Effect of resource factors to economic growth in Vinh Phuc province, Vietnam

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Abstract

This study evaluates the effect of capital stock, labor and total factor productivity on economic growth in Vinh Phuc province based on the growth accounting approach. The results showed that the total factor productivity factor was the greatest contribution to the economic growth of Vinh Phuc province during 2001-2018 with 74.38%. Despite the unstable level of growth, the employed workers have also made small contributions to the economic growth of Vinh Phuc province. The capital stock factor has also retained its contribution to the province's economic growth with a general average of 20.35% for the 2001-2018 period. However, the efficiency of using resource factors for economic growth still needs to be improved in the future.

Keywords: Economic Growth; Total Factor Productivity; Capital Stock; Labor; Vinh Phuc

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1. Introduction

Economic growth is not only an important indicator reflecting the level of economic development of a region, a country in each certain period, but also a prerequisite for economic development, for improving people's lives, for reducing unemployment and for many other macro objectives. Being a province located in the Northern key economic region[i] of Vietnam, Vinh Phuc is adjacent to Hanoi capital and is an integral part of the industrial development belt of the Northern provinces of Vietnam. Over the past 20 years, Vinh Phuc province has been successfully in revamping its economy with modern industrialization and opening up the economy; thus, the province's economic growth and per capita income increased quite high. However, there has not been any specific study on the resource factors affecting the economic growth in Vinh Phuc province. This study uses growth accounting method to assess the effects of resource factors on economic growth in Vinh Phuc province and propose solutions to enhance the impact of the factors on Vinh Phuc's economic growth.

2. Theoretical studies and research methods

2.1. Theoretical studies for resource factors on economic growth

Economic growth is an increase in the income of the economy for a certain period of time, usually a year. High economic growth is the goal of most countries, especially for developing countries because this is a prerequisite for overcoming the poverty and the backwardness of the country, making the life of the people increasingly improved. Economic growth is a much-mentioned concept in the research models of economists such as Smith (1776), Ricardo (1817), Harrod (1939), Domar (1946), Solow (1956), Romer (1986, 1990) and Mankiw et al. (1992). The production is the process of combining the inputs to create the outputs according to social needs. Each increase in resource factor will increase output. Both neoclassical economic theories and new growth theories recognize that, from the perspective of the resource factors of production, the main economic factors that are directly involved in the growth process are capital, labor and Total factor productivity (TFP).

Capital is an input factor of production and a fundamental resource that creates economic growth. It is all accumulated human wealth and the exploited and processed natural wealth such as land and minerals. A country's capital in a given period is measured in the mobilized and used currency for economic growth. Smith (1776) and Ricardo (1817) are behind classical economic growth model in which they emphasized productive investment and capital accumulation as engine of growth. Harrod (1939) and Domar (1946) have found a relationship between economic growth and increased investment through the Incremental Capital Output Ratio (ICOR[ii]), in which the rate of growth of output is determined by the rate of saving and the ICOR. They suggested that the ICOR could be a key variable to link investment requirements with targeted rates of economic growth. The Solow (1956) growth model[iii], Romer (1986, 1990) and Grossman and Helpman (1991) all stated that capital accumulation can lead to permanent growth in output per worker and is the main component to elevate a nation economics.

Labor is one of the basic factors of economic growth. Labor resources are the cause, the driving force of all growth and development, and also the product of development. As a part of the population, the labor force creates demand in the economy through participating in consumption of social products and services. While looking at population factors that determine output-input ratio, the neoclassical growth model of Solow (1956) stated that the growth is achieved when the output and physical capital grow in relation to the constant rate of the labor force growth. Moreover, in modern economic growth models, labor is considered as human capital, which means that labor have production skills, technology level to operate all kinds of machinery and equipment, ability to promote innovations and technical improvements (Romer, 1990; Grossman and Helpman, 1991; Mankiw et al., 1992). The quality of human resources depends on the educational level, intellectual level, health, quantity and quality of production machinery and equipment that equipped for workers and their working and living environment. Quality of human resources is considered a quality factor of growth (Romer, 1986; Romer, 1990).

