Analysis of the Real Exchange Rate of Vietnamese Dong from the Perspective of Demographic Dividend

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Abstract. With the advantage of demographic dividend and extensive investment value, Vietnam's foreign trade has developed rapidly and made great contribution to its economic development. By studying the mechanism of the indirect effect of the population age structure on the promoting effect of economic development on the real exchange rate of the Vietnamese dong, it is of great significance to understand the long-term change law of the exchange rate of Vietnam and even other developing countries. In this paper, the influence of population age structure on the real exchange rate of VND(Vietnamese dong) against USD(US dollar) was studied. In accordance with the idea of "relevant theoretical analysis - empirical analysis - conclusions and suggestions", the unit root test, analysis of variance and other econometric methods were used for empirical test. It is found that there is a long-term equilibrium relationship between the population age structure and the real exchange rate of VND. It mainly affects the real exchange rate of Vietnam through the mechanism of economic demand, while the influence of "Balassa-Samuelson" on the supply side is weak. In the process of boosting economic growth, the age structure of the population leads to the depreciation tendency of the dong exchange rate. Based on the conclusions of this paper, relevant suggestions are put forward for Vietnam and other countries enjoying demographic dividend to improve the exchange rate formation mechanism, tap the second demographic dividend and develop demographic quality dividend.

Keywords: Real Exchange Rate; Population Age Structure; Demographic Dividend; Balassa-Samuelson Effect.

1. Introduction

In recent years, Vietnam has maintained high economic growth. With its cheap labor force and open business environment, Vietnam has become a new labor-intensive industrial destination in Asia. On the one hand, the rapid development of Vietnam's foreign trade benefits from the demographic dividend and low labor cost; On the other hand, influenced by the tide of trade protection under the geographical conflicts, some developed countries transferred their low-technology industries to Vietnam.

Undeniably, demographic dividend has made great contribution to Vietnam's economic development, providing Vietnam with sufficient labor force, which in turn leads to the relatively low labor cost and technological progress to boost economic development. However, Vietnam began to enter the demographic dividend period from 2007, with the rapid development of aging, Vietnam's demographic dividend will gradually decline. Demographic dividend refers to the fact that the working-age population of a country accounts for a large proportion of the total population and the dependency rate is relatively low, which creates favorable demographic conditions for economic development. The whole country's economy shows a situation of high savings, high investment and high growth. In the actual research, the demographic dividend is quantified by using the population age structure and introduced into the model, which can directly represent the impact of demographic factors on the real exchange rate.

By studying the mechanism of the indirect influence of the population age structure on the real exchange rate of VND on the promoting effect of economic development, it is of great significance for understanding the long-term change rule of the exchange rate of Vietnam and even other developing countries, and can also guide the population decision makers how to better control the quantity, quality and structural proportion of the population. How to explore the impact of the second demographic dividend on the economy by means of building social security mechanism and

cultivating human capital, so as to stabilize the exchange rate at an appropriate and balanced level for a long time and promote the healthy development of economy and society.

2. Literature Review

2.1 Review of Existing Literature

Before 2000, the research based on population age structure basically only focused on its impact on economic growth, and rarely involved the study of exchange rate. Keynes put forward the influence of population structure on macro-economy in 1937, and the study on the relationship between population change and economic development has become a hot topic in the discussion and research of population economics since Malthus published the Principle of Population in 1978.According to Bloom and Williamson's research, in the rapid development stage of Japan and other Southeast Asian countries and regions, demographic dividend is an important driving force for economic development. During the period 1970-1995, East Asian economies achieved average annual GDP growth of 6.1 per cent, higher than the steady state growth rate of 4.1 per cent, of which demographic changes could explain 1.5 to 2.0 percentage points[2]; T. W. Schultz[3] and Robert Lucas[4] have pointed out that human capital investment can improve the output level of the whole society. Higgins[5] discussed the influence of population age structure on capital flow in 1998.

The literature on the study of exchange rate fluctuation from the perspective of demographic structure really began after 2000. Barassa [7] and Samuelson [8] studied changes in real exchange rates through productivity. Andersson, Andreas and Osterholm took Sweden as the research object and found that the population age structure could significantly explain the changes of the real exchange rate. They further expanded the perspective and used panel data of 25 OECD countries for regression, and found that the elderly population had an appreciation effect on the exchange rate and the labor population had a depreciation effect on the real exchange rate [10]. Rose and Supaat collected sample data from 87 countries and came to the opposite conclusion: the decline of fertility led to the depreciation of exchange rate [11]. However, Aloya argued that the effect of birth rate on exchange rate depends on whether the economy is a net creditor country [12].

2.2 Innovation

First, the research perspective has new ideas. This paper analyzes the influence of demographic age structure especially demographic dividend on the exchange rate of VND. Studies on exchange rate generally focus on interest rate, purchasing power, balance of payments and other perspectives, while studies on population structure are usually related to economic development and rarely involve the relationship between population age structure and exchange rate. This paper attempts to study the mechanism of the population age structure on the exchange rate fluctuations of the VND and empirically test the actual data of Vietnam and the United States to obtain relevant conclusions.

Second, it analyzes the path of the influence of the population age structure on the exchange rate of VND. It includes the mechanism based on the demand side of the economy that affects the exchange rate by affecting the differences in consumption, investment, current account and demand structure, and the mechanism based on the supply side that affects the economic growth by affecting the productivity, thus affecting the exchange rate. At the same time, this paper combines qualitative research with quantitative research, which can not only accurately screen out macroeconomic variables that have a great impact on the exchange rate of VND, but also avoid inaccurate long-term prediction results caused by the use of models.

Third, choose Vietnam as the research object. At present, the research on Vietnam is still very limited, but in recent years, as a typical country benefiting from the rapid economic development of the demographic dividend, Vietnam can represent the population status quo of many developing countries, which has certain research significance.

3. Current Situation of Vietnam's Demographic Dividend

With a population of about 96.46 million, Vietnam ranks third in Southeast Asia and 14th in the world, making it one of the most densely populated countries in the world. Vietnam's population is mainly located along the coast and in river basins. The Red River Delta in the north and the Mekong Delta in the south, which account for 12% of Vietnam's land area, are the most important concentrations of Vietnamese people. In terms of age composition, Vietnam is a young country. The median age per capita is only 31 years old, among which 25.6% are from 0 to 14 years old, 68.6% are from 15 to 64 years old, and 5.8% are old people. The dependency ratio is low. Cheap labor resources and land, the construction of infrastructure and the implementation of export-oriented economic policies have promoted the injection of foreign capital and technological progress, and the continuous improvement of the financial market, making Vietnam enjoy the demographic dividend in the rapid economic growth.

Although Vietnam's labor force is abundant, with the influx of a large number of foreign enterprises, the situation of recruitment difficulties also begun to appear in the last two years. This is only a local phenomenon, but also indicates that with the development of the economy, Vietnam's labor shortage will appear in the future. As urbanization of Vietnam accelerates, its birth rate has fallen. Although Vietnam currently has a higher share of the working population than the world average, its population growth rate has been below the world average since 1997. In 2021, for example, Vietnam's population growth rate is 0.849%, lower than the world average of 0.936% and lower than Southeast Asian countries such as Malaysia and the Philippines. In response, on April 28, 2020, the Vietnamese government signed a resolution to encourage fertility, with the main objective of maintaining alternative fertility in the country and extending the duration of the demographic dividend.

As the effect of the demographic dividend wanes, Vietnam needs to be alert to the challenges brought by a series of problems, such as the gradual disappearance of the "first demographic dividend", the difficulty in developing the "second demographic dividend", and the lack of savings due to the aging population. Therefore, whether Vietnam can find a new economic center of gravity and improve the production mode of cheap processing in this period of time before the population advantage disappears will affect the economic development and the long-term trend of exchange rate.

