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In search of balance between economic growth and inflation in Vietnam

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Abstract: We define the balance point between economic growth and inflation as the maximum economic growth rate, given that the inflation rate is lower than one value. In the Vietnamese economy, multiple balance points exist. In one balance point, the economic growth is 8.02% given the inflation is below 4%, while in another point, the economic growth is 7.70%, given the inflation is in the 7-8% range. And there is a trap embedded in the 5-6% inflation range. Either the reduction of inflation to below 4% or its increase to fall into the 7-8% range is associated with a greater economic growth rate. Thus, the balance between economic growth and inflation can be considered as a balance path rather than just one balance point. The result is robust in accounting for the role of the foreign exchange rate, as proxied by the depreciation of the domestic currency, and also robust on accounting for both the annual and quarterly data sample. Since higher inflation is harmful to economic growth with a negative correlation coefficient of -0.05 in annual sample, the objective of public policy should be placed in the combination of economic growth and inflation when the inflation rate is below 4%.

Keywords: Economic growth, inflation, Vietnam.

1. Introduction

At the end of 2022, the Prime Minister of Vietnam officially announced achieving a balance between economic growth and inflation as the priority for public policy in the new year (Vietnamnet, 2022). This balance point, in turn, opens a research gap on the current literature. We approach this point by combining the economic theory with the policy practice in the Vietnamese economy. In theory, we review three related studies on optimal economic growth, optimal inflation and inflation threshold. In practice, we examine the key idea in the indicators proposed by the Vietnamese government, which is realized in the first Decision issued in January of each year. Accordingly, economic growth is more important than inflation in the policy architecture.

We define the balance point between economic growth and inflation as the maximum economic growth rate given one constraint that the inflation rate is lower than one value. Based on this concept, the evidence records that multiple balance points exist: one has economic growth at 8.02% with inflation below 4%, and another has economic growth at 7.70% with inflation in the 7-8% range. And there is also a trap attached to inflation in the 5-6% range: either reducing inflation to be below 4% or raising inflation to be 7-8% would be associated with a greater economic growth rate. In brief, the balance between economic growth and inflation can be considered as a path rather than just a point.

The paper belongs to the literature on economic growth. In the neoclassical growth theory (Solow, 1956), the economic growth rate, measured by the annual change of output, is exogenously given by technological progress and labour force expansion. Later models of endogenous growth explain the source of technological progress. The progress can rely on the capital accumulation process as in the AK model (Frankel, 1962), or on product variety (Romer, 1990), or on research and development expenditure (Aghion & Howitt, 1992), or on human capital accumulation (Mankiw et al., 1992). Therefore, an optimal economic growth rate exists, which maximizes the welfare of an economy. Accordingly, economic growth is one control variable while welfare is an objective variable.

Our paper complements the aforementioned literature by finding one economic growth rate, which is on balance with inflation. This concept of economic growth grows out of policy architecture and is related to, but still different from, optimal economic growth. Technically, in our analysis framework, economic growth is an objective variable to be maximized, rather than a control variable as in the literature.

The paper is also related to the literature on inflation. Inflation is determined by both monetary and fiscal factors and demand or supply shocks (Blanchard, 1989). In an open economy context, inflation is also related to world inflation and affected much by expectation (Bhattacharya, 2014). Moreover, inflation also affects economic growth as one crucial factor of macroeconomic stability (Clarida et al., 2000). A stable and low inflation rate enhances economic growth. But a too-high inflation rate can also reduce economic growth. Thus, an optimal inflation rate can exist, which can contribute positively to economic growth.

In the empirical analysis, many papers also reveal a threshold of inflation above which inflation impedes economic growth. But below the threshold, the impact of inflation on economic growth turns out to be insignificant. The inflation threshold can be 2% for industrialized economies and up to 17% for non-industrialized economies (Kremer et al., 2012). The inflation threshold can be 5.43% for Asian economies (Vinayagathasan, 2013), or 4% or even higher at 8% for Vietnam (Chi, 2019).

Our paper contributes one new result to the literature on inflation by showing that inflation is one constraint for economic growth. In Vietnam, economic growth turns out to be conditional on the inflation. In detail, the objective of public policy is to attain a maximum economic growth rate, given the inflation rate being lower than one value proposed by the government. This inflation value is 4% since 2017, and it only increases slightly to 4.5% in 2023.

2. Framework

2.1. Literature review

The balance point between economic growth and the inflation rate arises from the public policy architecture. Thus, an appropriate approach to the balance point is to examine the related literature, and then propose a concept for the analysis. In particular, the balance point between economic growth and inflation can be related to the theories on, (i) optimal economic growth, (ii) optimal inflation and (iii) growth-inflation relationship.

First, according to the literature on optimal economic growth, optimal economic growth is the economic growth rate that maximizes the welfare of an economy (Lucas, 2000). Welfare can be measured by the utility sum for society over an unbounded period. McKenzie (1986) shows that the primary sources of the optimal growth model are the aggregate savings programs and capital accumulation programs for an economy.

Recently, the line of research on optimal economic growth has received some refreshed explorations. Jones (2022) argues that when the population declines rather than stabilizes in the long run, economic growth would be featured by stagnated living standards rather than continued exponential growth. Oikawa and Ueda (2018) construct an endogenous growth model in which the central banks can maximize the economic growth rate by setting their inflation target at a negative of fundamental growth.

Second, according to the literature on optimal inflation, one optimal inflation rate exists that can enhance the economic growth rate, since both a too-high or too-low inflation rate is harmful to the economy (Billi & Kahn, 2008). By simulating a model of the United States economy, these authors find that the optimal inflation rate is estimated to range from 0.7 to 1.4%, depending on the assumed degree of model uncertainty. Schmitt-Grobe and Uribe (2010) record that the optimal rate of inflation, predicted by leading theories of monetary non-neutrality, falls in the range from minus the real rate of interest, to some numbers insignificantly above zero.

Related to the optimal inflation rate, there is also evidence of the existence of a threshold in the inflation rate so that above the threshold, the inflation rate impedes economic growth. But below the threshold, the impact of the inflation rate on economic growth is insignificant. In Asian economies, the inflation threshold can be 5.43% (Vinayagathasan, 2013). And in the Vietnamese economy, this threshold can be 4% as evidence by Chi (2019) or even higher at 8%, from the result by Ho (2014). Moreover, in public policy practice, the optimal inflation literature also guides the implementation of inflation-targeting monetary policy. When the target in inflation is approximated to the optimal rate, the monetary policy can both stabilise the inflation and contribute to enhancing economic growth.

Third, according to the literature on the output-inflation trade-off (Lucas, 1978), a higher inflation rate can be associated with a greater economic growth rate. Recent papers also provide various theoretical models and empirical evidence to account for the output-inflation trade-offs (Ball et al., 1988; Hung, 2021). In the classical theory of money, a positive growth rate of the money supply is translated into an increase of price level or the inflation rate. But money growth also raises the aggregated demand by lowering the interest rate, which then levels up the economic growth. Thus, a higher inflation rate is associated with a greater economic growth.

The inflation rate can also negatively affect the economic growth rate. Since an economy with a high inflation rate has an unstable macroeconomic environment, the high inflation is detrimental to economic growth. In detail, firms reduce their investment due to the higher cost of capital, i.e., the interest rate effect; households decrease their consumption due to lower real wealth, i.e., the wealth effect; and foreigners buy fewer domestic goods and services due to higher prices, i.e., the exchange rate effect. In a sample of 100 economies over 1960-1990, Barro (2013) shows that an increase in average inflation by 10 percentage points per year is a reduction of the growth rate of real per capita GDP by 0.2-0.3 percentage points per year.

In brief, the highest economic growth can exist, given some constraints on other macroeconomic variables. And the inflation is also crucial for economic growth, thus both can enhance or impede economic growth.

2.2. Theory

We define the balance point between the economic growth and inflation rate as the maximum value of economic growth given a constraint on the inflation rate. By this approach, economic growth is considered to be conditional on the inflation rate. This consideration is consistent with the context of the Vietnamese economy in which economic growth is the most important objective to stimulate the living standard of domestic households; while the inflation rate also needs to be controlled at an appropriate value (Vietnamnet, 2022).

2.2.1. Benchmark model

The balance point between economic growth and the inflation rate is captured by the following objective function:

$$Maximize\ EconomicGrowth_t \quad (1)$$

$$such\ that: Inflation_t < \overline{Inflation} \quad (2)$$

whereby, the time notation illustrates the dynamic of the maximization problem, since at the end of each year, the Vietnamese government proposes both the indicators of economic growth and the inflation rate for the next year.

In the maximization problem (1), economic growth is one function of the inflation rate. In a simple version, when economic growth is a monotonic function of the inflation rate, such as a decreasing function, the maximum value of economic growth is attained for the lowest value of inflation. In that case, the constraint is not binding. But in fact, economic growth can be a non-monotonic function of the inflation rate, such as quadratic or even cubic function, and the maximum economic growth can be unique or multiple, and the constraint can be binding.

The objective function, as captured by equation (1), reflects the idea from the literature on optimal economic growth. In particular, economic growth in the concept of a balance point would be the maximum value given some constraints. In the optimal growth literature, the constraint is the welfare value of an economy. And in the concept of the balance point, the constraint is one threshold value of the inflation rate.

The constraint function, as captured by inequality (2), reflects the idea from the literature on the optimal inflation and inflation threshold. In detail, the inflation rate in the concept of a balance point serves as one constraint for the objective function of economic growth. But in the literature on optimal inflation and inflation threshold, the inflation rate is the objective of the maximum problem.

2.2.2. Extended model

The balance point between the economic growth and inflation rate can take into account the exchange rate. The extended model is captured by the following objective function:

$$\text{Maximize } EconomicGrowth_t \qquad (3)$$

$$\text{such that}: Inflation_t < \overline{Inflation} \qquad (4)$$

$$VNDdepreciaton_t < \overline{VNDdepreciation} \qquad (5)$$

whereby, the extended model considers the annual changes in the foreign exchange rate as one additional constraint for the economic growth rate.

The addition of foreign exchange rates illustrates the role of foreign exchange rates in one small open economy like Vietnam. Currently, the State Bank of Vietnam follows a central exchange rate regime, a similar version to the controlled floating exchange rate regime as classified by the International Monetary Funds (2022). In particular, the central bank announces an official exchange rate, and the interbank foreign exchange market can deviate from this official exchange rate by some percentage points. And the central bank is ready to intervene in the foreign exchange market to ensure the stability of the foreign exchange rate.

The fluctuation of the exchange rate is one channel for the domestic economy to absorb the shocks from the world economy. As a well-known Triffin dilemma in international finance, the State Bank of Vietnam in fact chose the combination of independent monetary policy and a managed exchange rate with controlled foreign capital flows. Within this choice, since the foreign exchange rate affects directly the macroeconomic variables, the exchange rate becomes a constraint for the economy to pursue a maximized economic growth rate. This idea is captured by the inequality (5) in the extended model.

We note that there are also various approaches to the balance point between economic growth and the inflation rate; thus there are different forms of maximization problems. This variety relies on the fact that the notion of a balance point arises from public policy architecture rather than economic science research. And in fact, the indicator for economic growth and inflation proposed by the Vietnamese government for a new year is a special feature in the policy implementation. And this feature needs to be captured in any appropriated approach.

We only consider the proposed concept with associated framework in our paper as one first step to investigate the balance point. Hereby, we focus on the formulation of concept so that we can make a bridge between the policy and the facts on the economy. Thus, we only state the maximization problem to capture the balance point. One researcher can approach the balance point by formulating an in-detail objective function and constraint inequality, and then solve for the exact solution of the balance point.

For instance, three objective variables, including economic growth, inflation and exchange rate can be constructed as the function of three control variables, including: monetary supply, fiscal balance and foreign capital management.

2.3. Data

The data set is an annual time-series sample of the Vietnamese economy over the 2000-2022 period. The beginning year is the earliest time point that the Vietnam General Statistics Office - GSO (2023) releases the online database, while the ending year is the latest time point until now. Following strictly the time framework by the GSO is useful since the data on the inflation, as mentioned later, is uniquely and officially announced by this agency for the Vietnamese economy.

First, economic growth is the annual change of real gross domestic product in the constant 2010 national price, released by the GSO (2023). The data is available in the online database and associated quarterly economic-social reports by the GSO (2023).

Second, the inflation rate is measured by the annual average change of the overall price level on percentage units, whereby the price level is measured by the consumer price index (CPI). The data is also available in the online database and associated quarterly economic-social reports by the GSO (2023).

At the end of each year, the GSO (2023) releases three annual inflation rates, including (i) the annual average change of the consumer price index in one year compared with the corresponding index of the previous year; (ii) the annual change of the consumer price index in the fourth quarter of one year compared with the fourth quarter of the previous year; and (iii) the annual change of the consumer price index in December of one year compared with the December of the previous year.

Among these inflation rates, only the first one is consistent with the indicator of inflation rate proposed by the Vietnamese government. This indicator is also employed for the monetary policy by the State Bank of Vietnam. In particular, at the end of each year, the Vietnamese government suggests the indicator of the inflation rate for the next year. This indicator is examined and approved by the National Assembly of Vietnam. Then, the Vietnamese government releases the indicator of inflation officially in the first Decision of the new year; usually the first Decision on the Yearly Economic-Social Plan.

For example, the indicator of inflation rate proposed in November 2022 for 2023 is 4-4.5% by the Decision No. 01/NQ-CP by the Vietnamese government on the main solutions to implement the economic-social plan, public budget and business environment improvement and national competitiveness enhancement in 2023 (Vietnam Government Online, 2022).

Therefore, we employ the first measure of the annual average change of consumer price index in one year compared with the previous year as the inflation rate in our paper. This approach creates consistency between the research results and the public policy discussion.

Third, the foreign exchange rate is measured by the annual changes in the nominal exchange rate between the domestic currency, Vietnam Dong (VND) and United States Dollar (USD), as a percentage. An increase of this variable reflects the depreciation of the domestic currency while its decrease captures the appreciation of domestic currency. The data on the nominal exchange rate (VND/USD) is from the global macroeconomic monitor database constructed by the World Bank (2023).

We also carry out a robustness analysis with a quarterly data sample. The time period of the quarterly sample covers from the first quarter of 2007 to the second quarter of 2023. The beginning time point is 2007 which is the earliest time having the data released online by the GSO (2023).

The quarterly economic growth rate is the annual change of the quarter's real gross domestic product in the constant 2010 price in domestic currency. And the quarterly inflation rate is the average change of consumer price index of one quarter compared with the same quarter of the previous year. These two variables are from the GSO (2023). Finally, the quarterly foreign exchange rate is the annual changes of the nominal exchange rate between VND and USD. The data is from the global macroeconomic monitor database constructed by the World Bank (2023).

Table 1: Descriptive statistics

Variable	Observations	Mean	Standard deviation	Min	Max
1. Annual sample					
Economic growth (%)	23	6.42	1.36	2.6	8.02
Inflation rate (%)	23	5.91	5.61	-1.62	22.97
Exchange rate (%)	23	2.25	2.52	-1.28	8.23
2. Quarterly sample					
Economic growth (%)	66	5.84	2.27	-6.17	13.67
Inflation rate (%)	66	6.61	6.33	0.29	27.75
Exchange rate (%)	66	2.38	3.03	-1.62	9.75

Source: GSO (2023).

We also note that both the annual and quarterly dataset are also consistent with the analysis framework. First, the balance between economic growth and inflation is mainly originated from the policy architecture related to the indicator of growth and inflation. In the Vietnamese economy, these indicators are released for annual data. Second, the indicator on inflation, that is the annual average change of overall price level, is uniquely released by the GSO; thus, it is necessary to explore the data by this agency rather than other agencies even with different time series datasets. Third, the analysis framework, captured by equation (1) to (5), is related to the picking of the economic growth rate given the range of the inflation rate, rather than the regression of economic growth on the inflation rate. Therefore, the annual data sample is still useful for the analysis.

Table 1 shows the descriptive statistics for the data sample in the Vietnamese economy. For the annual sample, there are 23 yearly observations from 2000 to 2023. The economic growth rate has a mean of 6.42% with a standard deviation of 1.36%. Compared with this variable, the inflation rate has a higher mean of 5.61% with a greater standard deviation of 5.61%. The range of value of the inflation rate, from a minimum of (-1.62%) to a maximum of 22.97%, is also much larger than that of the economic growth rate, which is from 2.6% to 8.02% correspondingly. Among these variables, the annual changes in the foreign exchange rate have the lowest mean at 2.25% with the lowest standard deviation at 2.52%. This reflects the fact that the exchange rate follows a controlled floating regime in the Vietnamese economy. Moreover, the quarterly sample also exhibits a large variation. The inflation rate still has the largest standard deviation while the economic growth has the lowest deviation. The inflation also has a highest mean while the exchange rate has a lowest mean. In brief, the data offers a great deviation to explore the interaction of the economic growth rate with other macroeconomic variables in Vietnam.

3. Evidence

3.1. Balance between economic growth and inflation

Figure 1 examines the maximum economic growth rate over a different range of inflation rates. The highest economic growth is 8.02% in 2022 when the inflation rate is between 3-4%. If we only account for the time period before the COVID-19 pandemic, the highest economic growth would be 7.50% in 2018 when the inflation rate falls in the range of 3-4%.

