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Corporate Tax Rate, Financing Policy, and Investment Decisions: Evidence from 8 Asian Economies

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Abstract

This study intends to examine the heterogeneous impact of corporate tax rates on financing policy and investment decisions. It further quantifies how different financing options can alienate the adverse impacts of corporate taxation on industrial investment decisions. The empirical analysis is based on ten years of financial information relating to non-financial sector firms from eight Asian economies. For the regression analysis, we employ panel EGLS and the system GMM model. The statistical analysis of the study first reveals the negative and significant influence of corporate taxation on industrial investment. It also suggests the dynamic impact of different financing options on corporate investment decisions. The statistical analysis further documents the positive impact of corporate taxation on bank and trade credit financing as well as the negative effect on equity financing. In addition to linear analysis, the findings of study corroborate the existence of the moderating expression of financing options on corporate tax rates and the industrial investment relationship. Based on empirical analysis, it can be suggested that corporate managers should acquire more funding, specifically debt financing, to maintain investment volume during a period of high corporate tax rates. This study substantiates the co-association among three strategically linked decisions and suggests the significance of debt financing for mitigating the adverse impacts of taxation on corporate investment.

Key Words: Asian Economies, Corporate tax rates, Financing Policy, Investment Decisions, GMM estimator

JEL Classification: G31: G32: H25

1. Introduction

The potential impact of corporate taxation policy on various industrial decisions has increasingly attracted the attention of corporate managers and other economic policy individuals (Asiri et al., 2020; Devereux et al., 2018; Sobiech et al., 2021). In this study, we explore the exogenous impact of corporate tax rates on industrial investment and corporate financing choices. Such a relationship is not yet well established in the literature. This study investigates how enterprises respond to changes in taxation policy regarding financing policy and investment decisions. Using firm-level data, we show that changes in taxation policy can change the financing choices of enterprises, which further determine their capital investment decisions. Specifically, this study intends to investigate the following research questions:

- What are the relevant consequences of high corporate tax rates for industrial investment decisions?
- How do different financing options impinge upon industrial investment decisions?
- How do corporate firms adjust their financing choices in response to corporate tax rates?
- Are there any differences in investment decisions across firms that acquire more bank loans during a high corporate tax rates era?

Any change in government policy regarding corporate taxation directly affects the multiple financial policies of the industrial sector (Hanlon & Heitzman, 2010). Government officials often make taxation reforms to sustain the growth of industrial sector. Such government reforms regarding corporate tax can benefit the industrial sector by mitigating the financial burden of taxation. Conversely, high statutory corporate tax rates can hamper investment decisions as they reduce the cash reserves of enterprises. This detrimental effect is more explicit regarding physical investment, i.e., investment in the procurement of three capital assets,

property, *plant*, and *equipment* (Muthitacharoen, 2021). Greater taxation tends to absorb more funds that could be utilized in investment expansion. Thus, it creates a scarcity of funds and therefore negative investment growth. On the other hand, a high tax rate spurs a preference for a specific type of financing, i.e., bank financing subject to the tax incentives for such financing (Devereux et al., 2018). The greater availability of bank loans not only reduces the tax cost but could also achieve positive investment growth by creating a flexible financial environment. In view of such a theoretical description, this study aims to examine the empirical relationship between corporate tax rates and industrial investment. Additionally, this study further considers the moderating impact of different financing choices on the formal relationship between corporate taxation and investment decisions. This study reveals the unexplained story among three strategically linked factors, i.e., corporate tax rates, industrial investment, and financing policy.

In this study, we have analysed non-financial publicly listed firms from eight Asian economies. To explain the mathematical assessment of the variables, corporate taxation denotes the flat tax rate as specified by the relevant authority on the expense-residual income of enterprises. Similarly, industrial investment illustrates the percentage of total funds extended by corporate firms to purchase capital assets. This measurement of industrial investment allows for underlining the corporate characteristics regarding the exploration of capital projects. In addition to theoretical explanation, some recent studies have also specified such a measurement of investment (Alstadsæter et al., 2017; Farooq et al., 2021; Ohrn 2018). Finally, the corporate financing policy was segmented into three types, i.e., debt, equity, and trade credit financing. For empirical analysis, we employ panel EGLS (generalized least square), and two-step system GMM (generalized method of moments) models for regression analysis. The study by Wintoki et

al. (2012) has indicated some root causes of endogeneity issues, i.e., model misspecification, the measurement problem, and the existence of both macroeconomic and firm-specific variables in a similar econometric equation as in our case. In the current analysis, the endogeneity issue stems from omitted variables and the composition of both firm-specific and macroeconomic variables in the same model. Additionally, the statistical outcomes of the Wald test empirically explain the existence of endogeneity issues. Based on such notions, we employ the system GMM model to estimate the regression among the variables and to eradicate the said problem of endogeneity.

The empirical results first reveal the negative impact of corporate tax rates on industrial investment. Controlling for endogeneity issues, a one per cent increase in corporate tax rates can impede industrial investment by 5.7%. In response to financing choices, industrial investment increases by 37% and 19.2% due to a one per cent increase in bank loans and equity financing respectively. However, trade credit financing impedes industrial investment by 49.7%. This asymmetric impact of financing alternatives on industrial investment is driven by the deviation in financing cost. Relating to financing choices, corporate tax rates have a positive association with debt and trade credit financing, but a negative relationship with equity financing. The positive association with debt financing shows the tax incentives due to a greater acquisition of debt. The empirical results further highlight the transformation of the adverse impacts of corporate taxation into positive ones when financing policy moderates this relationship. The adjustment in financing policy in response to the tax rate can overcome the negative impact of corporate taxation on investment decisions. Our findings were robust even after controlling for leverage, firm size, and profitability at the corporate level, and interest rate, financial sector development, and GDP growth rate at the macroeconomic level.

This study enriches the existing literature by assessing the impact of corporate tax rates on investment decisions and financing policy. A range of studies offer evidence on the individual effect of corporate tax rates on bank loans (Devereux et al., 2018; Feld et al., 2013) and investment decisions (Alstadsæter et al., 2017; Djankov et al., 2010; Edgerton, 2010). These studies use various econometric techniques, including dynamic GMM, fixed effect, and DID models, and suggest that corporate tax rate is an important determinant of investment decisions and bank loan preferences. Linking to the findings of previous studies, the current study provides robustness to the empirical findings of prior literature and extends the current literature by examining the other financing options, i.e., equity financing and trade credit financing. Our study finds that corporate tax rates have an equal implication for other sources of financing. It demonstrates that corporate taxation negatively influences equity financing whilst positively affecting trade credit financing. Empirically, this study advocates the presence of a moderating impact of financing choices while corporate tax rates influence investment decisions. By employing a large data set from eight Asian economies, this study documents that any change in taxation policy can cause a change in investment decisions and financing choices. The current empirical estimation permits an understanding of the transformation channel of corporate tax rates into industrial investment decisions. This study differs from existing literature because it considers multiple financing choices and jointly checks the effect of corporate tax rates on various financing options that further impact investment decisions. Practically, this study mainly recommends that preferring bank loans during a period of high corporate tax rates can deal with the negative impacts of taxation.

Other parts of the paper describe the following sections: Section 2 illustrates the review of previous studies and the hypotheses development, while Section 3 discusses on materials and

methods. Similarly, Section 4 presents the empirical framework and Section 5 the empirical results. Section 6 discusses these statistical results by comparing them with the findings of prior literature. Section 7 concludes the paper and suggests some policy implications drawn from the empirical results.

2. Survey of Literature

How statutory tax rates affect corporate financing and investment decisions is an emerging research issue in contemporary literature regarding financial economics. There exists a strand of literature that attempts to explain the role of corporate income tax in determining financing policy and investment decisions individually (Alstadsæter et al., 2017; Asiri et al., 2020; Devereux et al., 2018; Muthitacharoen, 2021; Taylor et al., 2019). Similarly, some other studies have also discussed the relevant impact of corporate tax on both financing and investment decisions (Dobbins & Jacob, 2016; Sobiech et al., 2021; Wu & Yue, 2009). Nonetheless, very few studies have explained the combined analysis (Ohrn, 2018; Sankarganesh & Shanmugam, 2021). It is still debateable how corporate firms respond to changes in taxation policy regarding financing preferences that further determine corporate investment decisions. Therefore, this study fills this gap in the literature by exploring the relevant impact of corporate tax rates on financing and investment decisions.

2.1 Corporate Income Tax and Investment Decisions

The channel through which corporate taxation affects investment decisions can be explained as the way it affects the cash reserve of enterprises and hence deteriorates managerial confidence in investing in long-term projects (Asiri et al., 2020). Each dollar spent on tax payments would eventually lead to depleting the cash reserve for any active investment. Because tax expenditures are one of the major expenditures that appear on the financial statements of a company, any

increment in such expenditure therefore substantially reduces the other investing activities, i.e., capital investment. Ohrn (2018) therefore posits that a one per cent increment in corporate tax expenditure would limit investment activities by 4.7%. Such a reduction in investment volume stems from an enrichment in corporate expenditures and the allocation of more tax payments. Djankov et al. (2010) have illustrated the negative impact of corporate tax rates on investment decisions. This adverse impact was more conducive in capital-intensive industries, i.e., manufacturing industries. The levy of high taxation on enterprises exogenously reduces the sales volume due to the increment in the prices of industrial goods (Serrato & Zidar, 2016). Such an increment eventually mitigates the demand for industrial goods and results in a smaller utilization of industrial machinery. This factor discourages industrial managers and restricts their investment confidence (Cristea & Nguyen, 2016). Supporting this, Dobbins, and Jacob (2016) studied the impact of corporate tax cuts on investment decisions. Their study explicitly noted that a reduction in corporate tax rate induces more investment, and this effect is more apparent for firms relying on internal funds. Considering the pragmatic findings of the literature, it can be argued that an inverse relationship between corporate tax rate and industrial investment exists**.**

2.2 Corporate Income Tax and Financing Policy

The potential impact of corporate taxation on the financing policy of enterprises has been discussed by many empirical studies in the contemporary literature of financial economics. Specifically, the classical theory of capital structure posed by Modigliani and Miller (1958) has documented the significance of corporate taxation in determining the financing pattern of corporate firms. According to this theory, corporate firms should prefer to have more debt during a period of high taxation due to the tax advantages. In addition to this, Feld et al. (2013) suggested the marginal effect of company taxation on the debt ratio, which is about 0.27%.

Corporate firms prefer to have more debt during high taxation and this effect is higher in the case of multinational firms. Mokhova and Zinecker (2014) found the effect of fiscal and monetary policies on the capital structure decisions of corporate firms. Relating to fiscal policy, they have noted a positive association between high taxation policy and debt preferences. Another seminal study by Faccio and Xu (2015) indicated the positive regression between corporate taxes and debt financing. They found that both individual and corporate taxes are significant determinants of capital structure decisions. A recent study by Sobiech et al. (2021) advocates the positive interlinkages between bank taxation and bank leverage. During high taxation, banks reduce the credit supply and corporates switch to bond financing, exposed to the bank credit supply effect. Summarizing the empirical findings, it can be stated that there exists a positive association between corporate tax rates and debt financing**.**

2.3 Financing Policy and Investment Decisions

Financially sound organizations always make active investments. Such firms are more interested in venture investments due to having high financial reserve to bear any shock (Männasoo et al., 2018). This factor speaks to the role of financial sources in escalating investment. Similarly, the accessibility of funds through primary and secondary sources of financing has a dynamic impact on industrial investment. For instance, Hackbarth and Mauer (2012) analysed the interaction between financing choices and investment decisions and found that optimal capital structure decisions can enhance the investment confidence of corporate managers. They have further argued that financially constrained firms always follow debt opportunities to ensure their investment growth. Eisdorfer et al. (2013) examined the relationship between leverage ratio and investment decisions. The findings of their study reveal that a large leverage gap can result in investment distortion. Responding to this, corporate firms were unable

to spend funds on capital projects due to the absence of financial sources. Similarly, Gutiérrez et al. (2015) illustrated that corporate firms bearing more financial distress have a greater propensity for under-investment. Appendini (2018) has observed the exogenous impact of the financial distress situation of a firm on the investment decisions of non-distressed firms. He has argued that financially distressed firms enhanced the financing cost and hence restrict the credit access for non-distressed firms, which eventually leads to a declining trend in the investment of these firms. Irrespective of the abundant literature on the role of financial sources in investment decisions, no study was found which corroborates the directional impact of a specific type of financing source on investment decisions. Therefore, it can be suggested that there exists a significant relationship between financing policy and investment decisions**.**

2.4 Corporate Income Tax, Financing Policy, and Investment Decisions

Any variation in government policies has a strong influence on industrial sector strategies (Farooq et al., 2021a). Corporate firms try to impede the unfavourable effects of such government policies by formulating efficient strategies. Among others, policy changes regarding corporate tax rates have a strong implication for industrial investment and financing policy. Any increment in corporate taxation may lead to deteriorating the investment volume of enterprises by enhancing the burden of additional costs (Dobbins & Jacob, 2016). In such circumstances, corporate firms exaggerate financing policies that may help to mitigate the adverse impacts of taxation. Responding to an increment in the taxation rate, enterprises formulate dynamic financing policies. For instance, Ohrn (2018) analysed the impact of corporate taxation on investment and financing decisions. He argued that corporate firms preferred to have more debt when responding to an increment in corporate taxation and to stimulate investment. Similarly, Federic and Parisi (2015) investigated the potential impact of the corporate tax rate on Italian

firms and found that the corporate tax rate may distort industrial investment. However, the availability of more funds can enhance the immunity of firms against such adverse impacts of taxations by offering financial sources (Gaiotti, 2013).

Some other empirical studies have also conjectured a negative association between corporate taxation and industrial investment (Djankov et al., 2010; Sankarganesh & Shanmugam, 2021; Zwick & Mahon, 2017). However, very few studies have documented the role of different financing sources in the alienation of such an adverse impact. Considering this, the current study attempts to find out the moderating impact of financing sources in the relationship between corporate tax rates and investment decisions. The empirical findings of the literature suggest that corporate firms enhance their funding sources during high taxation, and it has a positive impact on their investment decisions**.**

Briefly, the literature suggests a negative association between corporate tax rates and investment decisions and the positive influence of corporate tax rates on debt financing. Additionally, it can further summarize that financing policy has an inconclusive relationship with industrial investment. Further literature findings suggest that financing decisions have a moderating role in the relationship between tax rate and investment decisions. We combine different strands of literature and add new concepts regarding the moderating role of financing decisions. We test these theoretical assumptions by analysing a large data set from eight economies. This study adds new views in an existing body of financial economics literature that employing more debt during a high taxation rate can reduce the burden of taxation and has a favourable impact on industrial investment.

3. Material and Methods

3.1 Data

Th statistical analysis consists of both firm-specific and macroeconomic variables. The financial information for the firm-specific variables was collected from Thomson Reuters DataStream while the data for the macroeconomic variables, including corporate tax rates and other control variables, were sourced from *World Development Indicators,* the World Bank[1]. The sample size consists of 440,500 firm-level observations for the years 2007 to 2016. However, the sample size was subsequently reduced to 28,734 observations due to the implication of some data refining tools, i.e., the omission of financial sector firms having SIC classification 6000-6999, deleting the firms that have missing financial information for five or more years, and winsorizing at 5% from both ends. The financial sector firms were removed from the sample due to accounting differentiation, dissimilar management, and the absence of physical investment. Our sample is made up of eight Asian economies, including China, Malaysia, Pakistan, Philippines, South Korea, Thailand, India, and Indonesia.

Corporate capital investment is a dependent variable, measured by the ratio of total expenditure in the acquisition of three types of assets, i.e., property, plant, and equipment divided by total assets. Corporate firms acquire such assets to enhance their production capacity and to fulfil the demand for industrial products. Additionally, such investment exemplifies the growth of enterprises regarding new business ventures. The mathematical measurement of industrial investment was derived from the study of Alstadsæter et al. (2017) and Farooq et al. (2021). Corporate tax rate is included as an explanatory variable, exhibiting the direct tax deductible from the net profit of enterprises and imposed by the relevant jurisdiction. Djankov et al. (2010) used a similar proxy for the quantification of corporate tax rates. Next, the financing policy of

[1] https://databank.worldbank.org/source/world-development-indicators

corporate firms acts as a moderating variable and are segmented into two basic sources, i.e., primary and secondary sources of financing. Debt and equity financing are two options in primary financing, while the account payable ratio is used as a secondary source of financing. These two sources exemplify the financing diversification of corporate firms (Feld et al., 2013).

In the regression model, we control for several variables both at the corporate level and at the country-specific level that can affect investment decisions. Firm size, profitability ratio, and sales growth ratio are firm-specific determinants of industrial investment, while interest rate, financial development, and GDP growth rate are macroeconomic control variables. We measure the firm size as a log of total assets, the profitability ratio as a fraction between EBIT and total assets, and the sales growth ratio with the average increment in sales as compared to the previous year scaled by the previous year's sales. Likewise, the interest rate is a real lending rate, and the financial sector development depicts the average efficiency of the financial sector of a country on the scale of depth, access, and efficiency. If the average performance score of a country on these three indicators is greater than or equal to 0.60, then this country can be categorized as financially developed, and vice versa. This measurement of financial sector development was specified by the World Bank. GDP growth rate is an annual increment in the economic output of a country. Many studies arranged on a similar theme have considered these variables as potential determinants of industrial investment (Farooq et al., 2021a; Muthitacharoen, 2021; Ohrn, 2018). The inclusion of all these variables into the econometric models makes the analysis more comprehensive. Furthermore, a brief description of all these variables has been provided in Table 1.

Table 1

DESCRIPTION OF VARIABLES

Variables	Use as	Description	Reference
Investment Decisions	DV	Investment decisions exemplify the decision related to acquisition of three capital assets i.e., property, plant, and equipment. It can be calculated by weighting the fixed assets comparative to total volume of assets.	(Alstadsæter, et al., 2017; Ohrn, 2018; Farooq, et al., 2021a)
Corporate tax rates	IV	Corporate taxation is a flat tax rate imposed by relative jurisdiction on net industrial income, earned from basic business operations. Many governments set this rate at national level and equally applicable to all industrial sectors.	(Dobbins & Jacob, 2016; Ohrn, 2018; Asiri, et al., 2020)
Financing Policy	MV	Financing policy refers to volume of bank loans, equity financing, and trade credit financing acquired to finance business operations.	(Wu & Yue, 2009; Ohrn, 2018; Devereux, et al., 2018)
Firm Size	CV	Firm size is logarithmic value of total assets owned by a company.	(Adelino, et al., 2017)
Profitability ratio	CV	Profitability ratio can be defined as earning capacity of a firm by utilizing the total assets. It can pronounce as ROA (return on assets).	(Aghion, et al., 2010)
Sale growth ratio	CV	Sales growth ratio illustrates growth of a firm regarding sales volume. It is a percentage value, showing the net increment in current year sales as compared to previous year.	(Al-Gamrh, et al., 2020)
Financial Development	CV	Financial sector development is a systematic measurement of overall status of financial sector on the scale of depth, access, and efficiency as specified by The World Bank. The performance score equal or above 60 indicates that financial sector is developed.	(Farooq, et al., 2021)
Real Interest rate	CV	It is a lending interest rate which is inflation adjusted and measured by GDP deflator.	(Akron, et al., 2020)
GDP growth rate	CV	This rate shows the percentage increment in the value of all products produced by multiple sources of an	(Farooq, et al., 2021a)

		economy during a specific year.	

Acronyms: *DV= dependent variable, IV=independent variable, MV= mediating variable, CV= control variable* **Source:** *Past Literature*

The statistics summary of variables is shown in Table 2. As the statistical values exhibit, the average investment rate is 0.371. Corporate firms invest 37.1% of total assets to expand their capital investment. The average tax rate is 27.308%, implying that under-analysis countries impose 27% on average tax on the net income of the industrial sector. As for concern financing choices, the corporate firms prefer 30.2% on average bank loans, 43.9% equity financing, and 13.6% trade credit financing. These percentages exhibit the financing pattern of under-analysis firms. Further, it also exemplifies the distribution of funds that were acquired from different sources to finance the total assets of company. Next, the average firm size is 2.396 which is a logarithmic value, the profitability rate is 0.061 or 6.1%, and the sales growth ratio is 8.2%. Similarly, the average interest rate is 3.028% while the maximum interest rate is 11.782 and FSD is 0.576. The average value of FSD is less than the benchmark value of 0.60, indicating that sampled countries have under-developed or less-developed financial sectors. Lastly, the mean value of the GDP growth rate is 6.7272, revealing the average growth rate. These empirical values exemplify the average trends of variables of study. In addition to this, Figure A1 describes the co-movement of main variables of study i.e., investment decisions, corporate tax rates, and three financing choices.

Table 2

SUMMARY STATISTICS

	Mean	**Median**	**Std. Dev.**	**Maximum**	**Minimum**
Investment	0.371	0.360	0.197	0.897	0.010
Corporate tax rates	27.308	25.000	0.064	35.000	20.000
Bank loans	0.302	0.295	0.166	0.899	0.012
Equity ratio	0.439	0.429	0.079	0.907	0.011

Account payable	0.136	0.111	0.101	0.898	0.010
Firm size	2.396	2.333	0.076	5.858	0.040
Profitability	0.061	0.059	0.082	0.901	-0.851
Sales growth ratio	0.082	0.063	0.248	0.909	-0.321
Interest rate	3.028	3.751	0.082	11.782	-5.079
Financial sector development	0.576	0.541	0.167	0.858	0.170
GDP growth rate	6.272	6.496	0.061	14.231	-1.513

Source: *Self estimation.* ***Note:*** *The numbers of observations are 28734.*

In addition to descriptive analysis, we have also estimated the correlation matrices for the variables of the study. We have presented the correlation matrices of the variables in Table A2. As the statistical values imply, CTR (carbon tax rates) has a correlation value of 0.098 with INV (investment). This value shows the degree of association between carbon tax rates and investment. Relating to financing choices, BL (bank loans) has positive correlation values of 0.270 while equity ratio and account payable ratio have negative correlation values of -0.056, and -0.288 relatively. The correlation values of firm size, profitability, and sales growth ratio are 0.027, -0.020, and 0.019 respectively. Similarly, macroeconomic variables have correlation values as 0.014 (interest rate), -0.074 (financial sector development), and -0.019 (GDP growth rate) relatively. According to the correlation values reported in the Table A2 (less than 0.7), we can safely claim that multicollinearity is not a major problem in our data.

4. Empirical Framework

This study aims to find out the impact of corporate tax rates on investment decisions and how this effect varies in the presence of financing policy. For empirical analysis, we employ the two-step system GMM model because the standard panel regression techniques do not provide consistent estimates in the presence of endogeneity problems. In GMM model, the lagged values of the variables are used as instruments to identify the effect of the endogenous variables on the

dependent variable. In this section, we have developed the three equations while equation (3) is our main equation of interest.