4. Theoretical Framework

4.1 The Influence of Population Age Structure on Exchange Rate Based on Economic Supply

Productivity is an important thought to study the impact of population age structure on the real exchange rate from the perspective of supply. Based on the Balassa-Samuelson effect from this perspective, it is believed that the rise of the labor-population ratio will lead to the appreciation of the real exchange rate; on the contrary, the increase of dependency burden will lead to the depreciation of the real exchange rate. The idea is as follows:

Under the two-sector economy, the level of labor productivity of the tradable goods production sector is different from that of the non-tradable goods production sector. The country or region with fast economic development has relatively high labor productivity of the tradable goods sector, which leads to the rise of real wages in the tradable goods sector. The free movement of labor between the two sectors in turn drives up real wages in the non-tradable goods sector, which raises relative prices in the non-tradable goods sector. At the same time, rising wages mean higher incomes, higher demand for non-tradable goods, and higher prices. According to the formula $IRER = TP/NP$ of the internal real exchange rate (where $IRER$ represents the internal real interest rate, TP represents the price index of domestic traded goods, and NP represents the price index of domestic non-traded goods), it can be deduced that the real exchange rate of countries or regions with rapid economic growth tends to appreciate. Its conduction pathway is shown as follows:

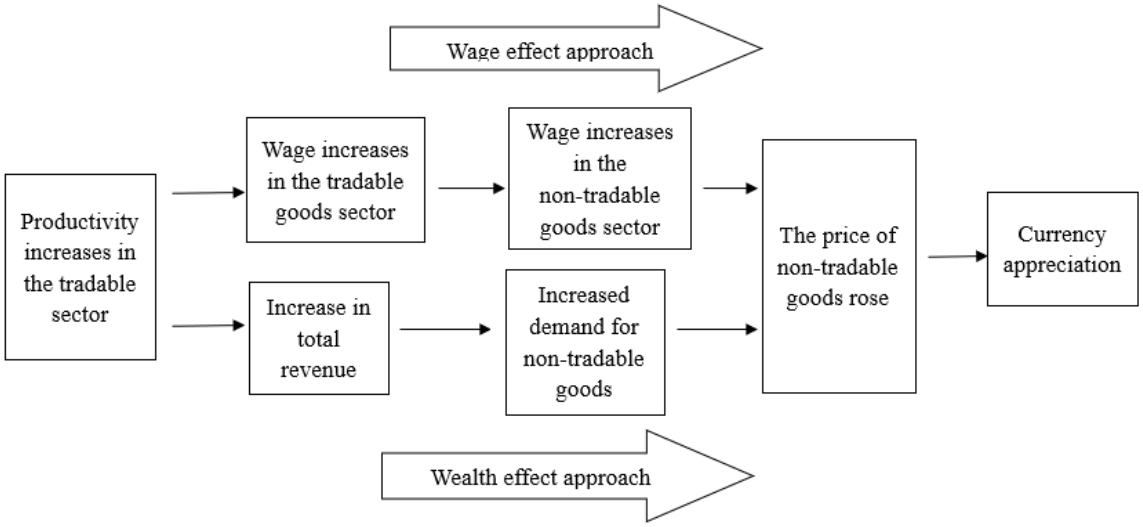

Figure 1. Balassa-Samuelson effect path

According to the Barassa-Samuelson effect, when the age structure of the population changes and the proportion of the working-age population increases, it will lead to an increase in labor productivity in the production process, which will cause the price of non-tradable goods to rise through the wage effect and the wealth effect, thereby driving the appreciation of the internal real exchange rate.

4.2 The Impact of Population Age Structure on Exchange Rates based on Economic Needs

The life cycle hypothesis is based on the consumer's perspective, which holds that consumers will optimally allocate their expected total income over their lifetime at different ages, in order to maximize intertemporal utility. Low income tends to be negative savings when young, high income and high savings in middle age, and zero income or low income in old age, with a bias towards negative saving. Thus, when the share of the working population rises, the country's total savings rate rises.

4.2.1 Current Account Mechanism based on the Life-cycle Hypothesis

Under Keynesian open economy conditions, the formula of expenditure method is $Y = C + I + G + M$,and the formula of income method is $Y = C + S + G + X$, which yields:$X - M = S - I$.The current account difference can be expressed as $CA = X - M = S - I$. When the proportion of a country's labor force population increases, savings increase, consumption decreases, surpluses increase, capital outflows, and local currency depreciates; Conversely, when the proportion of the working population declines, the population upbringing rate, and savings are lower than consumption, international capital inflows are brought and the local currency appreciates. However, some studies suggest that older people may hold large amounts of wealth and leave it to the next generation, leading to higher savings, current-account surpluses and, ultimately, real exchange rate depreciation.

