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Corporate Investment Behavior and Level of Participation in the Global Value Chain: A Dynamic Panel Data Approach

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Abstract

This study was conducted to comprehensively identify factors that potentially influence corporate investment behavior, including micro, macro, and sectoral variables. Furthermore, investment behavior was studied across nations based on their participation in the global value chain (GVC), which was evaluated based on commodities, limited manufacturing, advanced manufacturing, and innovative activities. The study uses the dynamic panel data analysis and Generalized Method of Moment (GMM) estimation for a sample of 800 corporations, with data spanning over 2000−2019. The study result shows that in all types of countries, the coefficient lag indicator of capital expenditure statistically has a significant effect on capital expenditure. Sales growth, exchange rate, and GDP have a significant positive effect on corporate investment growth, while DER has a negative effect. In commodity countries, corporate investment is influenced by sales growth, exchange rate, and FCI. The variables that influence corporate investment in manufacturing countries are the FCI, exchange rate, sales growth, GDP, and DER. In innovative countries, variables that significantly affect capital expenditure are DER, GDP, and Tobin *Q*. In each type of country, the interaction terms between exchange rate and commodity price are positive and statistically significant.

Keywords: Global Value Chain, Corporate Investment, Capital Expenditure

JEL Classification Code: G30, G40, E22, F21

1. Introduction

By committing to economic development and improving the quality of life and environment, a corporation may play a critical role in addressing social issues. Investment is one of the approaches used by corporations to develop the economy of the country. Corporate investment, such as capital expenditure, has a high multiplier that encourages higher financing needs in other sectors and, in turn, increases economic growth. The neoclassical theory assumes that every stakeholder, including the corporation, invests to achieve the maximum capital stock (Jorgensen, 1963). The acceleration theory stated that consumption leads to an additional investment because producing an additional consumption requires a large capital stock (James, 2018). Both theories show a constant relationship between capital, consumption, and output. An increased consumption needs more investment to achieve the maximum capital stock.

Our paper is associated with the comprehensive empirical literature on corporate investment determinants in emerging markets. Because of capital market imperfections, this study stresses the value of internal funding for corporate investment. Analyzing the corporate investment behavior, particularly its determinants, is essential. The participation of a country in GVC is one factor determining the country's investment behavior. By participating in the GVC, related countries are expected to have various positive impacts, particularly in increasing product competitiveness, expansion of production, and improved access to global markets (Putri Nurdiati & Oktaviani, 2015). In conjunction with the added value gained via the value chain, the GVC is supposed to promote economic improvement.

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Three indicators measure the level of participation of a country in the GVC: (1) index of participation (in percentage), which measure the backward and forward participation of a country; (2) index for the number of production stages, which measures the number of stages of production required to produce a good or service; and (3) index of distance to final demand, which measures how many stages of production are left before the goods or services produced to reach the final consumer Sudhana (2017). These indicators are then calculated based on the five global input-output matrices of the TiVA database (OECD, 2015).

Indonesia was a country with a low level of participation in the GVC, although it has transitioned from a commodity country to a limited manufacturing country (World Bank, 2020b). It is likely to have a negative impact on Indonesian corporate investment behavior. Indonesia was placed behind Singapore, Malaysia, the Philippines, and Vietnam. Research on developing countries has placed the Indonesian corporate cycle at the basis of the credit crunch. A credit crunch is a condition wherein banks are reluctant to channel credit because of no demand.

The World Bank reported that Thailand, Brazil, and Singapore were included in the mid-cycle, where corporate growth had accelerated (World Bank, 2020b). The Philippines, Malaysia, Vietnam, and Korea were entering the late-cycle phase, wherein their corporate financing had peaked and had the potential to decline. China was included in the extending cycle group, where the corporate cycle had slowed down in the absence of policy support.

A country's institutional, policy, and regulatory environment influence the investment climate (Dollar et al., 2005). Some factors influence the investment climate in Indonesia, which concern not only political and social stability but also economic stability, functioning of the financing sector, and government regulation. These factors come from microeconomic and macroeconomic indicators. Analyzing the micro variables of the corporation, such as cash flows and sales growth, will explain the corporate investment behavior. Meanwhile, macro variables, particularly the exchange rate, corporate loan interest rates, and FCI, are expected to increase the knowledge in corporate finance.