Beside the two physical factors, capital and labor, which have an impact on economic growth, TFP is a factor that has a great influence on economic growth that is much interested recently. According to Solow (1957), TFP is the portion of output not explained by the amount of inputs used in production such as physical capital and labor. It can be reinterpreted as an index of all those factors other than labor and capital not explicitly accounted for but which contribute to the generation of output (Felipe, 1999). TFP "reflects the contribution of intangible factors such as knowledge, experience, labor skills, restructuring the economy or goods and services, and the quality of investment capital, which is mainly the quality of equipment technology, management skills..." (Vietnam Productivity Centre, 2009). In other words, TFP is the indicator reflecting the production results brought about by improving the efficiency of using capital and labor based on the impact of technological innovation factor, production rationalization, improving management, economic restructuring and improving labor standards. Higher TFP growth indicates the efficient utilization and management of resources, materials and inputs necessary for the production of goods and services.

To evaluate the growth of production results, beside the estimation the contribution of the growth rates of labor and capital, we can determine the TFP contribution in the GDP growth. Increasing TFP may greater production output through optimization of labor and capital sources, improvement of technology and management and efficiency the economic structure change in the economy. TFP is increasingly important in terms of development based on innovation and knowledge, reflected in its creativity, development of science and technology and advanced management methods as well as high value-added investments" (Vietnam Productivity Centre, 2009).

2.2. Research method

To measure and evaluate the effects of resource factors on economic growth of Vinh Phuc province, this research uses the starting model developed in Solow (1957) in the form of Cobb-Douglas production function:

$$Y = TFP.f(K^\alpha.L^\beta) \qquad (1)$$

in which, Y is total output (or GDP); K is capital stock; L is labor; TFP measures the efficiency of the combination between labor and capital, namely total factor productivity; α is the contribution ratio of capital (also known as the share of income of capital) and β = (1- α) is the contribution ratio of labor (also known as the share of income of labor).

Taking the natural logarithm of two sides of the equation (1), we have:

$$LnY = LnTFP + \alpha\, LnK + \beta\, LnL \qquad (1')$$

Differentiating two sides of the equation (1') over time, we have:

$$\frac{dY}{Y} = \frac{dTFP}{TFP} + \alpha\frac{dK}{K} + \beta\frac{dL}{L}$$

in which, $\frac{dY}{Y}, \frac{dK}{K}, \frac{dL}{L}$ and $\frac{dTFP}{TFP}$ are the growth rates of GDP, capital, labor and the growth rate of TFP, respectively.

If G_Y is the growth rate of GDP, G_K is the growth rate of capital, G_L is the growth rate of labor and G_{TFP} is the growth rate of TFP, Production function (1) changes as follows:

$$G_Y = G_{TFP} + \alpha.G_K + \beta.G_L \qquad (2)$$

One of the contributions of the Solow model is that it can be used to measure the contribution of production factors to economic growth. Indicators GY, GL, GK are calculated based on published data. The contribution ratio of capital (α), contribution ratio of labor (β) and G_{TFP} can be determined by various methods, of which the two most common methods are used to evaluate the contributions of the production factors in economic growth based on the Solow model as in equation (1) are growth accounting approach and growth regression approach. According to CIEM (2010), each method is applied appropriately depending on the conditions of each country and the system of different statistics available. The growth accounting method can determine the contribution ratio of capital, the contribution ratio of labor and G_{TFP} for each year and the data has been not necessarily continue for many years. The Growth regression method needs to use data with time series long enough[iv] and continuously for regression model to produce reliable results. In addition, the contribution ratio of capital and of labor calculated according to the growth regression method will be applied to the whole period even though the annual economic situation of the whole period has changed.

In order to determine the contribution ratio of capital (α), contribution ratio of labor (β) and G_{TFP} to Vinh Phuc province, provided that the data is accessible, this study uses growth accounting developed by Solow (1957).