When the range of the inflation rate is lower, the highest value of the economic growth rate also reduces: it is 7.40% when the inflation rate is 2-3%; 2.60% when the inflation rate is 1-2%, and 7.0% when the inflation rate is less than 1%. And when the range of the inflation rate is higher, the highest value of the economic growth rate also goes down. It is 6.40% when the inflation rate is 4-5%, and 5.60% when the inflation rate is 6-7%. Therefore, the highest value of economic growth tends to rise when the inflation rate is below the range of 3-4% and decrease when the inflation rate is higher than this range of inflation rate. This pattern can be imaged as an inverted-U-shape curve on the

dependence pattern of the highest economic growth on the inflation rate. And note that this pattern holds even when we only account for the time period before the COVID-19 pandemic.

Moreover, there seems to be an additional inverted U-shaped curve when the inflation rate is higher than 6%. In particular, the highest economic growth rate climbs from a value of

5.6% when the inflation rate is at 6-7% to a value of 7.7% when the inflation is at 7-8%. Then, when the range of inflation rate increases, the highest value of the economic growth rate tends to go down, to 6.4% when the inflation rate is higher than 9%. Therefore, a peak of 7.7% exists attained in 2004 with the inflation rate being between 7% and 8%.
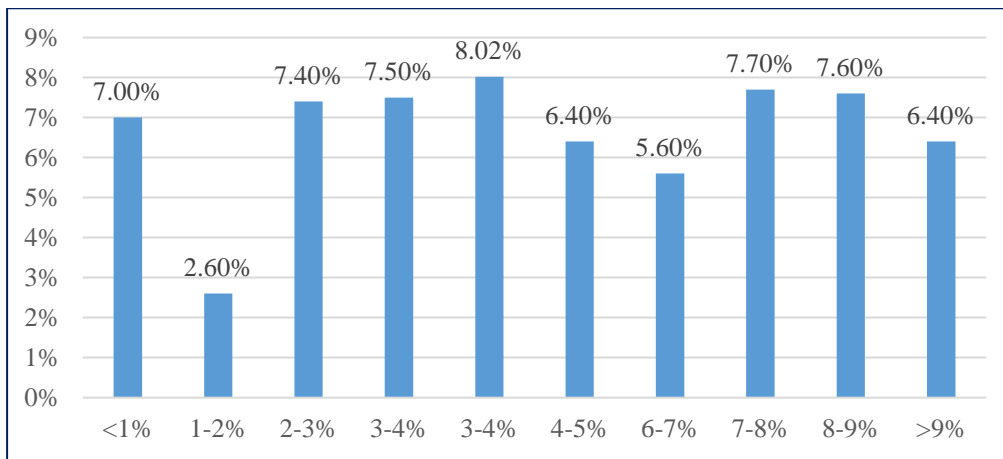

Figure 1: Highest economic growth over different range of inflation
Source: GSO (2023).

Note that if we only account for the time period before the COVID-19 pandemic, the peak of the economic growth rate would be 7.7% when the inflation rate belongs to the range of 7-8%. These results even raise a concern about the current objective of 4.5% in 2023 that the Vietnam government proposes for 2023.

The evidence in Figure 2 implies that not only one balance point exists between the economic growth and the inflation rate. There are multiple balance points; one is 8.02% of economic growth when inflation is 3-4%, and another is 7.7% of economic growth when inflation is 7-8%.
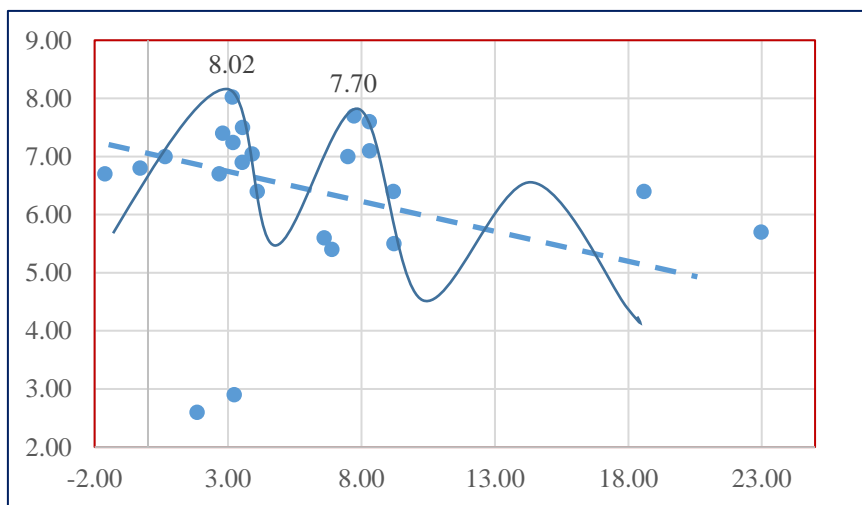

Figure 2: Balance between economic growth and inflation
Source: GSO (2023).

