

# FINANCIAL DEVELOPMENT AND INCOME INEQUALITY: VIETNAM'S EMPIRICAL RESEARCH ON ARDL MODEL

PHÁT TRIỂN TÀI CHÍNH VÀ BẤT BÌNH ĐẲNG PHÂN PHỐI THU NHẬP:  
NGHIÊN CỨU THỰC NGHIỆM TRƯỜNG HỢP VIỆT NAM BẰNG MÔ HÌNH ARDL

Ngày nhận bài: 26/09/2024

Ngày nhận bản sửa: 20/02/2025

Ngày chấp nhận đăng: 20/03/2025

*Nguyen Ngoc Diep*<sup>✉</sup>

## ABSTRACT

The paper conducts an empirical investigation to examine whether there is a linkage between financial development and income disparity or not. Final results withdrawn from the ARDL model, which is employed to deal with Vietnam's national-level time series data from 1992 to 2021, reveal that the influence of financial development on income inequality depends on the specific measure used to capture its multidimensional aspects. On the basis of research findings, the authors would like to propose some policy implications to Vietnam's government to take advantages of financial growth to address unequal distribution in income in Vietnam.

**Keywords:** ARDL model; Financial development; Income inequality; Multidimensional financial development; Vietnam.

## TÓM TẮT

Bài viết nghiên cứu tác động của phát triển tài chính đến bất bình đẳng phân phối thu nhập tại Việt Nam, dựa trên số liệu từ năm 1992 đến 2021, được xử lý bằng mô hình tự hồi quy phân phối trễ (ARDL). Kết quả nghiên cứu cho thấy phát triển tài chính được đo lường dưới nhiều khía cạnh (độ sâu tài chính, hiệu quả tài chính và ổn định tài chính của các tổ chức tài chính) và mỗi khía cạnh tác động đến bất bình đẳng phân phối thu nhập theo chiều hướng khác nhau. Từ đó, tác giả đưa ra một số khuyến nghị cho Chính phủ Việt Nam, tận dụng phát triển tài chính để thu hẹp khoảng cách thu nhập trong xã hội.

**Từ khóa:** Mô hình ARDL; Phát triển tài chính; Bất bình đẳng phân phối thu nhập; Phát triển tài chính; Việt Nam.

## 1. Introduction

Sustainable development and sustainable development goals have been calls for urgent action by all countries in the global partnership (United Nations, 2015). Vietnam, as an independent country, has been the 149th member of the United Nations since 1977 and has made many important contributions to the implementation of the United Nations' missions, including sustainable development. Besides, being a member country of the Association of Southeast Asian Nations (ASEAN), Vietnam has been also determined to pursue the goals of sustainable development as the 2030 Agenda for Sustainable

Development of the United Nations is emphasized in the ASEAN Vision 2025, or in other words, sustainable development has been considered the ASEAN's goal as well.<sup>1</sup> In addition, having actively participated in the global economic integration, Vietnam has already had sixteen effective free trade agreements (FTAs), including four "new generation" FTAs such as CPTPP, EVFTA, UKVFTA, Vietnam - EAEU FTA, to which sustainable development goals are

---

Nguyen Ngoc Diep, Thuongmai University  
✉Email: diep.nn@tmu.edu.vn

indispensable. This once again confirms that sustainable development has been Vietnam's ultimate goal.

With a view to achieving sustainable development, Vietnam should harmonize all three sub-goals, including economic sustainability, social sustainability and environmental sustainability, corresponding to three pillars of sustainable development according to the United Nations. However, among these three aspects, social sustainability should be paid the most attention because (i) social sustainability is an irreplaceable pillar of sustainable development, meaning that without social sustainability, all countries in the globe, including Vietnam, would be far from sustainable development and (ii) social sustainability is people-oriented, showing that not only are people the drive to economic sustainability and environmental sustainability but they are their eventual destination as well. Thus, the humanity lies behind the importance of social sustainability.

When it comes to social sustainability, although Vietnam has been recognized for political stability and human development efforts, income inequality has increasingly risen to prominence. Namely, income inequality, which is captured by the GINI coefficient, experienced from 0,362 in 1996 to 0,420 in 2002 and 0,433 in 2010, before decreasing to 0,375 in 2022. However, the difference between the average income per capita of the top 20% and the one of the top 20% lowest income households in 2019 was 10,2 times, which were much more noticeable than the figure of 9,2 in 2010. Or in the period 2010-2022, the growth rate registered in the average monthly income of the poorest households was only 9,4%, compared to the

figure of 15,8% witnessed in the one of the richest households (General Statistics Office, 2024). This points out that there was a downward trend in the GINI coefficient, meanwhile Vietnam's absolute income inequality showed an upturn. Specially, it is worth mentioning that income inequality is found to have a negative impact on economic growth (Ostry, Berg, and Tsangarides, 2014; Dabla-Norris et al., 2015; Topuz, 2022) or hinder the process of hunger eradication (Ravallion, 2004; Fosu, 2017) or aggravate the environmental degradation as well (Masud et al., 2018; Khan, Yahong, and Zeeshan, 2022). As a result, in case of no prompt answer to income inequality, the world's countries in general and Vietnam in particular would not be capable of succeeding in all three pillars of sustainable development.

Fortunately, Vietnam has enjoyed an effective solution to deal with income inequality according to Claessens and Feijen (2006), which is financial development, especially in the context that Vietnam has been in the top 4 members with the highest financial index in the ASEAN for recent years. However, people have been divided in their opinions regarding whether financial development plays a role in ameliorating or worsening income distribution or even has no influence on income inequality for a quite long time. Therefore, this study focuses on assessing the impact of financial development on Vietnam's income inequality and the research question in the whole study is to what extent financial development affects Vietnam's income inequality index (the GINI coefficient). The authors then would like to propose some recommendations for Vietnam to take advantages of financial development to deal with its income inequality.

## **2. Theoretical framework and literature review**

### ***2.1. Theoretical framework on financial development and its impact of income inequality***

The theoretical background on the nexus of financial development and income inequality can be classified into three different points of view. The first hypothesis is developed by Greenwood and Jovanovic (1990), presenting that financial expansion has a non-linear relationship with income inequality. Namely, according to Greenwood and Jovanovic (1990), financial development associates with economic development, determining to what extent financial development has impact on income inequality. At the early stage of economic growth and underdeveloped financial system, the rich, who are the one and only group getting involved in financial services because of their high fixed cost, are capable of exploiting the most benefits from any financial system improvement. This makes income inequality between two income groups increase. Meanwhile, when it comes to higher level of economic development followed by a more accessible and affordable financial system at the second stage, income disparity gradually narrows as financial resources are distributed equally among individuals. In short, financial extension interacts with income disparity in an inverted U-shaped curve.