4.2.2 Consumption Structure Difference Mechanism based on Life Cycle Hypothesis

Children, the elderly population and the working population have different consumption structures. Children and the elderly tend to consume non-tradable goods such as education and medical care, respectively. Thus, an increase in the proportion of children and the elderly population increases demand for non-tradable goods and increases prices, resulting in real exchange rate appreciation. The increase in the social dependency ratio also means that the government's expenditure on social welfare undertakings such as the old-age security system and compulsory education has increased relatively. Fiscal spending also tends to buy non-tradable goods, causing real exchange rates to rise. Conversely, the working population tends to consume tradable goods, resulting in higher demand for tradable goods and higher prices and a tendency for exchange rates to depreciate. Different consumption structures presented by different age structures will lead to corresponding appreciation and

depreciation of the real exchange rate, reflecting the way in which demographic factors affect the real exchange rate through consumption structure.

5. Methodology

5.1 Selection of Variables

According to the equilibrium real exchange rate theory, its general structural equation is:

$$\log(e_t) = F(fund_t) + \varepsilon_t$$

Among them, e_t represents the real effective exchange rate, $fund_t$ represents economic fundamentals, including labor productivity, current account, real interest rates, external dependence, terms of trade, and so on. ε_t is a composite perturbation term.

Referring to the results of the study of equilibrium real exchange rates in developing countries, the general theoretical analysis of the impact of population age structure on exchange rates, and the availability of data, the independent variables selected in this paper are:

(1) Proportion of working population in Vietnam and the United States (LABOR). It is calculated by dividing the proportion of Vietnam's working population by the proportion of the working population in the United States.

(2) The ratio of GDP per capita between Vietnam and the United States (GDP). Using GDP per capita as a proxy variable for labor productivity, according to the Barassa-Samuelson effect, an increase in the proportion of the working-age population, that is, an increase in labor productivity, will lead to an increase in the price of non-tradable goods, which will lead to an appreciation of the internal real exchange rate.

(3) The ratio of the foreign trade dependence of the two countries (OPEN). Foreign trade dependence is obtained by dividing the sum of imports and exports by GDP. When the degree of openness of the economy to the outside world increases, foreign demand for domestic goods increases, promoting the development of the country and appreciating the local currency; At the same time, it will also lead to a large flow of resources to the tradable sector, which will reduce resources and increase the price of non-tradable goods, thereby promoting the appreciation of the local currency.

(4) The ratio of government spending between the two countries (GOV). Divided by the share of GDP in general government spending in both countries, government spending causes the price of non-tradable goods to rise and the local currency to appreciate.

(5) Terms of trade (TOT). Calculate the ratio of the export commodity price index to the import commodity price index of the two countries separately, and then divide the values of the two countries. When a country's terms of trade improve, that is, the price of exported goods rises relative to imported goods, the country will invest more resources in producing tradable goods, the price of tradable goods will increase relatively, and the exchange rate will appreciate.

The dependent variable is the VND real exchange rate against the USD (rer). The calculation method is $rer = NER * P_U/P_V$, where NER is the nominal exchange rate of VND against the USD, P_U is the US price index, and P_V is the Vietnam price index. The annual data of Vietnam and the United States from 1996 to 2021 for 26 years were selected as samples, and data are sourced from the World Bank (WDI) database and the International Monetary Fund (IMF) database.