According to equation (2), the growth rate of TFP is calculated by the following formula:

$$G_{TFP} = G_Y - \beta.G_L - \alpha.G_K \qquad (3)$$

After calculating the growth rate of each factor such as capital (G_K), labor (G_L) and growth rate of TFP (G_{TFP}), we can determine the contribution of capital, labor and TFP to the growth rate of GDP is as follows:

$$\% \text{ contribution of TFP} = G_{TFP}/ G_Y \times 100\%$$

% contribution of capital = α G_K / G_Y x 100%

% contribution of labor = $(1-\alpha)$ G_L/ G_Y x 100% = β. G_L / G_Y x 100%

2.3. Data calculation

Total output (Y) measured by Vinh Phuc's actual GDP, which is determined by the 2010 constant prices, in billion VND. The capital factor (K) is the actual capital stock of Vinh Phuc province, which is determined by the 2010 constant prices, in billion VND. The author chooses the method of determining the actual capital stock used in the study of Hiep and Nha (2015), Thong and Danh (2011) and applied in the case of Vinh Phuc province. Currently, Vietnam and other provinces of Vietnam (including Vinh Phuc province) have no data on the "capital stock". Since Vinh Phuc province was re-established in 1997, we used the actual GDP of Vinh Phuc province in 1998 as the first K level (K_0). From this initial K level and the annual investment value (I_t), we calculate the capital stock over time based on the formula:

$$K_t = (1- \delta) K_{t-1} + I_t$$

in which δ = 5% is depreciation rate. Based on research on the Vietnamese economic growth model by Dat (2005, 2010) and Hiep and Nha (2015), the author assumes the depreciation rate of capital in Vinh Phuc province is 5%[v].

Labor factor (L) is a labor of 15 years or older working in the economic sectors of Vinh Phuc province over the years and the unit is thousands of people.

The method of determining the contribution ratio of capital in GDP (α) was chosen as the method used in the study of Hiep and Nha (2015). According to Hiep and Nha (2015), the contribution ratio of capital (α) = λ K / Y, in which λ is the marginal product value of capital. The average lending rate in a year is the norm used to represent the marginal product value of capital.

The contribution ratio of labor in GDP β = 1- α.

In order to determine the impact of resource factors on economic growth of Vinh Phuc province, this research uses data on GDP, capital and labor collected from the Statistical Yearbook of Vinh Phuc province and Statistics Offices of Vinh Phuc province in the period from 2000 to 2018. Data on the average lending interest rate in the year were collected from the International Financial Statistics database of the IMF.

3. Results and discussions

Vinh Phuc province plays an important role in the Northern key economic region of Vietnam and is the gateway for socio-economic exchange between the Northern midland and Hanoi capital. Over the nearly past 20 years (2001-2018), Vinh Phuc province has made rapid development steps, some key industries have increased production capacity; economic sectors all have grown, especially the non-state economic sector, which has affirmed its position in a multi-sector economy.

Figure 1 shows that the GDP value of Vinh Phuc province increases annually with the increase in the following year higher than the previous year, in 2018 the total GDP reached 94498 billion VND, more than 8 times compared to 2010 and 21 times compared to 2001. The GDP growth rate of Vinh Phuc province during the period of 2001 - 2018 always maintained at a high level, with an average increase of 12.26% per year.

In 2012, the growth rate suddenly dropped to -3.46%. Besides the impact of the general situation of Vietnam[vi], the industry sector - the foundation to create high economic growth in Vinh Phuc province - grew low, leading to a slowdown in the overall economic growth (Nga, 2012). According to Director of the Department Finance in Vinh Phuc province, the economic growth rate of the province was low due to the budget revenue of the province depends mainly on the activities of production and business of enterprises, especially the two foreign invested companies Toyota and Honda Vietnam, which accounted for more than 80% of the budget revenue of Vinh Phuc province. In 2012, the revenues of these two companies declined, causing the number of budget remittances to decrease.
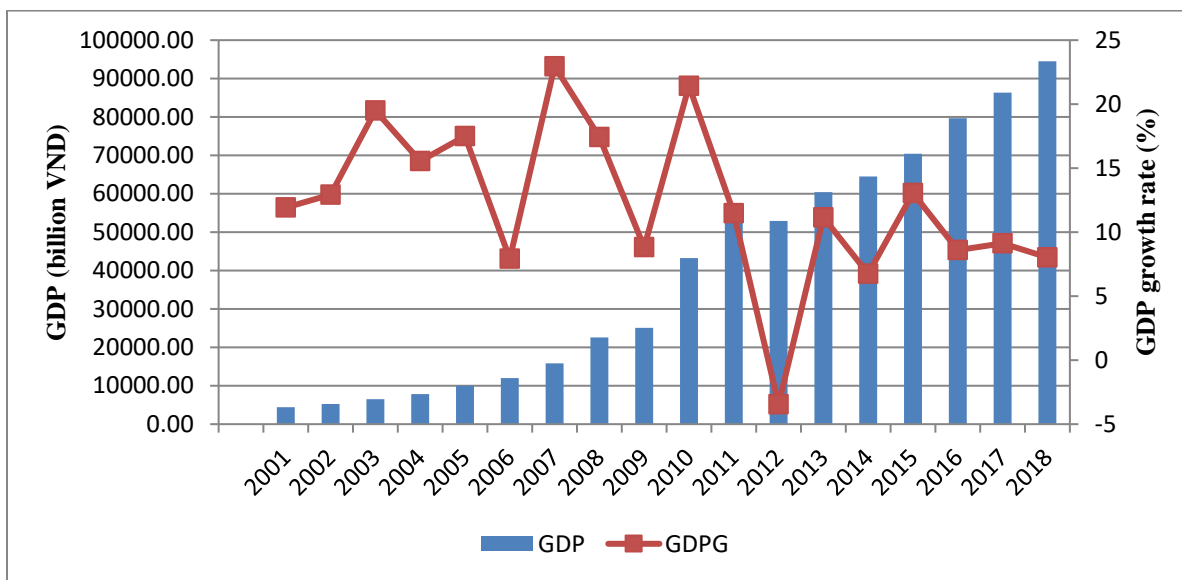
Figure 1. GDP and GDP growth rate of Vinh Phuc province (Source: Statistical yearbooks of Vinh Phuc province in 2001-2018)

However, in the following years, the growth rate of GDP has shown signs of recovery. Especially in the years of 2015, the provincial GDP growth rate reached over 13%.This is the result of attracting foreign investment in Vinh Phuc province in the field of manufacturing electronic products, communication equipment and mineral processing after exploitation. Foreign investment companies in the province have basically completed the phase of infrastructure construction, initially going into production to create new resilience and added value to the economy of the province. High economic growth rate, while the population growth rate is controlled, the average income per capita of Vinh Phuc province increases year after year. The

GDP per capita (at current prices) is constantly increasing. In 1997, it was only 2.13 million VND per person. In 2018, it reached VND 86.5 million VND per person and was 40.6 times compared to 1997.

During the 2001-2018 period, the growth rate of capital in Vinh Phuc province is always high with the average growth rate of the whole period of 18.35% (Table 1). In 2012, the investment capital in Vinh Phuc province decreased by 17% compared to the year of 2011 (Appendix) because Vinh Phuc province was also affected by the global financial crisis so investment countries narrowed their investment capital. The growth rate of capital decreased to only 13.16%, the lowest rate in the last 10 - year - period. However, in the 2013-2018 period, the investment attraction in Vinh Phuc continues to have positive changes. The growth rate of capital (K) of Vinh Phuc province increased constantly with the average rate of 12.5% in this period. Results in Table 2 also shows that the average contribution of capital in GDP is about 16.39% in the period 2001-2010 and increased to 29.83% in the period 2011-2018.