In addition, a linear positive connection between financial growth and low equal income distribution is the second idea, which is introduced by Rajan and Zingales (2003). In contrast to Greenwood and Jovanovic (1990), the authors believe that even in case of developed financial expansion, it is impossible to achieve a fair income distribution among groups of income without strong institutions. Because in an economy, financial system's activities are under control

of incumbents. They aim at preventing financial improvement because from their perspective, competition-related challenges can offset advantages of financial extension. In other words, due to low functioning institutions, people, who are rich and politically connected, have privileged access to financial system and the poor, on the contrary, suffer from an injustice access and unproductive channeling of resources. They are excluded from financial development, triggering the wider income gap between income groups.

Inequality-narrowing strand of Galor and Zeira (1993) and Banerjee and Newman (1993) is the final taken into consideration in this paper. Their argument is that financial development takes part in solving income inequality by dealing with credit market imperfections and financial constraints. They are information asymmetries, contract enforcement and transaction costs, which are obstacles, faced by the poor and small firms in the lack of collateral, credit histories and connections when getting engaged in financial sector. Besides, two different mechanisms accelerating income inequality reduction are suggested as well by Galor and Zeira (1993) and Banerjee and Newman (1993). They are human capital investment and professional choice investment, respectively, depending both on credit. This once again confirms that a developed financial system alleviates income inequality through greater credit availability.

### ***2.2. Literature review on financial development and its impact on income inequality in the world***

The relationship between financial growth and income distribution has sparked a heated debate in the world. The first point of view favours the non-linear hypothesis for financial expansion and income inequality interaction. Destek, Sinha, and Sarkodie (2020) took into

consideration the overall financial development, the banking sector development, stock market development and bond market development of Turkey for the period 1990 to 2015 and revealed that each dimension has different impact on income inequality. While both Turkey's overall financial development index and banking sector development index follows an inverted U-shaped relationship with income inequality, the stock market development is in support of low-income population, confirming its negative effect on income inequality. The bond market, however, is unable to mitigate unequal income distribution in Turkey because domestic public debt securities has mainly belonged to the banks for decades. Vo et al. (2023) paid attention to the financial development, economic growth and both of their single and combined effect on income inequality of 12 Asia-Pacific countries from 1990 to 2021. A reverse U-shaped connection between the financial growth and income inequality is confirmed, which is consistent with Destek, Sinha, and Sarkodie (2020). Moreover, in terms of financial development's reaction to the economic growth, Vo et al. (2023) discovered that although the inverted U-shaped impact of financial development on income inequality does not change, the level of per capita income determines to what extent the magnitude of the impact is, leading to their policy recommendations for Asia-Pacific countries to bear in mind the initial level of per capita income when adopting financial development approach to income inequality. Nguyen (2019), using domestic credit by the financial sector to GDP and broad money supply to GDP as financial development's proxies, came into a similar conclusion with Destek, Sinha, and Sarkodie (2020) and Vo et al. (2023) that there exist a reverse U-shaped

relationship between financial development and income inequality in 8 Southeast Asian countries, meanwhile an increasing tendency in per capita GDP is attached with a worse income inequality. On the basis of panel data of 21 emerging countries for the period of 1961-2017, Cong Nguyen et al. (2019) aimed at investigating whether the financial development - income inequality nexus exists or not. Employing the same approach as Destek, Sinha, and Sarkodie (2020), Cong Nguyen et al. (2019) had the overall financial development represented by a new broad-based index by IMF, four different credit-related indexes as financial institutions' proxies and the stock market taken into account as well. However, different from Destek, Sinha, and Sarkodie (2020)'s opinion that financial dimensions have heterogeneous impact on income inequality, Cong Nguyen et al. (2019) pointed out that unequal income distribution may increase because of multidimensional development but a certain level of financial expansion results in improving income inequality. Zungu, Greyling, and Kaseeram (2022) talked about the non-linear connection between financial development and income inequality as well but their empirical results were opposite to the ones of the four mentioned-above papers that financial growth and income inequality follow a U-shaped relation. Namely, the low level of financial development, which is below the threshold of 21,90% as a share of GDP, is income inequality solution but the higher level of financial development is believed to trigger income inequality because in such case, financial development gives priority to the rich at the expense of the poor.

In contrast, linear hypothesis is believed for financial development and income inequality but whether the relationship is

negative or positive is still a controversial issue. The former is supported by Suhaimee et al. (2021), Kappel (2010), Naceur and Zhang (2016), Beck, Demirguc-Kunt, and Levine (2004) and Della (2023), whereas Rodríguez, Bolívar, and Bujari (2019), Jauch and Watzka (2011) and Shi, Paul, and Paramati (2022) are in favour of the latter. Regarding the negative impact of financial growth and income inequality, Suhaimee et al. (2021) got involved in the Malaysian banking sector and stock market and indicated that although both of the two features of financial development are income reducing measures, the dominance of the banking sector cannot be denied. Examining 143 countries from 1961 to 2011, Naceur and Zhang (2016) came into an agreement with Suhaimee et al. (2021) about the greater impact of the banking sector development on income distribution improvement than the one of the stock market development. The results were withdrawn from the OLS and IV regressions focusing on four dimensions of financial development, including access, depth, efficiency and stability. Similar conclusion was found in Kappel (2010) empirical research on 78 developing and developed countries for the period 1960-2006 that not only loan market but also stock market is solution to income inequality. Beck, Demirguc-Kunt, and Levine (2004) and Della (2023) gave their undivided attention to private credit to GDP as financial development's representation to analyse the finance - income inequality nexus in 52 developing and developed countries and Ethiopia, respectively. Their results suggested that strong financial institutions are an effective remedy for income inequality alleviation. In the study of Rodríguez, Bolívar, and Bujari (2019), financial

development was captured by the credit to GDP ratio as well, but the authors reached a conclusion, which was different from Beck, Demirguc-Kunt, and Levine (2004) and Della (2023) that the extension of the financial system promotes income inequality in 13 Latin American countries. The idea of Rodríguez, Bolívar, and Bujari (2019) about the unfavourable influence of financial expansion on income distribution was encouraged by Jauch and Watzka (2011) and Shi, Paul, and Paramati (2022) regardless of their research scope, which was as large as 138 developed and developing countries or as limited as Australia.

In terms of research methods, studies on the influence of financial growth in income inequality prefer the quantitative one and the fixed effects (FE) and generalized method of moments (GMM) models are the most favourable. On the usage of FE model, Park and Shin (2015) evaluated how the financial extension, which was measured by three proxies being liquid liabilities to GDP, private credit by deposit money banks to GDP and stock market capitalization to GDP, has impact on income inequality, captured by the GINI coefficient of 162 countries. An interesting finding, disclosed by their empirical research, was a U-shaped interaction between financial development and income disparity, getting approval from Zungu, Greyling, and Kaseeram (2022). Chisadza and Biyase (2022) employed the same method with Park and Shin (2015), which was two sub-components of the financial system (being financial institutions and financial markets) and FE model to analyse to what extent financial development has effect on income disparity of 148 countries between 1980 and 2019. However, Chisadza and Biyase (2022) enlarged their research scope to cover three different

dimensions of financial growth, including depth, access and efficiency rather than only financial depth as Park and Shin (2015). That was the reason why their results were much more sophisticated than financial institutions are an income decreasing address but financial markets trigger a worse income disparity.

On the contrary, the GMM model was chosen in Batuo, Guidi, and Mlambo (2010), Brei, Ferri, and Gambacorta (2018), Farnaz (2021) and Tchekoumi and Awounang (2019) and the empirical results withdrawn from their researches gave notice to different impacts of financial development on income disparity. Although Batuo, Guidi, and Mlambo (2010) and Tchekoumi and Awounang (2019) examined different proxies, they reached a consensus that financial development was an effective way of tackling income inequality for African countries. Meanwhile, Farnaz (2021), giving a closer look at different aspects such as depth, efficiency and stability related to banking systems and stock markets, explored independent influences of financial development on income inequality of 151 developed and developing countries. A U-shaped relationship with income inequality is experienced by the banking sector depth, whereas the stock markets fail to make a statistically significant impact. With regard to the efficiency of the financial system, on one hand, financial institutions result in income distribution deterioration, on the other hand, financial markets and their effect on income disparity register a reverse U-shaped curve. And finally, in terms of financial stability, the volatility of both banking sector and stock market exhibit an inequality degenerating influence. Brei, Ferri, and Gambacorta (2018), employing the GMM model as well

on the panel data of 97 advanced and emerging market economies, presented opposite results compared to Farnaz (2021) about contributions of two sub-components of financial services to addressing income inequality that the stock market depth follows a U-shaped interaction with income inequality while the financial institutions have no statistically significant inequality - mitigating impact.

Autoregressive distributed lag (ARDL) is a new research model, applied to assess the effect of financial growth and income disparity recently. For example, Abbas, Afshan, and Mustifa (2022), using the ARDL model to discover the relationship between financial expansion and income inequality of 42 middle-income countries for a period of 23 years (1995-2018), revealed an inverted U-shaped association in both lower-middle income and upper-middle income countries. Zahra (2019), on basis of the same approach with Abbas, Afshan, and Mustifa (2022), disclosed a reverse U-shaped impact of the financial system on income disparity of 13 developing countries as well. From the two foregoing papers, it is easy to realize that not only can the ARDL model estimate long-run relationships between variables and it also takes short-term dynamics into account.

### ***2.3. Literature review on financial development and its impact on income inequality in Vietnam***

Hoi and Hoi (2013, 2016), Le, Quach and Tran (2022) was recognized for their unique researches on the impact of financial development on income inequality in Vietnam. Although their researches had two things in common, provincial approach and the adoption of GMM model and FE model, which are the most prominent in international

studies, they still faced with opposite conclusions. Namely, discovering the financial growth in the period of 2002-2012, the authors perceived that financial growth adversely influences income distribution in Vietnam. However, according to authors, data limitation resulted in their failure to take into consideration many other indicators except for the ratio of credit, net income of private firms and the proportion of private firms' credit in the total of credit of private and state firms (Hoi and Hoi, 2016)). Their another research in 2013 paid attention to three financial proxies presenting financial firms' competition to capture market size, capital mobilization-related capability and asset-related expansion and to what extent they have impact on Vietnam's income disparity. Employing FE model instead of GMM model in the previous paper, Hoi and Hoi (2013) supported financial improvement to become an income disparity remedy, which was also different from their point of view in the previous study. And in the most recent research in 2022, Le, Quach and Tran (2022) only took into account credit extension, including commercial credit and policy credit as proxies for financial development and found out their two different effect on income distribution in Vietnam. While commercial credit widens income inequality, policy credit is a problem-solving approach. In addition, empirical results from 60 provinces' data from 2002 to 2016 analysed by GMM model showed that along with better provincial-level institutional quality and higher education attainment, public credit reaches its full potential. The largest number of financial indicators, which was five and their impact on income disparity of Vietnam was investigated in the research of Nguyen (2021). Besides, like Le, Quach and Tran (2022), Nguyen (2021) also wondered whether the interaction between financial development and

transparent institutions could facilitate Vietnam's income inequality alleviation or not, therefore, democracy index, given by the Freedom House, was analysed in the model together with financial indicators, provided by the World Bank. Fortunately, Nguyen (2021) and Le, Quach and Tran (2022) came into a consensus about the role of democracy in accelerating financial development to address income inequality in Vietnam. This conclusion was brought about from the ARDL model, which was a new approach of Nguyen (2021) compared to Le, Quach and Tran (2022).

With all the foregoing researches, it is impossible to miss that the topic on the relationship between financial expansion and income inequality in Vietnam has been paid quite little attention to. As a result, we would like to contribute our research on the effect of financial growth on Vietnam's income disparity, on the usage of national-level data from 1992 to 2021 and ARDL model, which is a new method as well in the world and especially in Vietnam. It enables us to take a closer look at their impact in both short term and long term, leading to appropriate recommendations to Vietnam's government. In terms of financial development, because of data constraints, only three among four measures, proposed by the World Bank, are taken into consideration in our paper. They are financial depth, financial efficiency and financial stability of financial institutions.

