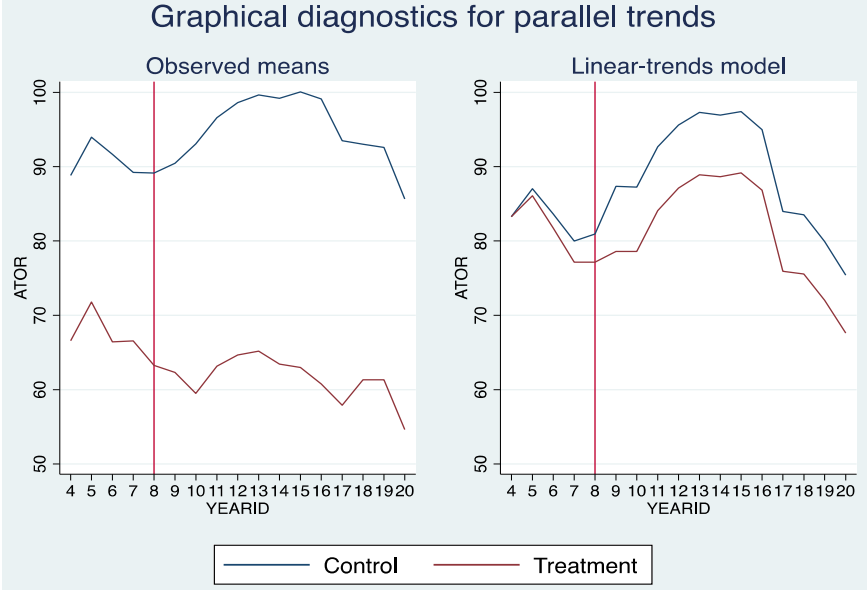


Figure 3 Graphical diagnostics for the parallel trend of asset turnover ratio (ATOR) (see online version for colours)



Similarly, for ROE, a proxy for the efficient use of equity, the coefficient of all the variables was found significantly negative. All variables found significant and negative relationships but AGE. The coefficients are –3.149, –3.770, –3.093, –3.610 and –4.193 for the variables SIZE, LEV, LIQ, SG and ROCE, respectively. For the ATOR (an indicator of asset utilisation), it is found that five out of six control variables have a significantly negative association. The control variable SIZE has a negative association with the coefficient of –8.891 with a 10% level of significance; similarly, LIQ, LEV, SG and ROCE have a negative association of –9.530, –9.544, –9.489 and –9.756 with the 10% level of significance. These findings are the impact of the underdeveloped bond market of India. A similar result for the Indian debt market is found by Dawar (2014) and Pandey and Sahu (2019). Dawar (2014) mentioned that the negative association of corporate bond issuance align with the agency theory, which is widely accepted and commonly received in developing as well as developed economies. However, in India, the postulates of agency theory should be seen differently as the corporate bond market is underdeveloped and the corporate sector is dominated by state-owned banks.

8 Conclusions

As part of the debt, the corporate bond market also has a very significant relationship with the agency cost. Higher issuance of the debt can reduce agency conflict between shareholders and managers. This can be caused by the expectation of future cash outflow; hence liquidation, cost of insolvency or financial distress will be increased. Trade-off theory also supports this as higher debt issuance increases the financial risk by backing the cost of debt which contributes towards bankruptcy cost drivers directly or indirectly. It is reflected from the current study that firms issuing bonds are unable to use the investors' funds efficiently, their profitability will reduce in comparison to the total assets and assets are also not utilised effectively. For developing nations like India, Booth et al. (2001) provided comparable findings for ten developing nations, including, among others: Zimbabwe, Brazil, Mexico and Malaysia.

The outcome of the study demonstrated that debt agency expenditures in developing economies are significantly greater than in developed ones. A similar conclusion to the present study was made by Rao et al. (2007) in the study of the Omani industry which revealed that capital structure and financial performance have a negative correlation. They argued that this negative association is caused by the underdeveloped Oman debt market and the high cost of debt borrowing/loans. This can be evident in the Indian economy as Indian CBM is also underdeveloped with a similar malaise of the high cost of debt borrowing. This can be caused by the dominance of state-owned banks in the debt market or a significant part of private placement issuance in the Indian CBM.