Table 1. Growth rate of GDP, capital, labor and TFP of Vinh Phuc province

Year	Growth rate of GDP G_Y (%)	Growth rate of capital G_K (%)	Growth rate of labor G_L (%)	contribution ratio of capital α	contribution ratio of labor β = 1- α	Growth rate of TFP G_{TFP} (%)
2001	11.93	5.48	7.60	0.0694	0.9306	4.48
2002	12.92	18.17	0.42	0.0698	0.9302	11.26
2003	19.49	35.70	0.38	0.0830	0.9170	16.18
2004	15.55	24.78	4.67	0.0919	0.9081	9.04
2005	17.51	16.87	2.22	0.1037	0.8963	13.78
2006	7.92	17.32	1.84	0.1142	0.8858	4.31
2007	22.96	18.74	1.85	0.1103	0.8897	19.25
2008	17.43	25.53	-15.47	0.1664	0.8336	26.08
2009	8.82	30.71	3.49	0.1276	0.8724	1.86
2010	21.42	27.09	2.61	0.1743	0.8257	14.54
2011	11.48	21.67	1.25	0.2453	0.7547	5.22
2012	-3.46	13.16	-2.84	0.2285	0.7715	-4.28
2013	11.16	12.56	1.46	0.1781	0.8219	7.72
2014	6.75	12.51	0.51	0.1568	0.8432	4.36

2015	13.06	13.64	1.15	0.1296	0.8704	10.30
2016	8.61	12.95	0.02	0.1317	0.8683	6.89
2017	9.13	11.92	-0.01	0.1372	0.8628	7.50
2018	8.03	11.44	0.78	0.1482	0.8518	5.67
2001-2010	**15.60**	**22.04**	**0.96**	**0.11**	**0.89**	**12.08**
2011-2018	**8.10**	**13.73**	**0.29**	**0.17**	**0.83**	**5.42**
2001-2018	**12.26**	**18.35**	**0.66**	**0.14**	**0.86**	**9.12**

Source: Statistical yearbooks of Vinh Phuc province in 2001-2018 and author's calculations

Thus, capital is one of the important factors contributing to the economic growth of Vinh Phuc province in the 2001-2018 period, averaging 2.49 percentage points (accounting for 20.35%). In the period of 2011-2018, while there is a huge amount of capital invested in Vinh Phuc, the ICOR of this period increased slightly compared to the ICOR in the period of 2001-2010 (Appendix). Moreover, the average ICOR of Vinh Phuc province in the period 2001-2018 is 1.92; lower than this value of the whole country[vii]. This means that the investment efficiency of Vinh Phuc province is high and needs to be promoted in the future.

The labor growth rate of Vinh Phuc province is not high and quite unstable between years. The population in working age of Vinh Phuc province has increased over the years (Appendix) will increase savings and increase the contribution to the social security fund, thereby positively impacting economic growth. However, labor contributed only to GDP of 0.6485 percentage points on average, corresponding to 5.29 % of economic growth of Vinh Phuc province. In the 2011-2018 period, the contribution of labor in economic growth tended to decrease by 3% compared to the 2001 -2010 period because in this period more than 10% of the labor force in the agriculture - forestry -fishery sector of Vinh Phuc province has moved to work in industry and construction sector when workers of Vinh Phuc province have not yet changed their jobs to catch up with new jobs.

Besides the contribution of capital and labor in GDP growth, TFP also made a positive contribution to GDP. In the period of 2001-2010, the average contribution of TFP in GDP growth was 77.4% and higher than the contribution of TFP in GDP growth in 2011-2018. Though, TFP did contribute the highest share to GDP growth of Vinh Phuc province (Table 2). The growth of TFP during this period is the result of increasing labor productivity in Thai Nguyen province. This upward trend is due to the actual capital stock were put into production to create goods and services. Investment capital in this period is only used for ground clearance, construction of facilities to create a premise for production of goods and services. During the 2001-2010 period, the contribution of TFP to GDP increased quite strongly, about 77.41%. The growth of TFP during this period is the result of increasing capital productivity in Vinh Phuc province.

Table 2. Contribution of capital, labor and TFP in GDP growth of Vinh Phuc province

Year	Growth rate of GDP (%)	Contribution of capital		Contribution of Labor		Contribution of TFP	
		contribution percentage in G_Y	Proportion	contribution percentage in G_Y	Proportion	contribution percentage in G_Y	Proportion
2001	11.93	0.3803	3.19	7.0728	59.29	4.4769	37.53
2002	12.92	1.2680	9.81	0.3905	3.02	11.2615	87.16
2003	19.49	2.9618	15.20	0.3489	1.79	16.1794	83.01
2004	15.55	2.2766	14.64	4.2376	27.25	9.0358	58.11
2005	17.51	1.7492	9.99	1.9855	11.34	13.7753	78.67
2006	7.92	1.9791	24.99	1.6342	20.63	4.3067	54.38
2007	22.96	2.0667	9.00	1.6477	7.18	19.2456	83.82
2008	17.43	4.2496	24.38	-12.8946	-73.98	26.0751	149.60
2009	8.82	3.9186	44.43	3.0439	34.51	1.8575	21.06
2010	21.42	4.7201	22.04	2.1559	10.06	14.5440	67.90
2011	11.48	5.3155	46.30	0.9397	8.19	5.2248	45.51
2012	-3.46	3.0073	-86.92	-2.1909	63.32	-4.2764	123.59
2013	11.16	2.2369	20.04	1.2037	10.79	7.7194	69.17
2014	6.75	1.9623	29.07	0.4274	6.33	4.3603	64.60
2015	13.06	1.7680	13.54	0.9968	7.63	10.2952	78.83
2016	8.61	1.7062	19.82	0.0150	0.17	6.8888	80.01
2017	9.13	1.6358	17.92	-0.0045	-0.05	7.4987	82.13
2018	8.03	1.6957	21.12	0.6633	8.26	5.6711	70.62
2001-2010	**15.60**	**2.5570**	**16.39**	**0.9622**	**6.17**	**12.0758**	**77.41**
2011-2018	**8.10**	**2.4159**	**29.83**	**0.2563**	**3.16**	**5.4227**	**66.95**
2001-2018	**12.26**	**2.4943**	**20.35**	**0.6485**	**5.29**	**9.1189**	**74.38**

Source: Statistical yearbooks of Vinh Phuc province in 2001-2018 and author's calculations

Calculated at current prices, the average social labor productivity in the 2011-2018 period of Vinh Phuc province is 113.76 million VND per labor, an increase of 4.6 times compared to the period 2001 - 2010 (Appendix). This is the result of the economic restructuring from agricultural-forestry-fishery sector to industry sector in Vinh Phuc province. Since the Decision No.712/QD-TTg on 21 May 2010 on approving the Vietnamese national program named "Improving the productivity and quality of products and goods of Vietnamese enterprises by 2020" (Ministry of Science and Technology Portal, 2010) effected, the Party Committee of Vinh Phuc Province has determined industrial development as the foundation and attracting investment as an important key for the development of the province (Vinh Phuc Provincial Party Committee, 2010). The province always creates the most favorable conditions for all enterprises to develop. All businesses have equal access to land resources, infrastructure, electricity and water supply, tax incentives, vocational training and recruitment, and access to communication and capital (Tri, 2019). With those efforts, up to 2018, Vinh Phuc province was attracted 1081 investment projects in the industry sector[viii], in which there are 326 foreign direct investment projects with total investment capital of 4.38 billion USD and 755 domestic investment valid projects with total registered investment capital of 80.9 trillion dong. With the strong development in the industry sector, in 2018, the GDP of the province was accounted for 79.965 billion VND, increasing 8.03% compared to 2017, in which, the agriculture - forestry - fishery sector increased by 3.72%, the industry – construction sector increased by 15.20% and the service sector increased by 7.46% (Vinh Phuc Statistics Office, 2018). From 1997 (the time Vinh Phuc province was re-established) to 2018, Vinh Phuc's economic structure shifted towards industrialization: reducing the proportion of the agricultural sector from 48.27% to 8.28%; services sector from 37.75% to 29.57% of GDP and the increasing the proportion of industry - construction from 13.98% to 62.15% (Vinh Phuc Statistics Office, 2000-2019). The increasing labor productivity in Vinh Phuc province in 2011-2018 period through shifting its economic structure from agriculture to industry sector which is the greater value-added sector in Vinh Phuc's economy is very popular in countries with low development as Vietnam.