### 3. Theoretical framework and literature review

The effect of financial development on Vietnam's income inequality is estimated by the following formula:

$$\text{GINI}_t = \beta_0 + \beta_1 \text{FD}_t + \varepsilon_t$$

In this equation, GINI is the GINI coefficient, regarded as the most commonly used measure of income inequality

(Gastwirth, 1972). The GINI coefficient takes values from 0 to 1 with  $GINI = 0$  representing absolutely equal income distribution and  $GINI = 1$  indicating that an individual or a household enjoys the entire total income or absolutely unequal income distribution (Nguyen, 2016). The lower the GINI coefficient means the more equal income distribution (Trapeznikova, 2019). The GINI coefficient is not influenced by the size of the economy and population, which is one of its advantages as an income inequality indicator. Besides, the GINI coefficient is calculated on the basis of the entire income distribution (Trapeznikova, 2019), giving a comprehensive and objective view of income distribution of the country in question. FD is financial development, causing difficulties for us to select right proxies with a view to reflecting its different aspects. According to the World Bank, there are four dimensions of financial expansion, including financial access, financial depth, financial efficiency and financial stability. These four characteristics should also be taken into account separately for financial institutions and financial markets, leading to more than 100 indicators to capture financial development. Financial institutions primarily concentrate on the banking system, whereas the stock market serves as a key representative of financial markets. In developed countries, financial institutions and stock markets serve as two fundamental pillars for assessing the level of financial development. Conversely, in developing nations, where stock markets are often nascent and relatively small in comparison to the overall economy, financial institutions are typically the primary metric for evaluation (Bui, 2020). Taking Vietnam as a case study, the financial system is predominantly characterized by the banking sector

(O'Connor, 2000; Ngo and Nguyen, 2024; Dang-Duc, Marriott and Marriott, 2008), which significantly outweighs the stock market in terms of size and influence. This disparity is evidenced by the asset holdings of these two sectors, with the banking sector accounting for 136,2% of GDP in 2021, while the stock market represented only 41,47% of GDP in 2022 (The Global Economy, n.d.). The Vietnamese stock market, officially established in 1998 under the Decree No. 48/1998/ND-CP and commencing operations in 2000 with the launch of the Ho Chi Minh City Securities Trading Center, remains in a developmental phase (Nasir et al., 2021). As of 2024, the Vietnamese stock market continues to be classified as a frontier market in the MSCI 2024 Global Market Accessibility Review Report, indicating that its accessibility remains limited compared to developed markets (MSCI, 2024). This context underscores the rationale for prioritizing financial development indicators related to financial institutions over those pertaining to the stock market in order to provide a comprehensive overview of the current state of the Vietnamese financial system. Moreover, total five indicators are chosen to take a closer look at financial depth, financial efficiency and financial stability of Vietnam's financial institutions, meanwhile their access is excluded from the research model because of data limits.

Financial depth is a critical measure of the size and liquidity of a financial system. The three indicators selected for analysis in this article are: (1) the ratio of deposit money banks' assets to GDP (FD1), (2) the ratio of financial system deposits to GDP (FD2), and (3) the ratio of private credit extended by deposit money banks and other financial institutions to GDP (FD3).

Table 1. *Variables and their sources used in the research model*

No	Variables	Definition	Proxy	Source
1	GINI	Income inequality indicator	GINI coefficient	World Bank
2	FD1	Financial development indicator	Deposit money banks' assets to GDP (%)	
3	FD2		Financial system deposits to GDP (%)	
4	FD3		Private credit by deposit money banks and other financial institutions to GDP (%)	
5	FD4		Credit to government and state-owned enterprises to GDP (%)	
6	FD5		Bank credit to bank deposits (%)	

*Source: The author's compilation*

FD1 includes assets classified as claims on the domestic real non-financial sector, which comprises central, state, and local governments, non-financial public enterprises, and the private sector. Together with FD2, this indicator elucidates the characteristics of the Vietnam's financial system, particularly highlighting the significant dominance of the banking sector and its two principal functions: lending, as represented by FD1, and borrowing, as indicated by FD2. These indicators underscore the financial intermediation role of banks and other institutions (Seven and Coskun, 2016). A larger asset base for banks, as reflected in FD1, enhances their ability to offer financial services at reduced costs, thereby improving financial efficiency. In this regard, FD1 serves as a crucial link between

two dimensions of financial development: financial depth and financial efficiency.

FD3 encompasses financial resources, including loans, purchases of non-equity securities, trade credits, and other accounts receivable extended to the private sector (Čihák et al., 2012). This indicator has been utilized in numerous empirical studies on financial depth (Li, Squire, and Zou, 1998; Clarke, Xu, and Zou, 2006; Beck, Demirgüç-Kunt, and Levine, 2007; Hamori and Hashiguchi, 2012). The advantages of FD3 in measuring the development level of the financial system are twofold: (i) it represents the total volume of credit directly transferred by banks and other financial institutions from surplus fund sources (savers) to capital-demanding entities (the private sector); and (ii) it excludes credit sources provided to the public sector, including the central bank, government entities, development banks, and public enterprises (Čihák et al., 2012)). These factors further underscore the pivotal role of the banking system and other financial institutions in facilitating financial intermediation for the private sector in developing countries like Vietnam (Seven and Coskun, 2016). Consequently, FD3 is significantly more informative than the M2/GDP ratio, which is also commonly employed to assess financial depth.

Financial efficiency refers to the capacity of the financial system to deliver services at a low cost. Given the dominance of the banking system within Vietnam's financial landscape, as compared to the stock market, and recognizing that the primary function of financial institutions is to coordinate financial resources in an intermediary capacity, the ratio of credit to government and state-owned enterprises to GDP (FD4) has been selected as a measure of the efficiency of these organizations. State-owned enterprises are

regarded as a vital force for the government in orienting and regulating the economy, as well as facilitating the development of other ownership types (The Communist Party of Vietnam, 2006). A high FD4 value indicates a high level of efficiency within the banking system as financial intermediaries. Furthermore, the combination of FD3 and FD4, which assesses the ability of financial institutions to fulfill the capital requirements of both the private and public sectors, illustrates the interrelationship between these two indicators in evaluating the depth and efficiency of the financial system as a comprehensive capital intermediary. Financial stability, which encompasses the volatility of banks and other financial institutions, is fundamental to the integrity of the broader financial system. Given that lending and deposit-taking are the primary activities of these institutions, the ratio of bank credit to bank deposits (FD5) is utilized in this article as an indicator of financial stability. FD5 is also recognized by the World Bank as a critical measure of financial stability (Farnaz, 2021). Excessive credit growth, frequently stemming from insufficient risk management and lax lending practices, significantly contributes to crises within the banking sector (Čihák et al., 2012; Kaminsky and Reinhart, 1999). The private sector's inclination to increase borrowing is often motivated by expectations of future asset value appreciation and income growth. However, when income and asset values do not keep pace with the expansion of credit, the likelihood of non-performing loans or defaults escalates. In severe instances, this imbalance can culminate in the collapse of the banking system.

Employing the ARDL model to investigate the impact of financial development on

income inequality in Vietnam, considering both short-term and long-term effects, the paper posits that the empirical findings will reveal an inverted U-shaped relationship proposed by Greenwood and Jovanovic (1990). Specifically, in the short term, the financial system, whether assessed through depth or efficiency, tends to exacerbate income inequality during the early stages of development. This occurs as wealthier individuals, who can afford to access financial services at elevated costs, benefit disproportionately compared to poorer individuals, who are marginalized. However, as the financial system matures, it is anticipated to promote equitable access to financial services across different social classes, thereby reducing the income disparity among them.

In contrast, when financial development is assessed from the perspective of stability, it becomes evident that system instability is detrimental to income equality. In other words, the analysis suggests a linear, positive relationship between financial development and income inequality, indicating that as financial development progresses, income inequality tends to increase.

The extended model specifications are as follows:

$$\ln\text{GINI} = \beta_0 + \beta_1\ln\text{FD1}_t + \beta_2\ln\text{FD4}_t + \beta_3\ln\text{FD5}_t + \varepsilon_t \quad (1)$$

$$\ln\text{GINI} = \beta_0 + \beta_1\ln\text{FD2}_t + \beta_2\ln\text{FD4}_t + \beta_3\ln\text{FD5}_t + \varepsilon_t \quad (2)$$

$$\ln\text{GINI} = \beta_0 + \beta_1\ln\text{FD3}_t + \beta_2\ln\text{FD4}_t + \beta_3\ln\text{FD5}_t + \varepsilon_t \quad (3)$$

where each proxy for financial depth is examined along with financial efficiency and financial stability's single proxy. All models are in log-log specifications recommended by

Shahbaz et al., (2013) to smooth out the data and provide more efficient results, hence the parameters are interpreted as elasticities.  $t$  denotes the year  $t$ , from 1992 to 2021. It means that national-level data are collected for the period of 1992 - 2021.

The ARDL model by Pesaran, Shin, and Smith (2001), which well-known for capturing short-run and long-run elasticities for a small sample size due to the restrictiveness of data availability (Duasa, 2007), is employed in the paper. It is also proven to be the best econometric method in case of different integration orders of variables, which is impossible for Engle-Grange two-step, for example.

When it comes to long-term relationship between variables in the four models, bounds tests are conducted, followed by the ordinary least square (OLS) approach for cointegration between variables. After finding the long-run association between independent variables and the GINI coefficient, the paper uses the error correction model (ECM) to determine the short-run dynamics. As a result, the equation (1), (2) and (3) can be written in ECM form as follows:

$$\Delta \ln \text{GINI}_t = \beta_0 + \sum_{k=1}^n \beta_1 \Delta \ln \text{GINI}_{t-k} + \sum_{k=1}^n \beta_2 \Delta \ln \text{FD1}_{t-k} + \sum_{k=1}^n \beta_3 \Delta \ln \text{FD4}_{t-k} + \sum_{k=1}^n \beta_4 \Delta \ln \text{FD5}_{t-k} + \alpha_1 \ln \text{GINI}_{t-1} + \alpha_2 \ln \text{FD1}_{t-1} + \alpha_3 \ln \text{FD4}_{t-1} + \alpha_4 \ln \text{FD5}_{t-1} + \varepsilon_t \tag{1'}$$

$$\Delta \ln \text{GINI}_t = \beta_0 + \sum_{k=1}^n \beta_1 \Delta \ln \text{GINI}_{t-k} + \sum_{k=1}^n \beta_2 \Delta \ln \text{FD2}_{t-k} + \sum_{k=1}^n \beta_3 \Delta \ln \text{FD4}_{t-k} + \sum_{k=1}^n \beta_4 \Delta \ln \text{FD5}_{t-k} + \alpha_1 \ln \text{GINI}_{t-1} + \alpha_2 \ln \text{FD2}_{t-1} + \alpha_3 \ln \text{FD4}_{t-1} + \alpha_4 \ln \text{FD5}_{t-1} + \varepsilon_t \tag{2'}$$

$$\Delta \ln \text{GINI}_t = \beta_0 + \sum_{k=1}^n \beta_1 \Delta \ln \text{GINI}_{t-k} + \sum_{k=1}^n \beta_2 \Delta \ln \text{FD3}_{t-k} + \sum_{k=1}^n \beta_3 \Delta \ln \text{FD4}_{t-k} + \sum_{k=1}^n \beta_4 \Delta \ln \text{FD5}_{t-k} + \alpha_1 \ln \text{GINI}_{t-1} + \alpha_2 \ln \text{FD3}_{t-1} + \alpha_3 \ln \text{FD4}_{t-1} + \alpha_4 \ln \text{FD5}_{t-1} + \varepsilon_t \tag{3'}$$

$$\sum_{k=1}^n \beta_4 \Delta \ln \text{FD5}_{t-k} + \alpha_1 \ln \text{GINI}_{t-1} + \alpha_2 \ln \text{FD}_{t-1} + \alpha_3 \ln \text{FD4}_{t-1} + \alpha_4 \ln \text{FD5}_{t-1} + \varepsilon_t \tag{3'}$$

where  $\Delta$  shows the first difference and  $\varepsilon_t$  shows the white noise.

## 4. Results and discussions

### 4.1. Preliminary analysis

Unit root test tests are conducted to identify variables' orders of integration. A combination of Dicky-Fuller and Phillip Perron tests is applied to confirm the results' consistency and robustness, showing that all variables are open to stationarity at I (1), which satisfies the use of ARDL cointegration test.

Table 2. Unit root test results

Variables	DF		PP	
	Trend	No trend	Trend	No Trend
lnGINI	0,3457	0,1023	0,3363	0,0988 ***
ΔlnGINI	0,0114 *	0,0014 *	0,0116 *	0,0014 *
lnFD1	0,9939	0,1715	0,9961	0,1181
ΔlnFD1	0,0052 *	0,0163 **	0,0057 *	0,0203 **
lnFD2	0,6553	0,7871	0,7273	0,8185
ΔlnFD2	0,0000 *	0,0000 *	0,0000 *	0,0000 *
lnFD3	0,9862	0,1988	0,9914	0,1425
ΔlnFD3	0,0060 *	0,0086 *	0,0064 *	0,0098 *
lnFD4	0,7702	0,3101	0,7493	0,3157
ΔlnFD4	0,0000 *	0,0000	0,0000	0,0000
lnFD5	0,9559	0,3462	0,9327	0,3222
ΔlnFD5	0,0045 *	0,0126 **	0,0045 *	0,0101 **

Note: The table shows results of Dickey Fuller and Phillips Perron test and the numbers are p-value of the test with and without a trend parameter where \*, \*\*, \*\*\* indicate significance at 1%; 5% and 10% respectively.

Source: The author's compilation

The second analysis is testing the cointegration relationship among variables, the authors perform ARDL bounds F-tests, which are displayed in the following table. The maximum lag of 1 is set in each model, using Akaike information criterion (AIC).

The value of F-statistics for each model (5,314; 5,475 and 5,475) is higher than the upper I (1) critical value table and significant at 5% level, confirming the existence of a long-run relationship between all variables in the four models.

Table 3. *Bounds tests for cointegration*

Model	F-statistics	Significance	Bound critical values Pesaran, Shin, and Smith (2001)	
			I (0)	I (1)
(1)	5,314**	1%	4,29	5,61
		5%	3,23	4,35
		10%	2,72	3,77
(2)	5,475**	1%	4,29	5,61
		5%	3,23	4,35
		10%	2,72	3,77
(3)	5,475**	1%	4,29	5,61
		5%	3,23	4,35
		10%	2,72	3,77

Note: \*, \*\*, \*\*\* indicate significance at 1%; 5% and 10% respectively.

Source: The author's compilation

#### 4.2. Preliminary analysis

Table 4. *Long-rung ad short-run relationship between variables*

		FD1	FD2	FD3
Adjustment	ΔGINI	-0,4880843*	-0,5014013*	-0,5014009*
Long-run relationship	FD1	0,3028365**		
	FD2		0,2671431**	
	FD3			0,2671435**
	FD4	-0,2092388**	-0,1778934**	-0,1778936*
	FD5	-0,0518303	0,222068**	-0,0450754
Short-run relationship	FD1			
	FD2			
	FD3			
	FD4	0,0644343***	0,0664922***	0,0664922*
	FD5	0,1343206**	0,1339837**	0,1339838**

Note: \*, \*\*, \*\*\* indicate significance at 1%; 5% and 10% respectively.

Source: The author's compilation

Table 4 shows the long-term and short-term results from ARDL model on how financial development interacts with income inequality in Vietnam. Overall, financial improvement is attached with different impacts on the GINI coefficient, depending on financial dimensions. Positive effect on income disparity is registered in financial depth, whereas financial efficiency is found to equalize income distribution and financial instability's positive impact on income inequality is recognized in one of three models. With regard to the short-run analysis, an increasing tendency in financial efficiency and financial instability worsen differences between income groups, which is opposite to non-effective financial depth.

In conclusion, this paper finds that different dimensions of financial growth have heterogenous impact on income inequality where increasing financial institutions' depth is not related to income inequality in the short term but trigger a worse problem in the long run, while financial efficiency confirms a reverse U-shaped interaction with income disparity and financial instability is accompanied by a rise in income inequality in both short run and long run. It is evident that the empirical results regarding the impact of financial depth on income distribution align with the aforementioned hypotheses and theories proposed by Rajan and Zingales (2003) as well as Greenwood and Jovanovic (1990) that Vietnam's financial institutions, which are at early stage of development, are dedicated to the wealthy. In fact, in Vietnam, not only are financial system deposits mainly contributed by high income individuals but private credit by deposit money banks and other financial institutions is much more accessible to the rich as well. That is the reason why rising deposits and credits in financial system are linked with a more

unequal distribution of income. An upturn in the credit to government and state-owned enterprises, indicating financial institutions' efficiency, has a positive influence on income distribution improvement, which is appropriate to the hypotheses and suited to the dominant role of Vietnam's state-owned sector in the whole national economy. And finally, the greater banking volatility tends to aggravate income inequality since the unstable financial system disproportionately hurts the poor, who are more vulnerable, which does make sense.

Finally, the author conducts several diagnostic tests, including the Ramsey RESET test for omitted variables, the Lagrange Multiplier test for autocorrelation of errors, and the White test for heteroscedasticity of errors. The results of these tests collectively affirm the robustness and reliability of the research models.

Table 5. *Diagnostic test results*

	P-value			Note
	Model (1)	Model (2)	Model (3)	
Ramsey RESET test	0,1936	0,2237	0,2237	No omitted variables
Lagrange Multiplier test	0,1249	0,1376	0,1376	No serial correlation
White test	0,3904	0,3908	0,3908	No heteroscedasticity of errors

## 5. Results and discussions

The paper conducts an empirical investigation to examine whether the financial development - income inequality nexus exists or not. Final results withdrawn from the

ARDL model, which is employed to deal with Vietnam's national-level time series data from 1992 to 2021, reveal that the influence of financial development on income inequality depends on the specific measure used to capture multidimensional aspects of financial institutions. On the basis of research findings, the authors would like to propose some policy implications to Vietnam's government to take advantages of financial growth to address unequal distribution in income as follows:

Firstly, regarding financial depth and efficiency, the Government should make their efforts in increasing the banking sector depth through greater availability of private credit and facilitate its distribution to a wider segment of the population or variety of types of ownership, especially state-owned enterprises.

However, secondly, in terms of credit expansion, it is essential for the government to take control through better regulatory framework as excessive credit of financial system is accompanied with higher income disparity. And with a view to improving the stability in the financial system, policymakers had better ensure its transparency by facilitating the diffusion of information on financial institutions' services or promoting their interactions with customers in a fair manner.

Thirdly, high quality human resources are a springboard for financial development to play its role in income disparity mitigation, which is suggested by Galor and Zeira (1993). As a result, the authors would like to advise the Vietnam's government to pay more attention to public education and human capacity improvement.