5.2 Model Building

5.2.1 Multicollinearity Solution

To avoid multicollinearity, the variables should be pre-screened, that is, tested for correlation. Correlation analysis measures the degree of correlation between two variables and prevents multicollinearity between variables from causing inaccurate regression results. Eviews were used to test the correlation of the independent variables and the results were as follows:

	Correlation				
	LABOR	GDP	OPEN	GOV	TOT
LABOR	1.000000	0.947940	0.562043	0.672225	0.480249
GDP	0.947940	1.000000	0.626631	0.793384	0.522525
OPEN	0.562043	0.626631	1.000000	0.194754	0.703323
GOV	0.672225	0.793384	0.194754	1.000000	0.180927
TOT	0.480249	0.522525	0.703323	0.180927	1.000000

Figure 2. Correlation coefficient matrix

As can be seen from the above table, the correlation coefficient between $LABOR$ (labor force share) and GDP (labor productivity) is 0.947 close to 1, indicating that there may be serious multicollinearity between explanatory variables, and in order to solve this problem, it is necessary to exclude the part of labor productivity that is determined by the age structure of the population, that is, the part affected by other factors (non-population age structure) is retained. Therefore, this paper regresses GDP to LABOR, and the residual term in the regression model is the part determined by other factors, and the model fitting with the residual instead of GDP can effectively avoid the collinearity problem. The preliminary setting model form is:

$$\ln(rer) = \beta_0 + \beta_1 LABOR + \beta_2 GDP + \beta_3 OPEN + \beta_4 GOV + \beta_5 TOT + \varepsilon$$

5.2.2 Test for Heteroscedasticity and Autocorrelation

On the basis of not considering heteroscedasticity and autocorrelation, the variables were first modeled with OLS, and it was found that when the dependent variable was set to $\ln(rer)$, multiple independent variables could not pass the t-test, and the fitting effect of the model was poor, so we tried not to take the logarithm of the dependent variable, and found that the significance of the respective variables was significantly improved after modification, so the untreated rer was directly used as the dependent variable. The fitting results of the new model are as follows:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	62989.28	5006.481	12.58155	0.0000
LABOR	-554.1126	79.36003	-6.982263	0.0000
GDP	669.6025	152.2622	4.397694	0.0003
OPEN	6.168002	3.060746	2.015196	0.0575
GOV	48.12782	38.76411	1.241556	0.0008
TOT	101.3606	18.96495	5.344628	0.0000

R-squared	0.934171	Mean dependent var	19661.61
Adjusted R-squared	0.917714	S.D. dependent var	3387.090
S.E. of regression	971.6053	Akaike info criterion	16.79495
Sum squared resid	18880337	Schwarz criterion	17.08528
Log likelihood	-212.3344	Hannan-Quinn criter.	16.87856
F-statistic	56.76364	Durbin-Watson stat	1.163183
Prob(F-statistic)	0.000000		

Figure 3. OLS regression results

Analysis of the model results shows that except for the appreciation of VND, the other independent variables change in the opposite direction to the exchange rate, except for the increase in the proportion of the working population that can lead to the appreciation of the Vietnamese dong, which is inconsistent with the previous analysis. This phenomenon may be due to heteroscedasticity and autocorrelation in the model, so heteroscedasticity and autocorrelation tests need to be performed before the model is established. The test for heteroscedasticity, implemented using the White Test, is performed by constructing an auxiliary regression – statisticχ^2statistic for heteroscedasticity, with the null hypothesis that there is no heteroscedasticity for the residual term. The test result is that the

adjoint probability of TR^2 is significantly greater than 0.05, so it can be considered that there is no heteroscedasticity, and the fitting result of the model is valid.

Self-correlation test is achieved by LM test. It is found that the residuals have obvious autocorrelation and the hysteresis order is 2. The presence of autocorrelation makes the parameters no longer unbiased and is likely to underestimate the true parameter variance, so autocorrelation correction is required. The GLS method is used to modify the model, and the new fitting result is: $\text{rer} = 43094.37 - 207.60\text{LABOR} + 397.07\text{GDP} - 2.23\text{OPEN} + 44.17\text{GOV} - 26.88\text{TOT}$. However, the cointegration of each variable also needs to be considered to determine the final form of the model.

5.2.3 Stationary Inspection and Cointegration Inspection

The classical regression model is based on stationary data variables, and classical regression for non-stationary data variables is prone to pseudo-regression. To avoid the pseudoregression problem, it is necessary to test whether there is a cointegration relationship between the variables. The significance of the cointegration test is that even if multiple variables have their own long-term change laws, as long as they are cointegrated, there is a long-term stable fluctuation law between them, that is, there is a long-term equilibrium relationship.

