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Factors Affecting Women's Income in Vietnam: Analysis of Provincial Data

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Abstract:
This study examines the effects factors on women's income in the provinces of Vietnam. Analysis was conducted on panel data of 63 provinces in Vietnam from 2014 to 2018. