



Economic inequality over financial cycle in Vietnam*

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Abstract

The paper investigates the dynamics of economic inequality over the financial cycle in Vietnam using the Hodrick-Prescott decomposition and one time-series sample from 2000 to 2022. Research results record that economic inequality has a timely switching regime, being lowly correlated with the financial market over 2000-2010 but highly correlated over 2011-2022. Economic inequality also has a fragmentation in the sense that it is differently correlated with different components of the financial cycle. Combining these two characteristics, economic inequality is closely related to the credit growth rate over 2000-2010, then turns to be more related to the gold price change rate over 2011-2022. This evidence also suggests the employment of a switching regime model to analyze the economic inequality in Vietnam in future research avenues.

Keywords: Economic inequality, Hodrick-Prescott decomposition, Vietnam

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1. General introduction

Economic inequality governs the process of capital accumulation through its ability to influence the distribution of income and savings among individuals in an economy (Piketty, 2014; Galor and Zeira, 1993). In theory, inequality can be understood as the uneven distribution of opportunities, according to Weber (2019), or the uneven distribution of capabilities, according to Sen (1991). Either way, economic inequality is closely linked to savings in the economy, so inequality also has the potential to be related to fluctuations in financial markets (Botta et al., 2021; Kaldor, 1955). At the same time, in practice, recent studies have shown that, after the COVID-19 pandemic, economic inequality tends to increase while financial markets also experience extreme fluctuation. Theory and practice suggest that economic inequality may be closely related to financial cycle fluctuations. This connection raises the question of how changes in economic inequality relate to financial cycle fluctuations. This question is even more critical for Vietnam, as its economy is moving towards economic and social sustainability, but its financial market is still developing. This article answers this question by combining quantitative and qualitative analysis based on a time series data sample for Vietnam from 2005 to 2023.

The paper shows that economic inequality closely follows the evolution of the financial cycle in Vietnam but with divergence and fragmentation. The divergence pattern shows that economic inequality is initially less correlated with financial markets in 2000-2010, then becomes more correlated in 2011-2022. This pattern is also fragmented in the sense that inequality has different relationships with each type of financial market. Combining these two characteristics shows that inequality closely follows the credit growth rate in 2000-2010, followed by a shift to closely follow the rate of change in gold prices in 2011-2022. These results suggest that future studies should use a switching regime model to determine the economic inequality in Vietnam.

The results of the paper complement the current research on economic inequality. The economic inequality is closely linked to income distribution across asset classes. High-income groups tend to hold assets with higher investment returns because they have a higher risk tolerance (Piketty, 2014). Low-income groups, on the other hand, tend to hold fewer assets, mainly low-return assets, and have income from wages. In an economy, the wealth of high-income groups increases at the rate of r while that of low-income groups increases

at the rate of g . Therefore, the gap between r and g determines the distribution of income or economic inequality among individuals (Alvaredo et al., 2017). As financial markets become more volatile, leading to an increase in the gap $r-g$, the income inequality worsens.

For this research branch, the paper points out the relationship between economic inequality and fluctuations in the financial cycle, according to which the change in economic inequality can also be cyclical. In Vietnam, along the financial cycle, economic inequality also changes. After the upturn phase of the financial cycle, economic inequality increases; after the downturn phase of the financial cycle, economic inequality narrows.

The paper also contributes another result to recent studies on financial cycles. The financial economy exists in parallel with the real economy, closely correlated with the financial economy, based on the vital role of finance in the economy. The financial cycle also exists longer than the real economic cycle (Borio, 2014). With international globalization, since the financial markets of countries are interconnected, the financial cycle of a large economy such as the United States creates a spillover effect on the financial economy and the real economy of economies worldwide (Miranda-Agrippino and Rey, 2020). The significant influence of a large financial cycle on other cycles creates a global financial cycle system (Miranda-Agrippino and Rey, 2022). One filter of the effects of these financial cycles is through changes in exchange rates, in which a floating exchange rate regime allows the most flexibility in absorbing shocks from external financial cycles (Obstfeld et al., 2019). Complementing the branch mentioned above of research on financial cycles, this article shows that financial cycles can create changes in income distribution among income groups, thereby affecting economic inequality. Some other studies have also pointed out this effect but have not analyzed the Vietnamese economy (Bordo and Meissner, 2012; Botta et al., 2021). According to the results of this article, in Vietnam, the financial cycles affect income inequality mainly through adjusting gold prices.

2. Analytical framework

In a context where many different understandings of the financial cycle coexist, the article uses Borio et al.'s (2014) approach as a basis for data collection and selection of appropriate analysis methods. According to this approach, the financial cycle mainly includes the economy's credit cycle. Applied in Vietnam, the article adds the cycle of gold prices, an important asset in storing value in the economy.

2.1. Data

The dataset used in the paper is a time series sample from 2010 to 2023. The sample's time dimension allows the paper to capture the trend of economic inequality and financial cycles over time.

The economic inequality is often measured by the Gini coefficient on income distribution (Gini, 1912; Lorenz, 1905). The Gini coefficient has been developed in many directions, such as adding the social welfare dimension (Atkinson, 1970) or the gap between different income groups (Theil, 1967). However, this data in Vietnam is published intermittently by the General Statistics Office (2024) with a frequency of every two years and even years. Therefore, the Gini coefficient is unsuitable for assessing continuous fluctuations over time.

Given the current lack of data, to ensure continuity in assessing economic inequality, the article uses the income share of the top ten percent income group in the total national income, denoted by *Top10incomeshare*, as a measure of economic inequality. This variable is exploited from the World Inequality Database, developed by Alvaredo et al. (2017). The advantage of this variable lies in its ability to reflect income distribution, that is, the share of gross domestic product (GDP) after deducting income taxes and other amounts. Moreover, this measure is continuously calculated to expand over time, as in Vietnam, the data still covers since the 1960s, which is a very long time, especially when compared to the Gini coefficient.

The financial cycle is first represented by the credit growth rate in the economy, denoted by *Creditbalanceyoy* in percentage. This data is extracted from the State Bank database (2024). In addition, the financial cycle is also represented by the rate of change in gold prices, denoted by *Goldpriceyoy* in percentage. This data is extracted from the General Statistics Office database (2024).

TABLE 1: Descriptive statistics of sample data

Variable	Mean	Standard deviation	Min	Max
Top10incomeshare (%)	0.45	0.02	0.44	0.48
Goldpriceyoy (%)	13.08	14.40	-11.49	39.00
Creditbalanceyoy (%)	22.20	12.79	7.83	58.36

Source: Author's calculation.

Table 1 describes the statistical parameters of the data sample. The economic inequality has an average value of 0.45 percent with a standard deviation of 0.02 percent. These parameters show that the fluctuation of this variable is low, that is, stable over time. This stability is also shown by the slight difference between the largest value (0.48 percent) and the smallest (0.44 percent). The credit growth rate has an average value of 22.20 percent with a standard deviation of 12.79 percent. Compared to this variable, the rate of change of gold price has a lower average value (13.08 percent) but a higher standard deviation (14.40 percent). The parameters show that the data set has a reasonably high fluctuation amplitude, which is suitable for assessing economic inequality associated with the financial cycle.

2.2. Method

The decomposition of the financial cycle plays a fundamental role in the research content. To do so, the article uses the HP filtering method, proposed by Hodrick and Prescott (1997), to decompose a financial variable into a trend component and a cyclical component. Accordingly, a variable y_t is decomposed by the sum of the trend component τ_t and the cyclical component c_t .

$$y_t = \tau_t + c_t + \epsilon_t \quad (1)$$

Whereby, the error component ϵ_t represents other elements of the variable after calculating the trend and cyclical oscillation components. This list of variables y includes the income share of the top ten percent in a country's total income (*Top10incomeshare*), the credit growth rate (*Creditbalanceyoy*) and the rate of change of gold prices (*Goldpriceyoy*).

By applying this method, each financial cycle variable, including credit growth rate and gold price change rate, is decomposed into two components: the trend component (trend) and the cyclical component (cyclical). For example, credit growth is decomposed as follows:

$$Top10incomeshare_t = Top10incomeshare_trend_t + Top10incomeshare_cyclical_t \quad (2)$$

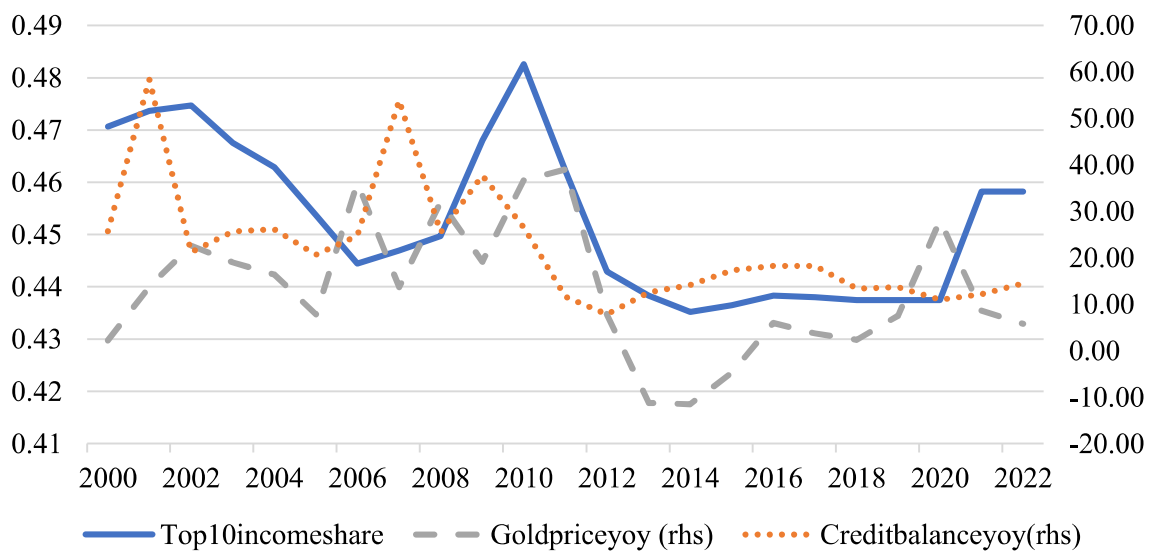
In economic terms, the trend component τ_t reflects the long-term value that a variable converges to over time. The value of this component can change, such as increasing or decreasing, over time. The cyclical component reflects c_t the degree of variation of a variable in the short term, deviating from the long-term trend value. This variation is assessed by the degree of deviation, high or low, and the time this variation decreases so that the variable value returns to the long-term trend value.

3. Result

The economic inequality closely follows the financial cycle, as shown by fluctuations in credit balance and gold prices. This relationship includes the following main characteristics: (i) the economic inequality, credit balance and gold prices all have two distinct cycles in ten years, including 2000-2010 and 2011-2020; (ii) the trend component of economic inequality is closely correlated with credit balance in the period 2000-2010 and with gold prices in the period 2011-2020; (iii) the cyclical component of economic inequality closely follows the fluctuations of both credit balance and gold prices.

The economic inequality is cyclical and each cycle lasts for ten years. As shown in Figure 1, economic inequality fell from 0.47 percent in 2000 to 0.44 percent in 2006 before rising again to 0.48 percent in 2010. This level of 0.48 percent was also the peak for the entire 20-year period. This decline and increase cycle continued for 2011-2022, when economic inequality fell from 0.48 percent in 2010 to 0.44 percent in 2012, continuing for the next few years, before rising again to 0.46 percent in 2021.

FIGURE 1: **Economic inequality, credit balances and gold prices in the period 2000-2022 (percent)**



Source: Author’s calculation from data by Vietnam General Statistics Office (2024) and State Bank of Vietnam (2024).

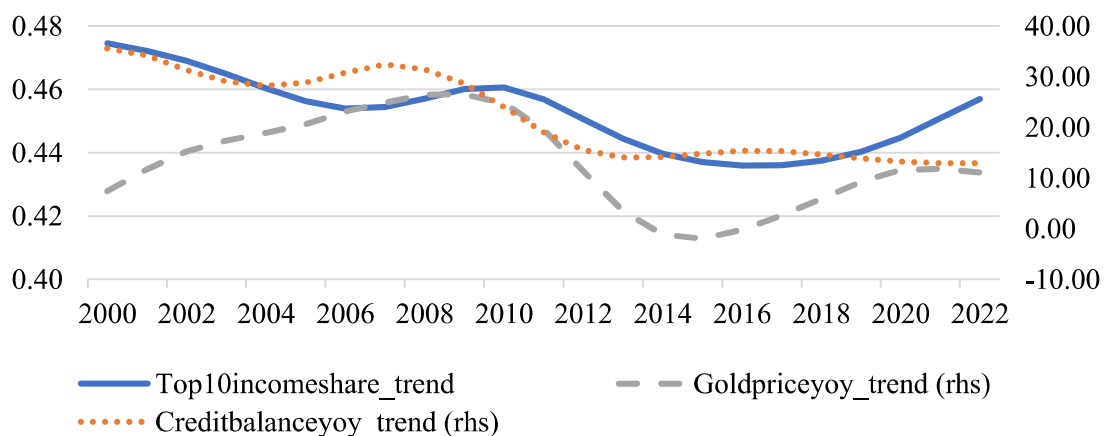
The financial cycle is also quite clearly shown in the 2000-2010 and 2011-2020 periods. In 2000-2010, the credit growth rate reached 58.76 percent in 2001 and then decreased to

20.67 percent in 2005 before increasing again to 37.73 percent in 2009. From 2011 to 2020, the growth rate of gold prices started at a high level, reaching 39 percent in 2011, then decreased to (-11.49 percent) in 2014, before increasing again to 28.05 percent in 2020.

Following the cycle of economic inequality, the cycles of credit balance and gold prices also fluctuate closely but with a separation. In 2000-2010, the credit growth rate closely followed economic inequality while gold prices were quite loose. However, in the period 2011-2020, the credit growth rate less closely followed economic inequality, while gold prices followed economic inequality very closely. These relationships are clearly shown in Figure 2.

The trend lines of economic inequality and gold prices are concave in the same direction, forming two curves that follow each other very closely over 2011-2020. Even the bottoms of these two curves fall close together, with the bottom of gold prices in 2015 and economic inequality in 2016. This image shows the cyclical convergence of two different variables. This convergence also indicates that the fluctuations in asset values during the financial cycle impact income distribution among individuals. When asset prices fall, economic inequality also falls because the wealth of the high-income group slows down, moving closer to that of the low-income group. When asset prices rise, economic inequality also increases because the wealth of the high-income group increases rapidly, widening the gap with that of the low-income group.

FIGURE 2: Trends in economic inequality and credit balances and gold price in the period 2000-2022 (percent)

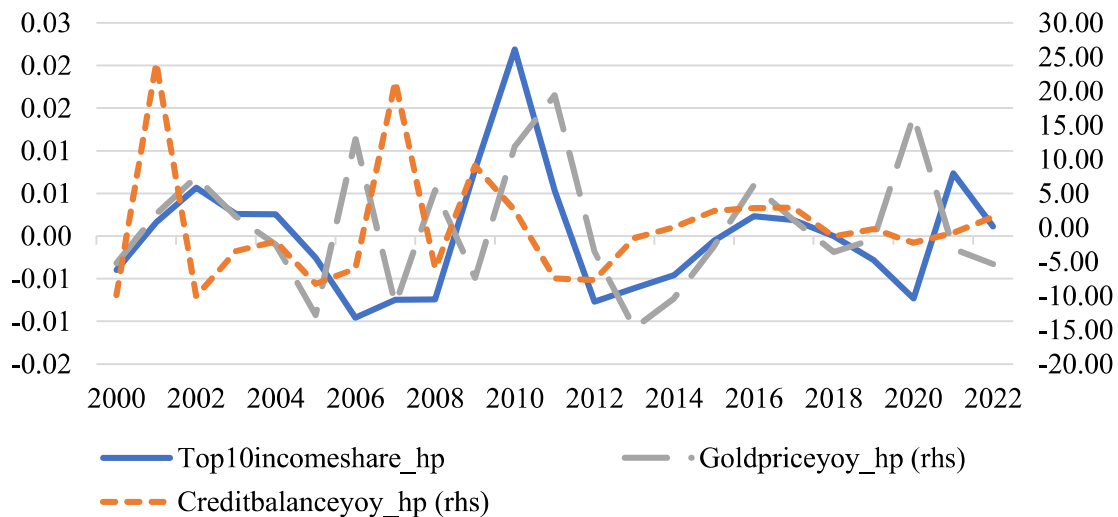


Source: Author’s calculation from data by Vietnam General Statistics Office (2024) and State Bank of Vietnam (2024).

Another point worth noting is that the credit balance and gold prices are also related to each other, at least within the monetary policy framework, because they both determine the money supply in the economy. These two variables exhibit cyclical fluctuations with relatively low correlation. This lack of connection also proves that gold prices are mainly affected by factors outside of monetary policy in Vietnam. The low correlation may also be the reason for phase separation when inequality closely followed credit balance in 2000-2010 and then shifted to follow gold prices in 2011-2020 closely.

The third characteristic of economic inequality over the financial cycle is its almost identical fluctuations relative to the general trend. Figure 3 records the fluctuations around the trend of the variables. This image shows a clear pattern; all three variables fluctuate around the trend almost identically, especially in 2011-2020. Specifically, when economic inequality increases the gap with the trend, both the credit growth rate and the rate of change in gold prices rise relative to the trend. The same pattern occurs when the economic inequality decreases lower than the trend.