$$INV_{ijt} = \beta_{\circ} + \alpha_1 CTR_{jt} + \beta_1 FS_{ijt} + \beta_2 ROA_{ijt} + \beta_3 SGR_{ijt} + \gamma_1 IR_{jt} + \gamma_2 FSD_{jt} + \gamma_3 GDP_{jt} + Cross.sec.FE + yearFE + \varepsilon_{ijt} \quad (1)$$

$$INV_{ijt} = \beta_{\circ} + \alpha_1 BL_{ijt} + \alpha_2 ER_{ijt} + \alpha_3 AP_{ijt} + \beta_1 FS_{ijt} + \beta_2 ROA_{ijt} + \beta_3 SGR_{ijt} + \gamma_1 IR_{jt} + \gamma_2 FSD_{jt} + \gamma_3 GDP_{jt} + Cross.sec.FE + yearFE + \varepsilon_{ijt} \quad (2)$$

$$INV_{ijt} = \beta_{\circ} + \alpha_1 CTR_{jt} + \alpha_n \sum_{n=3}^{i=1} FP_{ijt} + \alpha_m CTR \times \sum_{n=3}^{i=1} FP_{ijt} + \beta_1 FS_{ijt} + \beta_2 ROA_{ijt} + \beta_3 SGR_{ijt} + \gamma_1 IR_{jt} + \gamma_2 FSD_{jt} + \gamma_3 GDP_{jt} + Cross.sec.FE + yearFE + \varepsilon_{ijt} \quad (3)$$

Equation (1) shows the impact of corporate tax rates on investment while equation (2) explains the relationship between investment and financing policies. Similarly, equation (3) illustrates the interaction effect of corporate tax rate and financing policy on investment. We have controlled the various macroeconomic and firm-specific variables. In these equations, INV is investment, CTR is corporate tax rates, FS is firm size, ROA is profitability, and SGR is sales growth ratio. Similarly, IR is for interest rate, FSD is financial sector development, and GDP is an acronym of GDP growth rate. The three financing policies (FP) are abbreviated as BL (bank loans), ER (equity ratio), and AP (account payable ratio).

4.1 Explanation of Methodology

The estimation of the regression among the variables of the study is based upon implication of several econometric techniques. As the analysis consisted of several macroeconomic variables, it is therefore more likely that such variables have stationarity issues. To test the stationarity, we apply a diagnostic test named the unit root test and report the results in Table A1. The probability values of the Im, Pesaran (Im et al., 2003), and ADF (Dickey & Fuller, 1979) tests reject a null hypothesis, i.e., the unit root exists, and signify that data are stationary when normal. Subsequently, we start the regression estimation by employing the baseline technique, i.e., the

fixed effect model (the results of this model are hidden) as it is an appropriate technique for estimating the panel data. However, the existence of a heteroscedasticity issue, as highlighted by the LR (likelihood ratio) test, makes the fixed effect unsuitable and suggests the application of the panel EGLS (estimated generalized least square), commonly known as the GLS model, for regression estimation. In addition to the panel GLS, we also apply the two-step system GMM model (known as the GMM model) for robustness. Furthermore, the statistical outputs of the Wald test advocate the existence of endogeneity issues (as shown in Table 3). It can be further argued that the issue of endogeneity arises when we estimate equations (1) and (2) due to omitted variable biases. This is another root cause of the endogeneity issue in panel data analysis. The problem of endogeneity is common when the analysis consists of both firm-specific and country-level variables because error terms may become endogenous with explanatory variables. In such a situation, the GMM model can provide unbiased results in the presence of valid instruments. According to the GMM technique, we use the lagged values of explanatory variables as instruments. The use of such techniques was also observed in some previous studies (Ohrn, 2018; Farooq et al., 2021a; Farooq et al., 2021).

Table 3

ENDOGENEITY DIAGNOSTIC

	Wald Test		
Test Statistic	**Value**	**Df**	**Probability**
Panel estimation			
F-statistic	2725.357	(10, 28723)	0.000***
Chi-square	27253.57	10	0.000
Individual estimation			
Coefficient Restriction		**Probability**	**Std. Error**
C (1)		0.084	0.020
C (2)		0.005	0.003
C (3)		0.038	0.010

C (4)	0.016	0.010
C (5)	-0.042	0.013
C (6)	0.008	0.001
C (7)	-0.010	0.014
C (8)	0.002	0.004
C (9)	-0.007	0.004
C (10)	0.044	0.012

Note: **=significant at 10% level, **=significant at 5% level, ***=significant at 1% level,* **Description:** *The significant probability values of restrictions terms illustrate that error term is correlated with explanatory variables which create the issue of endogeneity*. **Source:** s*elf-estimation.*

5. Empirical Results

5.1 Regression Analysis

Table 4

EFFECT OF CORPORATE TAX RATES ON INVESTMENT DECISIONS

	EGLS		2-step System GMM	
	Coefficient	**Std. error**	**Coefficient**	**Std. error**
Constant	0.369***	0.017	0.285**	0.158
CTR (Corp. Tax rate.)	0.017***	0.004	-0.057***	0.001
Control Variables				
FS (firm size)	0.004**	0.002	0.093*	0.055
ROA (profitability)	-0.091***	0.006	-0.682***	0.057
SGR (sale. Grow. Ratio)	-0.011***	0.001	0.116***	0.169
IR (interest rate)	-0.009	0.001	-0.015***	0.001
FSD (financial Sector develop.)	-0.148***	0.012	-0.117**	0.060
GDP (GDP growth rate)	0.031	0.002	0.027***	0.006
Adjusted R-square		0.016		0.747
S.E. of regression		0.089		0.099
Prob. Of F-statistics		0.000		-
Prob. Of J-statistics		-		0.308

Instruments Details: INV (-1) CTR (-1) FS (-1) ROA (-1) SGR (-1) IR (-1) FSD (-1) GDP (-1)

Source: Self estimation **Note:** **, **, *** represent the significance at 10, 5, and 1% level respectively.*

To estimate the econometric equation (1), we employ the panel EGLS and 2-step system GMM model and report the results in Table 4. As the statistical values imply, CTR has a positive association with investment decisions at a 1% significance level. However, this positive impact changes into negative when we address the problem of endogeneity by employing the system GMM model. The coefficient value of CTR is -0.057 which illustrates that a one percent increment in tax rate can impede the investment decisions by 5.7%. In addition to this, FS has a positive and significant coefficient value of 0.093 while ROA has a negative coefficient value of -0.682. Similarly, the sales growth ratio has a positive and significant impact on industrial investment and its coefficient value is 0.116. At the macro-level, IR and FSD have negative but GDP has a positive and significant adherence with investment decisions.

