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Financial Development Impact towards Economic Growth and Income Inequality in 5-Asean Countries

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ABSTRACT

Financial development is essential in influencing a country's economic environment. ASEAN countries exhibit varying degrees of financial sector maturity, ranging from highly developed to less develop. Nevertheless, its banking sectors are relatively well-developed. The article aims to examine the impact of financial development on economic growth and income inequality in five ASEAN countries. The study examines a bank-based financial system using the ratio of domestic credit to the private sector to GDP as a measure of financial development. The study utilises panel data regression analysis spanning from 1990 to 2020. Other economic drivers included in the models as control variables are human capital, labour force growth rate, government expenditure, physical capital, inflation, and trade openness. The findings of this study suggest that financial development in five ASEAN countries has a significant negative relationship with economic growth while positively related to income disparity This study uncovers adverse outcomes on the impact of financial development, highlighting the need for legislative reform to improve the efficiency of the banking sector in delivering financial services to all societal groups.

1. Introduction

Over time, the study of financial development, economic growth, and income inequality has always been at the centre of literature in developed and developing countries. Financial development plays a crucial role in shaping the economic landscape of a country. According to Levine [1], financial development refers to the emergence, growth, and maturation of financial institutions, markets, and intermediaries. Levine [1] underlines the critical role financial systems play in mobilizing savings, effectively allocating resources, and promoting economic growth. Besides, financial development also refers to the advancement and sophistication of a country's financial system, which includes its banking sector, stock markets, bond markets, insurance companies, and other financial intermediaries. Nevertheless, Low *et al.*, [2] highlight the different roles of the stocks market and

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credit market play in providing financial services to different market segments. Thus, the issues on the section and measurement of financial development indicators remain controversial among most researchers [3], thus creating an ambiguous effect of the role of financial development on economic growth and income inequality. Some of the commonly used indicators are domestic credit to the private sector, credit to deposit ratio, and the ratio of liquid liabilities to GDP.

On the other hand, economic growth is defined as a boost in an economy's overall output, which often manifests itself as an increase in national income. It acts as a fundamental indicator of a country's financial well-being and usually being measured using Gross Domestic Product, or GDP. Economic growth refers to an increase in the capacity of an economy to produce goods and services, measured by the expansion of real GDP over time. It also demonstrates the rise of an economy's productive capacity, which is frequently fueled by elements like greater investment, technical improvements, increased productivity, population growth, and increasing trade. Previous studies such as Abbas *et al.*, [4] and Guru and Yadav [5] reveal that financial development and economic growth have a positive relationship. Other research also reveals that a stable and effective financial system is important for fostering economic development and growth [6]. Similarly, financial development is ultimately linked to the achievement of economies of scale, enhancing economic efficiency and growth can be seen in the review papers of several authors [7,8].

Moreover, income inequality refers to how unevenly income is distributed throughout a population. A common way to measure income disparity is using the Gini coefficient. The range of the Gini coefficient is from 0 to 1, with 0 denoting perfect equality and 1 denoting complete inequality. Besides, income inequality tends to rise in the early phase of economic growth and slides in the later stage of development. Therefore, the literature on financial development and income inequality linkage is inconclusive. Mookherjee and Ray [9] examined the role of flawed capital markets in perpetuating inequality. Daisaka *et al*., [10] observed that financial imperfections contribute to income inequality by benefiting borrowers (entrepreneurs) and disadvantaging lenders due to its effect on decreasing the capital rental rate. In contrast, Rajan and Zingales [11] stated that the development of the financial sector may widen the existing income inequality.

Along the line of that, issues of financial development, economic growth, and income inequality are also continuously debated in developing countries like in ASEAN (Association of Southeast Asian Nations). ASEAN is a region that consists of 10 countries. However, this study only included 5 of 10 countries due to data availability. The countries are Indonesia, Malaysia, Thailand, Singapore, and Vietnam. These countries can be categorised into three different income levels, first: high-income (Singapore), second: upper-middle income (Indonesia, Malaysia, and Thailand) and third: lower-middle income (Vietnam). Therefore, Figure 1 and Figure 2 show the GDP per Capita Growth Rate and Gini Index of 5-ASEAN countries. It can be concluded that the downward trend of the GDP per capita growth rate of 5 ASEAN countries was caused due to the Asia financial crisis (1997-1998), the Global financial crisis (2007-2008), and the Pandemic Covid-19 (2020). Besides, it also reveals that Malaysia has the highest Gini coefficient among the 5-ASEAN countries.

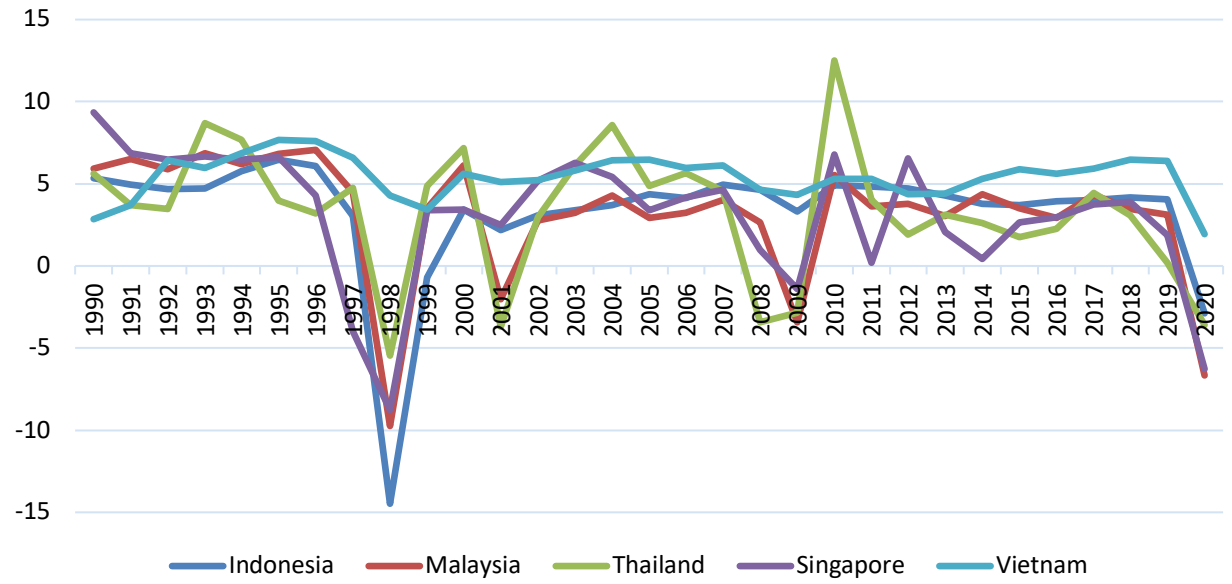

Fig. 1. GDP per Capita Growth Rate

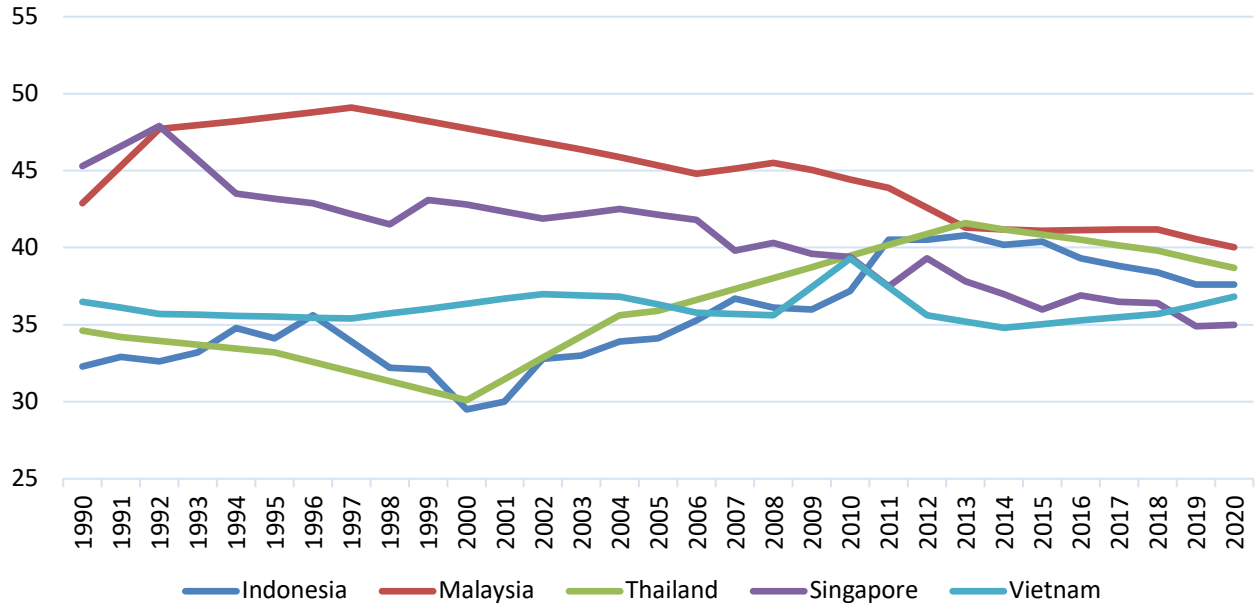

Fig. 2. GINI Index

Numerous studies have examined and measured the relationship between financial development, economic growth, and income disparity. Despite that, this study uses domestic credit to the private sector as the indicator of financial development. This is because, the private sector is said to be the engine of economic growth for a country, especially for developing economies. In developing countries like ASEAN, the private sector generates 90% of jobs, funds 60% of all investments and provides more than 80% of government expenditure. For example, in 2009, the SME sector in Indonesia significantly contributed to the economy's Gross Domestic Product (GDP) with approximately a total of 56.6% [12]. However, these cannot be achieved if the private sector stands alone. Government and financial institutions such as banks need to play a central role in supporting these private sectors so they can produce high and inclusive growth while generating the profits needed to succeed and grow. Understanding the relationship between these three aspects is crucial

for policymakers, economists, and researchers seeking to promote inclusive and sustainable economic development and reduce income inequality.

Being a diverse region, ASEAN has always been known for its population that has multiculturism, multiracial, ethnic groups and religions. Therefore, income disparity, poverty, education, and health problems always remain a challenge in ASEAN. Along with that, the financial system plays an important role in catalysing the economic growth and income inequality of a country. Financial institutions such as banks need to support private sectors like SMEs (Small and Medium Enterprises) through loans, purchases of nonequity securities, trade credits and other accounts receivable. The fact is supported by Yoshino and Hesary [13], which revealed that SMEs contributed an average of 42% of the gross domestic product (GDP) in Asia. In addition, it also highlighted that access to finance could unlock possible opportunities in terms of creation, growth, and productivity that will eventually allow individuals or enterprises to invest either in tangible or intangible capital (OECD, 2021). Therefore, good support systems for private sectors indirectly can reduce income inequality and enhance economic growth. However, the presence of financial crises such as the Asia financial crisis and the pandemic Covid-19 has affected bank institutions and caused consumers and businesses tough to get credit.

Additionally, the advancement of the financial sector in emerging countries has played a significant role in the remarkable expansion of the Asian region. Several ASEAN countries have experienced significant economic and social transformations in recent years as a result of their rapid development rates. For instance, the Philippines saw a growth rate of 7.15% in 2016, Malaysia 5.81% in 2017, Singapore 4.52% in 2017, and Indonesia 5.17% in 2018. In addition, the domestic lending to the private sector and expansive money supply are both exhibiting a consistent upward trajectory, indicating a healthy outlook for the financial sector development in ASEAN. Singapore, Thailand, Malaysia, Indonesia, Vietnam, and the Philippines are the most sophisticated countries in the ASEAN area with highly specialised financial markets (World Economic Forum, 2015). In line with that, a downward trend of inequality can be observed in ASEAN, particularly in Malaysia, the Philippines, Thailand, and Singapore. According to the World Bank (2019), the Gini index in Malaysia recorded a maximum of 49.10 in 1997 and the lowest index of 41.1 in 2015. For the Philippines, it recorded a maximum of 47.7 in 2000, while it reached its minimum of 42.3 in 2018. Singapore attained its maximum of 54.0 in 2003, and a minimum of 40.0 in 2016. For Thailand, it recorded a maximum value of 47.9 in 1992 and a minimum value of 34.9 in 2019.

In conjunction with the Sustainable Development Goals (SDGs), each country especially developing countries must play a critical role in achieving the tenth goal of SDG, which is reducing income inequality and enhancing access to financial institutions (United Nations, 2018). This policy is important to foster long-term economic growth. Levine, [1] noted that financial development can expand economic opportunities and tighten income distribution, primarily by boosting the incomes of the poor. However, in the current scenario, a developed financial system tends to favour the wealthy as they have better access to financial services, enabling them to accumulate more wealth. In contrast, the accessibility of financial services for the poor is limited. As a result, this situation can contribute to economic growth but exacerbate income inequality [14].

This study is interested in doing a research study on the relationship between financial development, economic growth, and income inequality after considering the above problem. There are numerous of empirical literature that has analysed the relationship between financial growth nexus and financial development and income inequality. However, there are limited papers that include these three features. Therefore, this paper aims to fill the research gap and solely focus on 5-ASEAN countries which are Malaysia, Indonesia, Thailand, Singapore, and Vietnam. Thus, this research aims to fulfil the following objectives:

i. To analyse the extent of financial development impact on economic growth in ASEAN countries using panel data analysis.
ii. To measure the relationship between financial development and income inequality in ASEAN countries using panel data analysis.

By examining the empirical evidence and theoretical frameworks, this study seeks to shed light on the complex dynamics and potential trade-offs between financial development, economic growth, and income inequality. Understanding these relationships can inform policymakers in their efforts to promote inclusive and sustainable economic development in the ASEAN region.

This study used secondary data for the past 30 years from 1990 to 2020. All the data was attained from the World Bank, the International Monetary Fund (IMF) and the Department of Statistics Malaysia (DOSM). The relationship between financial development, economic growth, and income inequality in the five ASEAN countries of Indonesia, Malaysia, Thailand, Singapore, and Vietnam are examined in this study using a panel data regression model. Economic growth and income inequality are the dependent variables in this study, whereas the independent variables are financial development, human capital, growth rate of the labour force, government spending, physical capital, inflation rate, and trade openness.

This paper consists of five sections and the sequence will be followed throughout the paper. Section 1 discusses the introduction of the study. In section 2, summaries of previous research papers that related to the relationship between financial development, economic growth and income inequality are presented. Next, section 3 provides a brief overview of the data and the methodology used to analyse the results. Subsequently, section 4 is the results and discussion. Lastly, section 5 is the conclusion.

2. Literature Review

2.1 Financial Development

The relationship between financial development and economic growth has been the subject of numerous empirical research studies since the key work by King and Levine, [15] was published. Nevertheless, the result from this issue yet can still be arguable and mixed due to the variations in sample size, study periods, and quantitative approaches used. Despite that, the majority of research studies that analyse the relationship between financial development and economic growth found that financial development promotes economic growth of the country. According to Abbas *et al.*, [4] in a study to analyse the relationship between financial development, economic growth, and income inequality in 44 countries with varying income levels The study concludes that financial development helps economic growth in lower-middle-income and upper-middle-income nations by utilising domestic total credit volume to GDP as an indicator of financial development. However, the findings show that the influence of financial development was more visible in upper-middle income countries. The findings are consistent with the findings of Guru and Yadav, [5], who found that financial development, had a favourable impact on economic growth. To achieve the goals, this article employs different proxies of financial development, such as the credit-to-deposit ratio (CDR) and domestic credit to the private sector (CPS).

Similarly, the connection between financial development and income inequality remains inconclusive and diverse. In a study examining the impact of financial development on income inequality in Malaysia, Law and Tan [16] discovered that the advancement of the financial market had a negligible effect on reducing income inequality. The study utilized three indicators of financial development – the banking sector, stock market, and aggregate finance indicators. The outcomes

suggest that financial development tends to favour the wealthy rather than benefit the poor, contributing to an expansion of income disparity within Malaysian society. On the other hand, Abbas *et al.,* [4] prove also that there was an appositive relationship between financial development and income inequality in upper-middle income countries. Furthermore, Azam and Raza [17] employed domestic credit to the private sector, money supply, and stock market capitalization as indicators of financial development in the context of ASEAN-5 countries (Malaysia, Singapore, Thailand, Indonesia, and the Philippines). The study's findings indicate a significant and positive relationship between financial development and income inequality in these countries. Interestingly, the inclusion of the squared terms for the financial development proxies revealed a significantly negative impact on income inequality. Another example is a study from Chiu and Lee, [18], which investigated the nonlinear effects of country threats and financial development on income disparities. A comprehensive sample of 59 states from 1985 to 2015 was acquired for this study. According to the findings, income disparities in high-income states can be reduced by financial development in managed economic and financial environments.

2.2 Human Capital

Human capital defined as the economic value derived from a worker's experience, encompasses the knowledge and skills of a nation's workforce. According to Abbas *et al.,* [4] the research reveals a positive contribution of human capital to the long-term economic growth of Indonesia, Malaysia, the Philippines, Thailand, and Vietnam, although this effect is not observed in the short run. The study suggests that the enhancement of human capital fosters economic growth through various channels, including increased labour productivity, the adoption of technologies by the workforce, and improvements in the research and development process.

Moreover, the relationship between human capital and income inequality is explored by Alves, [19], who found a negative and significant association in both lower-middle-income and upper-middle-income countries. This negative correlation can be attributed to the role of education in elevating labour productivity, consequently leading to higher wages in the labour market. Thus, these findings underscore the multifaceted impact of human capital on both economic growth and income distribution. Besides, a study from Lee and Lee, [20] noted that education expansion is a major factor in reducing educational inequality and thus income inequality.

2.3 Growth Rate of Labour Force

Labour force participation is a prevalent aspect in numerous developing nations, as highlighted in the research conducted by Kyophilavong *et al.,* [7]. Their study emphasizes that in Malaysia and Singapore, long-term economic growth is positively influenced by the growth rate of the labour force or labour force participation rate. Conversely, in developed countries like Canada, South Africa, and New Zealand, there is an observed inverse relationship, where labour has a detrimental impact on economic growth. Similarly, Yakubu *et al.,* [21] investigated the role of labour force participation in economic growth in Nigeria. The findings underscore the significance of enhancing labour force participation levels, asserting that an increase in labour force participation contributes to economic growth and overall development of the country. The study also points out that the negative influence of labour force participation on economic growth can be attributed to the high unemployment rate in the country, coupled with disparities in employment opportunities.

2.4 Government Expenditures

Another crucial factor affecting the relationship between financial development and economic growth is government expenditure. Poku *et al.,* [22] conducted a study on the impact of government expenditure on economic growth in Ghana, revealing a positive correlation between government expenditure and economic growth. Public sector expenditure is a vital tool influencing the overall performance of the economy. Additionally, Barlas, [23] assessed the influence of government expenditure on economic growth in Afghanistan, utilizing an autoregressive distributed lag (ARDL) model with data spanning from 2004 to 2019. The results indicated a significant and negative association between government expenditure and economic growth in Afghanistan. Furthermore, research by Park and Shin, [24] emphasized that substantial government expenditures contribute to increased income inequality within a country.

2.5 Physical Capital

Physical capital stands as one of the three fundamental factors of production, alongside human capital and natural resources. Its significance lies in its ability to enhance the productivity of goods and services, thereby contributing to overall economic growth. Additionally, Turnovsky & Mitra [25] found that improvements in productivity within the human capital sector result in a permanent increase in the growth rate. However, in the final output sector, this effect is only temporary. Moreover, Shen and Zhao [26] uncovered that inequality tends to hinder growth by influencing factors such as reducing the level of human capital, political stability, and increasing fertility rates, rather than affecting investment-related channels.

2.6 Inflation

Law and Tan [16] asserted that, in Malaysia, financial development does not play a significant role in diminishing income inequality. Their study also found that inflation does not have a noteworthy impact on income inequality. In a separate investigation, Shi *et al.,* [27] utilized data spanning from 1980 to 2014 to underscore the impact of financial development indices on income disparity in Australia. According to this research, several supplementary variables, such as per capita income, inflation, and trade openness, have the potential to affect income inequality.

2.7 Trade Openness

According to a study by Hasan, [28] examining the relationship between trade openness and economic growth in Bangladesh, the conclusion was drawn that trade openness has a positive and significant impact on economic growth. This observation is in alignment with the findings of Makun, [29], who also affirms the existence of a significant positive effect of trade openness on economic growth. In the context of Malaysia, a study conducted over the period from 1980 to 2013 focused on trade openness, revealing its importance in the economic landscape.

3. Data and Methodology

3.1 Data Collection

The data collected in this study is secondary panel data. Data on financial development, growth rate and other independent variables were obtained from a variety of sources, including the World

Development Indicators dataset (World Bank), the International Monetary Fund (IMF), the Standardized World Income Inequality Database (SWIID) and the Department of Statistics Malaysia (DOSM) between the years 1990 and 2020. The panel data of 5 ASEAN countries which are Indonesia, Malaysia, Singapore, Thailand, and Vietnam were collected. The dependent variables of this study are economic growth and income inequality. However, the proxies are gross domestic product per capita (PCY) and Gini Index (GINI) respectively. Meanwhile, there are seven independent variables in this research which are financial development (FD), human capital (HK), growth rate of labour force (GL), government expenditure (GE), physical capital (PK), inflation rate (INF), and trade openness (OPEN). Details of variables are reported in Table 1.

Table 1
Summary of variables

Variables	Proxy	Unit	Definition	Source
FD	Domestic credit to the private sector per GDP	%	Measurement of financial development	IMF
PCY	GDP per capita growth rate	annual %	Growth of the total monetary or market value of all the finished goods and services produced by a country per total population	World Bank DOSM
GINI	Gini index	between 0-100 0 represents perfect equality, 100 represents perfect inequality	Income inequality measurement	World Bank SWIID
HK	Enrolment in secondary education per population	%	The economic value of worker's experience and skills	World Bank
GL	Employment rate	%	The number of people who are available to work as a percentage of the total population	World Bank
GE	Government spending to GDP	%	The total sum of money a government uses to finance its activities and functions	World Bank
PK	Gross fixed capital to GDP	%	Assets, such as buildings, machinery, and vehicles, which are owned and employed by an organisation	World Bank
INF	Year-to-year change in consumer price index	%	A measurement of the overall level of prices in the economy	World Bank DOSM
OPEN	The ratio of exports plus imports to GDP	%	The outward or inward orientation of a given country's economy	World Bank

Figure 3 presents the conceptual framework for this research built based on the literature review discussed in the previous section. The role of financial development in economic growth and income inequality is shown in Figure 3, with financial development as the independent variable for the two models, and economic growth and income inequality as the dependent variable, separately. The other variables serve as control variables in both models.

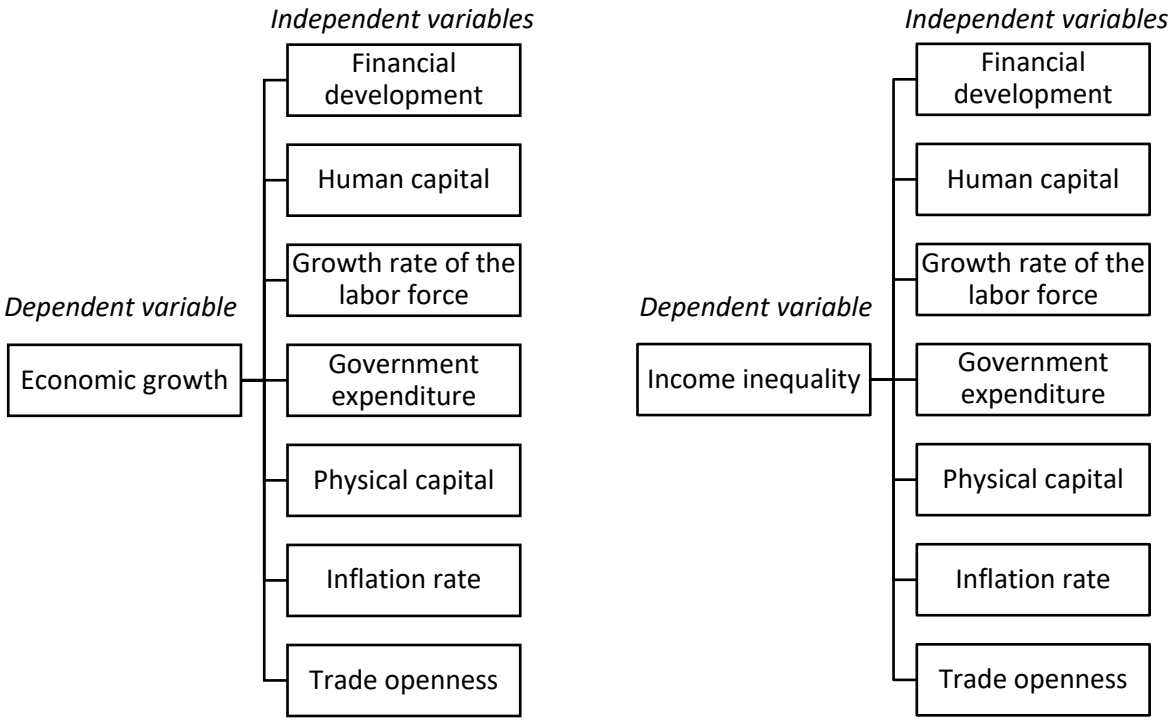

Figure 3. Conceptual framework

3.2 Data analysis

3.2.1 Panel regression model

There are two equations used in this study. Eq. (1) is used to study the relationship between financial development and economic growth, whereas Eq. (2) is used to study the relationship between financial development and income inequality. The model is as follows:

Model 1:

$$PCY_{it} = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 HK_{it} + \alpha_3 GL_{it} + \alpha_4 GE_{it} + \alpha_5 PK_{it} + \alpha_6 INF_{it} + \alpha_7 OPEN_{it} + \varepsilon_{it} \quad (1)$$

Model 2:

$$GINI_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 HK_{it} + \beta_3 GL_{it} + \beta_4 GE_{it} + \beta_5 PK_{it} + \beta_6 INF_{it} + \beta_7 OPEN_{it} + \mu_{it} \quad (2)$$

where;

PCY	=	Real per-capita income
GINI	=	Gini index
FD	=	financial development
HK	=	human capital
GL	=	growth rate of the labour force
GE	=	government expenditure
PK	=	physical capital
INF	=	inflation rate
OPEN	=	trade openness
μ,ε	=	error term

3.2.2 Panel model analysis

The models selected for this study underwent a thorough evaluation of their criteria before proceeding with the analysis. This assessment aimed to determine the most suitable estimation method among pooled OLS, random effect, and fixed effect for the models.

i. Pooled OLS
A pooled regression model is a model that has a constant coefficient referring to the intercept and slopes of the model. By using this model, all data can be pooled and run an ordinary least squares regression model. Pooled OLS is the estimation of OLS in panel data. Thus, all individual effects are ignored.

ii. Random Effect
In the random effect model, the unobserved component is treated as a component of the random error term. The unobserved component is the element of the error which varies between groups but not within groups. Usually, random effect is used when the sample is large, and time is small. If the cross-sectional groups are random samples of the population, random effect is preferable.

iii. Fixed Effect
In the fixed effect model, each cross-section is allowed to have its intercept. Too many dummies in this model can reduce the degree of freedom and have the possibility of multicollinearity. This model assumes that there is no correlation between error terms in each variable at the same time. The fixed effect model is preferable to compute when time is large, and the sample is likely to be small.

iv. Breusch and Pagan Lagrangian Multiplier (LM Test)
The Breusch-Pagan Lagrangian Multiplier (LM) test assesses whether the variance of regression errors is correlated with the values of independent variables. This test is used in this study to determine if the random effect model or pooled OLS is more appropriate. If the p-value is below 5%, the random effect model is considered a more appropriate estimation for the model.

H_0: $Var(v_i) = 0$ (Pooled OLS model is preferred)
H_1: $Var(v_i) > 0$ (Random Effect model is preferred)

v. Hausman Test
As panel data is employed in this study, one of the crucial tests to conduct is the Hausman Test. This test helps identify the appropriate model between fixed effects and random effects. If the null hypothesis is rejected, it indicates that the fixed effect model is more suitable.

H_0: $There\ is\ no$ correlation between explanatory variables and error term (Random Effect model is preferred)
H_1: $There\ is$ correlation between the explanatory variables and error term (Fixed Effect model is preferred)

3.2.3 Diagnostic check

The estimated model is checked for bias using a diagnostic check. Numerous tests, including those for heteroskedasticity, autocorrelation, and multicollinearity, must be examined. This is done to guarantee the consistency and effectiveness of the coefficient.

i. Multicollinearity
The issue of multicollinearity arises when there is a high correlation among independent variables in a regression model. To address this problem, one solution is to remove the independent variable that exhibits a high correlation. Pearson's correlation analysis is commonly employed to assess this problem. Another test that can be utilized to detect multicollinearity is the Variance Inflation Factor (VIF). If the VIF value exceeds 10, it indicates that the variable is experiencing multicollinearity. In general, multicollinearity can lead to wider confidence intervals that produce less reliable probabilities in terms of the effect of independent variables in a model.

ii. Autocorrelation
Autocorrelation analysis measures the relationship of the observations between the different points in time and thus seeks a pattern or trend over the time series. Wooldridge test is used to detect if the model has an autocorrelation problem. The null hypothesis that the model has no autocorrelation will be rejected if the p-value is less than 5%. Otherwise, if the p-value is higher than 5% then, there is no autocorrelation in the model.

$H_0 : There\ is\ no\ autocorrelation\ in\ this\ model$
$H_1 : There\ is\ autocorrelation\ in\ this\ model$

iii. Heteroskedasticity
Heteroskedasticity, or heteroscedasticity, occurs when the standard deviations of a predicted variable vary across different values of an independent variable or with previous periods. In other words, it refers to situations where the variability of the residuals is not constant across a range of measured values. When conducting a regression analysis, heteroskedasticity is observed as an uneven dispersion of the residuals or the error term. Wald test is used to check the presence of heteroskedasticity.

3.2.4 Inferential analysis

i. R-squared
The R-squared test, also known as the coefficient of determination, is utilized as a statistical measure to evaluate how well a regression model fits the data. It provides information about the proportion of the dependent variable's variation that can be explained by the independent variables incorporated in the model. It is usually between 0 to 100%. Larger R-squared indicates better model regression fit.

$$R^2 = \frac{\text{variance explained by the model total variance}}{\text{total variance}}$$

ii. F-test

The F-test is used to determine whether independent factors have a significant impact on the dependent variable when considered collectively. It is employed to measure the model's data's fitness. In this study, significance levels of 1 per cent, 5 per cent, and 10 per cent will be used.

iii. Hypothesis Testing
Hypothesis testing is used to study the relationship between financial development, economic growth, and income inequality. The significance level that will be used in this paper is 99%, 95% and 90%.

Hypothesis 1:
H_0: $There\ is\ no\ significant\ effect\ between\ financial\ development\ and\ economic\ growth$
H_1: $There\ is\ significant\ effect\ between\ financial\ development\ and\ economic\ growth$

Hypothesis 2:
H_0: $There\ is\ no\ significant\ effect\ between\ financial\ development\ and\ income\ inequality$
H_1: $There\ is\ significant\ effect\ between\ financial\ development\ and\ income\ inequality$

4. Results and Discussion

4.1 Descriptive Analysis

According to Table 2, the average GDP per capita growth rate (PCY) is 3.67%, with a standard deviation of 3.59. Singapore recorded the highest PCY in 2010 with 12.59%, while Indonesia has the lowest at -14.48%. On the other hand, the Gini Index (GINI) has a mean value of 38.73 and a standard deviation of 4.7. This illustrates that, while the average level of income disparity is approximately 38.73, there are some places or groups within the population whose income inequality is either higher or lower than the average, contributing to the observed variability. A Gini coefficient of 38.73, indicates a moderate level of income inequality within the economy in these countries. According to this data, Malaysia had the highest Gini index (49.1) among these five countries in 1997, while Indonesia had the lowest level (29.5) in 2000.

Next, the average percentage of enrolment in secondary education per population (HK) is 79.45% with a standard deviation of 22.14%. This indicates that roughly 79.45% of the population in these 5-ASEAN countries are enrolled in secondary education, and there is a significant degree of variability in enrolment rates among these countries, as indicated by the standard deviation of 22.14%. Moreover, the mean value of employment to population ratio (GL) in percentage is 66.43% with a standard deviation of 5.56%. This indicated that on average, 66.43% is currently employed against the total working-age population of the region. Then, the average government spending (GE) is 17.68% of GDP with a standard deviation of 4.9%. The result from this finding depicts that on average, the government spend approximately 17.68% of its money on the acquisition of goods and provision of services. The mean value of gross fixed capital formation (PK) in percentage is 28.48% of GDP with a standard deviation of 5.81%. The mean value of inflation (INF) is 5.19%. Meanwhile, the trade-to-GDP ratio (OPEN) has an average of 161.41% and a standard deviation of 106.04%. This finding reflects the 5-ASEAN countries' integration into the world. This also implies that the total value of

trade is larger than the domestic product. Additionally, the average share of domestic credit allocated to the private sector stands at 85.54% in the 5 ASEAN countries, indicating a significant reliance on credit to support economic activity.

Table 2
Description analysis of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
PCY	155	3.6676	3.5871	-14.4757	12.5085
GINI	155	38.7273	4.6961	29.5000	49.1000
HK	155	79.4510	22.1357	28.5175	122.4890
GL	155	66.4307	5.5593	58.1330	76.0690
GE	155	17.6825	4.9073	10.211	30.8892
PK	155	28.4848	5.8115	19.4292	43.5860
INF	155	5.1928	7.4277	-1.7103	58.4511
OPEN	155	161.4065	106.0453	32.9722	437.3267
FD	155	85.5380	39.4302	9.5531	160.1124

4.2 Financial Developments on Economic Growth

The first objective of this study is to evaluate the relationship between financial development and economic growth in 5-ASEAN countries. This model is used to determine the relationship of independent variables which are HK, GL, GE, PK, INF, OPEN, and FD on the dependent variable which is PCY.

$$PCY_{it} = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 HK_{it} + \alpha_3 GL_{it} + \alpha_4 GE_{it} + \alpha_5 PK_{it} + \alpha_6 INF_{it} + \alpha_7 OPEN_{it} + \varepsilon_{it} \quad (1)$$

where;

PCY = Real per-capita income
FD = financial development
HK = human capital
GL = growth rate of the labour force
GE = government expenditure
PK = physical capital
INF = inflation rate
OPEN = trade openness
ε = error term

There are a few tests that must be performed, including the Hausman test and the Breusch and Pagan Lagrangian Multiplier (LM test), to determine which model is suitable for Eq. (1). Based on Table 3, the p-value for Breusch and Pagan Lagrangian Multiplier (LM Test) is more than 0.05 which is 1.00, shows that the null hypothesis cannot be rejected which the variance of individual specific event is equal to zero. Hence, Pooled OLS is better to estimate for the model than the Random Effect. We do not continue with the Hausman test, since the pooled OLS model is more suitable for Eq. (1). This model is subjected to diagnostic checks such as heteroskedasticity, autocorrelation and multicollinearity.

Before proceeding with the regression analysis, it is important to check that the model does not suffer from multicollinearity, autocorrelation and heteroskedasticity. The variance Inflation Factor (VIF) test is used to detect whether the model suffers from multicollinearity. The result shown in Table 3 depicted that Eq. (1) does not suffer from multicollinearity since the VIF value of the

explanatory variables is 2.02 which is less than 10. Therefore, the pooled OLS model is free from multicollinearity.

Table 3
Description analysis of variables

Dependent variable: PCY			
	Pooled OLS	RE	FE
Constant	-4.31338	-4.431338	6.128441
	(0.415)	(0.414)	(0.538)
FD	-0.036515	-0.036515	-0.0521893
	(0.000) *	(0.000) *	(0.002) *
HK	-0.0271552	-0.0271552	0.0087532
	(0.105)	(0.102)	(0.704)
GL	0.1333943	0.1333943	0.0158452
	(0.045) *	(0.043) *	(0.905)
GE	0.0311753	0.0311753	-0.3168452
	(0.709)	(0.708)	(0.007) *
Pk	0.1469183	0.1469183	0.1331088
	(0.002) *	(0.001)*	(0.004) *
INF	-0.2059512	-0.2056512	-0.2263124
	(0.000) *	(0.000) *	(0.000) *
OPEN	0.0052766	0.0052766	0.020095
	(0.171)	(0.168)	(0.062) **
LM test	p-value = 1.0000		-
	OLS vs RE		
R-squared	0.2585	0.2450	0.3059
F-test (p-value)	0.0000	0.0000	0.0000
Observation	155	155	155
Multicollinearity	2.02	-	-
Heteroskedasticity	17.89	-	-
	(0.0000)*		
Serial correlation	19.718	-	-
	(0.0113)*		

Note: *significant at 5% level, **significant at 10% level

Besides, the Wald test is used to detect the presence of heteroskedasticity in the model. The null hypothesis is rejected, as the p-value is 0.00 which is less than 0.05 and this shows that Eq. (1) suffers from heteroskedasticity problem. The pooled OLS model also suffers from autocorrelation with a p-value is 0.0113 when tested using the Wooldridge test. Thus, the Generalized Least Square (GLS) model is used to fix the heteroskedasticity and autocorrelation problem.

Based on the pooled GLS regression in Table 4, the result indicates that financial development has a negative and significant relationship to economic growth. The coefficient of -0.0164838 indicates that a 1% increase in the ratio of domestic credit to the private sector as proportion to GDP will decrease the annual GDP per capita growth rate by 0.017%. This result is in contrast to a study by Abbas et al., [3] that found financial development has a positive relationship with economic growth.

The other control variables that have a significant and positive effect on the economic growth of 5-ASEAN countries are the growth rate of the labour force and physical capital, while inflation and human capital have a significant negative relationship. The positive result of the growth rate of the labour force is supported by Kyophilavong *et al.,* [7], which emphasizes that in Malaysia and Singapore, the long-term economic growth rate is fuelled by a higher labour force participation rate. Meanwhile, the significant positive relationship between physical capital and economic growth is

parallel to the study from Abbas *et al.,* [4] that found physical capital significantly improves economic growth in upper-middle income countries.

Table 4
Pooled GLS Regression for Eqn. (1)

Dependent variable	PCY						
Independent variable	FD	HK	GL	GE	PK	INF	OPEN
Coefficient	-0.0165	-0.0352	0.1181	-0.0117	0.0893	-0.1867	0.0052
	(0.049)*	(0.062)**	(0.023)*	(0.860)	(0.043)*	(0.000)*	(0.177)
F-test (p-value)	0.0000						

Note: *significant at 5% level, **significant at 10% level

4.3 Financial Developments on Income Inequality

The second objective of this study is to determine the relationship between financial development and income inequality in 5 ASEAN countries. This model is used to measure the relationship of independent variables which are HK, GL, GE, PK, INF, OPEN, and FD on the dependent variable which is GINI.

$$GINI_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 HK_{it} + \beta_3 GL_{it} + \beta_4 GE_{it} + \beta_5 PK_{it} + \beta_6 INF_{it} + \beta_7 OPEN_{it} + \mu_{it} \qquad (2)$$

where;

GINI = Gini index
FD = financial development
HK = human capital
GL = growth rate of the labour force
GE = government expenditure
PK = physical capital
INF = inflation rate
OPEN = trade openness
μ = error term

Eq. (2) employs the same procedure as Eq. (1), and the selection between the best estimate models is determined through LM and Hausman tests. According to Table 5, the p-value for the Breusch and Pagan Lagrangian Multiplier (LM Test) is 1.00, which cannot reject the null hypothesis of equal variance of individual specific events, favouring Pooled OLS over Random Effect for model estimation. Hence, the Hausman Test which tests the random effect vs fixed effect models is not performed since the pooled OLS model is deemed more suitable for Eq. (2). Subsequently, diagnostic checks for heteroskedasticity, autocorrelation, and multicollinearity are conducted on this model.

Before proceeding into regression analysis, it is crucial to examine the presence of multicollinearity, autocorrelation, and heteroskedasticity in the model. The Variance Inflation Factor (VIF) test is employed for detecting multicollinearity. Based on the results in Table 5, it is evident that Eq. (2) is free from multicollinearity, as the VIF values for the explanatory variables are 2.02, which is below the threshold of 10. Consequently, the pooled OLS model is not affected by multicollinearity.

Table 5
Results of panel data analysis

Dependent variable: GINI

	Pooled OLS	RE	FE
Constant	24.67839	24.67839	-9.251829
	(0.000)*	(0.000)*	(0.271)
FD	0.0591395	0.0591395	-0.0233992
	(0.000)*	(0.000)*	(0.099)
HK	-0.1294374	-0.1294374	-0.0206468
	(0.000)*	(0.000)*	(0.287)
GL	0.103486	0.103486	0.6332138
	(0.116)	(0.114)	(0.000)*
GE	0.4280003	0.4280003	0.0031872
	(0.000)*	(0.000)*	(0.974)
PK	0.1510663	0.1510663	0.1711016
	(0.001)*	(0.001)*	(0.000)*
INF	-0.087944	-0.087944	-0.0903932
	(0.035)*	(0.033)*	(0.010)*
OPEN	0.0059157	0.0059157	0.0391937
	(0.123)	(0.121)	(0.000)*
LM test	P-value = 1.00		-
	OLS vs RE		
R-squared	0.5701	0.0608	0.3214
F-test (p-value)	0.00	0.00	0.00
Observation	155	155	155
Multicollinearity	2.02	-	-
Heteroskedasticity	79.24	-	-
	(0.00)*		
Serial correlation	22.493	-	-
	(0.0090)*		

Note: *significant at 5% level, **significant at 10% level

Furthermore, the presence of heteroskedasticity in the model is investigated using the Wald test. The null hypothesis is not rejected, as the p-value is 0.00, indicating that Eq. (2) indeed suffers from heteroskedasticity issues. Additionally, the pooled OLS model displays autocorrelation, with a p-value of 0.0090 according to the Wooldridge test. Consequently, to address these issues of heteroskedasticity and autocorrelation, the Generalized Least Squares (GLS) model is employed.

Based on the pooled GLS regression in Table 6, the result shows that financial development has a significant and positive relationship with income inequality in 5-ASEAN countries. The coefficient of 0.0575 indicates that a 1% increase in domestic credit to the private sector as proportion GDP widens the income gap index by 0.0575. This result is supported by Abbas *et al.,* [4], which found financial development has a positive relationship with income inequality in upper-middle income countries. Moreover, the result shows that human capital has a negative and significant effect on income inequality with a beta coefficient of -0.1270047. This result is similar to Alves [19] that human capital and income inequality have a negative and significant relationship in both lower-middle income countries and upper-middle income countries. The growth rate of the labour force (GL) has a positive and significant effect on income inequality at a 10% significance level. The beta coefficient of the labour force is 0.1004238 with a p-value of 0.0876. This finding implied that the higher income gap is influenced by a higher labour force growth rate. According to Jaapar *et al.*, [30], this could be due to underpaid employment which is not in line with higher productivity growth.

Table 6
Pooled GLS Regression for Eqn. (2)

Dependent variable	GINI

Independent variable	FD	HK	GL	GE	PK	INF	OPEN
Coefficient	0.0575495 (0.0187)**	-0.1270047 (0.0637)**	0.1004238 (0.0876)**	0.4311268 (0.1276)	0.1564522 (0.1597)	-0.0906667 (0.0433)*	0.0054965 (0.0068)*
F-test (p-value)	0.0000						

Note: *significant at 5% level, ** significant at 10% level

5. Conclusion

The paper provides a comprehensive analysis of the connections among financial development, economic growth, and income inequality in five ASEAN countries. The study effectively accomplished its initial purpose of evaluating the relationship between financial development and economic growth. The panel data analysis based on Eq. (1) shows that the growth rates of the labour force and physical capital have a positive and significant impact on economic growth. Financial development, human capital, and inflation exert substantial adverse impacts on economic growth. The second purpose of this investigation was successfully accomplished. The findings from Equation (2) show that financial development, human capital, the growth rate of the labour force, and physical capital have a positive impact on income disparity. The study's findings indicate that financial development hindered economic growth and exacerbated wealth disparity in these countries. The conclusion may be attributed to the study's exclusive use of domestic credit to the private sector as a proportion of GDP, indicating that only companies meeting bank criteria qualify for credit services. Furthermore, this result is also impacted by the insufficient human capital in the ASEAN region. The report suggests that governments, particularly in developing nations such as those in ASEAN, improve the delivery of financial services to the public. This could promote economic growth and reduce income disparity between the affluent and underprivileged sectors of society.

The study faces challenges in data collection, specifically related to incomplete data for certain variables in certain countries. Vietnam and Singapore are examples of countries where comprehensive data throughout the year is lacking. To address this issue, the study employs the cubic spline interpolation method to fill in the gaps in the data. Lastly, further researchers are recommended to make further studies about the causality relationship between financial development, economic growth, and income inequality in ASEAN countries. This is because the variations in results can be partially attributed to the differences in the country samples, study periods, and quantitative approaches used.

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