When applying cointegration theory in practice, it is first necessary to test the stationarity of the variables, and a stationary sequence with the same single integer order is the prerequisite for the cointegration test. This article uses the ADF test to verify that each variable has a root of identity. The presence of a unit root indicates that the variable is not stationary. After testing, all variables are zero-order non-stationary and first-order stationary, so they are all first-order monowhole, and there may be a cointegration relationship, which can be carried out for the next cointegration test.

Using the residual e_t of the previous fitting result as the estimation of the equilibrium error u_t, and then the stationarity test of the residual term e_t, the test result is shown in the figure below, from the accompanying probability value of the ADF statistic, it can be known that the residual term is stable, and the cointegration between the explanatory variable and the explanatory variable is cointegrated, that is, there is a long-term equilibrium relationship.

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.222836	0.0004
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Figure 4. Results of the residual stationarity test

Therefore, the specific form of the model is:

$$\text{rer} = 43094.37 - 207.60\text{LABOR} + 397.07\text{GDP} - 2.23\text{OPEN} + 44.17\text{GOV} - 26.88\text{TOT}$$

6. Analysis

6.1 Analysis of Model Results

From the model results, it can be seen that there is a long-term equilibrium relationship between the labor force population and the real exchange rate, and the increase in the proportion of Vietnam's working population will lead to the depreciation of the exchange rate. The impact of the labor force on the exchange rate is divided into the impact of the supply side and the demand side, combined with the foregoing, the impact of the supply side makes the exchange rate appreciate, and the impact of the demand side makes the exchange rate depreciate. Therefore, Vietnam's population structure is

more significant in the face of exchange rate based on demand, and the demographic dividend tends to depreciate in the process of boosting economic growth.

Combined with the actual situation in Vietnam, the weak supply-side impact is due to the fact that the Barassa-Samuelson effect has not been fully realized locally. First of all, Vietnam is gradually transitioning from the traditional economic system to the market economy system, especially in recent years of rapid economic development, the domestic economic system and financial market are undergoing rapid transformation, capital and financial accounts have not been fully liberalized, interest rate marketization has not been fully realized, this reform and change will also correspondingly affect the price transmission between the trading sector, the non-trade sector, and the resource allocation process, which is inconsistent with the Barassa-Samuelson effect; At the same time, despite the increasing urbanization in Vietnam, there is still a large surplus labor force in rural areas, which to some extent hinders the growth of wages with the increase of labor productivity, thereby hindering the transmission between tradable and non-tradable prices, and also causing the Balassa-Samuelson effect to be not significant in Vietnam. In addition, factors such as price rigidity should also be taken into account. Therefore, although Vietnam has experienced economic development and increased foreign investment brought about by the demographic dividend, it has not brought about an appreciation of the VND.

6.2 Variance Partitioning Analysis

Through the multiple regression method, it is only possible to determine whether the respective variables have a significant impact on the dependent variable, and the relative importance of the influence of each variable cannot be determined. Therefore, this article performs a variance decomposition of all variables with the following results:

Variance Decomposition of RER:

Period	S.E.	RER	LABOR	GDP	OPEN	GOV	TOT
1	0.035751	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.056318	85.77822	0.069379	0.521741	2.781660	3.962287	6.886717
3	0.066487	84.46827	0.489663	0.478887	2.632220	3.686453	8.244510
4	0.073795	83.53965	0.907814	1.920588	2.816495	3.078344	7.737109
5	0.081540	81.51701	2.354819	2.777535	3.930788	2.581676	6.838173
6	0.087310	79.95609	3.843383	3.265546	4.296910	2.440921	6.197154
7	0.091894	78.61319	4.721924	3.853739	4.592448	2.386789	5.831914
8	0.095010	77.42184	5.340442	4.560778	4.634548	2.502587	5.539808
9	0.096966	76.29281	5.844829	5.200122	4.596933	2.732310	5.333001
10	0.098067	75.38581	6.184940	5.720417	4.521807	2.972338	5.214687
11	0.098610	74.69617	6.342549	6.110457	4.474034	3.201691	5.175102
12	0.098982	74.14194	6.366989	6.404872	4.504759	3.393864	5.187581
13	0.099419	73.71671	6.316062	6.578962	4.634700	3.528387	5.225182
14	0.100057	73.35225	6.244415	6.646926	4.885490	3.601192	5.269727
15	0.100869	73.04657	6.199754	6.628798	5.211812	3.615584	5.297479
16	0.101784	72.73724	6.200266	6.564152	5.599364	3.592087	5.306889
17	0.102673	72.43618	6.251223	6.483660	5.983262	3.550267	5.295408
18	0.103443	72.12708	6.332062	6.412269	6.348072	3.506808	5.273709
19	0.104027	71.83870	6.426368	6.362257	6.654722	3.471159	5.246791
20	0.104422	71.57429	6.511247	6.340253	6.905133	3.446645	5.222428