Table 5

Effect Of Financing Policy on Investment Decisions

	EGLS		2-step System GMM	
	Coefficient	**Std. error**	**Coefficient**	**Std. error**
Constant	0.384***	0.010	1.632***	0.066
BL (Bank Loan)	0.177***	0.009	0.370***	0.027
ER (equity ratio)	0.052***	0.009	0.192***	0.025
AP (account payable)	-0.246***	0.011	-0.497***	0.034
Control Variables				
FS (firm size)	-0.002	0.002	0.078***	0.004
ROA (profitability)	-0.071***	0.008	-0.495***	0.077
SGR (sale. Grow. Ratio)	-0.004**	0.002	0.007	0.121
IR (interest rate)	0.001	0.001	-0.092***	0.006
FSD (financial Sector develop.)	-0.116***	0.010	-1.145***	0.053
GDP (GDP growth rate)	-0.001	0.002	0.1006***	0.004
Adjusted R-square		0.062		0.883
S.E. of regression		0.084		0.033

Prob. Of F-statistics	0.000	-
Prob. Of J-statistics	-	0.158

Instruments Details: INV (-1) BL (-1) ER (-1) AP (-1) FS (-1) ROA (-1) SGR (-1) IR (-1) FSD (-1) GDP (-1) **Source:** Self estimation **Note:** **, **, *** represent the significance at 10, 5, and 1% level respectively.*

Table 5 shows the statistical outcomes when we test the econometric equation (2). As shown in Table 5, bank loans and equity ratio positively and significantly impinge upon industrial investment while financing through account payables has an adverse impact on investment decisions. All three financing choices are significant at 1% level and their coefficient values are 0.370, 0.192, and -0.497 relatively. Additionally, all financing choices show the robustness even after controlling the endogeneity issue and other variables of study.

Table 6

EFFECT OF CORPORATE TAX RATES ON FINANCING POLICY

	2-step System GMM model					
	BL (1)		***ER (2)***		***AP (3)***	
	Coefficient	**Std. error**	**Coefficient**	**Std. error**	**Coefficient**	**Std. error**
C	0.080***	0.017	0.701***	0.017	0.039***	0.010
CTR	0.004***	0.004	-0.005***	0.001	0.007***	0.002
Control Variables						
FS	0.062***	0.002	-0.097***	0.015	-0.012***	0.001
ROA	-0.334***	0.007	0.371***	0.008	-0.030***	0.004
SGR	0.004***	0.001	-0.033***	0.008	0.025***	0.005
IR	-2.310	0.004	-0.008***	0.006	0.005***	0.009
FSD	0.097***	0.011	0.174***	0.012	0.162***	0.007
GDP	-0.003	0.002	0.004**	0.002	-0.003***	0.005
Adjusted R-square	0.094		0.140		0.351	
S.E. of regression	0.090		0.032		0.033	
Prob. Of J-statistics	0.821		0.433		0.671	

Instruments Details: NV (-1) CTR (-1) FS (-1) ROA (-1) SGR (-1) IR (-1) FSD (-1) GDP (-1) **Source:** Self estimation **Note:** **, **, *** represent the significance at 10, 5, and 1% level respectively.*

Table 6 mainly shows the statistical impact of the corporate tax rates on different financing options. Following the statistical results, it can be suggested that CTR has a positive impact on BL while a negative effect on equity financing. As for concern secondary source of financing, it has a positive adherence with the account payable ratio. At the corporate level, FS has a positive impact on bank loans while has a negative association with equity and trade credit financing. ROA has a negative association with BL and AP while the positive and significant relationship with ER. Similarly, SGR has positive adherence with BL and AP while the negative correlation with ER. At the macro level, the negative and significant relationship of IR can be observed with BL and ER. However, it has a positive impact on AP. FSD has a positive and significant regression with all financing choices. In contrast, GDP has negative and significant coefficient values for BL and AP while positive and significant coefficient statistics for ER. Summarizing, the coefficient values of CTR show dynamic association with different financing choices when we control different firm-level and macro-level factors.

Table 7

EFFECT OF CORPORATE TAX RATES AND FINANCING POLICY ON INDUSTRIAL INVESTMENT

	EGLS		2-step System GMM	
	Coefficient	**Std. error**	**Coefficient**	**Std. error**
Constant	0.444***	0.046	3.546***	0.048
CTR (corporate tax rates)	-0.003***	0.001	-1.067***	0.375
BL (Bank Loan)	-0.012**	0.053	2.512***	0.213
ER (equity ratio)	-0.069***	0.053	3.448***	0.026
AP (account payable)	-0.421***	0.064	-3.141***	0.013
CTR*BL	0.007***	0.001	0.765***	0.090

CTR*ER	0.004***	0.001	1.422***	0.049
CTR*AP	0.006***	0.002	-1.109***	0.148
Control Variables				
FS (firm size)	-0.008	0.002	0.355***	0.138
ROA (profitability)	-0.071***	0.008	-1.902***	0.054
SGR (sale. Grow. Ratio)	-0.004***	0.002	0.453***	0.158
IR (interest rate)	0.065	0.001	-0.013**	0.024
FSD (financial Sector develop.)	-0.081***	0.012	-0.705***	0.055
GDP (GDP growth rate)	-0.263	0.002	0.044***	0.038
Adjusted R-square		0.063		0.868
S.E. of regression		0.089		0.042
Prob. Of F-statistics		0.000		-
Prob. Of J-statistics		-		0.173

Instruments Details: INV (-1) BL (-1) ER (-1) AP (-1) FS (-1) ROA (-1) SGR (-1) IR (-1) FSD (-1) GDP (-1) BL (-2) ER (-2) AP (-2) CTR (-2) **Source:** Self estimation **Note:** **, **, *** represent the significance at 10, 5, and 1% level respectively.*

The empirical results that based upon the analyses of equation (1) and equation (2) may be biased due to problem of omitted variables. This problem can be addressed by estimating equation (3). Table 7 reports the main results of the study when we test the econometric equation (3). This table primarily explains regression results for how corporate firms may respond to change in CTR by employing different financing options. The interaction effect of financing choices and CTR on investment decisions corroborates the moderating role of financing options in the relationship between CTR and INV. Based upon statistical results, it can be noticed that the availability of both bank loans and equity financing can disentangle the adverse impacts of CTR on investment decisions. However, the interaction term of CTR*AP has a negative coefficient value of -1.902. The coefficient values of all interaction terms (CTR*BL, CTR*ER, CTR*AP) show the dynamic role of different financing options in disregarding the negative impact of CTR. Other variables of study show a similar relationship as mentioned above.