9 Implications and recommendations

9.1 For academicians and researchers

Through this study, academicians can gain a better understanding of the current scenario of the Indian CBM in the macroeconomic scenario and its impact on the firm performance. For further research, a details study can be made, such as more detailed

data can provide better research insight. The present study made a unique attempt to study the causal relationship of Indian CBM with other macroeconomic variables. This can be taken further so that better insight into more interconnection can be discovered. For the firm-level study, it is discovered that corporate bond issuance has a negative association with the different parameters of firm performance. For future research, academicians and researchers can investigate the cause that is responsible for this. The model developed for the sensitive issues can be practically implemented and issues in the corporate bond market can be identified and addressed accordingly.

9.2 For regulatory bodies and policymakers

In the past few years, some remarkable progressive policy initiatives made in India for the growth of the Indian corporate bond market. These policies majorly focused on the enhancement of transparency, investor participation and market efficiency. Some major policy implications are the disclosure norms (2003), the establishment of electronic bidding platforms (2012) and during the COVID-19 pandemic liquidity support mechanisms (2020). Some other notable policy implications are the introduction of credit default swaps, environment, social and governance bond framework (ESG) and rationalised investment guidelines have strengthened the markets dept and resilience.

The current study will help the policymakers to frame better policies based on the market movement to safeguard the economy when the Indian economy faces a crisis again, similar to 2007, or to safeguard the corporate bond market if factors positively related to the corporate bonds market start falling. The study further helps in formulating better policies for the upliftment of the CBM by assessing the individual macroeconomic variables, which will be helpful for the CBM. For retail investors, policies can be made to protect them by reducing their risk through diversifying their investment portfolio, as corporate bonds are less risky. Institutional investors can also make their investment safe by investing in a corporate bond, as it may provide less return in comparison to the equity market, but on the other hand, it is less risky too. Small and medium enterprises and producers can be safeguarded by mandating the issue of corporate bonds, as these are less risky, so investors who do not want to take a high risk can invest in them. Large companies can also uphold themselves by the issue of a corporate bond as these are less responsive to the market shock than the equity market. This study has certain limitations. The historical data available for this study is very low. More frequent data will be more helpful for a better understanding of macroeconomic variables in the Indian context, as more frequent data can provide more information.

Policymakers and regulatory bodies must identify the causes related to the underdevelopment of corporate bond issuance. Significant issuance is as the private placement, the cause behind the negative association of firm performance with the corporate bond issuance. Through the implementation of the model proposed for the identification of sensitive issues, problems related to the CBM can be identified and can be addressed accordingly.

9.3 For market participants and industry practitioners

For rapid economic growth, India needs a developed CBM. For a strong and developed CBM, the Indian Government is taking positive steps. In the budget for the financial year 2018–2019, it was announced that corporate bonds could be made mandatory for large

corporates for up to one-fourth of their funding needs. SEBI is also taking measures to deepen the bond market. Foreign portfolio investors (FPIs) are allowed to invest in unlisted corporate debt securities, as well as a new framework is structured for the consolidation of debt securities. For the improvement of CBM in India, the issue of non-conventional bonds can be a better option as Malaysia issued the 'Sukuk bonds', which provide a certificate to the investors for a share of asset return, which makes them compatible with Islamic prohibition. This is a prohibition of interest return (Raghavan and Sarwano, 2012). China has issued the 'Panda bonds', which ensures that funds raised through these bonds will remain in China; issuers would not be permitted to use raised funds anywhere else (Johansson, 2008). Similarly, India can also issue 'Swadeshi bonds', which give investors a sense of empowerment that they are contributing to countries infrastructure development; this can give them a patriotic sense and motivate them to invest in corporate bonds instead of similar safe savings options such as post office, fixed deposits (Raghavan and Sarwano, 2012; Thukral et al., 2015).

For industry practitioners, it is evident how the corporate bond market is associated with the other major macroeconomic variables and how it has a causal relationship with the same. To safeguard the interest of the institution, industry practitioners or industry participants can make a prediction of the future behaviour of the bond market based on the association. From the firm-level study, it is evident that the issuance of corporate bonds has a negative association with firm performance, similar to the other debt instruments. The identification of sensitive issues can also make a significant impact on the corporate bond market.

10 Limitations and future scope

The present study is a premier study in the area of the Indian corporate bond market; however, this study is still lacking in several areas and needs to be addressed in the future. Such as the macroeconomic study can be more robust if weekly or daily data can be used. A more detailed study can be made by considering some other factors such as creditworthiness, default risk and issuance risk. The limited availability of data related to the Indian corporate bond market is another hindrance but can be rectified soon and more robust studies can be evident. In the firm-level study, corporate bond issuance has a negative association with firm performance. Future studies can make a more robust study related to bond issuance and firm performance. Other dimensions of the firm performance should also be explored, such as accounting performance. The period of the study can also be increased and a more detailed study can be made. The model developed for the estimation of sensitive issues also has limitations. The study is a computational study and all the data produced are hypothetical to prove the efficiency of the method used. The practical implication of the proposed approach has not been performed. Although the present approach has depicted better results than the existing approaches, the practical implication can bring different results. This can also be the future scope for upcoming researchers. These results can be set as the benchmark for the upcoming guideline-making and policy formulation by the policymakers and the government.

Declarations

The author declares that he has no conflicts of interest.

References

Abadie, A. (2005) 'Semiparametric difference-in-differences estimators', *The Review of Economic Studies*, Vol. 72, No. 1, pp.1–19.

Abadie, A. (2010) 'Difference-in-difference estimators', *Microeconometrics*, pp.36–39, Palgrave Macmillan, London.

Abor, J. (2005), The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana', *Journal of Risk Finance*, Vol. 6, No. 5, pp.438–447.

Abor, J. (2007) 'Debt policy and performance of SMEs: evidence from Ghanaian and South Africa firms', *Journal of Risk Finance*, Vol. 8, No. 4, pp.364–379.

Abu-Tapanjeh and Abdussalam, M. (2006), An empirical study of firm structure and profitability relationship: the case of Jordan', *Journal of Economic and Administrative Sciences*, Vol. 22, No. 1, pp.41–59.

Ardalan, K. (2017) 'Capital structure theory: reconsidered', *Research in International Business and Finance*, Vol. 39, No. Part B, pp.696–710.

Benner, M.J. and Veloso, F.M. (2008), 'ISO 9000 practices and financial performance: a technology coherence perspective', *Journal of Operation Management*, Vol. 26, No. 5, pp.611–629.

Blackwell, M., Iacus, S., King, G. and Porro, G. (2009) 'CEM: coarsened exact matching in Stata', *The Stata Journal*, Vol. 9, No. 4, pp.524–546.

Booth, L., Aivazian, V., Demirguc-Kunt, A. and Maksimovic, V. (2001) 'Capital structure in developing countries', *The Journal of Finance*, Vol. 56, No. 1, pp.87–130.

Burrel, G. and Morgan, G. (1979) *Sociological Paradigms and Organisational Analysis*, Gower Publishing Company Limited, Hants, England.

Calza, E., Goedhuys, M. and Trifkovi c, N. (2018), 'Drivers of productivity in Vietnamese SMEs: the role of management standards and innovation', *Economics of Innovation and New Technology*, Vol. 28, No. 1, pp.23–44.

Card, D. (1990), The impact of the Mariel Boatlift on the Miami labor market', *Industrial and Labor Relations Review*, Vol. 43, No. 2, pp.245–57.

Card, D. and Krueger, A.B. (1994) 'Minimum wages and employment: a case study of the fastfood industry in New Jersey and Pennsylvania', *American Economic Review*, Vol. 84, No. 4, pp.772–93.

Card, D., Devicienti, F. and Maida, A. (2014) 'Rent-sharing, holdup, and wages: evidence from matched panel data', *Review of Economic Studies*, Vol. 81, No. 1, pp.84–111.