FIGURE 3: **Fluctuations around the trend of economic inequality, credit balance and gold price in the period 2000-2022 (percent)**



Source: Author’s calculation from data by Vietnam General Statistics Office (2024) and State Bank of Vietnam (2024).

In statistical terms, the trend line represents the long-run equilibrium value that a variable moves toward. In contrast, the cyclical line around the trend line represents the short-run value of a variable. The development shown in Figure 3 shows that the short-run values of

economic inequality and the financial cycle follow each other very closely. In other words, the financial cycle is indeed closely correlated, influencing economic inequality, as some theories and empirical evidence have recently shown (Bordo and Meissner, 2012; Botta et al., 2021; O'Farrell and Rawdanowicz, 2017; Paul, 2023).

In general, economic inequality is more closely correlated with gold prices than credit balance. This correlation further confirms the role of the asset market and, thus, the asset allocation in the economic inequality in Vietnam - a fundamental characteristic unique to Vietnam compared to other markets. Specifically, the credit balance is the most important representative of the financial cycle in developed economies such as the United States and the European Union (Borio, 2014; Miranda-Agrippino and Rey, 2022). However, in Vietnam, credit balance does not seem to have such a characteristic; instead, it is the price of gold.

Recent research shows that credit balance controls inflation but has little impact on economic growth (Hung, 2021; Bhattacharya, 2014; Nguyen et al., 2012; Hang and Thanh, 2010). It should be noted that, as argued by Piketty (2014), the financial cycle is essential when it affects both interest rates r and growth rates g . Accordingly, the influence of credit balance on growth g is low, while credit balance itself has little impact on interest rates r . Combining these two factors is the reason for the weak influence of credit balance on income distribution, that is, economic inequality. However, gold prices differ from the credit balance regarding their influence on the economy, especially on interest rates r and economic growth g . Gold is a highly safe asset, acting as a currency, so people convert their savings into gold instead of depositing them in banks. Accordingly, the money multiplier decreases, weakening the transmission mechanism of monetary policy on interest rates. The stronger the gold price increases, the stronger the attraction of income to gold and the thinner the liquidity of the banking system becomes. When liquidity is thin, the interest rate level will increase.

Gold is also an asset that accumulates value over time, like economic capital. However, unlike capital, such as factories and machinery, which create physical products such as goods and services through the production function, gold does not create physical products. Therefore, the more people's wealth is stored in gold, the more capital in the economy is narrowed, creating another constraint that limits economic growth. In Vietnam, this reality is also the basis for policymakers to find ways to effectively manage the gold market for many years to direct gold and promote growth.

The assessment of economic inequality over the financial cycle suggests that a quantitative analysis model suitable for the Vietnamese economy would need a switching regime. Specifically, assuming T is the time when the pattern of economic inequality changes, a quantitative model that analyzes the variable y over time t can be described as follows:

$$y_t = y_1 \text{ if } t < T \text{ and } y_t = y_2 \text{ if } t > T \quad (3)$$

Equation 3 implies that after time T , the value of y will change from y_1 to y_2 . In practical model construction, the variable y could be economic inequality in a univariate model or a vector of multiple variables, such as economic inequality, credit balance, and gold prices, in a multivariate model.

4. Conclusion and policy discussion

Economic inequality tends to fluctuate with the financial cycle in Vietnam, with the relationship varying across variables and periods. When the economy is in an expansionary phase of the financial cycle, economic inequality increases, while when the economy is in a contractionary phase, economic inequality decreases. Over time, economic inequality has become more closely linked to fluctuations in gold prices and more disconnected from fluctuations in credit balances, highlighting the role of asset markets in redistributing income among individuals in the economy.

According to these results, policies to address economic inequality need to integrate fiscal and financial policies. Currently widely used, fiscal policies based on taxes and subsidies still help improve income redistribution. However, economic inequality requires direct income redistribution solutions and indirect solutions based on financial market stability. In particular, the prioritized solutions may include closer supervision of financial markets and regulation of these markets so that the financial economy evolves more closely with the real economy, especially the gold market.

In the future, the content of this paper can further delve into the quantitative interaction between social inequality and the financial cycle in Vietnam. This research direction can provide empirical evidence on the negative impact of economic inequality on financial volatility, thereby suggesting specific ways to reduce inequality while stabilizing the current financial cycle.

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