6. Discussion of Results

This study primarily focuses on checking the impact of different financing options in relation to the corporate tax rates on corporate investment decisions. To estimate the regression, we employ the two econometric techniques, the panel GLS and system GMM models, and report the results in Table 4, 5, 6, and 7. As the statistical results imply, the corporate tax rate has a negative impact on industrial investment. The increment in statutory corporate tax rates enhances the financial burden of tax payments on corporate firms and consequently creates a shortage of funds for capital investment. More funds flow towards the payment of taxes and hence corporate firms may face a shortage of financial sources for making any investments (Dobbins & Jacob, 2016). Supporting this, the empirical study arranged by Djankov et al. (2010) analysed the response of corporate firms across 85 countries and found robust evidence for the negative association between effective corporate tax rates and industrial investment. In addition to this, we also estimate the dynamic impact of different financing options on corporate investment decisions. As the statistical results show, bank loans have a positive association with investment decisions. The availability of more bank loans provides financial flexibility for making new investments in capital projects (Gaiotti, 2013). It provides a financial setback to financially distressed firms for enhancing their investment volume. A similar relationship was also observed for equity financing. The enterprises also obtain funds by issuing new stocks. Such funds can be further used to make investments. However, the statistical results reveal that there is a negative regression between the secondary sources of financing, i.e., trade credit financing and industrial investment. Not surprisingly, there exists an inverse simultaneity between investment and trade credit financing. Corporate firms that are suffering from low investment (less property, plant, and equipment) cannot obtain more trade credit financing due to limited production and sale volume

and vice versa (Ferrando & Mulier, 2013). Additionally, obtaining more funds through wide trade credit terms may distort a firm's reputation, which has a negative spill-over impact on industrial investment (Wu et al., 2014).

The empirical results further reveal that corporate tax rates have a positive association with debt financing, but a negative one with equity financing. According to the trade-off theory, corporate firms prefer to have more debt financing during a high taxation era due to the deduction of interest expenses from taxable income (Modigliani & Miller, 1958). In addition to this, some other empirical studies have also illustrated that corporate firms prefer to have more debt financing while deciding their capital structure during a period of high taxation (Devereux et al., 2018; Feld et al., 2013; Faccio & Xu, 2015). In regard to the impact of CTR on AP, it has a positive association with trade credit financing. Corporate firms may enhance their production volume by purchasing raw materials on credit to gain the tax rebates. Higher tax rates may push enterprises to enhance their trade volume due to the advantages of a low tax implication on high sales volume (Murfin & Njoroge, 2015). Following the statistical results reported in Table 7, it can be seen that the interaction of corporate tax rates with all three sources of financing has a positive impact on industrial investment. This positive impact advocates the moderating role of financial sources in mitigating the adverse impact of corporate tax rates on investment decisions. Acquiring more funds during a high taxation period can impede the adversities of corporate taxation by offering a strong financial setback (Ohrn, 2018). It enhances the financial immunization of enterprises and thus corporate firms may bear the shocks of high taxation. Supporting this, Wu and Yue (2009) argued that corporate firms preferred to take more bank loans in response to high taxation, which has further a positive impact on industrial investment.

Extending the discussion on the empirical results of the control variables, firm size has a positive contribution in determining industrial investment. Larger firms make voluminous investments in acquiring property, plant, and equipment (PPE) due to rising demand for their products (Ajide, 2017). Contrary to this, profitability has an adverse impact on investment, implying that profitable firms may be interested in making the investment in early return projects, e.g., securities investments instead of capital projects that have slow returns. Nonetheless, the sales growth ratio has a positive relationship with investment decisions. The objective of a higher sales volume is attached to voluminous investment. Additionally, a higher sales growth rate may compel firms to make more investment in PPE due to an increasing sales volume. Such empirical findings are well established in literature (Adelino et al., 2017; Al-Gamrh et al., 2020; Farooq et al., 2021).

At the macro level, the negative impact of interest rates on industrial investment can be explained through the concept of the opportunity cost created by a high interest rate for investing into capital projects. Corporate managers may invest more funds into government securities instead of capital investment due to early and high returns in the case of securities investment (Farooq et al., 2021a). Similarly, financial sector development has a negative relationship with investment decisions. The development of the financial sector may offer a high lending rate for investment in banking securities which has a negative spill-over impact on fixed assets investment (Omri, 2020). Lastly, GDP growth rate posits a positive association with corporate investment, indicating the positive impact of an overall prosperous economic condition on industrial investment (Ajide, 2017). Briefly, the analysis provides robust evidence for the dynamic impact of different macroeconomic and firm-specific factors on industrial investment.