Chiang, Y., Chang, P. and Hui, C. (2002), Capital structure and profitability of the property and construction sectors in Hong Kong', *Journal of Property Investment and Finance*, Vol. 20, No. 6, pp.434–453.

Corbett, C.J., Montes-Sancho, M.J. and Kirsch, D.A. (2005), 'The financial impact of ISO 9000 certification in the US: an empirical analysis', *Management Science*, Vol. 51, No. 7, pp.1046–1059.

Crump, R.K., Hotz, V.J., Imbens, G.W. and Mitnik, O. (2006) *Moving the Goalposts: Addressing Limited Overlap in Estimation of Average Treatment Effects by Changing the Estimand*, NBER Working Paper, Department of Economics, UC Berkeley.

Dang, V.A., Kim, M. and Shin, Y. (2015) 'In search of robust methods for dynamic panel data models in empirical corporate finance', *Journal of Banking & Finance*, Vol. 53, pp.84–98.

Dare, F.D. and Olorunfemi, S. (2010) 'Capital structure and corporate performance in Nigeria petroleum industry: panel data analysis', *Journal of Banking and Finance*, Vol. 32, No. 9, pp.1954–1969.

Dawar, V. (2014), 'Agency theory, capital structure and firm performance: some Indian evidence', *Managerial Finance*, Vol. 40 No. 12, pp.1190–1206.

Ebaid, I.E.S. (2009), 'The impact of capital-structure choice on firm performance: empirical evidence from Egypt', *The Journal of Risk Finance*, Vol. 10, No. 5, pp.477–487.

Fairfield, P.M. and Yohn, T.L. (2001) 'Using asset turnover and profit margin to forecast changes in profitability', *Review of accounting Studies*, Vol. 6, No. 4, pp.371–385.

Flannery, M.J. and Rangan, K.P. (2006) 'Partial adjustment toward target capital structures', *Journal of Financial Economics*, Vol. 79, No. 3, pp.469–506.

Frank, M.Z. and Goyal, V.K. (2008) 'Trade-off and pecking order theories of debt', *Handbook of Empirical Corporate Finance*, pp.135–202.

Garvey, G.T. and Hanka, G. (1999) 'Capital structure and corporate control: the effect of antitakeover statutes on firm leverage', *The Journal of Finance*, Vol. 54, No. 2, pp.519–546.

Grossman, S.J. and Hart, O.D. (1982) 'Corporate financial structure and managerial incentives', *The Economics of Information and Uncertainty*, Vol. 82, No. 1, pp.107–140, University of Chicago Press,

Gruber, J. and Poterba, J. (1994) 'Tax incentives and the decision to purchase health insurance: evidence from the self-employed', *The Quarterly Journal of Economics*, Vol. 109, No. 3, pp.701–733.

Guariglia, A. (2008) 'Internal financial constraints, external financial constraints, and investment choice: evidence from a panel of UK firms', *Journal of Banking & Finance*, Vol. 32, No. 9, pp.1795–1809.

Guo, S. and Fraser, M.W. (2015) *Propensity Score Analysis: Statistical Methods and Applications*, Vol. 11, SAGE publications.

Harris, M. and Raviv, A. (1988) 'Corporate control contests and capital structure', *Journal of Financial Economics*, Vol. 20, pp.55–86.

Harris, M. and Raviv, A. (1990) 'Capital structure and the informational role of debt', *The Journal of Finance*, Vol. 45, No. 2, pp.321–349.

Hart, O. and Moore, J. (1994) 'A theory of debt based on the inalienability of human capital', *The Quarterly Journal of Economics*, Vol. 109, No. 4, pp.841–879.

Iacus, S.M., King, G. and Porro, G. (2012) 'Causal inference without balance checking: coarsened exact matching', *Political Analysis*, Vol. 20, No. 1, pp.1–24.

Jebur, J.K. and Yehya, O.N. (2021) 'Sensitive information in the stock markets', *Review of International Geographical Education Online*, Vol. 11, No. 3, pp.1058–1067.

Jensen, M.C. (1986) 'Agency costs of free cash flow, corporate finance, and takeovers', *The American Economic Review*, Vol. 76, No. 2, pp.323–329.

Jensen, M.C. and Meckling, W.H. (1976) 'Theory of the firm: managerial behavior, agency costs and ownership structure', *Corporate Governance*, pp.77–132, Gower.

Johansson, A.C. (2008) 'Interdependencies among Asian bond markets', *Journal of Asian Economics*, Vol. 19, No. 2, pp.101–116.

Kester, W.C. (1986) 'Capital and ownership structure: a comparison of United States and Japanese manufacturing corporations', *Financial Management*, Vol. 15, No. 1, pp.5–16.

Kim, E.H. and McConnell, J.J. (1977) 'Corporate mergers and the co-insurance of corporate debt', *The Journal of Finance*, Vol. 32, No. 2, pp.349–365.

King, G. and Zeng, L. (2006) 'The dangers of extreme counterfactuals', *Political Analysis*, Vol. 14, No. 2, pp.131–159.

Kirch, G. and Terra, P.R.S. (2012) 'Determinants of corporate debt maturity in South America: do institutional quality and financial development matter?', *Journal of Corporate Finance*, Vol. 18, No. 4, pp.980–993.

Kraus, A. and Litzenberger, R.H. (1973) 'A state-preference model of optimal financial leverage', *The Journal of Finance*, Vol. 28, No. 4, pp.911–922.

Krishnan, V.S. and Moyer, R.C. (1997) 'Performance, capital structure and home country: an analysis of Asian corporations', *Global Finance Journal*, Vol. 8, No. 1, pp.129–143.

Kyereboah-Coleman, A. (2007) 'The impact of capital structure on the performance of microfinance institutions', *The Journal of Risk Finance*, Vol. 8, No. 1, pp.56–71.

Lagoarde-Segot, T. (2016) 'Prolegomena to an alternative study of finance', *Finance Reconsidered: New Perspectives for a Responsible and Sustainable Finance*, pp.89–110, Emerald Group Publishing Limited.

Lagoarde-Segot, T. and Leoni, P.L. (2013) 'Pandemics of the poor and banking stability', *Journal of Banking & Finance*, Vol. 37, No. 11, pp.4574–4583.

Le, T.P.V. and Phan, T.B.N. (2017) 'Capital structure and firm performance: empirical evidence from a small transition country', *Research in International Business and Finance*, Vol. 42, pp.710–726.

Levin, A., Lin, C.F. and Chu, C.S.J. (2002) 'Unit root tests in panel data: asymptotic and finitesample properties', *Journal of Econometrics*, Vol. 108, No. 1, pp.1–24.

Levine, D.I. and Toffel, M.W. (2010) 'Quality management and job quality: how the ISO 9001 standard for quality management systems affects employees and employers', *Management Science*, Vol. 56, No. 6, pp.978–996.

Lien, D. and Balakrishnan, N. (2005) 'On regression analysis with data cleaning via trimming, winsorisation, and dichotomisation', *Communications in Statistics – Simulation and Computation®*, Vol. 34, No. 4, pp.839–849.

Lo, C.K. and Yeung, A.C. (2018) 'Quality management standards, institutionalisation and organisational implications: a longitudinal analysis', *International Journal of Production Economics*, Vol. 200, pp.231–239.

Majumdar, S.K. and Chhibber, P. (1999) 'Capital structure and performance: evidence from a transition economy on an aspect of corporate governance', *Public Choice*, Vol. 98, No. 3, pp.287–305.

Martinez-Costa, M. and Martinez-Lorente, R. (2007) 'A triple analysis of ISO 9000 effects on company performance', *International Journal of Productivity and Performance Management*, Vol. 56, Nos. 5–6, pp.484–499.

Matusin, A.R., Andryan, R. and Pamela, A. (2014) 'The impact capital structure on agency cost of Indonesian listed companies', *The 2nd IBEA – International Conference on Business, Economics and Accounting*, March.