To push further analysis, we examine the combination of economic growth and the inflation rate for all of the observations in the data sample, as shown in Figure 2.

Figure 2 illustrates the correlation between economic growth on the y-axis with the inflation rate on the x-axis. There is a clear tendency for a negative correlation being (-0.05), which is captured by the dashed line. Thus, for a higher inflation rate, the economic growth rate tends to decrease.

The combination point of economic growth and inflation rate fluctuates around the correlation line. In fact, we can draw a curve connecting these points.

Along the curve, there are different peaks of economic growth rates, such as 8.02% of economic growth combined with 3.15% in 2021 or 7.7% of economic growth combined with 7.71% in 2004.

An important piece of evidence is the existence of a trap when the inflation rate is between 5% and 6%. This range of inflation is a trap since the economic growth rate would diverge when inflation falls in this range. In particular, when the inflation rate reduces to approach the range of 3-4%, the economic growth rate increases. And when the inflation rate rises to approach the range of 7-8%, the economic growth rate also increases.

In economic theory, the inflation range of 5-6% can be considered as an unstable equilibrium if we consider the economic growth rate as a function of the inflation rate. In particular, as Figure 2 shows, the function seems to be a non-linear function with multiple extremum values. When the inflation rate moves up or down, economic growth would diverge rather than be stable.

3.2. Balance between economic growth and inflation with exchange rate

Table 2 presents the highest economic growth rate over different ranges of inflation rate and the VND depreciation rate. The results capture the idea suggested by the extended model of the balance point between economic growth and inflation in equations (3), (4) and (5).

The maximum value of economic growth with a low VND depreciation rate is usually higher than the corresponding value with a high VND depreciation rate. When the inflation rate falls into the 2-3% range, the highest economic growth is 7.4%, with VND depreciation being less than 2%. This value is much higher than the corresponding economic growth of 6.7% with VND depreciation being higher than 2%. Similarly, when the inflation rate falls into the 3-4% range, the highest economic growth is 7.5% with VND depreciation being less than 2%. This value is much higher than the corresponding economic growth of 7.04% with VND depreciation being higher than 2%.

Table 2: Highest economic growth over different ranges of inflation and VND depreciation

| Inflation | Highest economic growth | |
	VND Depreciation <2%	VND Depreciation >2%
< 1%	6.7%	7.0%
1-2%	2.6%	n/a
2-3%	7.4%	6.7%
3-4%	8.02%	7.04%
4-5%	6.4%	n/a
6-7%	5.6%	5.4%
7-8%	7.77%	n/a
8-9%	7.6%	n/a
> 9%	6.4%	6.4%

Sources: GSO (2023), World Bank (2023).

Multiple balance points exist between the economic growth and inflation rate on accounting for the foreign exchange rate. This result is similar to the evidence on the benchmark model without accounting for the foreign exchange rate.

When the VND depreciation rate is lower than 2%, there are three balance points, including: (i) the highest economic growth rate being 6.7% combined with the inflation rate being less than 1%; (ii) the highest economic growth rate being 8.02% combined with the inflation rate being in the 3-4% range; and (iii) the highest economic growth rate being 7.77% combined with the inflation rate being at 7-8%.

When the VND depreciation rate is higher than 2%, there are three balance points, including (i) the highest economic growth rate being 7.0% combined with the inflation rate being less than 1%; (ii) the highest economic growth rate being 7.04% combined with the inflation rate being at 3-4%; and (iii) highest

economic growth rate being 6.04% combined with the inflation rate being higher than 9%.

Moreover, there is also a trap on the balance point between economic growth and inflation rate. This result is consistent with the evidence on the benchmark model without accounting for the foreign exchange rate.

In particular, the range of inflation over 6-7% is unstable in the sense that either a decrease or an increase in the inflation rate is associated with an increase of the maximum economic growth rate. This result holds even for the low or high depreciation rate of the domestic currency.

When the depreciation rate of the domestic currency is below 2%, the maximum economic growth rate is 5.6% for the inflation rate at 6-7%. If the inflation rate drops to 3-4%, the maximum economic growth rate rises from 5.6% to 8.02%. And if the inflation rate goes up to the range of 7-8%, the maximum economic growth rate also rises from 5.6% to 7.77%.