7. Conclusion

Previous studies have mainly examined the individual effects of corporate tax rates on investment and financing decisions. Such studies were limited to examining the impact of corporate tax rates on bank loans and investment decisions individually. In this study, we investigate the impact of corporate tax rates on industrial investment and how this effect changes in the presence of multiple financing options. This study extends the existing literature by examining the impact of corporate tax rates on multiple financing options and how such types of financing options alienate the adverse impacts of corporate taxation on investment volume. For empirical analysis, we employ ten years of data for non-financial sector firms from eight Asian economies and use the EGLS and system GMM model to estimate the regression. The statistical findings first reveal the negative impact of corporate taxation on industrial investment due to the extra burden of the taxation cost. The statistical analysis further documents the dynamic impact of various financing options on industrial investment. It also suggests the negative impact of corporate taxation on equity financing, as well as the positive effect on debt and trade credit financing. Notably, the statistical results corroborate the moderating role of different financing options in the nexus between corporate tax rates and industrial investments. We find that corporate firms that have more access to funding sources are less effective due to increasing tax rates. The accessibility of different funding sources may enhance the capital reserve of enterprises and thus enable the firms to bear any increment in corporate taxations. This study further sheds light on the dynamic role of different firm-level and macro-level factors in determining industrial investment.

7.1 Policy Implications

The empirical results of study suggest the following policy implications.

- Policy officials should try their best to keep corporate taxation at the lowest level because it has a negative impact on industrial investment and impedes the growth of this sector.
- The empirical results pointed out the sensitivity of corporate investment and financing policy towards corporate tax rates. Thus, corporate managers should consider changes in statutory tax rates when making decisions about investment volume and financing policy.
- Corporate managers should focus on enhancing funding through various sources during a high taxation era because it can help to deal with the adverse impacts of high taxations. Specifically, they should focus on bank financing because it has dual benefits regarding tax deductions and financial setbacks.

Appendix

Tables

Table A1

UNIT ROOT TESTING

	Im, Pesaran and Shin W-stat		ADF - Fisher Chi-square	
Variables	**Statistic**	**Prob.**	**Statistic**	**Prob.**
Investment	-15.623	0.000	7960.970	0.000
Corporate tax rates	-18.650	0.000	3173.050	0.000
Bank Loans	-10.474	0.000	7678.920	0.000
Equity ratio	-5.728	0.000	7367.130	0.000
Account payable ratio	-24.689	0.000	9413.990	0.000
Firm size	-11.194	0.000	8243.340	0.000
Profitability	-35.659	0.000	10936.500	0.000
Sales growth ratio	-57.659	0.000	14586.000	0.000
Interest rate	-35.463	0.000	10415.000	0.000
Financial development	34.267	0.000	27249.100	0.000
GDP growth rate	-90.406	0.000	19883.800	0.000

Note: *Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution.* **Description:** *The significance probability values reveal that variables are stationary at normal.* **Source:** *self-estimation*

Table A2

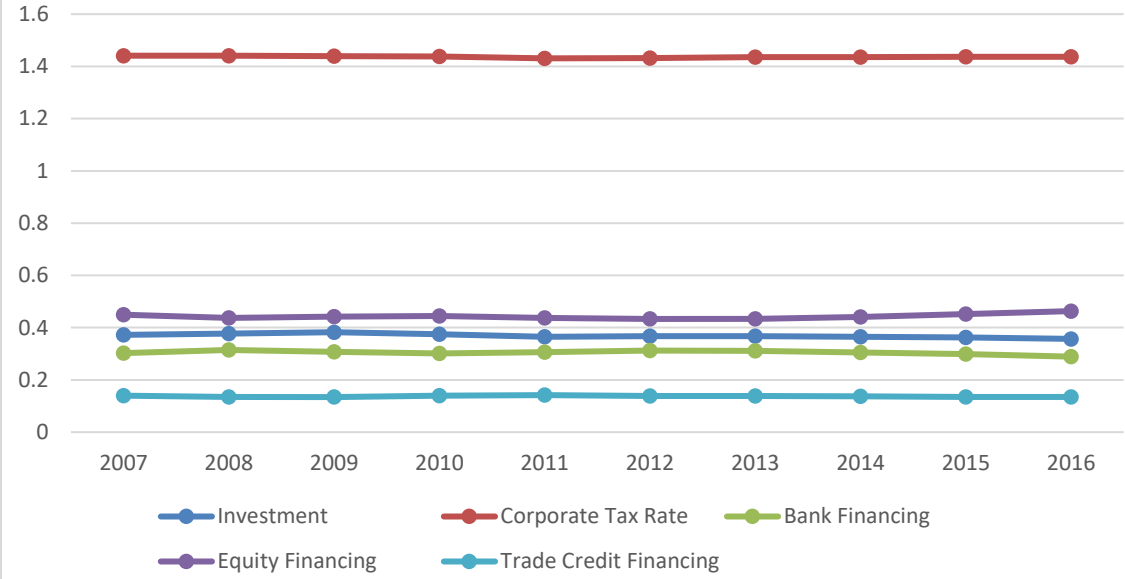
CORRELATION METRICS

	INV	CTR	BL	ER	AP	FS	ROA	SGR	IR	FSD	GDP
INV	1.000										
CTR	0.098	1.000									
BL	0.270	0.124	1.000								
ER	-0.056	-0.171	-0.717	1.000							
AP	-0.288	-0.075	-0.156	-0.209	1.000						
FS	0.027	-0.273	0.143	-0.231	-0.085	1.000					
ROA	-0.020	0.203	-0.205	0.173	-0.061	0.030	1.000				
SGR	-0.019	0.035	-0.003	-0.043	0.022	0.059	0.287	1.000			
IR	0.014	0.176	0.014	-0.025	0.048	-0.057	-0.005	-0.258	1.000		
FSD	-0.074	-0.758	-0.105	0.173	0.240	0.127	-0.226	-0.091	-0.081	1.000	
GDP	-0.019	0.191	0.035	-0.097	-0.207	0.133	0.075	0.191	-0.251	-0.478	1.000

Acronyms: *INV= investment, CTR= corporate tax rates, BL= bank loans, ER= equity ratio, AP= account payable, FS= firm size, ROA= profitability, SGR, sales growth ratio, IR= interest rate, FSD= financial sector development, GDP= GDP growth rate* **Source:** *Self estimation.*

Figures

FIGURE A1 CO-MOVEMENT OF VARIABLES



Source: *Self estimation.* **Note:** *The value of corporate tax rates shows the logarithmic value of average tax rate during specific period. The graphical lines of all variables show linear relationship among variables*

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