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The Impact of Foreign Direct Investment on Income Convergence: Evidence from Provinces of Vietnam

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Abstract

The study examines the issues of income convergence across 18 provinces of Vietnam during 2000-2015 period, and the effect of foreign direct investment using data from the General Statistics Office. The objectives of this paper are twofold: First, to know whether the provinces of Vietnam are jointly converging in terms of absolute beta, conditional beta as well as sigma coefficients. Second, the role of foreign direct investment in the income convergence process is investigated. Our results show that Vietnam's provincial incomes appeared to be diverging rather than converging during the period of consideration both in terms of sigma and beta. However, the divergence trend slowed down in 2006-2015, when Vietnam has strongly integrated with the world economy. Foreign direct investment seems to help alleviating the seriousness of the divergence process in Vietnam but the contribution of FDI to the alleviation of income divergence is quite weak.

Keywords: Foreign Direct Investment, Income Convergence, Income Divergence , Provinces, Absolute Beta, Conditional Beta

1. Introduction

The economic reforms in Vietnam have transformed the country from a poor to a lower middle-income status since 1986. Economic growth has contributed to reducing poverty and increasing incomes (Dollar, 2002; World Bank, 2011; Malesky & London, 2014; Nguyen, 2017). The proportion of households below the poverty line declined from 58 per cent in 1993 to 14 per cent in 2012. The economic growth has also enabled Vietnam to improve social welfare of millions of households over the past three decades (World Bank, 2007 and 2011). Income disparity between regions, however, has become an increasing concern since 2000.

There have a few studies on income inequality at the provincial level in Vietnam (Vu and Nghiem, 2016; Phan and Coxhead, 2010). Vu and Nghiem (2016) used the "log(t)" approach and rejected evidence of income convergence across 61 provinces in Vietnam between 1990 and 2011. Similarly, Nguyen (2009) studied the trend of income convergence in Vietnam from 1990 to 2006 and found that a converging pattern was rejected. In addition, Phan and Coxhead (2010) show that migration contributed to reducing the income disparity between provinces in Vietnam. While studies in Vietnam focus exclusively on the evidence of income convergence and the role of migration at the provincial level, there have been no papers studying the relationship between foreign direct investment (FDI) and the increasing trend of income disparity among regions.

Therefore, the paper is aimed to investigate empirically the effect of FDI on income convergence using provincial panel data between 2000 and 2015. The evidence of this link provides insights of inequality reduction among provinces in Vietnam during economic reforms. Firstly, changes in poverty reduction are directly linked to the success in economic development and income redistribution (Thirwall, 2006). If FDI promotes income divergence, this impact could reduce the beneficial effects of FDI on poor provinces. Secondly, policies on income reallocation could lead to working disincentive effects (Banerjee and Duflo, 2011). Thus, attracting more foreign direct investment plays an important role in improving the efficiency and income equity among regions by expanding economic opportunities and thereby reduces the adverse repercussion aimed at equalizing outcomes (Lin et al.,

2013). Finally, according to the literature of political economics, renovations that result in improving efficiency may turn the political influences of political elites around (Taylor and Lybbert, 2015). FDI oriented policies are less likely to be prioritized if the achievements and impacts of FDI are evenly distributed. As the political elites may keep their interests by preventing FDI policies as controlling FDI reforms directly to reduce competition.

The paper is structured as follows. Section 2 introduces the literature review on income convergence and empirical studies. Section 3 outlines the empirical model of the paper and presents the data. Section 4 discusses empirical findings. Finally, section 5 provides conclusions and policy implications.

2. Literature Review

In the past few decades, the convergence hypothesis has been the subject of intense controversy generating a huge volume of empirical literature. To date, the convergence controversy has largely turned on different assumptions about the existence of factors or mechanisms, which can generate either convergence or divergence. Neoclassical Growth theory, pioneered by Solow (1956), assumes diminishing returns to production factors, and therefore predicts the convergence implication. Conversely, New Growth Theory, motivated by Romer (1986 and 1994) and Lucas (1998), assumes increasing returns to production factors and therefore that rich countries grow faster and inequality increases without any bound. Empirically, Barro and Sala-i-Martin (1999) used cross-section data from countries between 1960 and 1985 found that the growth rate of per capita income was not correlated with the initial per capital product. However, when initial human capital was controlled for, he found clear evidence of income convergence. Mankiw et al. (1992) find the absolute income convergence among 22 OECD economies over the years 1960-1985 absolute divergence among 98 economies. They find, however, strong conditional convergence all groups of countries.

The study by Islam (1995) finds conditional beta convergence. Using regional data, Barro and Sala-i-Martin (1995) and Sala-i-Martin (1996) found the evidence of absolute beta- convergence from different countries such as the United States, Japan, Europe, Canada, Germany, Italy and Spain. The

study by Young et al. (2007) also finds beta convergence in the United States from state-level data during the 1970-1998 period. However, he fails to detect sigma convergence during the same time period. The study by Coulombe and Lee (1995) recommends that the convergence for different measures of income per capita is also found. Using various techniques to examine China's regional growth patterns, a number of authors (for instance, Pedroni and Yao, 2006; and Zhang et al., 2001) find that regional incomes show divergence rather than convergence between Chinese provinces since China opened its economy and integrated more deeply into the world economy.

While the topic of convergence has become interests of several papers, the role of FDI in this process has been largely neglected in the literature. The study by Sivestriadou and Balasubramanyam (2000) suggests that countries pursuing export promoting (EP) policies converge at around 1.9 per cent per annum, while countries pursuing import substituting (IS) policies converge at the rate of only 0.9 per cent per year. Duasa (2010) uses data from ten members of the Organization of Islamic Conference for the period 1970-2004 to examine the existence of income convergence. His findings show that many economies experienced income divergence toward the benchmark country of the United State. He then analyzes the connection between globalization and income convergence and found that countries ranked higher in terms of globalization economically and technically experienced income divergence. Choi (2004) confirms that foreign direct investment is a driving force in closing the growth gap of per capita income between home and host countries. Conversely, Nunnenkamp and Bode (2011) use data from 51 states of the United State for the period of 1977-2005 to investigate the effect of FDI on income. They find that FDI results in the income divergence between regions of the United States.

More recently, a study by Sofi and Durai (2016), using data of India from 1980 to 2011, found that states diverged in the absolute term but converged on conditional analysis. By different measures between low quantiles and high ones, they find that the absolute divergence became weaker, whereas the conditional convergence tended to be faster. Ma and Jia (2015) pointed out that FDI inflows into China have played an indispensable role to expand conditional convergence since 1990.

To sum up, although there have been several studies on income convergence, the present paper is the first research that investigates the role of FDI on income convergence across 18 provinces of Vietnam. Since the *"doi moi"* (economic reform) foreign direct investment has been considered as a crucial factor behind the success of the economy (World Bank, 2011). Therefore, the investigation of the relationship between FDI and income and adjusting FDI policy during Vietnam's development.

3. Methodology and data

3.1 Empirical Models

Convergence in per capita income implies "economies with lower levels of per capita income (expressed relative to their steady-state levels of per capita income) tend to grow faster in per capita terms".[1] This economic issue has attracted the attention of many economists producing a large body of literature, especially since the mid-1980s. In general, the empirical findings in the literature are mixed. The paper uses the approach of Barro and Sala-i-Martin (1999) to test Sigma convergence hypothesis as follows:

$$\Delta z_{i\ ,t+1} = k z_{i,t}\,, \tag{1}$$

where $\Delta z_{i,t+1} = z_{i,t+1} - z_{i,t}$;

$$z_{i,t} = \log y_{i,t} - \log \overline{y}_t$$

$y_{i,t}$ is per capita income of province *i* in year *t*

$\overline{y}_t$ is un-weighted average of per capita incomes in year *t*.

k represents the rate of per capita income convergence.

If $k>0$, per capita incomes diverge within the sample group over time; if $k<0$, convergence of income takes place.

Second, in order to investigate unconditional beta convergence, the following framework will be used as following:

$$\gamma^{y}_{i.t+1} = a + \beta \log\left(y_{i.t}\right) + e_{i.t} \tag{2}$$

[1] See Barro and Sala-i-Martin (1999) for further information on different concepts of income convergence.

where $\gamma^{y}_{i,t+1}$ is province *i*'s annually average growth rates of per capita GDP in year $t+1$; log ($y_{i.t}$) is the measure of province *i*'s per capita GDP at time *t*. If β is smaller than 0 and is statistically significant, then we could reject the null hypothesis (H_0) of $\beta=0$ in favour of $\beta<0$, and we could conclude that data set exhibits absolute beta convergence implying that poorer provinces have higher economic growth than the richer ones. Conversely, if β is greater than 0 and is statistically significant, then we could reject the null hypothesis (H_0) of $\beta=0$ in favour of $\beta>0$, we could state that data set exhibits absolute beta divergence. The absolute beta convergence is calculated by using following equation:

$$\lambda = -\ln(\beta + 1), \tag{3}$$

λ is the rate of convergence implying that actual incomes reach the common steady state.