## REFERENCES

- Abbas, Z., Afshan, G., & Mustifa, G. (2022). The effect of financial development on economic growth and income distribution: An empirical evidence from lower-middle and upper-middle-income countries. *Development Studies Research*, 9(1), 117-128. <https://doi.org/10.1080/21665095.2022.2065325>
- Banerjee, A. V., & Newman, A. F. (1993). Occupational choice and the process of development. *Journal of Political Economy*, 101(2), 274-298.
- Batuo, M. E., Guidi, F., & Mlambo, K. (2010). *Financial Development and Income Inequality: Evidence from African Countries* (No. 25658). University Library of Munich, Germany.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2004). *Finance, inequality, and poverty: cross-country evidence* (No. 3338). The World Bank.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of economic growth*, 12, 27-49.
- Brei, M., Ferri, G., & Gambacorta, L. (2018). *Financial structure and income inequality* (No. 756). Bank for International Settlements.
- Bui, T. N. (2020). Financial development in Vietnam: An overview. *The Journal of Asian Finance, Economics and Business*, 7(9), 169-178. <https://doi.org/10.13106/jafeb.2020.vol7.no9.169>
- Chisadza, C., & Biyase, M. (2022). *Financial development and income inequality: evidence from advanced, emerging and developing economies* (No. 202221). Pretoria, South Africa: Department of Economics, University of Pretoria.

- Čihák, M., Demirgüç-Kunt, A., Feyen, E., & Levine, R. (2012). *Benchmarking financial systems around the world* (No. 6175). The World Bank.
- Claessens, S., & Feijen, E. (2006). *Financial sector development and the millennium development goals* (No. 89). World Bank Publications.
- Cong Nguyen, T., Ngoc Vu, T., Hong Vo, D., & Thi-Thieu Ha, D. (2019). Financial Development and Income Inequality in Emerging Markets: A New Approach. *Journal of Risk and Financial Management*, 12(4), 173. <https://doi.org/10.3390/jrfm12040173>
- 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.
- Dabla-Norris, M. E., Kochhar, M. K., Suphaphiphat, M. N., Ricka, M. F., & Tsounta, M. E. (2015). *Causes and Consequences of Income Inequality: A Global Perspective*. International Monetary Fund.
- Dang-Duc, S., Marriott, N., & Marriott, P. (2008). The banks' uses of smaller companies' financial information in the emerging economy of Vietnam: a user's oriented model. In *Corporate governance in less developed and emerging economies* (pp. 519-548). Emerald Group Publishing Limited. [https://doi.org/10.1016/S1479-3563\(08\)08017-1](https://doi.org/10.1016/S1479-3563(08)08017-1)
- Della, A. W. (2023). The Impact of Financial Development on Poverty, Growth and Inequality in Ethiopia. <https://doi.org/10.21203/rs.3.rs-2185850/v1>
- 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), 11. <https://doi.org/10.1186/s40008-020-0187-6>
- Duasa, J. (2007). Determinants of Malaysian trade balance: An ARDL bound testing approach. *Global economic review*, 36(1), 89-102. <https://doi:10.1080/1226508070121740s5>
- Farnaz, N. (2021). *Essays on financial development and income inequality*. [ Ph.D thesis]. The University of Manchester (United Kingdom). [https://pure.manchester.ac.uk/ws/portalfiles/portal/234003485/FULL\\_TEXT.PDF](https://pure.manchester.ac.uk/ws/portalfiles/portal/234003485/FULL_TEXT.PDF)
- Fosu, A. K. (2017). Growth, inequality, and poverty reduction in developing countries: Recent global evidence. *Research in Economics*, 71(2), 306-336. <https://doi.org/10.1016/j.rie.2016.05.005>
- Galor, O., & Zeira, J. (1993). Income distribution and macroeconomics. *The Review of Economic Studies*, 60(1), 35-52.
- Gastwirth, J. L. (1972). The estimation of the Lorenz curve and Gini index. *The review of economics and statistics*, 306-316.
- General Statistics Office (2024). *Results of the Vietnam household living standards survey 2022*. Statistical Publishing House.
- Greenwood, J., & Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy*, 98(5, Part 1), 1076-1107.
- Hamori, S., & Hashiguchi, Y. (2012). The effect of financial deepening on inequality: Some international evidence. *Journal of Asian Economics*, 23(4), 353-359.
- Hoi, C. M., & Hoi, L. Q. (2012). Financial development and income inequality in Vietnam: An empirical analysis. *Journal of Economics and Development*, 14(2), 5-25.

- Hoi, L. Q., & Hoi, C. M. (2016). Impact of financial development on income inequality in Vietnam. *Journal of Economic Development*, 23(2), 22-37.
- Kaminsky, G. L., & Reinhart, C. M. (1999). The twin crises: the causes of banking and balance-of-payments problems. *American economic review*, 89(3), 473-500.
- Jauch, S., & Watzka, S. (2011). *Financial development and income inequality* (No. 3687). CESifo Working Paper.
- Kappel, V. (2010). The Effects of Financial Development on Income Inequality and Poverty. *CER-ETH-Center of Economic Research at ETH Zurich, Working Paper*, (10/127). <http://dx.doi.org/10.2139/ssrn.1585148>
- Khan, S., Yahong, W., & Zeeshan, A. (2022). Impact of poverty and income inequality on the ecological footprint in Asian developing economies: Assessment of Sustainable Development Goals. *Energy Reports*, 8, 670-679. <https://doi.org/10.1016/j.egy.2021.12.001>
- Le, Q. H., Quach, M. H., & Tran, H. L. (2022). Credit composition and income inequality in Vietnam: an empirical analysis. *Journal of Economics and Development*, 24(4), 365-377. <https://doi.org/10.1108/JED-08-2020-0110>
- Li, H., Squire, L., & Zou, H. F. (1998). Explaining international and intertemporal variations in income inequality. *The economic journal*, 108(446), 26-43. <https://doi.org/10.1111/1468-0297.00271>
- Masud, M. M., Kari, F. B., Banna, H., & Saifullah, Md. K. (2018). Does income inequality affect environmental sustainability? Evidence from the ASEAN-5. *Journal of the Asia Pacific Economy*, 23(2), 213-228. <https://doi.org/10.1080/13547860.2018.1442146>
- MSCI. (2024). MSCI 2024 Global Market Accessibility Review Report. Retrieved December 14, 2024, from <https://www.msci.com/documents/1296102/a37efcf1-4584-6114-ca20-6ca94f1acbc0>
- Naceur, M. S. B., & Zhang, R. (2016). *Financial Development, Inequality and Poverty: Some International Evidence*. International Monetary Fund.
- Nasir, M. A., Shahbaz, M., Mai, T. T., & Shubita, M. (2021). Development of Vietnamese stock market: Influence of domestic macroeconomic environment and regional markets. *International Journal of Finance & Economics*, 26(1), 1435-1458. <https://onlinelibrary.wiley.com/doi/full/10.1002/ijfe.1857>
- Ngo, H. T., & Nguyen, L. T. H. (2024). Consumer adoption intention toward FinTech services in a bank-based financial system in Vietnam. *Journal of Financial Regulation and Compliance*, 32(2), 153-167. <https://doi.org/10.1108/JFRC-08-2021-0061>
- Nguyen, T. H. (2016). *A study on the factors affecting the wealth gap in Vietnam*. [ Ph.D thesis]. National Economics University. [https://sdh.neu.edu.vn/xem-tai-lieu/Nghien-cuu-sinh-Nguyen-Thi-Hue-bao-ve-luan-an-tien-si\\_\\_19171.html](https://sdh.neu.edu.vn/xem-tai-lieu/Nghien-cuu-sinh-Nguyen-Thi-Hue-bao-ve-luan-an-tien-si__19171.html)
- Nguyen, H. T. (2021). Financial development, income inequality and the role of democracy: Evidence from Vietnam. *The Journal of Asian Finance, Economics and Business*, 8(11), 21-29.
- Nguyen, T. M. L. (2021). Financial development and income inequality: Evidence from Southeast Asian countries. *Journal of Finance - Marketing Research*, 50, 38-49. <https://doi.org/10.52932/jfm.vi50.119>