4. Conclusions and recommendations

Vinh Phuc is one of the provinces with high growth in the period 2001-2018. Based on the growth accounting method, the research evaluated the affecting resource factors such as capital, labor and total-factor productivity on economic growth of Vinh Phuc province. Research results show that the average economic growth rate of Vinh Phuc province in the 2001-2018 period reached 12.26%, of which TFP is the most important factor contributing to economic growth with the proportion of 74.38%. Capital has also maintained its contribution to GDP growth with the average level of the whole period 2001-2018 of 20.35% and used the capital effectively with low ICOR ratio. Employed labor contributed 5.29% to Vinh Phuc's economic growth. However, the efficiency of using the labor of the province for economic growth is low and the labor productivity still needs to improve.

In 2011, Vinh Phuc province issued the "Socio-economic development plan of Vinh Phuc province to 2020, vision to 2030", which affirmed the economic development direction of Vinh Phuc province in 2030 as

"maintain a high economic growth rate towards stability and sustainability; efficiently exploiting investment resources for development. Improving the quality of growth with special attention to agricultural development and rural economy; taking industrial development as a foundation; promote development and improve service quality" (Vinh Phuc portal, 2011).

To implement the economic development orientations stated above, Vinh Phuc province should maximize and effectively exploit resources for economic development, especially capital, human capital and the role of TFP on economic growth. To do this, Vinh Phuc province needs to implement a number of solutions. Firstly, Vinh Phuc province should consider the direction of economic growth not based on increasing investment capital and exploiting resources, but based on knowledge and technology growth. Secondly, Vinh Phuc province needs to improve the efficiency of using investment capital through key investment in high-tech projects; avoid loss, waste in the use of investment capital and strengthen inspection and supervision of investment activities. Thirdly, Vinh Phuc province needs to improve the quality of human resources to serve the economic growth of Vinh Phuc province by raising the cultural level and awareness of workers, increasing investment in education and training on all aspects such as ethical quality, professional qualifications, foreign languages and informatics. In addition, Vinh Phuc province should resolutely reform the administration, improve the business investment environment and improve the effectiveness of state management on economic management.

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[i] The Northern key economic region of Vietnam included 7 cities and provinces: Ha Noi, Vinh Phuc, Bac Ninh, Hung Yen, Hai Duong, Hai Phong and Quang Ninh

[ii] According to Harrod (1939) and Domar (1946), the ICOR is defined as a ratio between incremental changes in capital over incremental changes in output. It shows that to increase by 1 percent (1%) of the output requires an increase of how many percent of the investment capital to output ratio.

[iii] The Solow model, which is sometimes known as the Solow–Swan model, was developed by Robert Solow (Solow, 1956) and Trevor Winchester Swan (Swan, 1956).

[iv] According to Green (1991) and Tabachnick and Fidell (2007), when data are in time series and statistics by year, the data series need to satisfy n -k> 20 (where n is the number of years and k is the number of independent variables in the model). Thus, if the model has 2 independent variables and 1 dependent variable as the production function (1), the number of consecutive years required to implement the regression model is n> 20 + 2 = 22 years.

[v] Theoretically, the determination of the general depreciation rate of capital will be estimated from the depreciation rates of various asset classes in the economy (Young, 1992). However, this is difficult to determine in practice. Therefore, most empirical studies

often assume a depreciation rate of capital between 4% -8%. For example, the 4% assumption comes from Chow (1993); 5% by Pekins (1988), Wang and Yao (2003), Whalley and Zhao (2010); and 8% by Ozyurt (2009). As other studies, the author assumes the depreciation rate of capital in Vinh Phuc Province is 5%, based on the assumption of Dat (2005, 2010) and Hiep and Nha (2015) when studying Vietnam's economic growth.

vi In 2012, Vietnam's economic growth reached 5.25% (at 2010 prices) - the lowest growth rate since 2000 (General Statistics Office of Vietnam, 2019). Vietnam's socio-economy continued to be affected by the instability of the world economy due to the unresolved financial crisis and public debt crisis in Europe. Some major countries playing an important role in trade relations with Vietnam such as the United States, China, Japan and the European Union faced many challenges, resulting in slow growth. Disadvantages from the decline of the world economy adversely affect production and business activities and people's life in Vietnam.

