Southeast Asian Journal of Economics Vol.13(3), December 2025:
Received: July 1, 2024
Revision: August 21, 2024
Accepted: November 1, 2024

Financial Development, Risk, and Income Inequality: Evidence From Thailand, Indonesia, Malaysia, and the Philippines[1]

Nattawan Pitakkochakorn
Graduate School of Development Economics
National Institute of Development Administration (NIDA), Bangkok, Thailand
Corresponding author: nattawan.kie@gmail.com

Abstract

This study investigates the relationship between financial development, financial and political risk, and income inequality in Thailand, Indonesia, Malaysia, and the Philippines by using the World Inequality Database from 1984 to 2022. We employ ARDL bound tests, the fixed effect model, and Generalized Method of Moment to investigate that relationship at the country level and consider them at the regional level in Thailand. Empirical results from each country model indicate that financial development is associated with reducing income inequality in Thailand and the Philippines. In the case of Malaysia, financial development appears to exacerbate income inequality in certain periods. However, the relationship between political risk and income inequality is inconclusive. For the regional model, financial development and regional economic growth are significant and aligned with the country-level model. This finding provides new insights for policymakers at both the country and regional levels and supports the need for consideration of the relationship between financial development and income inequality.

Keywords: financial development, financial and political risk, income inequality, ARDL bound tests, fixed effect model.

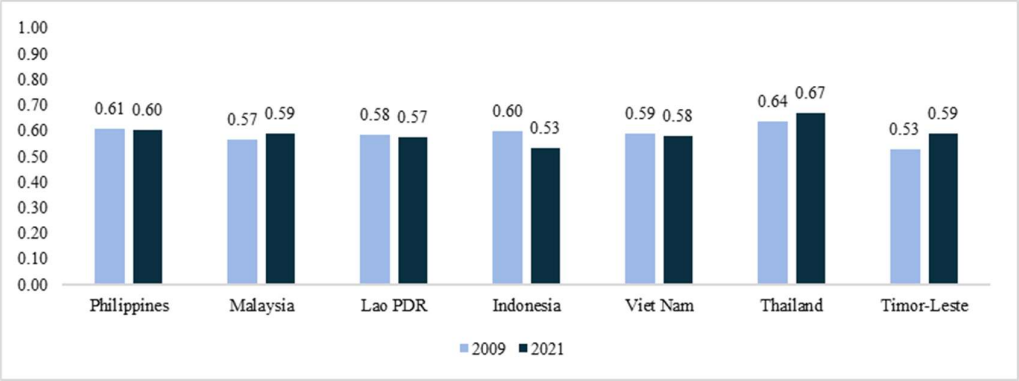
[1] This paper is part of PhD thesis.

1. Introduction

Developed and developing countries have long been confronted with inequality problems, especially income inequality. The income inequality problem worsened in the COVID-19 global pandemic of 2020–2022. The global top 1% owned 45.6% of the total wealth share in 2021, an increase from 43.9% in 2019. According to the World Inequality Report, the top 10% of the population around the world earned USD 122,100 annually, while the bottom 50% earned USD 3,920 (Chancel, Piketty, Saez, & Zucman, 2022). This indicated a widening income inequality gap.

An inequitable income distribution in developing countries has derived from the adverse effect of financial and trade globalization via government policies, such as monetary policies that emphasized price stability more than growth, degree of trade openness, financial deregulation that caused the exchange rate to be more volatile, and labor market policies that weakened the bargaining power between labor and employer (van der Hoeven, 2019). In addition, financial development is one of the potential factors that may affect income distribution. Greenwood and Jovanovic (1990) found that an increasing income inequality gap comes from the development of financial structures, which bring higher economic growth. A country with a fully developed financial structure would lead to a more equal income distribution. Jeanneney and Kpodar (2008) also found that financial instability would offset the income distribution benefits from the development. Hence, a stable economic environment with a financial development process can reduce income inequality; however, the effects of financial development may vary between groups of people (Chiu & Lee, 2019).

Figure 1. Gini coefficient classified by country in 2009 and 2021



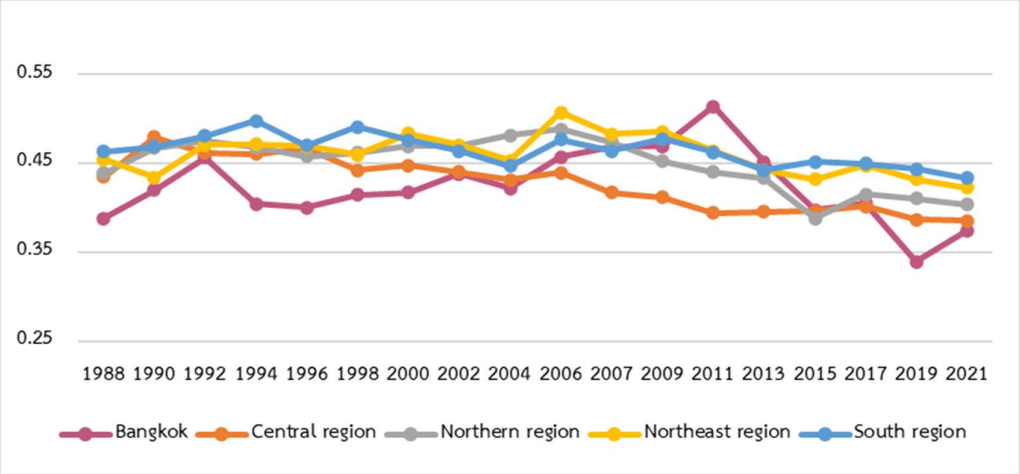
Source: World Inequality Database (WID)

Asia has been noted to have achieved remarkable economic growth, but also rising income inequality, which is a challenging problem in the region (Huang, Morgan, & Yoshino, 2019). From the World Inequality Database (WID), in 2021, income inequalities were greatest in the Philippines and Thailand, with Gini coefficients on income inequality of over 0.6 and 0.67, respectively, compared to Indonesia, which had the lowest at 0.53 (Figure 1). This also demonstrates that, compared to other Southeast Asian countries, Thailand and the Philippines have the greatest income discrepancy between the richest and poorest groups. Timor-Leste, Malaysia, and Thailand have had an upward trend since 2009, indicating that their income inequality gap is growing.

The official poverty rate in Thailand was reduced from 65.2% in 1998 to 9.85% in 2018 because of social and economic development (Yang, Wand, & Dewina, 2020). However, household income at the lowest end of the scale has declined in more recent years, leading to an increase in poverty rates between 2015 and 2018. More than 6.7 million people were recorded as living in poverty. Thailand is one of the countries with the greatest income inequality levels in East Asia, particularly in rural areas and the agriculture sector. According to the poverty and income inequality in each region in Thailand, as seen in the 2021 report (NESDC), the severity of poverty and income inequality in each region varies because of the economic structure and natural resources. Based on the income distribution in each

region, more than half was distributed in the Central region (accounting for 56.1% of the total notional production value), followed by the Eastern, Northern, and Southern regions. The Southern border region has the highest poverty, while the lowest poverty is in the Central region with the highest median income.

Figure 2. Gini coefficient across the regions in 1988–2021



Source: Office of the National Economics and Social Development Council

From Figure 2, the Southern region has the most severe income inequality, with the highest Gini coefficient, while the Central region and Bangkok have the lowest. The NESDC data in 2015 pointed out that the richest and the poorest in the southern border region had an income inequality gap of around 20.6 times. The wealthiest households represent about 41.4% of the total income in the region, while the poorest households represent only 2% of the total income in the region. In contrast, the richest and the poorest in the Northern region have an income inequality gap of about 12 times. The wealthiest group had 31.4% of the total income in the region, while the poorest had 2.6%.

The increasing trend of income inequality has become a major challenge for a country's path to prosperity, stability, and equality. Hence, it is important to explore which variables may widen income inequality. First, this study examines the relationship between financial development, financial and political risk, and income inequality. We initially concentrated on the comprehensive effects in Thailand, the

Philippines, Indonesia, and Malaysia. These four ASEAN countries have consistently developed economically and grown. They are considered attractive investment destinations within the ASEAN region due to their strong purchasing power and relatively low labor costs, as well as having economic, social, and cultural characteristics similar to Thailand. This study therefore chooses to focus on these four countries. Second, we use a different proxy of income inequality: the Gini coefficient, the share of the top 1% of the population, and the share of the bottom 50%. Third, we investigate those effects in the regional-level model in Thailand and add some specific multi-factored risk indicators that would differ across regions of Thailand. Income inequality has increasingly intensified at the regional level, with specific characteristics and factors influencing disparities varying across regions. Utilizing regional data allows for a more detailed understanding of these factors and their impacts. Additionally, the study results may differ from those obtained using national-level data. Therefore, using regional data provides a clearer understanding of the influencing factors and leads to more targeted solutions for addressing inequality at both the regional and national levels. However, due to data limitations, we focus only on the regional impacts in Thailand.

2. Related Literature

2.1 Financial Development and Income Inequality

The relationship between financial development and income inequality can be categorized into two main schools of thought. First, the non-linear relationship (inverted U-shaped curve and U-shaped finance-inequality nexus), and second, the linear relationship (both negative and positive). The first school is the inverted U-shape curve, launched by Kuznets (1955). This was the first theory explaining whether income inequality increases or decreases during the process of economic growth by using the historical distribution of income data. According to this theory,

as economic development occurs, income inequality increases first but then can be improved after reaching a certain tipping point. In underdeveloped countries, a wider income inequality is associated with a much lower average income per capita. The negative material and psychological impacts are much higher in these groups of countries. One of the essential parts of economic development that impacts income distribution across different groups of people is financial development. Its relationship with income inequality is an inverted U-shaped curve, which means income inequality will increase in the beginning period as financial sectors develop. After reaching a certain tipping point, financial development can more easily facilitate access to external finance for poor people and, thus, narrow income inequality (Greenwood & Jovanovic, 1990). This hypothesis has been supported by other researchers in many countries, including Turkey, Brazil, Russia, India, China, and South Africa (Destek, Sinha, & Sarkodie, 2020; Younsi & Bechtini, 2020).

The second non-linear relationship is the U-shaped finance-inequality nexus. Tan and Law (2012) used the Generalized Method of Moment (GMM) to discover a non-linear link between financial deepening and income distribution in 35 data sets from developing nations. Their findings challenged the inverted U-shaped correlation idea. According to the U-shaped finance-inequality nexus, the initial stages of financial development could alleviate income inequality, implying that both the wealthy and the poorest groups can utilize and profit from financial markets. However, at some levels, income disparity will improve only temporarily. Income disparity grows again after attaining a higher level of development, demonstrating inefficiencies in financial markets that worsen the inequality gap when the threshold level is exceeded.

The linear relationship school of thought presents a relationship between financial development and income inequality, which can be either positive or negative. The income inequality-widening hypothesis suggests that the wealthy groups benefit from financial development more than the poor because they are less

reliant on informal credit sources (Chiu & Lee, 2019; Mehta & Bhattacharya, 2020). Wealthy households are credit-worthy, while the poor lack collateral and are more likely to have problems paying back debts. As financial institutions develop, they tend to lend more to wealthy households, while low-income people who do not meet financial institutions' criteria find it difficult to obtain loans. The situation of the poor is still the same even when financial markets are well developed, whereas the rich gain more benefits. This limits people with low incomes from accessing formal loans and lowers the ability of people experiencing poverty to improve their economic prospects, leading to widening income inequality (Clarke, Xu, & Zou, 2006).

The inequality-narrowing hypothesis suggests that developed financial markets could lift information asymmetry and reduce high transaction costs, which are significant hurdles for people with low incomes. This makes it easier for people with low incomes to access financial markets and use loans from financial institutions to invest in both human and physical capital (Banerjee, Breza, Duflo, & Kinnan, 2017; Johansson & Wang, 2014). Income inequality would be mitigated by financial development in this case. Because human and capital accumulation are engines of economic growth, a high credit constraint leads to a greater value of human capital, which would be more detrimental to the effect of inequality on economic growth (Galor & Moav, 2004).

Table 1 represents the research scope, country sample, time period, methodology, and main conclusions from empirical studies on the effect of financial development on income disparity in developed and developing nations. Many studies report a negative relationship, which means that financial development can reduce income inequality because it allows lower-income households to have more access to financial resources. On the other hand, some studies supported the inverted U-shape relationship in which income inequality rises first in the initial state of development and then declines after a certain threshold.

Table 1. Review of empirical studies

Author(s)	Country/Period	Economic Methodology	Main finding
Rehman et al. (2008)	51 countries including both developing and developed countries 1975–2002	Pooled OLS	(-) Negative relationship
Jalil and Feridun (2011)	China 1987–2007	ARDL bound test	(-) Negative relationship
Shahbaz, Loganathan, Tiwari, and Sherafatian-Jahromi (2015)	Iran 1965–2011	ARDL bounds test	(-) Negative relationship
Sehrawat and Giri (2016)	South Asian countries 1990–2013 (Include Thailand, Malaysia, Vietnam, Philippines)	Pedroni's panel co-integration Panel dynamic ordinary least square	(-) Negative relationship
Doğan (2018)	Argentina 1974–2014	Cointegration with structural breaks Error correction model Dynamic ordinary least square	Confirm the U-shaped relationship
Nurazi and Usman (2019)	ASEAN countries 2007–2015 (Includes Malaysia, Indonesia, Thailand, Philippines, Vietnam)	Longitudinal panel data analysis	(+) Positive relationship
Ridzuan et al. (2021)	Malaysia, Indonesia, Thailand, Philippines 1970–2016	ARDL bounds test	Confirm the inverted U-shaped curve in Malaysia and Thailand Confirm the U-shaped relationship in Indonesia and the Philippines
Cetin, Demir, and Saygin (2021)	Turkey 1987–2018	Hatemi-J cointegration ARDL bounds test	Confirm the inverted U-shape relationship
Nittayakamolphun, Jirasatthumb and Pholkerd (2024)	Thailand 1980–2022	ARDL bounds tests	Confirm the U-shape relationship

2.2 Country Risks: Financial and Political Risk

Researchers aim to examine the factors influencing income distribution in addition to the financial developments that have a role in establishing income inequality. One critical factor is institutional quality, which is seen to have a direct impact on a country's level of inequality. From a political standpoint, the legal system and institutional quality are linked to wealth distribution (Glaeser, La Porta,

Lopez-de-Silanes, & Shleifer, 2004). In income inequality prediction models, it is widely accepted that poor institutional quality has a negative impact on income distribution. Murphy, Shleifer, and Vishny (2008), for example, explored how corruption affects disparities in income and growth. According to their findings, countries with lower levels of corruption had lower income variation than countries with higher levels of corruption. According to Bergh and Nilsson (2010), as the global economy has become more liberalized, income disparity within countries has worsened. This could imply that the rich and politically powerful are most likely to subvert legal, political, and regulatory systems for their benefit.

It is argued that one of the main elements of the nonlinear link between financial development and income disparity is institutional quality. Institutional quality can refer to a degree of unpredictability that may affect the market and thus economic performance and income distribution. Financial progress may not promote economic well-being or reduce inequality in the case of weak institutions due to widespread corruption or political involvement. Moreover, poor institutional quality could reduce the ability of financial intermediaries, giving the poor a disadvantage by preventing them from accessing external finance. Development tends to exacerbate income disparity in countries with insufficient institutions, whereas higher-level institutional quality may mitigate income inequality (Law, Tan, & Azman-Saini, 2014).

Growing literature in recent years has underlined the importance of country risk in income inequality. Country risk is a measure of economic, political, and financial hazards that encompass the key characteristics of a country's numerous institutions. Even though the country's risk is often evaluated mainly in terms of political dimensions, e.g., institutional subversion or government governance, it has broader financial and economic implications. Chiu and Lee (2019) focused on the degrees of country risk to explore the linkage between financial development and income inequality. The country risk was divided into three categories: economic,

financial, and political risk. In a high economic risk economy, the development of the financial system leads to increased income inequality, which gradually rises or falls until economic risk reaches a specific threshold. When economic risk varies, high- and low-income nations have varied relationships between financial development and income disparity. Financial development in high-income countries may assist in reducing income inequality, but in low-income countries, it may worsen inequality. Some recent studies indicate that the relationship between income inequality and institutional quality is 'non-monotonic'. Chong and Calderon (2000) and Lee and Lee (2018) confirm the inverted U-shaped relationship where institutions develop, as inequality initially increases and then decreases after the threshold is achieved.

Hence, a government needs appropriate industrial policies and low environmental risk to reduce income inequality (Wang, Zhang, Wang, Wang, & Jiang, 2021). To mitigate the detrimental effects of economic complexity on income distribution, the government should increase institutional development. In a stable economic environment, financial development should reduce income inequality.

Even though previous studies, such as Sehrawat and Giri (2016), Nurazi and Usman (2019), Ridzuan et al. (2021), examine the relationship between financial development and income inequality in these four ASEAN countries, those studies did not include financial and political risk, which are crucial factors that influence income distribution in countries due to stable economic conditions and facilitate the implementation of various policies, helping to develop the country's economy and reduce inequalities. We use the income share of the top 1% and the bottom 50% as proxies for income inequality to examine whether the results are consistent, regardless of whether the Gini coefficient or income share is used, while previous studies have typically relied solely on the Gini coefficient. In addition, we apply the regional data level model in the case of Thailand to understand the income inequality that has intensified in regional areas.

3. Econometric Methodology and Data

3.1 The Model Specification

The first objective of this study is to examine the relationship between financial development, country risk, and income inequality in the case of four ASEAN countries (Thailand, Indonesia, Malaysia, and the Philippines). The approach used follows the standard regression in the literature to capture the non-linear relationship that may be generated by different mechanisms and different levels of country risk (Chong & Calderon, 2000; Andres & Ramlogan-Dobson, 2011; Lee & Lee, 2018). To check the non-linear relationship, we add the quadratic term into the regression model as follows:

$$Y_{it} = \alpha_{it} + \beta_{it} FD_{it} + \theta_1 RISK_{it} + \theta_2 RISK_{it}^2 + \gamma_{it} C_{it} + \varepsilon_{it} \quad (1)$$

Where Y_{it} = income inequality of country i in time t. Explanatory variables: FD_{it} = financial development of country i in time t; $RISK_{it}$ = financial and political risk of country i in time t; $RISK_{it}^2$ = the squared term of financial and political risk of country i in time t; Control variables (C_{it}); INF_{it} = inflation of country i in time t; $ECON_{it}$ = economic growth of country i in time t; ε_{it} = stochastic error term representing the other influences omitted in the model.

From the equation above, the measure of income inequality on the left-hand side is proxied by the Gini coefficient, the income shares of the bottom 50% of the population, and the income share of the top 1% of the population. This study derives its Gini coefficient from consumption expenditure because of the limitations of data on income, and the expenditure method is more suitable for capturing well-being and permanent income.

The first explanatory variable is financial development (FD_{it}). We use the ratio of the private sector credit to Gross Domestic Product (GDP) as a proxy for

financial development, which follows Shahbaz et al. (2015), Sehrawat and Giri (2016), Doğan (2018), and Cetin et al. (2021). Financial development may benefit wealthy households disproportionately as they are deemed creditworthy and are less reliant on informal credit sources. Another school of thought cites that developed financial markets could reduce information asymmetry and transaction costs, leading to more access and participation of low-income households. The coefficient of FD_{it} can be a positive or negative sign.

For country risk, we used the risk component data of the International Country Risk Guide (ICRG), which includes the data of financial risk ($FRISK_{it}$) and political risk ($PRISK_{it}$). A stable environment with low risk will mitigate income inequality. The quadratic term represents the inverted U-shaped relationship, demonstrating a monotonic relationship in which income inequality increases in the early stage and then decreases once a certain level has been reached. Hence, the inverted U-shape relationship between country risk and income inequality is supported if $\theta_1 > 0$ and $\theta_2 < 0$.

The first controlling variable is inflation (INF_{it}) measured by the consumer price index (CPI). Higher inflation will reduce households' purchasing power, leading to a decrease in the real value of debt services. This improves income distribution because most of the lowest groups are debtors. However, high inflation harms lower- and middle-income classes disproportionately. Wealthy households can hedge their risk exposure by redistributing their money, including investing in financial assets, which leads to a widened income distribution. Hence, the coefficient corresponding to INF_{it} can be positive or negative.

Economic growth ($ECON_{it}$) is calculated by GDP growth. Most of the studies (Cetin et al., 2021; Sehrawat & Giri, 2016) showed a negative relationship. Their work suggested that economic growth contributes to poverty reduction. The coefficient of $ECON_t$ is expected to be a negative sign.

3.2 ARDL Estimated

To investigate the short-run and long-run relationship between financial development, country risk, and income inequality in each country, we use the Auto Regressive Distribution Lag (ARDL) model suggested by Pesaran, Shin, and Smith (2000). There are many benefits of using the ARDL model compared to others. First, it can be used with data with a different integrated order, which use the F-test to check cointegration with a boundary to correspond to the I(0), I(1) property of the data. Second, in a dynamic framework, the model accounts for a suitable number of lags in capturing the data generation process. Third, we can utilize the error correction model (ECM), investigating short-run adjustments when shock occurs and get back to the long-run equilibrium without losing long-run information. Fourth, the ARDL method is better suited to small sample properties than other cointegration methods. Fifth, the ARDL technique has a small endogeneity concern. Finally, the ARDL framework addresses the problems of endogeneity and serial correlation because the model chooses the appropriate lag in estimated long-run and short-run components. Our data availability is limited to small samples at the national and regional levels, so our appropriate model is the ARDL.

The ARDL methodology begins with estimating the equation using the ordinary least squares (OLS) method, then uses cointegration to test for stationarity. To check whether our variables have long-run correlations or not, we use the F-test. If the F-statistical value exceeds the upper bound (both 10% and 5%), it is assumed that the data are cointegrated. The null hypothesis states that all coefficients are 0, implying that no long-run correlations exist, while the alternative hypothesis is that at least one of the coefficients is not zero. This study applies the ARDL bound test to check for cointegration between variables. This method is based on estimating the ARDL model without considering the level of stationarity. The ARDL model for each country is represented as follows (time-series data, each country-level model):

$$\Delta Y_t = \alpha_0 + \sum_{j=1}^{n} \delta_j \Delta Y_{t-j} + \sum_{j=1}^{n} \theta_j \Delta FD_{t-j} + \sum_{j=1}^{n} \emptyset_j \Delta FRISK_{t-j} + \sum_{j=1}^{n} \beta_{ij} \Delta PRISK_{t-j} + \sum_{j=1}^{n} \sigma_j \Delta INF_{t-j} + \sum_{j=1}^{n} \vartheta_j \Delta ECON_{t-j} + +\lambda_1 Y_{t-1} + \lambda_2 FD_{t-1} + \lambda_3 FRISK_{t-1} + \lambda_4 PRISK_{t-1} + \lambda_5 INF_{t-1} + \lambda_6 ECON_{t-1} + \varepsilon_t \quad (2)$$

Where α_0 is the drift component and ε_t is a white noise. The summation term represents the error correction dynamics. The term λ_j represents the long-run relationship.

The ARDL equation can be rewritten in terms of the ECM, which explains the long-term relationship and short-run dynamics between variables. Those long-term relationships and short-run dynamics can be explained when only the cointegration relationship is found. The ECM equation is expressed as follows:

$$\Delta Y_t = \alpha_0 + \sum_{j=1}^{n} \delta_j \Delta Y_{t-j} + \sum_{j=1}^{n} \theta_j \Delta FD_{t-j} + \sum_{j=1}^{n} \emptyset_j \Delta FRISK_{t-j} + \sum_{j=1}^{n} \beta_j \Delta PRISK_{t-j} + \sum_{j=1}^{n} \sigma_j \Delta INF_{t-j} + \sum_{j=1}^{n} \vartheta_j \Delta ECON_{t-j} + \eta \hat{\mu}_{t-j} + \varepsilon_t \quad (3)$$

Where $\hat{\mu}_{t-j}$ is an ECM term representing a speed of adjustment.

In addition, one of the primary purposes of the first objective is to investigate the relationship between income inequality and financial development in different regions in Thailand. Hence, regional data should be applied to Equation 2. However, because of the limited cross-regional data, we drop some variables representing the view of the whole country from Equation 2, i.e., financial risk and political risk.

The explanatory variable in the regional-level model is financial development, while the controlling variables are economic growth (represented by gross regional domestic product, GRP), employment rate, and inflation (measured by CPI) in each region. The model at the regional level follows Aginta, Soraya, and

Santoso (2018). The ARDL and ECM model are represented as follows (panel data, regional-level model in Thailand):

$$\Delta Y_{it} = \alpha_0 + \sum_{j=1}^{n} \delta_{ij} \Delta Y_{i,t-j} + \sum_{j=1}^{n} \theta_{ij} \Delta FD_{i,t-j} + \sum_{j=1}^{n} \vartheta_{ij} \Delta ECON_{i,t-j} + \sum_{j=1}^{n} \delta_{ij} \Delta POP_{i,t-j} + \sum_{j=1}^{n} \alpha_{ij} \Delta EMPLOY_{i,t-j} + \lambda_1 Y_{i,t-1} + \lambda_2 FD_{i,t-1} + \lambda_3 ECON_{i,t-1} + \lambda_4 INF_{i,t-1} + \lambda_6 EMPLOY_{i,t-1} + \varepsilon_{it} \quad (4)$$

$$\Delta Y_{it} = \alpha_0 + \sum_{j=1}^{n} \delta_{ij} \Delta Y_{i,t-j} + \sum_{j=1}^{n} \theta_{ij} \Delta FD_{i,t-j} + \sum_{j=1}^{n} \vartheta_{ij} \Delta ECON_{i,t-j} + \sum_{j=1}^{n} \delta_{ij} \Delta INF_{i,t-j} + \sum_{j=1}^{n} \alpha_{ij} \Delta EMPLOY_{i,t-j} + \eta \hat{\mu}_{i,t-j} + \varepsilon_{it} \quad (5)$$

Where Y_{it} = measure of income inequality in region i at time t; FD_{it} = financial development in region i at time t; $ECON_{it}$ = regional economic growth measured by gross regional domestic product in region i at time t; $EMPLOY_{it}$ = unemployment rate of citizens in region i at time t; INF_{it} = measured by consumer price index in region i at time t; ε_{it}= disturbance term assumes to be a zero mean independent white noise process; and $\hat{\mu}_{i,t-j}$ = is an ECM term.

3.3 Cross-Sectional Dependence

Cross-sectional dependence is one of the most essential diagnostics that a researcher should investigate before performing a panel analysis. In this case, the estimated parameter using OLS will be inconsistent because of unobservable common shocks or cross-sectional correlation (Pesaran, 2006). This problem occurs because there is a dependence on economic outcomes across regions or provinces. Even though they are not neighbors geographically, they are economically or socially connected. According to Pesaran (2006), the standard approach to deal with cross-section dependence in the panel data, where the cross-section dimension (N) is small (N<10) and the time series dimension (T) is large, is to use seemingly

unrelated regression equations (SURE) and then estimate the system by generalized least square (GLS) techniques. Hence, this study uses the GLS approach to deal with cross-sectional dependence.

3.4 Data

Table 2 provides a detailed list of variables, definitions, and the source of variables in this empirical analysis. This study uses data from 1984 to 2022 for country-level models and 2010–2022 for regional-level model because this is the most historical data available. In country-level data, the banks' domestic credit to the private sector is used as a proxy for financial development. However, that proxy is limited in the regional-level model, so we use outstanding domestic business credit provided by the banks (% of GRP) as a proxy of financial development in each region.

Table 2. List of data

Variables	Definition	Source
Country-level data (1984–2022)		
Financial development (FD)	Domestic credit to private sector by banks (% of GDP).	World Bank
Gini coefficient (GINI)	Gini coefficient; high Gini represents more unequal income distribution.	World Development Indicators (WID)
The income shares of the top 1% (INT1)	The income shares of the top 1% of the population (wealthy households).	World Development Indicators (WID)
The income shares of the bottom 50% (INB50)	The income shares of the bottom 50% of the population (low-income households).	World Development Indicators (WID)
Financial Risk (FRISK)	Financial risk rating includes foreign debt risk, debt service risk, current account risk, international liquidity risk, and exchange rate stability risk. The value of the risk rating is between 0 (highest risk) to 50 (lowest risk).	International Country Risk Guide (ICRG)
Political Risk (PRISK)	Political risk rating includes government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy quality. The value of the risk rating is between 0 (highest risk) to 100 (lowest risk).	International Country Risk Guide (ICRG)

Economic growth (ECON)	Gross Domestic Product growth (%)	World Bank
Inflation (INF)	Measured by Consumer Price Index (CPI)	World Bank
Regional level data (2010-2022)		
Financial Development (FD)	Outstanding domestic business credit provided by bank (% of GRP).	Bank of Thailand (BOT) and National Statistical Office (NSO)
Gini Coefficient (GINI) of each region	High Gini represents more unequal income distribution.	National Statistical Office (NSO)
Economic growth (ECON)	Measured by Gross Regional Product chain volume.	The National Economic and Social Development Council (NESDC)
Employment (EMPLOY)	The amount of employment.	Bank of Thailand (BOT)
Inflation (INF)	Consumer Price Index (CPI).	Department of Provincial Administration (DOPA)

4. Findings

Table 3 shows the data of the Gini coefficient used in measuring income inequality and the potential variables that affect income inequality in both the country and regional data. We calculated each variable's mean, standard deviation, and minimum and maximum value from 1984–2022 (country-level model) and 2010–2022 (regional-level model). The political risk index in all ASEAN countries is lower (higher index) than the financial risk index. The range of ECON and INF variables, measured by GDP and CPI, respectively, is quite broad when considering it at the national level; even though the four ASEAN countries may have the same economic characteristics, they also have unique traits and differing economic fundamentals, which lead to variations in the data.

Table 3. Descriptive of analysis

Country-level data					
Variables	**Observation**	**Mean**	**Std. Dev.**	**Min**	**Max**
GINI	156	0.59	0.04	0.50	0.69
FD	156	69.91	41.96	13.05	166.50
FRISK	156	37.95	6.65	15.92	45.63

PRISK	156	61.32	9.55	35.92	79.42
ECON	156	4.68	3.96	-13.12	13.28
INF	156	77.96	37.57	8.42	163.07
Regional-level data					
GINI	65	0.33	0.02	0.28	0.39
FD	65	0.53	0.56	0.133	1.86
ECON	65	0.04	0.05	-0.12	0.22
EMPLOY	65	7,618,503	2,798,328	3,863,900	12,800,000
INF	65	98.16	5.03	87.73	108.11

4.1 Results of the Country-level Model

First, this study investigates a non-monotonic effect of country risk on income inequality as implied by the inverted U-shaped analysis. Table 4 presents the results from the GLS approach. Evidence in Models 1 and 2 shows that the linear term of political risk is positive and significant, and the coefficient for the squared term is negative and significant. For Model 3, the linear and non-linear terms' coefficients are negatively and positively significant, respectively. However, both linear and non-linear terms of financial risk are insignificant. The results of all models are consistent, as the dependent variable of Model 3 is the income share of the bottom 50% population, so the coefficient sign must be an inverse sign compared to Models 1 and 2. Thus, the inverted U-shaped relationship between political risk and income inequality is supported. The higher the political risk index score, the lower the risk represented by the index. The result suggests some risk levels are associated with reducing income inequality. As the political risk situation improves, income inequality initially increases and then reduces after reaching a certain level of risk. In other words, when the level of political risk is large (lower ICRG political rating), a decrease in political risk is associated with worsening income inequality. However, after reaching a certain threshold level of political risk, the relationship turns from positive to negative and is associated with reduced income inequality in the country. The result is consistent with previous studies, such as Lee and Lee (2018). The political risk index includes factors such as corruption and socioeconomic

conditions in its calculation. Therefore, the results suggest that an increase in corruption negatively impacts income inequality. Corruption tends to benefit only capitalists or their associates, often from higher income groups. Furthermore, corruption also affects economic development because the government budget that the government should allocate for national development is instead used for the benefit of a select group.

The results show the positive relationship between financial development and income inequality. This means that development in the financial market brings more benefits to wealthy groups and leads to increased income disparities, which supports the income inequality-widening hypothesis. Among the other control variables, the coefficient of INF consistently matches our expectations. Although economic growth is positively significant, higher growth is associated with higher income inequality.

In addition, there are omitted variable biases in panel data, which may lead to inconsistent estimators and the need to deal with unobserved variables that are unit-invariant and time-invariant. The fixed effect model (country fixed effect and time fixed effect) is used to control the unobserved variables that may affect our dependent variables. The time fixed effect model controls the unobserved variables that change over time but are consistent across countries and affect all countries in a particular period, such as economic recession, the COVID-19 pandemic, or global events. Country fixed effects control for characteristics, which are time-invariant variables and differences between countries, such as a country's geographical location, culture, or historical factors. Hence, we introduce the time fixed effect to our model because the data spans the period from 1984 to 2022, which includes significant economic events such as the Asian financial crisis, the Global financial crisis, and the COVID-19 pandemic. Introducing the fixed effect model will account for shocks or economic changes that affected countries during specific periods. The results in Table 4 show that the coefficients of FD and INF are consistent with GLS

analysis in all models, while political risk is insignificant in the fixed effect model. Political risk variables may only have an effect during certain periods, or their impact may vary over time because political instability or political unrest occurs only during a specific period in the case of these four countries. INF has a negative coefficient (Models 1 and 2) and a positive coefficient (Model 3), which is the opposite of the GLS analysis. The INF variable may have varying effects across different time periods. CPI is the primary tool to measure inflation, so a higher CPI refers to higher inflation, which benefits debtors, mostly the low-income groups, due to decreased debt repayments. This is associated with mitigating income inequality, which is consistent with the results in each country model. Adding a time-fixed effect into the model helps isolate the effects of the variable that arise from different periods, which may reveal a more accurate relationship and potentially reverse the sign of the coefficient

However, we do not include time-variant variables such as country characteristics in our model, so there may be an endogeneity problem in the relationship between the dependent and omitted variables. To deal with endogeneity problems in panel data, we use the GMM introduced by Blundell and Bond (1998), which uses the lag of the dependent variable as an instrumental variable. The GMM estimator is more efficient than other instruments for solving endogeneity when $T < N$ and in non-linear models (Arellano & Bond, 1991). The results indicate that when using the GMM estimator, the LOGINF and ECON variables are still significant, with the same sign consistent with the GLS and time-fixed effect models. However, political risk, previously significant in the GLS, is no longer significant in the GMM in all models; financial development is also not significant in GMM estimation. Based on the overall model of four ASEAN countries, the study found that the variables of financial development and political risk yielded different results across each model. Therefore, a definitive conclusion about their relationship cannot be drawn, as each model has different assumptions and is used to address different

issues. For example, GMM is suitable for addressing endogeneity when unobserved variables may correlate with the independent variables, while fixed effects are used to control for variables that change over time.

Next, we focus on the long-run cointegration between financial development, financial risk, political risk, and income inequality in each country (time-series data), shown by the ARDL bound technique and the ECM. When the integrated order of the variables is confirmed, we choose an appropriate lag to apply the ARDL bounds test approach. The Akaike Information Criterion (AIC) is used to select an appropriate lag, providing reliable and consistent information about lag order.

Table 4. Country model

Estimated model	**Model 1 LOGGINI = F (FD, RISK, ECON, INF)**			**Model 2 INT1 = F (FD, RISK, ECON, INF)**			**Model 3 INB50 = F (FD, RISK, ECON, INF)**		
	GLS	**Time Fixed effect**	**GMM**	**GLS**	**Time Fixed effect**	**GMM**	**GLS**	**Time Fixed effect**	**GMM**
***Y*-lagged**			0.07*** (0.00)			0.76*** (0.00)			0.71*** (0.00)
FD	0.02*** (0.00)	0.069*** (0.00)	0.01 (0.48)	0.05*** (0.00)	0.038** (0.05)	0.003 (0.72)	-0.03** (0.01)	-0.04*** (0.00)	-0.0024 (0.70)
FR	-0.03 (0.17)	-0.001 (0.96)	0.001 (0.67)	-0.01 (0.1)	-0.0005 (0.86)	0.001 (0.35)	0.003 (0.46)	0.0003 (0.86)	-0.0002 (0.79)
FR^2	0.00 (0.27)	-0.00001 (086)	-0.00001 (0.59)	0.00 (0.26)	-0.00001 (0.80)	-0.00002 (0.27)	-0.00 (0.67)	-0.00 (1.00)	0.000005 (0.73)
PR	0.005** (0.02)	0.001 (0.71)	-0.0003 (0.81)	0.02*** (0.00)	0.003 (0.21)	-0.0001 (0.91)	-0.01** (0.02)	-0.0004 (0.78)	0.0001 (0.83)
PR^2	-0.00004** (0.01)	-0.000002 (0.89)	0.000003 (0.71)	-0.001*** (0.00)	-0.00002 (0.26)	-0.000002 (0.22)	0.0001** (0.02)	-0.00 (0.96)	-0.000002 (0.72)
ECON	0.001*** (0.00)	0.002*** (0.00)	0.0007*** (0.00)	0.003*** (0.00)	0.002*** (0.00)	0.0006*** (0.00)	-0.002*** (0.00)	-0.001*** (0.02)	-0.0004*** (0.00)
LOGINF	0.01* (0.06)	-0.043*** (0.00)	-0.01** (0.05)	0.02* (0.06)	-0.03*** (0.00)	-0.007 (0.15)	-0.01 (0.122)	0.027*** (0.03)	0.006** (0.06)
Wald chi2 / F-test	49.62	170.88	363.09	61.16	65.82	475.25	36.25	153.77	353.03

Note: The number in (parentheses) is the p-value. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

Table 5. Results of ARDL Cointegration test and ECM in the case of Thailand

Estimated Model	**Model 1** GINI = F (FD, FRISK, PRISK, ECON, INF)	**Model 2** INT1 = F (FD, FRISK, PRISK, ECON, INF)	**Model 3** INB50 = F (FD, FRISK, PRISK, ECON, INF)
Maximum lag	(2,0)	(1,3)	(4,4)
Lag order	(1,0,0,0,0,0)	(1,2,2,3,3,3)	(1,2,1,0,1,3)
F-statistic	3.33	3.46	6.76
Lower bound I(0)	2.08 (10%)	2.08 (10%)	2.08 (10%)
Upper bound I(1)	3 (10%)	3 (10%)	3 (10%)
Results	Long run existed	Long run existed	Long run existed
ARDL Estimates			
$\boldsymbol{FD}$	-0.0002 (0.076)*	-0.005 (0.089)*	0.0004 (0.217)
$\boldsymbol{LOGFRISK}$	0.064 (0.201)	5.164 (0.157)	-0.985 (0.00)***
$\boldsymbol{LOGPRISK}$	0.130 (0.004)***	1.861 (0.062)*	-0.192 (0.188)
$\boldsymbol{ECON}$	-0.002 (0.736)	-0.095 (0.149)	0.006 (0.025)**
$\boldsymbol{LOGINF}$	-0.069 (0.001)***	-2.791 (0.145)	0.609 (0.00)***
Error correction coefficient			
$\boldsymbol{ECM_{t-1}}$	-0.81***	-0.31***	-0.90***
Adj. $\boldsymbol{R^2}$	0.47	0.55	0.65

Note: The number in (parentheses) is the t-statistics. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

Table 6. Results of ARDL Cointegration test and ECM in the case of Indonesia

Estimated Model	**Model 1** LOGGINI = F (FD, FRISK, PRISK, ECON, INF)	**Model 2** INT1 = F (FD, FRISK, PRISK, ECON, INF)	**Model 3** INB50 = F (FD, FRISK, PRISK, ECON INF)
Maximum lag	(3,1)	(2,1)	(2,4)
Lag order	(1,1,1,0,1,1)	(1,1,0,0,1,1)	(2,4,2,1,4,3)
F-statistic	3.52	5.32	2.73
Lower bound I(0)	2.39 (5%)	3.06 (1%)	2.08 (10%)
Upper bound I(1)	3.38 (5%)	4.15 (1%)	3 (10%)
Results	Long run existed	Long run existed	Inconclusive
ARDL Estimates			
$\boldsymbol{FD}$	0.0005 (0536)	0.0001 (0.489)	0.0004 (0.764)
$\boldsymbol{LOGFRISK}$	-0.131 (0.419)	-0.299 (0.128)	0.22 (0.185)
$\boldsymbol{LOGPRISK}$	0.015 (0.949)	0.324 (0.244)	-0.264 (0.229)
$\boldsymbol{ECON}$	0.012 (0.07)*	0.018 (0.01)**	-0.022 (0.02)**
$\boldsymbol{LOGINF}$	-0.012 (0.627)	0.019 (0.578)	0.07 (0.03)**
Error correction coefficient			
$\boldsymbol{ECM_{t-1}}$	-0.47***	-0.66***	-1.68***
Adj. $\boldsymbol{R^2}$	0.46	0.73	0.58

Note: The number in (parentheses) is the t-statistics. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

Table 7. Results of ARDL Cointegration test and ECM in the case of Malaysia

Estimated Model	**Model 1** LOGGINI = F (FD, FRISK, PRISK, ECON, INF)	**Model 2** INT1 = F (FD, FRISK, PRISK, ECON, INF)	**Model 3** INB50 = F (FD, FRISK, PRISK, ECON INF)
Maximum lag	(4,4)	(4,4)	(4,4)
Lag order	(3,0,4,2,1,4)	(4,1,4,3,4,4)	(3,0,4,2,1,3)
F-statistic	8.28	8.67	7.57
Lower bound I(0)	3.06 (1%)	3.06 (1%)	3.06 (1%)
Upper bound I(1)	4.15 (1%)	4.15 (1%)	4.15 (1%)
Results	Long run existed	Long run existed	Long run existed
ARDL Estimates			
$\boldsymbol{FD}$	-0.000 (0.679)	0.001 (0.013)**	0.0002 (0.281)
$\boldsymbol{LOGFRISK}$	0.295 (0.012)**	0.549 (0.002)**	-0.474 (0.01)**
$\boldsymbol{LOGPRISK}$	0.199 (0.209)	0.299 (0.134)	-0.577 (0.035)***
$\boldsymbol{ECON}$	-0.002 (0.025)**	-0.007 (0.047)**	0.004 (0.019)**
$\boldsymbol{LOGINF}$	-0.265 (0.00)***	-0.576 (0.00)***	0.387 (0.00)***
Error correction coefficient			
$\boldsymbol{ECM_{t-1}}$	-0.9***	-1.89***	-0.9***
Adj. $\boldsymbol{R^2}$	0.77	0.85	0.75

Note: The number in (parentheses) is the t-statistics. b) *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

Table 8. Results of ARDL Cointegration test and ECM in the case of the Philippines

Estimated Model	**Model 1** LOGGINI = F (FD, FRISK, PRISK, ECON, INF)	**Model 2** INT1 = F (FD, FRISK, PRISK, ECON, INF)	**Model 3** INB50 = F (FD, FRISK, PRISK, ECON INF)
Maximum lag	(4,4)	(4,4)	(4,4)
Lag order	(3,2,3,4,2,2)	(3,4,1,3,2,2)	(3,2,4,3,2,2)
F-statistic	11.47	11.03	8.45
Lower bound I(0)	3.06 (1%)	3.06 (1%)	3.06 (1%)
Upper bound I(1)	4.15 (1%)	4.15 (1%)	4.15 (1%)
Results	Long run existed	Long run existed	Long run existed
ARDL Estimates			
$\boldsymbol{FD}$	-0.001 (0.000)***	0.0001 (0.832)	0.002 (0.00)***
$\boldsymbol{LOGFRISK}$	0.344 (0.002)**	0.195 (0.416)	-0.725 (0.01)**
$\boldsymbol{LOGPRISK}$	0.101 (0.02)**	0.539 (0.00)***	-0.314 (0.01)**
$\boldsymbol{ECON}$	-0.005 (0.00)***	-0.013 (0.00)***	0.01 (0.00)***
$\boldsymbol{LOGINF}$	-0.149 (0.00)***	-0.224 (0.02)***	0.309 (0.00)**
Error correction coefficient			
$\boldsymbol{ECM_{t-1}}$	-0.73***	-0.83***	-0.67***
Adj. $\boldsymbol{R^2}$	0.89	0.91	0.90

Note: The number in (parentheses) is the t-statistics. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

Financial development, as proxied by domestic credit to the private sector by the banks, is statistically associated with income inequality. For Thailand and the Philippines, deepening financial development contributes to reducing income inequality, aligning with the inequality-narrowing hypothesis and various studies such as Jalil and Feridun (2011a; 2011b), Shahbaz et al. (2015), Sehrawat and Giri (2016), and Rehman, Khan, and Ahmed (2018). Development in the financial market increases information symmetry and reduces transaction costs, which are a significant burden on loan access for low-income groups in developing countries. However, financial development is found to have a positive relationship in Malaysia, which means the wealthier part of the population receives more benefits from financial development than the lower-income groups. This may be because most low-income people rely on informal credit sources. Hence, even with increased financial development, low-income households still have credit constraints that prevent them from investing optimally in human capital accumulation or business activities. This finding is in line with the income inequality-widening hypothesis. In the case of Indonesia, financial development is not significant in the long-run relationship with income inequality, which is consistent with Azwar, Possamuh, and Aqbar (2022). The insignificance of financial development might be attributed to low-quality institutions in Indonesia. According to Tan and Law (2012), who examined the relationship between financial development and income inequality in many countries, including Indonesia, by dividing the analysis into two regimes, i.e., low-quality institutions and high-quality institutions, it was found that, in the low-quality institution regime, financial development had no effect on income inequality. Therefore, it can be argued that if the model includes both low-quality and high-quality institutions, the results may be insignificant because the impact of this variable in the low-quality institutions group may weaken or nullify the overall relationship.

For financial and political risk, the models of Thailand, Malaysia, and the Philippines have similar results: A higher risk index (lower risk) leads to higher income inequality. However, the results of the four ASEAN countries' models are mixed. Hence, in each country model, even the political risk term is significant, and we cannot conclude that they confirm the inverted U-shaped relationship. For economic growth (GDP), an increase in economic growth leads to reduced income inequality because economic growth is often associated with higher investment and higher employment and, therefore, higher income for a significant proportion of the populations in Thailand, Malaysia, and the Philippines, consistent with Rehman et al. (2018), Dogan (2018), and Aginta et al. (2018). In addition, higher economic growth may come from technological development, which reduces the cost of mobilizing capital to benefit the low-income group. In the case of Indonesia, economic growth is found to have a positive relationship, which means the population that benefits from economic growth is concentrated within the wealthy group, leading to increasing income inequality. For the INF variable, measured by CPI, the increase in the CPI reflects a rise in the price levels of goods and services. The results show that a higher CPI reduces income inequality in all our interested countries. A high CPI reduces households' purchasing power, which leads to a decrease in the real value of money. The upper-middle and wealthy groups are more net lenders with large savings than the low-income groups. A higher price level of goods and services hurts savers and reduces income inequality because the debtors benefit from decreasing the real value of debt. This is consistent with the debt deflation hypothesis of Doepke and Schneider (2006) and Adam and Zhu (2016). From the ARDL cointegration results, Thailand and the Philippines have similar signs of significant variables.

The ECM results show that the ECM term's coefficients represent the speed of the adjustment process with respect to the long-run equilibrium path. The ECM terms indicate negative signs and are statistically significant in all models.

The coefficient of the ECM terms varies from -1.89 to -0.31 (Indonesia and Malaysia). ECM estimates greater than 1 mean it would take less than one year to attain a full convergence process in any shock to income inequality. For example, the estimated ECM term in the case of Indonesia (Model 3) is -1.68. This implies the deviations in the short run toward the long run are corrected by 168% per year. The estimated ECM of less than 1 (Thailand and Philippines) means reaching the long-run equilibrium path would take more than one year. All estimates of the ECM terms are negative and highly significant, confirming our established long-run relationship between our variables. To summarize, Thailand and the Philippines exhibit similar relationships across all significant variables in the ARDL model, while Malaysia and Indonesia show differing relationships that may depend on each country's specific characteristics. This may reflect each context's distinct economic, social, and cultural factors.

4.2 Results of the Regional-level Model

The second part of the results focuses on the long-run cointegration between financial development and income inequality by using regional-level data in Thailand. According to Table 8, the long-run estimates obtained from the ARDL suggest that the coefficient of financial development is negative and statistically significant at a 5% significance level. This means that an increase in financial development of 1% decreases regional income inequality by 0.22%. This may be due to deepening financial development, which reduces the barriers to accessing financial resources. The result of financial development in the regional model in Thailand is consistent with the country-level model. For ECON, we find a negative relationship with the Gini coefficient, which means an increase in GRP by 1% leads to a decrease in income inequality by 0.98%. However, the INF term shows a positive sign, which is not consistent with the country model and the GLS analysis. The switching sign of the coefficient might occur because of cross-sectional correlation in panel data. The ECM terms indicate negative signs and are statistically

significant. The coefficient of the ECM term variable is less than -1, which means it would take more than one year to attain a full convergence process in any shock to income inequality in the regional areas of Thailand. The deviations in the short run toward the long run are corrected by 93%.

In the panel data model, a significant problem might occur in panel data: cross-sectional correlation. Cross-sectional correlation is the problem of all units in the same cross-section being correlated. This is usually attributed to the effect of unobserved common factors that are common to all units and affect each (Menegaki, 2018). Hence, we use GLS to deal with cross-sectional correlation and heteroskedasticity problems. The results in Table 6 show that the results from the GLS model are quite different from the ARDL estimates. The financial development variable is insignificant, while ECON is still significant. For INF, it is negative and statistically significant at a 5% significance level, which is consistent with the country model. We apply the time-fixed effect to our model. The financial development variable turns from significant in the time fixed effect model, which may mean that it affects regional income inequality in a certain period. For ECON, it is still negatively significant, which is consistent with ARDL estimates and the GLS analysis. In addition, the GMM estimator is introduced to deal with endogeneity problems in the panel data. The result of the GMM estimator shows that FD and ECON are significant with a negative sign consistent with the time-fixed effect model, even though the coefficient is a bit less than in the fixed effect model. Therefore, we confirm the negative relationship between financial development and regional income inequality in Thailand.

Table 9. Result of ARDL Cointegration test and GLS in the regional-level model in Thailand

Estimated Model	**Regional model: LOGGINI = F (FD, ECON, EMPLOY, INF)**			
Maximum lag	(1,1)	N.A.	N.A.	N.A.
Lag order	(1,1,1,1,1)	N.A.	N.A.	N.A.
	Panel ARDLs	**GLS**	**Time Fixed effect**	**GMM**

LOGGINI lagged				0.10 (0.46)
FD	-0.22 (0.01)***	0.002 (0.76)	-0.07 (0.08)*	-0.06 (0.08)*
ECON	-0.98 (0.00)****	-0.04 (0.00)***	-0.38 (0.00)***	-0.31 (0.00)***
LOGEMPLOY	0.03 (0.73)	-0.02 (0.23)	-0.03 (0.49)	-0.07 (0.18)
LOGINF	0.98 (0.02)**	-0.67 (0.00)***	0.12 (0.51)	0.03 (0.86)
	Error correction coefficient			
ECM_{t-1}	-0.93	N.A.	N.A	N.A.
Wald chi2(3)	143.23	223.88	26.16	93.24

Note: *, **, and *** denote 10, 5, and 1% significance levels, respectively.

5. Conclusion and Policy Implications

The literature has noted that institutional quality, country risk, and financial development related to income inequality and how different dimensions influence income inequality are insufficiently investigated. This paper therefore examines the relationship between country risks (financial and political risk) and financial development on income inequality within country-level and regional-level models by using GLS analysis, fixed effect, the ARDL approach, and the GMM estimation.

This study investigates the relationship between financial development, political risk, and income inequality, but not causality. Our results draw three important conclusions. First, our findings cannot conclude the critical relationship between political risk and income distribution because of mixed results in different estimations. We suggest that future research use different measurement methods or indicators for political risk and consider studying relationships in other groups of countries.

Second, for the linear relationship between financial development and income inequality in each country, the results reveal that development in the financial sector

is associated with improving income distribution in Thailand and the Philippines. An environment that facilitates access to financial institutions and is conducive to investment is necessary for reducing benefits to the rich. There are many ways to improve opportunities for low-income households, such as access to financial institution loans and capital markets and the support of technological innovation and human capital development. Thus, policymakers should pay attention to the income inequality problem and to more than one aspect. In addition, in each country model, the quality of institutions, governance, or corruption-related issues are also associated with income inequality. Financial development, coupled with stable economic conditions and good institutional quality, may help developing countries achieve financial growth and reduce social inequality.

Third, in the regional level model, improving financial development provides broader and easier access to financial resources for the public, which is associated with reducing regional income disparities in the case of Thailand. This, in turn, benefits both the regional and national economies. Similarly, an increase in GRP is also linked with regional income inequality. Therefore, stimulating the economy or promoting technological advancements in industry and agriculture, which leads to an increase in GRP, can be associated with long-standing regional disparities, particularly in the northeast region of Thailand. Therefore, government policies should also consider the potential relationship between policies and regional income disparities.

The main limitation of this study is the availability of data in both countries and the regional model of ASEAN countries, especially for the more extended time-series data. For regional data in Thailand, some problems come from the different regional data groupings, which are different across organizations, so we must recalculate the Gini coefficient for Bangkok and four metropolitan areas in the case of Thailand. For future studies, it is beneficial to investigate the effect of financial development and risk on income inequality by different levels of institutional quality

in country and regional models in all ASEAN countries because the relationship between those variables varies with the level of institutional quality. This may provide more in-depth details of the impacts across different regions and situations in different countries.

References

Adam, K., & Zhu, J. (2016). Price-level changes and the redistribution of nominal wealth across the Euro area. *Journal of the European Economic Association*, *14*(4), 871–906.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277–297.

Andres, A. R., & Ramlogan-Dobson, C. (2011). Is corruption really bad for inequality? Evidence from Latin America. *Journal of Development Studies*, *47*(7), 959–976.

Aginta, H., Soraya, D. A., & Santoso, W. B. (2018). Financial development and income inequality in Indonesia: A sub-national level analysis. *Economics and Finance in Indonesia*, *64*(2).

Azwar, A., Possumah, B. T., & Aqbar, K. (2022). Islamic financial development and income inequality in Indonesia. *International Journal of Islamic Business Ethics*, *7*(2), 108–124.

Banerjee, A. V., Breza, E., Duflo, E., & Kinnan, C. (2017). *Do credit constraints limit entrepreneurship? Heterogeneity in the returns to microfinance (*Global Poverty Research Lab Working Paper, No. 17–104).

Bergh, A., & Nilsson, T. (2010). Do liberalization and globalization increase income inequality? *European Journal of Political Economy*, *26*(4), 488–505.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115–143.

Chancel, L., Piketty, T., Saez, E., & Zucman, G. (Eds.). (2022). *World inequality report 2022*. Harvard University Press.

Cetin, M., Demir, H., & Saygin, S. (2021). Financial development, technological innovation, and income inequality: Time series evidence from Turkey. *Social Indicators Research*, *156*(1), 47–69.

Chiu, Y.-B., & Lee, C.-C. (2019). Financial development, income inequality, and country risk. *Journal of International Money and Finance*, *93*, 1-18.

Chong, A., & Calderon, C. (2000). Institutional quality and income distribution. *Economic Development and Cultural Change*, *48*(4), 761–786.

Clarke, G. R., Xu, L. C., & Zou, H. F. (2006). Finance and income inequality: What do the data tell us? *Southern Economic Journal*, *72*(3), 578–596.

Destek, M. A., Sinha, A., & Sarkodie, S. A. (2020). The relationship between financial development and income inequality in Turkey. *Journal of Economic Structures*, *9*(1), 1–14.

Doepke, M., & Schneider, M. (2006). Inflation and the redistribution of nominal wealth. *Journal of Political Economy*, *114*(6), 1069–1097.

Doğan, B. (2018). The financial Kuznets curve: A case study of Argentina. *The Empirical Economics Letters*, *17*(4), 527–536.

Galor, O., & Moav, O. (2004). From physical to human capital accumulation: Inequality and the process of development. *The Review of Economic Studies*, *71*(4), 1001–1026.

Glaeser, E. L., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2004). Do institutions cause growth? *Journal of Economic Growth*, *9*, 271–303.

Greenwood, J., & Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy*, *98*(5, Part 1), 1076–1107.

Huang, B., Morgan, P., & Yoshino, N. (2019). *Demystifying rising inequality in Asia*. Asian Development Bank Institute.

Jalil, A., & Feridun, M. (2011). The impact of growth, energy and financial development on the environment in China: A cointegration analysis. *Energy Economics*, *33*(2), 284–291.

Jalil, A., & Feridun, M. (2011). The long-run relationship between income inequality and financial development in China. *Journal of the Asia Pacific Economy*, *16*(2), 202–214.

Jeanneney, S. G., & Kpodar, K. (2008). *Financial development and poverty reduction: Can there be a benefit without a cost?*. International Money Fund.

Johansson, A. C., & Wang, X. (2014). Financial sector policies and income inequality. *China Economic Review*, *31*, 367–378.

Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review*, *45*(1), 1–28.

Law, S. H., Tan, H. B., & Azman-Saini, W. (2014). Financial development and income inequality at different levels of institutional quality. *Emerging Markets Finance and Trade*, *50*(sup1), 21–33.

Lee, C.-C., & Lee, C.-C. (2018). The impact of country risk on income inequality: A multilevel analysis. *Social Indicators Research*, *136*(1), 139–162.

Mehta, A., & Bhattacharya, J. (2020). Channels of financial sector development and the inequality widening (narrowing) hypothesis–Evidence from India. *Journal of Financial Economic Policy*, *12*(4), 593–608.

Menegaki, A. (2018). *The economics and econometrics of the energy-growth nexus*. Academic Press.

Murphy, K. M., Shleifer, A., & Vishny, R. W. (2008). Why is rent-seeking so costly to growth? In R. D. Congleton, K. A. Konrad, & A. L. Hillman (Eds.), *40 years of research on rent seeking 2* (pp. 213–218). Springer.

Nittayakamolphun, P., Jirasatthumb, N., & Pholkerd, P. (2024). Financial Development and Income Inequality: Evidence from Thailand. *ABAC Journal, 44*(2), 152-165.

Nurazi, R., & Usman, B. (2019). Impact of financial development on income inequality and poverty in ASEAN. *Institutions and Economies*, *11*(3).

Pesaran, M. H., Shin, Y., & Smith, R. J. (2000). Structural analysis of vector error correction models with exogenous I (1) variables. *Journal of Econometrics*, *97*(2), 293–343.

Pesaran, M. H. (2006). Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica*, *74*(4), 967–1012.

Rehman, H. U., Khan, S., & Ahmed, I. (2008). Income distribution, growth, and financial development: A cross countries analysis. *Pakistan Economic and Social Review*, 1-16.

Ridzuan, A. R., Zakaria, S., Fianto, B. A., Yusoff, N. Y. M., Sulaiman, N. F. C., Razak, M. I. M., Siswantini, S., & Lestari, A. (2021). Nexus between financial development and income inequality before the pandemic covid-19: Does the financial Kuznets Curve exist in Malaysia, Indonesia, Thailand, and Philippines. *International Journal of Energy Economics and Policy*, *11*(2), 260–271.

Sehrawat, M., & Giri, A. K. (2016). Financial development, poverty, and rural-urban income inequality: Evidence from South Asian countries. *Quality & Quantity*, *50*, 577–590.

Shahbaz, M., Loganathan, N., Tiwari, A. K., & Sherafatian-Jahromi, R. (2015). Financial development and income inequality: Is there any financial Kuznets curve in Iran? *Social Indicators Research*, *124*, 357–382.

Tan, H.-B., & Law, S.-H. (2012). Nonlinear dynamics of the finance-inequality nexus in developing countries. *The Journal of Economic Inequality*, *10*, 551–563.

van der Hoeven, R. (2019). Income inequality in developing countries, past and present. In M. Nissanke & J. A. Ocampo (Eds.) *The Palgrave handbook of development economics* (pp. 335–376). Springer.

Wang, S., Zhang, W., Wang, H., Wang, J., & Jiang, M.-J. (2021). How does income inequality influence environmental regulation in the context of corruption? A panel threshold analysis based on Chinese provincial data. *International Journal of Environmental Research and Public Health*, *18*(15), 8050.

Yang, J., Wang, S., & Dewina, R. (2020). Taking the pulse of poverty and inequality in Thailand. *World Bank*.

Younsi, M., & Bechtini, M. (2020). Economic growth, financial development, and income inequality in BRICS countries: Does Kuznets' inverted U-shaped curve exist? *Journal of the Knowledge Economy*, *11*, 721–742.