This research examines the variables that influence corporate behavior in a country based on the country type, whether it is a commodity country, manufacturing country, or innovative country included in the emerging market. Based on the explanation, this study was conducted to identify the factors that influence corporate investment behavior, including micro, macro, and sectoral variables. Investment behavior across the countries was further understood through their participation in the GVC, which is reviewed based on the four factors. They are commodities, limited manufacturing, advanced manufacturing, and innovative activities.

2. Literature Review

2.1. Corporate Investment Behavior

The literature on corporate investment focuses primarily on the impact of cash flow, while behavioral finance literature offers a different interpretation focused on investor sentiment. Because of higher production costs, companies may be forced to abandon specific investment programs, reducing income and cash flow. However, the case is very different when it comes to business sentiment. Corporations' excitement for investing is fueled by positive market sentiment.

Companies' investment activity is only linked to investment opportunities in a perfect stock market because companies can take advantage of better investment opportunities. However, inefficient investment phenomena such as over-investment and under-investment are prevalent due to agency issues, funding limitations, knowledge asymmetry, and other practical issues.

The overall corporate investment expenditure can be divided into two categories: (i) investment expenditure to retain current assets and (ii) new investment expenditure. In a negative net present value project, new investment spending involves planned investment expenditure and overinvestment. The above is an example of over-investment, while under-investment occurs when businesses fail to invest in current assets or ventures with a positive net present value. The estimated investment expenditure varies depending on the company's growth prospects, funding constraints, industry association, and other factors. A company's under-investment or over-investment is a subjective phenomenon with little to do with the sum of money invested in absolute terms (Wu & Wang, 2021).

The behavior of corporate investment can be explained by analyzing the micro variables of the business, such as cash flows and sales growth. Meanwhile, it is expected that the macro variables, particularly the exchange rate, corporate loan interest rates, and FCI, will increase corporate finance awareness. There are some investment climate constraints in developing countries, physical and financial infrastructure issues, and human capital and institutional constraints (Kinda, 2010). Procyclical country-specific commodity prices are heavily influenced by market cycles in EMS (Moraga & Vidal, 2010). There is also a relationship between trade and investment terms (Ross, 2015).

2.2. Uncertainty Factors on Investment

Much recent research has focused on the negative impact of uncertainty on investment. As uncertainty grows, people become more risk-averse ("risk-premium channel"), and the value of delay rises ("real options channel"). On the other hand, recent empirical results

should be viewed with caution because uncertainty cannot be precisely calculated, and (ii) theoretical literature offers both negative and positive channels of uncertainty to influence investment. In the growth options model, for example, there is some empirical evidence that uncertainty boosts investment. In previous research, three types of uncertainty indicators (macro, micro, and higher-order) were used, as well as Economic Policy Uncertainty (EPU).

The unpredictability of aggregate variables is referred to as macro instability. The CBOE Volatility Index (VIX), which calculates the implied volatility of the SandP 500 index, is one illustration. Another form of macro uncertainty proxy such as the JLN uncertainty index uses econometric methods to derive time-varying volatility from many aggregate variables. Due to idiosyncratic factors, micro uncertainty captures the cross-sectional dispersion in individual firm results. This method can be used to calculate various micro-uncertainty measures, including, for example, at the factory, firm, or industry level, interquartile ranges of expected TFP shocks, sales growth, and stock returns. Higher-order uncertainty refers to disagreements between people's predictions for the future. The size of cross-sectional variance in macroeconomic forecasts by professional forecasters, such as those given by the Survey of Professional Forecasters (SPF) and Blue Chip Economic Indicators, is often used to quantify it (Suh & Yang, 2021).

Previous research has found that uncertainty exacerbates financial distress in businesses. This is because of the strong positive relationship between ambiguity and knowledge asymmetry, for example. Bank loans are more expensive for businesses with a high level of idiosyncratic political exposure. As EPU rises, the amount of bank credit available drops dramatically, potentially reducing corporate innovation investment. We believe that financial distress raises the value of waiting, which can serve as an essential economic channel through which the real options are revealed. The relationship between EPU exposure and corporate innovation investment is explained by theory (Cui et al., 2021).

2.3. GVC Participation

The World Bank categorized the country's participation in GVC into three groups, which are (i) Commodities to limited manufacturing, (ii) Limited manufacturing to advanced manufacturing and services, and (iii) advanced manufacturing and services to innovative activities (World Bank, 2020b). Because of that, it is essential to define GVC taxonomy groups (Figure 1). The rules consider the size of the country since smaller countries are naturally more reliant on trade. Countries in the commodities group can be categorized into three subgroups, which is small if backward manufacturing share is less than 20 percent, medium if less than 10 percent, and large if less than 7.5%.

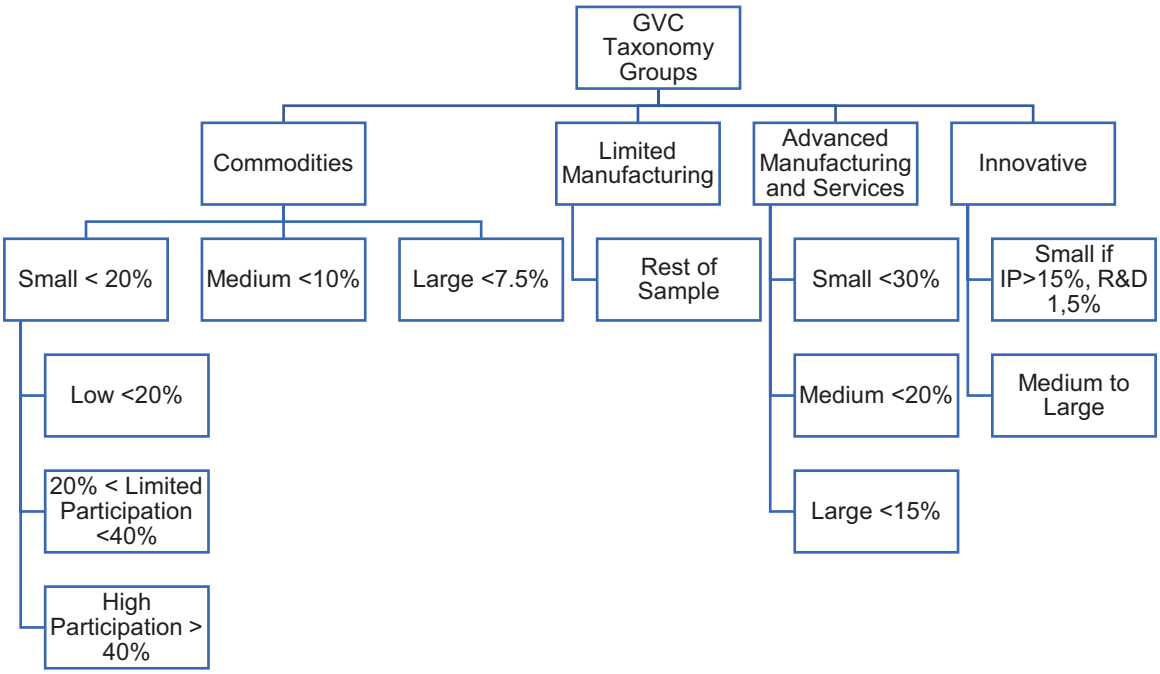

Figure 1: GVC Taxonomy Groups Based on the Share of Total Domestic Value-Added in Exports (World Bank, 2020a)

In more detail, this group is further subdivided into low, limited, and high participation. This subgroup categorization is based on primary goods' share of total domestic value-added in exports. If the country's share is less than 20 percent, then this country is considered within the low participation subgroup. If it is between 20 to 40 percent, then this country is considered within limited group participation. Last, if it is more than 40 percent, this country is considered within the high participation group.

There is also another subdivision for countries according to their export dependence on manufacturing. These requirements divide countries into those that spend a significant portion of their GDP on science and earn a significant portion of their GDP from intellectual property receipts (IP). A country can be categorized into small countries if their IP as a percentage of GDP is equal to or greater than 0.15 percent, and RandD intensity is equal to or greater than 1.5 percent. On the other hand, if the percentage of GDP is equal to or greater than 0.1 percent and RandD intensity is equal to or greater than 1 percent, then this country can be categorized into medium-size and large countries.

GVC participation is determined by factor endowments, geography, market size, and institutions. An average country in the commodities group is characterized by low political stability, low foreign direct investment inflows, high manufacturing import tariffs, low customs efficiency, and low logistics performance index scores. On average, countries in the manufacturing group exhibit further improved political stability, substantially higher FDI inflows, substantially lower average tariffs, better customs efficiency, and a higher logistics performance index than the limited manufacturing group. Countries in the innovative activities group show improved political stability, higher FDI inflows, lower tariffs, higher customs efficiency, and a better logistics performance index relative to the advanced manufacturing and services group. These findings are in line with a more favorable role for efficiency-seeking FDI that looks for internationally cost-competitive destinations and potential export platforms, (Buelens & Tirpák, 2017).

Furthermore, a 1 percent increase in GVC participation is estimated to boost per capita income by more than1 percent, or much more than the 0.2 percent income gain from standard trade (World Bank, 2020b). Eventually, these high growth rates cannot be sustained without moving to more sophisticated forms of participation. However, the transitions from limited manufacturing to more advanced manufacturing and services, and finally to innovative activities, become increasingly demanding in terms of skills, connectivity, and regulatory institutions.

3. Methodology

3.1. Data

This research is quantitatively based on the dataset, which is acquired from previously available data. The selected sample comes from countries with varying levels of participation in the GVC. A total of 800 corporations were selected, representing at least 80% of market capitalization. The samples are engaged in various sectors, such as energy, material, industrial, and consumer sectors.

One of the micro-indicators in this research is financial reports. The corporations' quarterly financial reports throughout 2010–2019 (9 years) are collected from Bloomberg, Capital IQ, and Citi Research. The data on financial reports include the following: (a) corporate investment calculated by annualized capital expenditure (Capex) growth, (b) corporate sales calculated by annualized sales growth, (c) corporate cash flows calculated by annualized free cash flows growth or after-tax operating profit plus depreciation, (d) average Q calculated by the ratio of book value to market capitalization, (e) capital structure calculated by comparing debt and equity, and (f) financial distress indicator represented by the Altman *Z*-Score indicator. Capital expenditure is a dependent variable, whereas the others are independent variables.

Bloomberg, Capital IQ, and Citi Research provided macro-indicators data from 2010 to 2019. Exchange rates and FCI are examples of specific macro indicators for countries dependent on their level of participation in the GVC. For information, the FCI is obtained only from Citi Research. It is precisely calculated for each country. General macro data is commodity prices obtained from the Bloomberg Commodity Index as a proxy.

3.2. Variables

3.2.1. Exchange Rate

Several recent studies have cast doubt on the efficacy of Real Effective Exchange Rate (RER) depreciations in boosting exports, demonstrating that GVC linkages minimize trade elasticity and exchange rate pass-through. A previous study examined how the formation of GVCs influenced the exchange rate elasticity of exports over time and across countries using a panel system covering 46 countries from 1996 to 2012 (Swarnali et al., 2017). They found evidence that GVC participation decreases manufacturing export RER elasticity by 22% on average. In order to address the question of causality in this new strand of research, Minh Hong and Thi Anh-Dao (2020) endogenized the price elasticity of

import demand for China and the United States using their partners' export diversification indices.

Some new studies connect GVCs and RER at the sector level from a value chain perspective (Patel et al., 2017). Bems and Johnson (2017) proposed the idea of the "value-added real effective exchange rate," which is an intriguing analysis. To account for sectoral heterogeneity in calculating RER, they use GDP deflators (rather than consumer price indices) to calculate price shifts, and the weights of these price indices are based on value-added bilateral trade flows.

Unfortunately, data on bilateral value-added trade, especially for developing countries, is a significant barrier to such studies. The lack of inter-country input-output trade tables is related to the scarcity of econometric and empirical studies of GVC integration. For example, due to missing data in specific fields, the World Input-Output Database (WIOD) only covers 43 countries. Note that productivity gains from exports may be linked to gross exports rather than their value-added counterparts, due to positive spillovers from imported inputs and technology (Patel et al., 2017).

3.2.2. Debt to Equity Ratio (DER)

Earnings management defines managers who use judgment in financial statements and transaction structuring to change financial results to confuse other stakeholders about the underlying economic performance of the business or manipulate contractual outcomes that rely on published accounting practices. Earnings management behavior influenced by different motivations can have a different impact on firms' investment behavior. Prior research examining how earnings management affects a company's investment behavior indicated that when earnings are adequately managed, the company overinvests. Firms may engage in income-increasing earnings management to obtain lower-cost external funding, which may encourage overinvestment. As a result, this study anticipates a positive relationship between earnings management and overinvestment (Liu et al., 2021).

In the corporate world, the concept of capital structure is as old as the economic concept. Capital structure means the relative shares of debt and equity financing, determined based on tangible and intangible assets. Earnings management is intended to improve the performance of the capital structure, which leads to efficient earnings management, and mismanagement leads to opportunistic earnings management. In countries like Pakistan, India, China, Bangladesh, and Sri Lanka, opportunistic earnings management seems to have adversely affected capital structure performance (Shoaib & Siddiqui, 2021).

3.2.3. Financial Conditions Index (FCI)

Financial conditions can be defined as the current state of financial variables that influence economic behavior and (thereby) the future state of the economy. In theory, such financial variables may include anything that characterizes the supply or demand of financial instruments relevant to economic activity. This list could include a broad range of asset prices and amounts (both stocks and flows), as well as possible asset supply and demand indicators. Surveys of credit access and financial capital adequacy are examples of the latter.

Financial conditions capture short-term macroeconomic volatility or financial disturbances that can disrupt a company's investment decisions because of brief changes in financial variables (Gochoco-Bautista et al., 2014). The FCI is a quantitative method that aims to extract information regarding the future economic state in the present value from a series of financial variables (Osario et al., 2011). Exogenous changes in financial conditions must be calculated with the ideal FCI, and therefore, the share of endogenous financial conditions should be excluded when compiling the index. Financial market conditions can influence risk transfer behavior through internal funds or liquidity changes that impact the firm's access to external finance (Tran & Le, 2017). A more favorable financial situation can lead to an increase in business cash flow, where creditors can be persuaded to consider overcoming the company's financial problems because of negative cash flow. The value of the increasing external capital should be increased by various means, such as by reducing restrictions on external financing.

3.2.4. Average *Q*

The *Q* model of investment assumes perfect competition in all markets, constant returns to scale, and purely convex costs of changing the capital stock in terms of investment level. Constant returns to scale render a company's net revenue homogeneous in scale to a degree of one. By including imperfect competition or declining returns to scale in the model, the convexity of the relationship between income and production price can be weakened and ultimately overturned. Price volatility may positively or negatively affect investment, depending on expectations about the business environment and technology. The average *Q* ratio in Hayashi's *Q* model is summarized by any uncertainty effect, a sufficient statistic for investment in this model. The average q ratio provides much more information about a company's investment than the traditional Brainard-*q* Tobin's test, which is calculated using the company's stock market valuation (Bond & Cummins, 2004).

3.2.5. Altman *Z*-Score

The literature on bankruptcy prediction dates back to the 1930s, with early research concentrating on ratio analysis techniques to forecast possible bankruptcy until the mid-1960s, with studies focusing on the univariate technique. In accounting, banking, and finance, including practitioners, research on predicting bankruptcy has piqued their interest. Bankruptcy models, in general, include indicators of financial distress and are often used by academics to assess a company's financial health. Furthermore, Altman, Edward first published the multivariate technique for failure prediction in 1968, and it is still widely used in the literature today.

3.3. Generalized Method of Moments (GMM)

Maximum Likelihood Estimation (MLE) has been around since the early twentieth century and is the best estimator available within the classical statistics paradigm. MLE's superiority arises from the fact that it is based on the data's joint probability distribution, also known as the likelihood function. This reliance on the probability distribution, however, can be a disadvantage in some instances. The GMM framework, on the other hand, provides a computationally convenient method of performing inference in these models without requiring the likelihood function to be specified.

In the 1890s, a technique known as the Method of Moments was first proposed. Since then, the potential of moment conditions for estimation has been recognized. Lars Hansen was the first to introduce GMM into the econometrics literature in 1982. Before Hansen's work, the statistical theory of these estimators was often limited to the moment conditions of a specific functional form. In econometrics and statistics, the generalized method of moments (GMM) is a generic method for estimating parameters in statistical models. The exact nature of these conditions varies depending on the application, but their validity is critical for the properties of the resulting estimator (Hall, 2007).

3.4. Econometrics Model

Lagged investment is a much better predictor of investment than Tobin's *Q* and cash flow combined. While this fact has been recognized in empirical work on investment, it has mostly been viewed as an inconvenience. Investment should depend only on Tobin's *Q* (Hayashi, 1982). However, the robustness of the lagged-investment effect run on a panel with fixed effects versions is much greater than that of *Q*. Since lagged investment is by definition correlated with the panel-level effects, the panel regressions used should be consistent with the GMM estimator (Eberly et al., 2012).

Investment is an activity that requires a time lag between the occurrence of an investment and its results. Because investment has more than one time pin, it is necessary to avoid serial correlation between independent variables that can quickly occur if the time series data model does not meet Kyocks' assumption (Jorgensen, 1963). The panel data model is appropriate to use in this study and has other advantages. It can capture the investment behavior better when there is a large amount of data because this study examines the investment behavior across countries. A large amount of data in the panel data can control the unobserved factors that are not included in the study (omitted variables).

This panel data model uses the GMM to estimate linear dynamic panel data because it can overcome unobserved individual effect and deal with the endogeneity problem (the correlation between the lagged dependent variable and the error term) (Arellano & Bover, 1995; Blundell & Bond, 1998; Hisham et al., 2019).

There is a model to process corporate data in developing countries: micro, macro, and sectoral variables that affect capital expenditure (Hisham et al., 2019). The final specification model of the determinants of Capex is as follows:

$$\begin{aligned} \text{gCAPEX}_{it} = {} & \beta_1 + \beta_2 \text{gCAPEX}_{it-1} + \beta_3 \text{gSALES}_{it} \\ & + \beta_4 \text{gCOMPRICE}_t + \beta_5 \text{gER}_{it} + \beta_6 \text{DER}_{it} \\ & + \beta_7 \text{gFCI}_{it} + \beta_8 \text{gGDP}_{it} + \beta_9 \text{AVERAGEQ}_{it} \\ & + \beta_{10} \text{ALTMANZ}_{it} + \mu_i + \vartheta_{it} \end{aligned} \quad (1)$$

Where,

$$\mu_i + \pi_t + \vartheta_{it} = \varepsilon_{it}, \vartheta_{it} \ \underline{iid} \ (0, \sigma_v^2) \quad (2)$$

Eq. (1) is rewritten to include the interaction of ER and COMPRICE as shown below:

$$\begin{aligned} \text{gCAPEX}_{it} = {} & \mu_1 + \beta_2 \text{gCAPEX}_{it-1} + \beta_3 \text{gSALES}_{it} \\ & + \beta_4 \text{gCOMPRICE}_t + \beta_5 \text{gER}_{it} \\ & + \beta_6 \text{gCOMPRICE}_t \times \text{gER}_{it} + \beta_6 \text{DER}_{it} \\ & + \beta_7 \text{gFCI}_{it} + \beta_8 \text{gGDP}_{it} + \beta_9 \text{AVERAGEQ}_{it} \\ & + \beta_{10} \text{ALTMANZ}_{it} + \mu_i + \vartheta_{it} \end{aligned} \quad (3)$$

where gCAPEX_{it} is capital expenditure growth of country *i* at time *t*; gSALES_{it} is sales growth; gCOMPRICE_t is commodity price growth at time *t*; gER_{it} is exchange rate growth; DER_{it} is debt to GDP ratio; is Financial Conditions Index growth; is GDP Growth; AVERAGEQ_{it} is average Tobin's *Q*; μ_i is unobservable firm-specific effect; ε_{it} is The error term; is a stochastic disturbance term. It is assumed to be independent and identically distributed with mean zero and constant variance.

4. Results and Discussion

Table 1 presents the estimation results using the full sample. The results show that the coefficient lag indicator of the capital expenditure has a statistically significant effect, and thus, the analysis of corporate investment growth this year is still influenced by the previous years. SALES, ER, DER and GDP have a significant effect on corporate investment growth. The results also show that COMPRICE, FCI, AVERAGEQ, and ALTMANZ are insignificantly related to corporate investment growth.

The coefficient of Growth GDP is positive and significant. Previous studies showed the same findings, which indicated that the GDP could affect corporate investment (Fauziana, 2014; Deisirey & Kusreni, 2013). The causality test for investment growth and GDP growth showed a two-way relationship between them: the GDP growth of this year was significantly influenced by investment growth in the previous three, eight, and twelve quarters; that is, investment growth up to three years ago had an impact on GDP growth this year (Galih & Purbasari, 2015).

Sales growth (SALES) has a positive effect on corporate investment. This finding is consistent with Martinez-Carrascal and Ferrando (2008), Phan and Nguyen (2021), and Phan (2021). Sales growth increase indicates increased corporate profits, which could be used for capital expenditure (Farida & Kartika, 2016). It follows the pecking order theory. The pecking order theory states that a company should prefer to finance itself first internally through retained earnings.

Capital structure growth policy (DER) is computed by dividing debt and equity. It will affect corporate investment growth. This result is the same as that from Rolita (2014), who stated that capital structure positively affects the corporate investment decision. Capital financing can be obtained from long-term debt and equity, and thus, if the capital structure increases, the corporate investment increases (Rolita, 2014).