- O'Connor, D. (2000). Financial sector reform in China and Viet Nam: A comparative perspective. *Comparative Economic Studies*, 42, 45-66. <https://doi.org/10.1057/ces.2000.23>
- Ostry, M. J. D., Berg, M. A., & Tsangarides, M. C. G. (2014). *Redistribution, inequality, and growth*. International Monetary Fund.
- Park, D., & Shin, K. (2015). *Economic Growth, Financial Development, and Income Inequality* (No. 441). Asian Development Bank.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326.
- Rajan, R. G., & Zingales, L. (2003). The great reversals: the politics of financial development in the twentieth century. *Journal of Financial Economics*, 69(1), 5-50.
- Ravallion, M. (2004). *Pro-poor growth: A primer* (No. 3242). The World Bank.
- Rodríguez, T. G., Bolívar, H. R., & Bujari, A. A. (2019). Financial development and income inequality, the Latin America case. *Contaduría y administración*, 64(4). <https://doi.org/10.22201/fca.24488410e.2019.1902>
- Seven, U., & Coskun, Y. (2016). Does financial development reduce income inequality and poverty? Evidence from emerging countries. *Emerging Markets Review*, 26, 34-63. <http://dx.doi.org/10.1016/j.ememar.2016.02.002>
- Shahbaz, M., Solarin, S. A., Mahmood, H., & Arouri, M. (2013). Does financial development reduce CO2 emissions in Malaysian economy? A time series analysis. *Economic modelling*, 35, 145-152. <https://doi.org/10.1016/j.econmod.2013.06.037>
- Shi, Y., Paul, S., & Paramati, S. R. (2022). The impact of financial deepening on income inequality: Empirical evidence from Australia. *International Journal of Finance & Economics*, 27(3), 3564-3579. <https://doi.org/10.1002/ijfe.2338>
- Suhaimee, S., Zaidi, M. A. S., Sulaiman, N., & Zulkepli, J. (2021). Impact of financial development on income inequality: evidence from system dynamics approach. *Global Business and Economics Review*, 24(3), 225-247. <https://doi.org/10.1504/GBER.2021.114658>
- Tchekoumi, L. B., & Awounang, C. (2019). Financial development and income inequality: Evidence from African countries in the franc zone. *Modern Economy*, 10(1), 120-136. <https://doi.org/10.4236/me.2019.101009>
- The Communist Party of Vietnam. (2006). *Documents of the 10th National Congress of the Communist Party of Vietnam*. National Political Publishing House.
- The Global Economy. (n. d.). Bank assets to GDP. Retrieved December 14, 2024, from [https://www.theglobaleconomy.com/Vietnam/bank\\_assets\\_GDP/#:~:text=Bank%20assets%2C%20percent%20of%20GDP&text=Historically%2C%20the%20average%20for%20Vietnam,to%202021%20is%2083.22%20percent](https://www.theglobaleconomy.com/Vietnam/bank_assets_GDP/#:~:text=Bank%20assets%2C%20percent%20of%20GDP&text=Historically%2C%20the%20average%20for%20Vietnam,to%202021%20is%2083.22%20percent)
- The Global Economy. (n. d.). Stock market capitalization, percent of GDP. Retrieved December 14, 2024, from [https://www.theglobaleconomy.com/Vietnam/stock\\_market\\_capitalization/#:~:text=Stock%20market%20capitalization%20as%20percent%20of%20GDP&text=The%20latest%20value%20from%202022,to%202022%20is%2033.51%20percent](https://www.theglobaleconomy.com/Vietnam/stock_market_capitalization/#:~:text=Stock%20market%20capitalization%20as%20percent%20of%20GDP&text=The%20latest%20value%20from%202022,to%202022%20is%2033.51%20percent)
- Topuz, S. G. (2022). The relationship between income inequality and economic growth: are transmission channels effective?. *Social Indicators Research*, 162(3), 1177-1231. <https://doi.org/10.1007/s11205-022-02882-0>

- Trapeznikova, I. (2019). Measuring income inequality. *IZA World of Labor*, 462-462. <http://doi.org/10.15185/izawol.462>
- United Nations. (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. Retrieved October 14, 2023, from <https://sdgs.un.org/2030agenda>.
- Vo, D. H., Pham, A. T., Tran, Q., & Vu, N. T. (2023). The long-run effects of financial development on income inequality: Evidence from the Asia-Pacific countries. *Heliyon*, 9(8). <https://doi.org/10.1016/j.heliyon.2023.e19000>
- Zahra, H. S. (2019). *The Effect of Financial Development on Income Inequality: An Empirical Study of Developing Countries*. [ Ph.D thesis]. Pakistan Institute of Development Economics, Islamabad. <https://file-thesis.pide.org.pk/pdf/mphil-development-studies-2017-hafiza-sadaf-zahra--the-effect-of-financial-development-on-income-inequality-an-empirical-study-of-developing-countries.pdf>
- Zungu, L. T., Greyling, L., & Kaseeram, I. (2022). Financial development and income inequality: a nonlinear econometric analysis of 21 African countries, 1990-2019. *Cogent Economics & Finance*, 10(1), 2137988. <https://doi.org/10.1080/23322039.2022.2137988>