In addition, the model used to test conditional β-convergence and the effect of FDI on the convergence process is expressed as follows:

$$\gamma^{y}_{i.t+1} = a + \beta_1 \log y_{i.t} + \beta_2 \log savings_{i.t+1} + \beta_3 \log(n + g + \rho)_{i,t+1} + \tag{4}$$
$$\beta_4 FDI_{i,t+1} + \beta_5 TRADE_{i,t+1} + e_{i,t+1}$$

where $\gamma^{y}_{i,t+1}$ is the province *i*'s annually average growth rate of per capita GDP at time $t+1$; log $y_{i.t}$ measures province *i*'s per capita GDP at time *t*; log $savings_{i.t\ +1}$ represents province i's average annually gross domestic savings to GDP growth; *n* is growth rate of population, *g* is the growth rate of technology caused by other factors rather than FDI and trade, ρ is the rate of depreciation. Following many previous studies (Milanovic, 2006; Islam, 1995), we assume *g* to be constant at 3 per cent and ρ to be constant at 2 per cent.[2] $FDI_{i.t}$ is the ratio of FDI to GDP. $TRADE_{it}$ is the economy *i*'s ratio of trade (imports plus exports) to GDP.

[2] Mankiw et al. (1992) argue that "*g* reflects primarily the advancement of knowledge, which is not country- specific. And there is neither any strong reason to expect depreciation rates to vary greatly across countries, nor are there any data that would allow us to estimate country-specific depreciation rates"

If $\beta_1 < 0$ and statistically significantly, then we would reject the null hypothesis (H_0) of $\beta_1 = 0$, implying that regions, which are further away from the steady state could experience faster growth rate than regions, which are closer to their steady states. Next, interaction of FDI_{it} with $\log y_{it}$ is introduced as:

$$\gamma^{y}_{i.t+1} = a + \beta_1 \log y_{i.t} + \beta_2 \log savings_{i.t+1} + \beta_3 \log(n + g + \rho)_{i,t+1} + \quad (5)$$

$$\beta_4 FDI_{i,t+1} + \beta_5 TRADE_{i,t+1} + \beta_6 FDI_{i,t+1} \times \log y_{i,t+1} + e_{i,t+1}$$

This specification allows us to examine not only the effect of FDI on income growth but also on the rate of convergence (to steady state growth rate). Now we consider the sign of interaction term between FDI_{it} with $\log y_{it}$. If the coefficient of this interaction is positive, it would suggest that FDI promotes incomes convergence process. Conversely, if the coefficient of this interaction is negative, it would suggest that FDI decelerates incomes convergence process.

3.2 Data

This paper relies on data provided by the General Statistical Office, which is chiefly responsible for economic indicators in Vietnam. The data shows the panel covering 18 provinces of Vietnam from 2000 to 2015. The provinces are: Baria-Vungtau, Bacninh, Binhduong, Danang, Dongnai, Hanoi, Hatay, Haiduong, Haiphong, Hungyen, Ho Chi Minh city, Khanhhoa, Kiengiang, Lamdong, Longan, Quangnam, Quangninh, Vinhphuc. Vietnam, at present, has 63 provinces, but we choose these 18 provinces because they attracted a significant FDI amount through the period. Particularly, their share is nearly 80 per cent in the whole country's implemented FDI in the period 2000-2015. All the variables are calculated in 1994 constant prices. GDP, domestic investment, and FDI are measured in Vietnam currency (Dong, thereafter called VND). Export turnover is measured in USD. Labor is growth rate of labor force in each province.