And when the depreciation rate of the domestic currency is higher than 2%, the maximum economic growth rate is 5.4% for the inflation rate at 6-7%. If the inflation rate drops to 3-4%, the maximum economic growth rate rises from 5.4% to 7.04%. And if the inflation rate goes up to the range of over 9%, the maximum economic growth rate also raises from 5.6% to 6.4%.

Note that in the benchmark model without the foreign exchange rate, a trap exists when the inflation rate falls in the 5-6% range, which is lower than the range of inflation for the trap in the extended model with the foreign exchange rate.

We carry out a robustness analysis for the quarterly sample from Q1/2007 to Q2/2023 which is the latest time point. The robustness analysis is used to check the validity of results and associated methods when the time scale expands from the annual to a quarterly sample.

Table 3: Highest economic growth in quarterly sample

| Inflation | Highest economic growth | | |
| | With one constraint on inflation | With two constraints on inflation and exchange rate | |
		gFER < 2%	gFER > 2%
< 1%	6,9%	6,13%	6,9%
1-2%	5,55%	5,22%	5,55%
2-3%	7,72%	7,72%	6,71%
3-4%	13,67%	6,99%	13,67%
4-5%	6,89%	6,24%	6,89%
6-7%	7,7%	7,7%	4,54%
7-8%	7,88%	7,88%	n/a
8-9%	7,02%	8,91%	7,02%
> 9%	9,12%	9,12%	7,47%

Source: GSO (2023).

The evidence on the quarterly sample gives similar results to the annual sample. With only one constraint on the inflation, multiple balance points exist between economic growth and the inflation rate. In detail, the first balance point has an economic growth rate of 6.9% with inflation being less than 1.0%; while the second point has a growth rate of 13.67% with inflation being 3-4%. And there is also a third point having economic growth of 9.12% with inflation being greater than 9.12%. Moreover, with this quarterly sample, the inflation range of 6-7% is a trap. Reducing inflation or raising inflation is associated with an increase of the highest economic growth.

A similar pattern arises when the analysis accounts for two constraints on both inflation and the foreign exchange rate. When the depreciation rate of the domestic currency is less than 2%, there are also multiple balance points, including: (i) growth of 6.13% with inflation less than 1%; (ii) growth of 7.72% with inflation 2-3%; and growth of 9.12% with inflation more than 9%. And when the depreciation rate of the domestic currency is more than 2%, there are also multiple balance points, including: (i) growth of 6.9% with inflation less than 1%; (ii) growth of 13.67% with inflation 2-3%; and growth of 7.47% with inflation more than 9%. Moreover, there a trap also exists when the

inflation is 4-5% for the low depreciation rate of domestic currency or when the inflation is 6-7% for the high depreciation rate.

In brief, the evidence on the extended model of a balance point reveals that multiple balance points exist between economic growth and inflation even with or without accounting for the role of the foreign exchange rate. And a low depreciation of domestic currency cultivates a higher maximum economic growth rate for the same inflation range.

4. Conclusion and policy recommendation

The paper analyzes the balance between economic growth and the inflation rate in the Vietnamese economy. The paper first proposes a concept of a balance point, and then collects a time-series sample of Vietnam over the 2000-2023 period. The evidence records that multiple balance points exist, thus, the balance between economic growth and inflation can be considered as a path rather than a point in the Vietnam economic context. The result is robust in accounting for the role of the foreign exchange rate, as proxied by the depreciation of the domestic currency.

The paper also has an implication for public policy. The economic growth rate can be maximized in balance with the inflation rate for the inflation range of 3-4% or 7-8%. There are many values of economic growth rate that an economy can receive in each inflation range. For instance, for the inflation range of 3-4%, the economic growth has a minimum at 2.90% in 2020 (during the COVID-19 pandemic) and a maximum at 8.02% in 2023 or 7.50% in 2018 when considering only the period before COVID-19. Even this fact, the existence of the highest economic growth in each inflation range, suggests that this is the highest value that can be attained. And since the inflation rate is negatively correlated with economic growth, the range of 3-4% can be prioritized for public policy.

For future research revenue, the paper can incorporate an econometric model to analyze the interaction between the economic growth and inflation rate in the Vietnamese economy. One direction is to use the vector autoregression (VAR) model, taking into account the fiscal and monetary policy. And in an extended model, the analysis can also account for the exchange rate and associated capital account management, which is important for developing economies.