Figure 5. Exploded variance chart

The results of variance decomposition show that $LABOR$, GDP and $OPEN$ have a large long-term impact on the exchange rate, and the contribution rate of $LABOR$ and $OPEN$ to the exchange rate is still increasing, but the growth rate is slow, so it takes a long time to reach stability. In the long run, population structure and openness are the dominant factors affecting the exchange rate, which may be due to the fact that Vietnam is currently dominated by processing industries with low technology content, so labor factors have an essential impact on the exchange rate. The development model that is highly dependent on foreign trade has made a huge contribution to Vietnam's economy, affecting the exchange rate by affecting productivity factors.

The impact of population age structure on the real exchange rate of RMB is a long-term and slow process, because the change of population age structure will be affected by population policy and natural evolution, so its impact on the real exchange rate is also a slow and relatively orderly process. The forecast data of the long-term population age structure is relatively accurate, and combined with

the long-term stable relationship found in the cointegration of the population age structure and the real exchange rate of RMB, we can predict the long-term trend of the real exchange rate to a certain extent. In the process of Vietnam's economic growth, the advantages of labor quantity and quality brought by the demographic dividend promote economic growth, and the demographic dividend has a tendency to depreciate the exchange rate of Vietnamese dong, which is more conducive to Vietnam's foreign trade exports, thereby promoting the sustained and rapid development of the economy.

Vietnam is still in the demographic dividend period, the impact of the population on the exchange rate is in a depreciation tendency, but with the deepening of the aging of the population, the impact of the population on the exchange rate will change into an appreciation tendency, which will increase the appreciation pressure of the VND, which is not conducive to Vietnam's export trade and economic development, and will also dampen the development of China's manufacturing industry. At the same time, the appreciation of the exchange rate brought about by aging will also attract foreign investors to enter Vietnam for arbitrage and arbitrage, making it more difficult for the government to maintain exchange rate stability.

7. Conclusion

7.1 Conclusion of the Study

With the deepening of Vietnam's opening to the outside world, the exchange rate of Vietnamese dong against the US dollar, as a bridge between Vietnam and other countries, has played an important role in the rapid development of Vietnam's economy. This paper analyzes the impact of various factors under the influence of population age structure on the real exchange rate of VND with the help of multivariate regression model on the annual time series data of Vietnam and the United States for 26 years from 1996 to 2021, using measurement techniques such as root of unit test, cointegration test, and variance decomposition. The main conclusions of this paper are as follows:

(1) There is a long-term equilibrium relationship between the real exchange rate of VND against the US dollar and the demographic dividend, and the age structure of the population has a more significant influence on the exchange rate based on the demand side, which leads to the depreciation of the VND exchange rate in the process of promoting Vietnam's economic growth.

(2) The change of population age structure is a long-term, slow process, affected by population policy and natural evolution. Moreover, its impact path on the real exchange rate is also more complex, including the economic supply side and demand side, so its impact on the real exchange rate is long-term and complex. The age structure of Vietnam's population is not obviously affected by the Barassa-Samuelson effect in the process of affecting the real exchange rate, because Vietnam's economic system and financial market are not perfect, and the price rigidity and wage rigidity caused by a large amount of labor surplus hinder the role of the Balassa-Samuelson effect in Vietnam, and also hinder the impact of the population age structure on the exchange rate, resulting in the depreciation of the demographic dividend on the Vietnamese dong exchange rate.