Modigliani, F. and Miller, M.H. (1958) 'The cost of capital, corporation finance and the theory of investment', *The American Economic Review*, Vol. 48, No. 3, pp.261–297.

Modigliani, F. and Miller, M.H. (1963) 'Corporate income taxes and the cost of capital: a correction', *The American Economic Review*, Vol. 53, No. 3, pp.433–443.

Myers, S. and Majluf, N. (1984) 'Corporate financing and investment decisions when firms have information that investors do not have', *Journal of Financial Economics*, Vol. 13, No. 2, p.187–221.

Myers, S.C. (1977) 'Determinants of corporate borrowing', *Journal of Financial Economics*, Vol. 5, No. 2, pp.147–175.

Nanda, S.K. and Barai, P. (2020) 'Effect of insider trading on stock characteristics', *Asian Journal of Accounting Research*, Vol. 6, No. 2, pp.2443–4175.

Neter, J., Wasserman, W. and Kutner, M.H. (1990) Regression, analysis of variance, and experimental design', *Applied Statistical Models*, pp.614–619.

Onaolapo, A.A. and Kajola, S.O. (2010) 'Capital structure and firm performance: evidence from Nigeria', *European Journal of Economics, Finance and Administrative Sciences*, Vol. 25, No. 1, pp.70–82.

Pandey, K.D. and Sahu, T.N. (2019) 'Concentrated promoters' ownership and firm value: reexamining the monitoring and expropriation hypothesis', *Paradigm*, Vol. 23, No. 1, pp.70–82.

Raghavan, S. and Sarwano, D. (2012) 'Development of the corporate bond market in India: an empirical and policy analysis', *International Conference on Economics and Finance Research*, IPEDR, Vol. 32.

Rao, N.V., Al-Yahyaee, K.H.M. and Syed, L.A. (2007) 'Capital structure and financial performance: evidence from Oman', *Indian Journal of Economics and Business*, Vol. 6, No. 1, p.1.

Rosenbaum, P. and Rubin, D. (1983) 'The central role of the propensity score in observational studies for causal effects', *Biometrika*, Vol. 70, No. 1, pp.41–55.

Ross, S.A. (1977) 'The determination of financial structure: the incentive signalling approach', *Bell Journal of Economics*, Vol. 8, No. 1, pp.23–40.

Sadeghian, N.S., Latifi, M.M., Soroush, S. and Aghabagher, Z.T. (2012) 'Debt policy and corporate performance: empirical evidence from Tehran Stock Exchange companies', *International Journal of Economics and Finance*, Vol. 4, No. 11, pp.217–224.

Shukla, A.K. and Prabu, A.E. (2014) 'Choice of private placement as an instrument for raising debt resources: evidence from Indian firms', *Reserve Bank of India Occasional Papers*, Vol. 352, p.2014.

Soliman, M.T. (2008) 'The use of DuPont analysis by market participants', *The Accounting Review*, Vol. 83, No. 3, pp.823–853.

Stinchcombe, A.L. (1965) 'Organisations and social structure', *Handbook of Organisations*, Vol. 44, No. 2, pp.142–193.

Thukral, S., Sridhar, S. and Joshi, M.S. (2015) 'Review of factors constraining the development of Indian corporate bond markets', *Qualitative Research in Financial Markets*, Vol. 7, No. 4, pp.429–444.

Ullah, B., Wei, Z. and Xie, F. (2014) 'ISO certification, financial constraints, and firm performance in Latin American and Caribbean countries', *Global Finance Journal*, Vol. 25, No. 3, pp.203–228.

Wayhan, V.B., Kirche, E.T. and Khumawala, B.M. (2002) 'ISO 9000 certification: the financial performance implications', *Total Quality Management*, Vol. 13, No. 2, pp.217–231.

Williamson, O.E. (1988) 'Corporate finance and corporate governance', *The Journal of Finance*, Vol. 43, No. 3, pp.567–591.

Zeitun, R. and Tian, G.G. (2014) 'Capital structure and corporate performance: evidence from Jordan', *Australasian Accounting Business & Finance Journal*, Forthcoming.