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References

Aghion, P., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica: Journal of the Econometric Society*, *60*(2), 323-351. https://doi.org/10.2307/2951599

Ball, L., Mankiw, N. G., Romer, D., Akerlof, G. A., Rose, A., Yellen, J., & Sims, C. A. (1988). The new Keynesian economics and the output-inflation trade-off. *Brookings Papers on Economic Activity*, *1*, 1-82.

Bhattacharya, R. (2014). Inflation dynamics and monetary policy transmission in Vietnam and emerging Asia. *Journal of Asian Economics*, *34*, 16-26. https://doi.org/10.1016/j.asieco.2014.05.001

Blanchard, O. J. (1989). A traditional interpretation of macroeconomic fluctuations. *The American Economic Review*, 1146-1164.

Billi, R. M., & Kahn, G. A. (2008). What is the optimal inflation rate? *Federal Reserve Bank of Kansas City Economic Review*, *93*(2), 5-28.

Clarida, R., Gali, J., & Gertler, M. (2000). Monetary policy rules and macroeconomic stability: evidence and some theory. *The Quarterly Journal of Economics*, *115*(1), 147-180. https://doi.org/10.1162/003355300554692

Chi, H. H. P. (2019). Non-monotonic relationship between economic growth and inflation in Vietnam. *Can Tho University Journal of Science, 55*(6), 82-88. In Vietnamese.

Frankel, M. (1962). The production function in allocation and growth: A synthesis. *The American Economic Review*, *52*(5), 996–1022. https://www.jstor.org/stable/1812179

Ly, D. H. (2021). Output-inflation trade-off in the presence of foreign capital: Evidence for

Vietnam. *South Asian Journal of Macroeconomics and Public Finance*, *10*(2), 179-192. http://doi.org/10.1177/2277978720979890

Jones, C. I. (2022). The end of economic growth? Unintended consequences of a declining population. *American Economic Review*, *112*(11), 3489-3527. https://doi.org/10.1257/aer.20201605

Kremer, S., Bick, A., & Nautz, D. (2013). Inflation and growth: New evidence from a dynamic panel threshold analysis. *Empirical Economics*, *44*, 861-878. https://doi.org/10.1007/s00181-012-0553-9

Lam, H. T. (2015). Threshold effects in the relationship between inflation and economic growth in Vietnam. *Journal of Economics and Development, 217*, 15-24.

Lucas, Jr, R. E. (2000). Inflation and welfare. *Econometrica*, *68*(2), 247-274. https://doi.org/10.1111/1468-0262.00109

Lucas, R. E. (1973). Some international evidence on output-inflation tradeoffs. *The American Economic Review*, *63*(3), 326-334.

Oikawa, K., & Ueda, K. (2018). The optimal inflation rate under Schumpeterian growth. *Journal of Monetary Economics*, *100*, 114-125.

Mankiw, N. G., Romer, D, & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics, 107*, 407-437. https://doi.org/10.1016/j.jmoneco.2018.07.012

McKenzie, L. W. (1986). Optimal economic growth, turnpike theorems and comparative dynamics. *Handbook of Mathematical Economics*,

3, 1281-1355. https://doi.org/10.1016/S1573-4382(86)03008-4

World Bank (2023). *Global economic prospects report.* https://www.worldbank.org/en/publication/global-economic-prospects

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, *98*(5, Part 2), S71-S102. https://doi.org/10.1086/261725

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics, 70*(1), 65-94. https://doi.org/10.2307/1884513

Schmitt-Grohé, S., & Uribe, M. (2010). The optimal rate of inflation. In *Handbook of Monetary Economics* (Vol. 3, pp. 653-722). Elsevier.

Vietnam Government Online. (2022). *Decision No. 01/NQ-CP by the Vietnam government on main solutions to implement the economic-social plan, public budget and business environment improvement, national competitiveness enhancement in 2023, dated 6.01.2023.*

Vietnamnet (2022). Finding the balance between growth and inflation. https://vietnamnet.vn/en/finding-the-balance-between-growth-and-inflation-2093134.html

Vinayagathasan, T. (2013). Inflation and economic growth: A dynamic panel threshold analysis for Asian economies. *Journal of Asian Economics*, *26*, 31-41. https://doi.org/10.1016/j.asieco.2013.04.001

Vietnam General Statistic Office - GSO (2022). *Monthly economic-social report*. https://www.gso.gov.vn/