(3) In the long run, the impact of the working population and the degree of openness to the outside world on the real exchange rate of VND is relatively large, and the explanation is strong. In general, the demographic dividend promotes economic growth, and at the same time has a tendency to depreciate the exchange rate of the Vietnamese dong, which is more conducive to Vietnam's foreign trade exports, thereby boosting economic development.

(4) Vietnam is currently in the period of demographic dividend, and the population has an impact on the depreciation of the exchange rate. However, with the gradual deepening of aging and the reduction of the proportion of the working population, after the demographic dividend gradually weakens in the future, the impact of population on the depreciation of the exchange rate will also weaken, and the appreciation pressure of Vietnamese dong will increase, which is not conducive to Vietnam's export trade and subsequent economic development, and will also dampen the development of manufacturing. At the same time, it will also trigger an influx of overseas funds for

arbitrage and arbitrage, which affects the stability of Vietnam's financial market and increases the difficulty of the government's macro-control.

Through the research of this paper, it is found that the mechanism of promoting the economic development of population age structure indirectly affects the real exchange rate of Vietnamese dong, which is of great significance for understanding the long-term change law of exchange rates in Vietnam and other countries that currently enjoy the demographic dividend, in order to promote these countries to make full use of the demographic dividend and maintain long-term stability of the exchange rate, this paper puts forward the following suggestions:

First, improve the exchange rate formation mechanism. On the one hand, after increasing the floating flexibility of the country's nominal exchange rate, so that the demographic dividend gradually disappears in the future, the appreciation pressure of the real exchange rate can be released through the nominal exchange rate, rather than through inflation and other means, resulting in rising prices and turbulence in the financial market; At the same time, improving the degree of interest rate marketization makes the market capital price more effective in reflecting the rate of return on capital, so that the financial market can more accurately reflect the exchange rate changes.

Second, tap the second demographic dividend. In addition to adjusting the population policy and promoting the increase of the fertility rate to delay the aging process, it is also necessary to fully improve the utilization rate of labor resources, expand the employment platform, promote the employment of surplus labor, and strive to tap the second demographic dividend, which can effectively delay the disappearance of the demographic dividend, balance the exchange rate appreciation and depreciation forces, and maintain it at a balanced and reasonable level.

Third, develop a demographic quality dividend. In order to achieve comprehensive and rapid economic development, it is necessary to cultivate practical talents in various industries, not only to increase the education popularization rate in developing countries, but also to pay attention to the effective connection between education and the labor market, comprehensively improve the quality of the population, and transform the demographic dividend into a more lasting demographic quality dividend.

7.2 Research Outlook

In terms of research methods, the research in this field is still mainly qualitative research, because there are few research models and the theory is not yet mature, so this paper only assumes a simple linear relationship between variables. But in fact, the fluctuation of the real exchange rate will be affected by many factors, and this paper analyzes the exchange rate from the perspective of population age structure, and the variables selected are relatively limited, which cannot fully and accurately reflect the changes in the real exchange rate. The results of Variance Partitioning Analysis show that the weak interpretation of real exchange rates by variables over the long term also illustrates this deficiency. Therefore, for future research, it can be improved from the following aspects: before model fitting, using the Lasso model to screen out the variables that have a large impact on the exchange rate, so that the selected variables can more comprehensively reflect the fluctuation of the exchange rate; While quantitatively analyzing, it is also necessary to combine the current international situation, the country's exchange rate policy and other factors that cannot be included in the model to improve the accuracy of the forecast; Looking for more mature models, etc.

In terms of research objects, only Vietnam is selected as the research object, but its exchange rate policy, national conditions and other factors will affect the research results. Therefore, subsequent studies can consider selecting data from multiple countries as samples, which can weaken the impact of individual differences to a certain extent; In order to further explore the impact of population structure on exchange rates at different levels of development, the sample can also be divided into developed countries (high-income countries) and developing countries (low-income countries), and the impact of population structure on these two types of countries can be studied in comparison.

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