Table 1. Summary statistics

Variables	No.of Obs	Mean	Std.Dev	Minimum	Maximum
γ^y	270	0.073	0.027	0.012	0.146
$\log(y_0)$	270	-5.63	0.656	-6.72	-3.301
$\log(n + g + \rho)$	270	-2.65	0.145	-2.942	-2.325
log(*savings*)	270	-1.04	0.269	-1.997	-0.521
FDI	270	0.093	0.079	0	0.376
TRADE	270	0.58	1.019	0.014	7.97

Table 2. Pairwise Correlation

	γ^y	$\log(y_0)$	$\log(n + g + \rho)$	log(*savings*)	FDI	*TRADE*
γ^y	1.0					
$\log(y_0)$	0.28 (0.00)	1.0				
$\log(n + g + \rho)$	-0.15 (0.02)	0.37 (0.00)	1.0			
log(*savings*)	0.20 (0.00)	-0.22 (0.00)	-0.29 (0.00)	1.0		
FDI	0.26 (0.00)	0.49 (0.00)	0.14 (0.02)	-0.55 (0.00)	1.0	
TRADE	0.28 (0.00)	0.39 (0.00)	0.22 (0.00)	-0.13 (0.03)	0.20 (0.00)	1.0

Note: All pairwise correlations are statistical significance at 1 per cent.

4. Empirical Findings

4.1 Sigma convergence

In this section, we firstly examine sigma convergence hypothesis in the context of Vietnam for the 2000-2015 period by estimating Equation (1) based on pooled data from 18 Vietnam's provinces. The convergence hypotheses

were examined for the whole period as well as shorter breakdowns of the 2000-2005 (thereafter called pre-liberalized) and 2006-2015 (thereafter called liberalized) periods. During the second period, Vietnam's economy is more open to the world economy than the former one with its accession to WTO in 2006. We follow the popular argument in the neoclassical literature that economic integration in the world could increase the convergence due to capital inflows between countries.

Table 3 shows that the estimated coefficient of income differential, *k*, for Vietnam's provinces during the 2000-2015 period is positive although not statistically significant. This implies that the disparity between Vietnam's provinces has not narrowed down during observed period. However, in the period 2000-2005, the provinces experienced significant divergence rather than convergence though the magnitude of coefficient is quite small. The estimated results in Table 3 also show that the divergence trend has not remained in the second period 2006-2015. The results seem to support the hypothesis that more open economy tends to perform better in terms of proceeding convergence process.

Table 3. Sigma convergence in Vietnam

Explanatory variable	Dependent variable: $\Delta z_{i,t}$ ($z_{it} = \log y_{i,t} - \log \bar{y}_t$)		
	2000-2015	2000-2005	2006-2015
$\hat{k}$	0.0010	0.009	-0.003
	(0.36)	(2.04)**	(1.03)
Const	-0.002	-0.005	-0.00003
	(1.07)	(1.70)*	(0.02)
Number of observations	270	90	180
R-square	0.0007	0.05	
Half-life			230
Double life	693	77	

Note: ** and *** denote statistical significance at 5 per cent and 1 per cent, respectively.

For the case of Vietnam, another possible explanation is that the policies attacking poverty implemented by the Government has gained some achievements. These policies are quite comprehensive and funded by the government, and includes quite many projects such as assistance to the absolute poverty, training, business guideline, education assistance, and production instruments for the poor (World Bank, 2011). In 1995, the Bank for the poor was established to assist the poor in providing funds for their production development. In the latter period of 2006-2015, the country was at higher level of development, it therefore could provide the poor with better resources.

Foreign enterprises are also given more favour treatment if they invest in the remote and difficult areas. The failure to find convergence in our study is inconsistent with some previous studies, in which the pattern of sigma convergence at the regional level was found very similar in industrial countries. However, our estimated results are similar to the research of Pedroni and Yao (2006), which displays a long run tendency for China's income divergence among provinces.

This section also tests the hypothesis of unconditional beta convergence that poorer regions grow faster than the richer regions, and thereby poorer regions tend to catch up with the richer ones in terms of per capita income. Following above argument, we examine both pre-liberalized and liberalized periods. In each period, we regress annually growth rates of real GDP per capita on the initial income. Regarding absolute beta convergence, the estimated beta coefficient should be strictly negative. First, equation (2) is estimated by using pooled data to investigate the relationship between per capita income growth and its initial income. Then, equation (3) estimates the rate of convergence/divergence among provinces. Table 4 contains the estimated coefficient β and its corresponding speed of convergence or divergence in different periods.