viiVietnam's ICOR has decreased from 6.29% in 2011-2015 to 6.11% in 2016-2018 (General Statistics Office of Vietnam, 2019), reflecting that the economy is becoming more efficient in using capital and investing to generate output and growth. However, Vietnam's ICOR is still high; investment efficiency is still low compared to many other economies. The reason is partly because the economy is in the period of concentrating investment in infrastructure in remote and isolated areas and investment in hunger eradication and poverty reduction, ensuring social security. Moreover, the world economic crisis has directly affected production and business activities in all sectors. The prices of input factors continue to increase, significantly reducing investment efficiency.

viii According to Trung (2020), the province received great attention from many global corporations such as Toyota, Honda, Sumitomo (Japan); Piaggio (Italy); De Heus (Netherlands); Deawoo; Patron Vina, Heasung Vina, Cammsys (Korea); Prime Group (Thailand); Weldex (United States) and so on. Besides foreign investors, there are the presences of many famous domestic enterprises such as FLC, Vin Group, Sun Group, Hong Hac Dai Lai Company, Red River Capital, Vietnamese Steel Germany… The three strong industries of Vinh Phuc province are the automobile and motorcycle manufacturing and electronic component manufacturing.

Appendix: Data and calculations in the research

Year	GDP-current prices (billion VND)	GDP-2010 constant prices (billion VND)	I-2010 constant prices (billion VND)	K-2010 constant prices (billion VND)	L (person)	Average lending interest rate	Contribution ratio of capital K	Labor productivity (million VNDD/person)	ICOR-2010 constant prices
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)=(1)/(5)**	**(9)**
1998	2943.22	7610.68	392.56	7610.68					
1999	3278.74	8204.32	527.39	7757.54					
2000	3920.92	10245.55	634.84	8004.50					
2001	4431.14	11467.85	839.14	8443.41	608610	0.0942	0.0694	7.2808	0.69
2002	5244.93	12949.50	1955.96	9977.20	611165	0.0906	0.0698	8.5819	1.32

2003	6498.13	15472.92	4061.09	13539.43	613490	0.0948	0.0830	10.5921	1.61
2004	7839.38	17878.31	4032.63	16895.09	642117	0.0972	0.0919	12.2086	1.68
2005	9961.28	21008.88	3695.476	19745.81	656341	0.1103	0.1037	15.1770	1.18
2006	12014.59	22672.51	4408.148	23166.67	668450	0.1118	0.1142	17.9738	2.65
2007	15832.88	27878.25	5498.64	27506.97	680830	0.1118	0.1103	23.2553	1.06
2008	22544.58	32737.70	8398.50	34530.12	575510	0.1578	0.1664	39.1732	1.73
2009	25112.95	35624.29	12331.88	45135.49	595590	0.1007	0.1276	42.1648	4.27
2010	43254.79	43254.79	14482.87	57361.59	611140	0.1314	0.1743	70.7772	1.90
2011	52899.21	48220.44	15296.91	69790.42	618750	0.1695	0.2453	85.4937	3.08
2012	52880.77	46552.01	12674.00	78974.90	601178	0.1347	0.2285	87.9619	-7.60
2013	60428.46	51747.21	13865.63	88891.78	609983	0.1037	0.1781	99.0658	2.67
2014	64476.377	55241.543	15569.38	100016.58	613075	0.0866	0.1568	105.1688	4.46
2015	70408.315	62454.20	18647.39	113663.14	620096	0.0712	0.1296	113.5442	2.59
2016	79664.57	67829.79	20404.43	128384.42	620203	0.0696	0.1317	128.4492	3.80
2017	86337.00	74021.00	21721.50	143686.70	620171	0.0707	0.1372	139.2148	3.51
2018	94498.00	79965.00	23626.47	160128.83	625000	0.0740	0.1482	151.1968	3.97

Source: Vinh Phuc Statistics Office (2001–2018) and IMF (2019)