Exchange rate growth (ER) positively affects corporate investment. The exchange rate level could have implications for investment behavior (Dao et al., 2017). Then, the depreciation of the exchange rate would boost export competitiveness and hence production, which could also lead to an increase in firms' investment (Mundell, 1963; Fleming, 1962). Consistent with Dao et al. (2017), exchange rate depreciation would immediately raise export revenues, which would expand the investment capacity of firms. The estimation results for Eq. (3) are shown in model 2. This estimation includes the interaction term between ER and COMPRICE. The coefficient of the interaction term is positive and significant.

Further analysis was to measure the determinant factors by comparing countries: commodity country, manufacturing country, and innovative country. This classification is based on the country's participation in the GVC (World Bank, 2020b).

Table 1: Arellano-Bond GMM Estimation, Full Sample (Dependent Variable: Growth of Capital Expenditure)

	1	2
gCAPEX (−1)	0.4259*** (0.1007)	0.4322*** (0.1019)
gSALES	0.3312*** (0.1010)	0.3328*** (0.1015)
gCOMPRICE	0.0506 (0.0415)	0.0375 (0.0410)
gER	0.1282** (0.0664)	0.1608* (0.0628)
gCOMPRICE*gER		0.2260* (0.1364)
DER	−0.0003* (0.0001)	−0.0003* (0.0001)
gFCI	0.0072 (0.0045)	0.0070 (0.0045)
gGDP	0.0076*** (0.0017)	0.0070*** (0.0016)
AVERAGEQ	0.0102 (0.0085)	0.0097 (0.0086)
Altman*Z*	0.0037 (0.0032)	0.0034 (0.0030)
Cons_	−0.0288 (0.0189)	−0.0240 (0.0196)
AR(1) - *p*-value	0.001	0.001
AR(2) - *p*-value	0.162	0.140
Hansen Test - *p*-value	0.108	0.104

Note: *Significant at 0.10 level; **Significant at 0.05 level; ***Significant at 0.01 level.

Table 2 shows that the coefficient CAPEX has an autoregressive effect from one period before CAPEX (−1). Statistically, CAPEX (−1) has a significant and positive effect in each type of country. Therefore, all countries should adopt the right macroeconomic policies backward, looking to achieve high and sustainable capital expenditure growth. The variables that affect CAPEX in all countries are SALES and ER.

As shown in Table 2, the FCI positively affects corporate investment in commodity and manufacture countries at 1% significance. Also, GDP is found to be significantly related to CAPEX in the manufacturing and innovative countries but not for commodity countries. This is a factor in corporate investment decisions. Corporations in commodity-producing countries should adjust their policies to the country's economic characteristics to increase investment prospects (Adiputra & Affandi, 2018).

In commodity countries, corporate investment is influenced by the SALES, ER and FCI. In models (1) and (2), COMPRICE does not affect growth investment. Because the commodity characteristics of each country vary, the movement of global commodity prices does not always affect commodity countries. Furthermore, the global commodity index includes a number of commodities that are not owned by all commodity-producing nations. In the case of Indonesia, only the price of coal and Crude Palm Oil (CPO) has an impact on investment, whereas other commodities do not impact investment.

The coefficient of the interaction term between ER and COMPRICE is significant. A positive value for the effect of the interaction term implies that exchange rate depreciation would increase the effect of COMPRICE on CAPEX. Commodity prices should become an important variable when considering corporate

Table 2: Arellano-Bond GMM Estimation for Each Country's Classification (Dependent Variable: Growth of Capital Expenditure)