Table 4. Absolute β-Convergence coefficients in Vietnam

Explanatory variable	Dependent variable: GDP per capita growth rate		
	2000-2015	2000-2005	2006-2015
β	0.012	0.012	0.006
	(4.77)***	(2.42)**	(1.86)
Const	0.139	0.13	0.11
	(10.03)***	(4.48)***	(6.74)***
No. of Obs	270	90	180
R-square	0.078	0.062	0.02
λ	-0.012	-0.012	-0.006

Note: ** and *** denote statistical significance at 5 per cent and 1 per cent, respectively.

The estimated results are quite similar for the whole period 2000-2015 and pre-liberalization period, 2000-2015, in which the estimated parameters of the initial level of GDP per capital are greater than zero and statistically significant. These show that divergence rather than convergence has taken place across Vietnam's provinces during the observed periods. For the liberalized period, the estimated parameter of the initial level of GDP per capital has remained positive. However, the magnitude of this parameter has cut half and not significant at 5 per cent. These results signify that the unconditional divergence trend was clearer during the pre-liberalized period, 2000-2005, than that during liberalized period, 2006-2015 although the estimated speed of divergence is very small for both periods. In particular, estimated speed of divergence was around at only 0.01 per cent per year for former period and dropped to 0.006 per cent per year for the latter period.

In short, for the period 2000-2015, we find a divergence trend in the sense of unconditional beta across Vietnam's provinces. Richer provinces experienced faster economic growth, and thereby the disparities in the per capita income or product among provinces have been widening during studied period. The divergence trend was significant in the pre-liberalized period but has not been maintained in the liberalized period.

4.2 Conditional convergence

Table 5 shows the findings for conditional beta convergence over the 2000-2015 period as well as two sub-periods: pre-liberalized, 2000-2005, and liberalized periods, 2006-2015. We begin by referring to the basic model, which regresses the growth of per capita GDP on the log of income per capita in initial year, the savings/GDP ratio and the population growth plus the rates of technological progress and depreciation, $(n + g + \rho)$. Then, in addition to the basic explanatory variables, we also add trade ratio and FDI-GDP ratio to control the province-specifics. Finally, the interaction term between FDI and initial level of income per capita is added.

In order to examine whether Vietnam's provinces have been converging in the sense of conditional beta, we focus upon parameter estimates of initial per capita GDP. First, for the whole period, we observe that the coefficient of the initial per capita GDP is positive, and statistically significant across all specifications, and thus we find the trend of income divergence. In other words, Vietnam's provinces have experienced significant divergence rather than convergence during the observed period, 2000-2015. These results are disappointed but not surprising given that since the introduction of economic reform income has been distributed to production factors rather than equally distributed by the central government.

Furthermore, in the initial period of economic development, economic activities much more dominated in big urban areas like Ho Chi Minh and Hanoi cities or provinces with rich endowment of resource such as Baria-Vungtau over rural provinces. Our results are similar to many previous papers related to the failure of income convergence across countries or regions (Baumol, 1996; Zhang et al., 2001). In addition, trade and FDI have positive and significant impacts on per capita income growth across estimated regressions, domestic saving rate (log of savings) has expected positive sign but its significance varies across specification, whilst logarithm of $(n + g + \rho)$ deteriorates the growth rate of per capita GDP. Column (5) presents estimate of the model with the presence of interaction term. The result could be interpreted as FDI has helped to alleviate the speed of divergence among Vietnam's provinces.

Table 5. Conditional convergence test for Vietnam

Independent variables	Dependent variable: Annual GDP per capita growth				
	2000-2015				
	(1) (RE)	(2) (RE)	(3) (RE)	(4) (RE)	(5) (RE)
Const	0.16 (4.30)***	0.12 (3.28)***	0.13 (3.66)***	0.09 (2.58)***	0.11 (3.00)***
log y_o	0.024 (7.53)***	0.018 (5.46)***	0.015 (4.94)***	0.010 (3.01)***	0.015 (3.26)***
log(*savings*)	0.026 (4.14)***	0.028 (4. 55)***	0.046 (6.45)***	0.048 (6.95)***	0.045 (6.48)***
log($n + g + \rho$)	-0.028 (2.09)**	-0.030 (2.36)**	-0.026 (2.09)**	-0.028 (2.34)**	-0.031 (2.62)***
Trade		0.006 (3.28)***		0.006 (3.86)***	0.006 (3.47)***
FDI			0.13 (5.03)***	0.139 (5.39)***	-0.087 (0.67)
FDI × log y_0					-0.040 (1.76)*
Implied λ	-0.024	-0.018	-0.015	-0.010	-0.015
No. of. obs.	270	270	270	270	270
R^2	0.29	0.29	0.32	0.33	0.34

Table 5. Conditional convergence test for Vietnam (cont.)

	2000-2005				
	(1) (RE)	(2) (RE)	(3) (RE)	(4) (RE)	(5) (RE)
Const	0.17	0.16	0.029	0.32	-0.06
	(1.72)*	(1.47)	(0.32)	(0.33)	(0.52)
log y_o	0.039	0.038	0.012	0.013	-0.003
	(4.15)***	(3.81)***	(1.29)	(1.30)	(0.22)
log(*savings*)	0.026	0.026	0.034	0.034	0.038
	(1.96)**	(1.95)*	(2.72)***	(2.71)***	(2.99)***
log($n + g + \rho$)	-0.055	-0.058	-0.048	-0.048	-0.047
	(1.50)	(1.54)	(1.45)	(1.43)	(1.38)
Trade		0.006		0.0007	0.002
		(0.59)		(0.08)	(0.23)
FDI			0.18	0.180	0.75
			(3.94)***	(3.80)***	(2.42)**
FDI × log y_0					0.096
					(1.88)*
Implied λ	-0.039	-0.038	-0.012	-0.013	0.003
No. of. obs.	90	90	90	90	90
R^2	0.29	0.30	0.29	0.30	0.37

Table 5. Conditional convergence test for Vietnam (cont.)

	2006-2015				
	(1) (RE)	(2) (RE)	(3) (RE)	(4) (RE)	(5) (RE)
Const	0.17 (3.96)***	0.12 (2.91)***	0.14 (3.50)***	0.10 (2.59)***	0.13 (2.76)***
$\log y_o$	0.021 (4.96)***	0.014 (3.25)***	0.016 (3.93)***	0.009 (2. 32)**	0.015 (2.25)**
log(*savings*)	0.025 (3.33)***	0.029 (4.00)***	0.039 (3.87)***	0.045 (3.69)***	0.044 (4.57)***
$\log(n + g + \rho)$	-0.020 (1.44)	-0.023 (1.72)*	-0.022 (1.60)	-0.023 (1.79)*	-0.026 (1.94)**
Trade		0.007 (3.46)***		0.007 (3.86)***	0.007 (3.51)***
FDI			0.077 (1.99)**	0.094 (2.54)**	-0.088 (0.52)
$FDI \times \log y_0$					-0.034 (1.09)
Implied λ	-0.021	-0.014	-0.016	-0.009	-0.015
No. of. obs.	180	180	180	180	180
R^2	0.25	0.25	0.22	0.26	0.27

Note: Absolute value of t-statistics in parentheses; ***, **, and * denote statistical significance at 1%, 5% and 10%, respectively.

Regarding the two sub-periods, 2000-2005 and 2006-2015, the estimated results are quite similar. Divergence is found in basic specification, which includes the key variables such as the log of income per capita in initial year, savings/GDP ratio and the population growth rate ($n + g + \rho$) . However, once we control for foreign direct investment, trade or both of these additional explanatory variables, the coefficient on the log of initial per capita GDP is no longer statistically significant in spite of the positive sign during the 2000-2005 period. These results could be interpreted that liberalization to trade and foreign direct investment has helped to alleviate income disparity among Vietnam's provinces.

However, the contribution of trade and foreign direct investment to income disparity alleviation is not strong because the coefficients interaction terms gain only marginal statistical significance and quite small. The results for foreign direct investment show that it has positive effects on the growth of GDP per capita in both pre-and liberalized periods. The coefficients on trade variable are statistically significant in the liberalized phase but not significant in the pre-liberalized period implying that trade has accelerated income growth only in the 2006-2015 period, but not in the 2000-2005 period. Population growth is, as usual, found to hamper income growth across specifications.

5. Conclusion

This study examines the issue of the Vietnamese provincial income convergence and the effect of FDI in this process between provinces, which spans from 2000 to 2015. Our results show that Vietnam's incomes at provincial level diverge rather than converge in both periods of consideration in terms of sigma and beta senses. However, the divergence trend has slowed down in the 2006-2015, when Vietnam has strongly integrated to the world economy. Foreign direct investment seems to help alleviating the seriousness of divergence process in Vietnam but the contribution of FDI to the alleviation of income divergence is quite weak.

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