	Commodity *C.*		**Manufacture *C.***		**Innovative *C.***	
	1	**2**	**3**	**4**	**5**	**6**
gCAPEX (−1)	0.2755** (0.1303)	0.2744** (0.1222)	0.3382*** (0.0504)	0.3587*** (0.1005)	0.3092*** (0.0649)	0.3045*** (0.0758)
gSALES	0.6052*** (0.1346)	0.5510*** (0.0936)	0.6503* (0.3364)	0.4233** (0.2017)	0.3281** (0.1780)	0.3289* (0.1740)
gCOMPRICE	−0.0604 (0.0450)	−0.0726 (0.0465)	−0.0232 (0.0629)	−0.0160 (0.0253)	0.0155 (0.0414)	0.0138 (0.0418)
gER	0.3345* (0.2006)	0.3013** (0.1419)	0.3820** (0.1627)	0.4032** (0.2012)	0.3079* (0.1856)	0.3352* (0.1817)
gComprice*gER		0.4774*** (0.1671)		0.4065* (0.2389)		0.0994 (0.2814)
DER	0.0021 (0.0017)	0.0008 (0.0015)	−0.0014*** (0.0003)	−0.0015*** (0.0006)	−0.0010** (0.0004)	−0.0010*** (0.0004)
gFCI	0.0128*** (0.0048)	0.0148*** (0.0033)	0.1330*** (0.0289)	0.1215*** (0.0206)	0.0068 (0.0118)	0.0069 (0.0118)
gGDP	0.0358 (0.0248)	0.0183 (0.0206)	0.0114* (0.0058)	0.0108** (0.0051)	0.0125*** (0.0030)	0.0125*** (0.0031)
AVERAGE*Q*	−0.3481 (0.3050)	−0.1580 (0.2611)	0.0183 (0.0685)	0.0467 (0.0627)	0.0427 (0.0286)	0.0464* (0.0268)
Altman*Z*	0.5912 (0.4917)	0.2735 (0.4197)	−0.0096 (0.0281)	−0.0258 (0.0304)	0.0103* (0.0058)	0.0089 (0.0059)
Cons_	−0.6133 (0.4283)	−0.2994 (0.3633)	0.0760 (0.0894)	0.0524 (0.0621)	−0.0203 (0.0250)	−0.0180 (0.0256)
AR(1) - *p*-value	0.087	0.086	0.062	0.056	0.029	0.027
AR(2) - *p*-value	0.457	0.300	0.603	0.717	0.903	0.911
Hansen Test - *p*-value	0.540	0.815	0.834	0.986	0.820	0.616

Note: *Significant at 0.10 level; **Significant at 0.05 level; ***Significant at 0.01 level.

investment because commodity prices play an important role in encouraging corporate investment (Lambin, 2014).

Like commodity countries, SALES, ER and FCI also affect corporate investment growth in manufacturing countries as shown in models (3) and (4). Apart from that, the variables that influence corporate investment in these countries are GDP and DER. GDP positively affects CAPEX at 5% significance and DER at 1% significance.

In model (4), the interaction term between ER and COMPRICE is positive and significant. A manufacturing country is a country that operates equipment, machinery, and labor to process raw materials, spare parts, and other components to be produced into finished goods with the sale value. Thus, manufacturing countries continuously export and import goods, either importing raw materials or exporting finished goods. The increase in raw material prices in the manufacturing industry causes an increase in domestic prices and inflation. Because inflation reduces demand for goods, it will reduce aggregate investment.

Innovative countries have intellectual property income as a proportion of GDP and RandD intensity, which is defined as public and private RandD. In a market economy, "innovation (rather than price)" becomes the primary competitive dimension (Lambin, 2014). Since the late 1980s, the economic literature suggests that RandD, innovation, and spillovers are the key factors that drive self-sustained economic growth. An innovative economy country is a country that creates the necessary infrastructure and resolves issues through intellectual effort, enabling practical application of science and technology to produce commercial products (Safiullina et al., 2014).

The estimation results for innovative countries are shown in models 5 and 6. In model (5), SALES, ER, DER, GDP, and AltmanZ affect the company's investment growth, while in model (6), AltmanZ does not affect CAPEX but TobinQ is significant at the 1% level. This result is the same as that from Zhang and Ying (2018), who stated that TobinQ is the main factor affecting investment behavior.

5. Conclusion

Based on GMM regression's result, variables that significantly affect capital expenditure are the lag indicator of the CAPEX, SALES, ER, DER, and GDP. Sales growth (SALES) has a positive effect on corporate investment. The finding implies that the company would use the internal sources of funds to invest, which follows the pecking order theory. Exchange rate growth (ER) positively affects corporate investment. A positive value implies that exchange rate depreciation would increase the investment capacity of firms. The coefficient of COMPRICE is statistically insignificant while the interaction term between COMPRICE and ER is positive and significant, suggesting the commodity price varies directly with the exchange rate.

In each type of country, corporate investment is influenced by the lag indicator of CAPEX, SALES, and ER. In manufacturing countries, GDP and DER also affect corporate investment. In innovative countries, variables that significantly affect capital expenditure are DER, GDP, and AltmanZ but when the interaction term is included, AltmanZ no longer affects CAPEX. The interaction term in each type of country is positive and statistically significant. A positive value for the effect of the interaction term implies that exchange rate depreciation would increase the effect of COMPRICE on CAPEX.

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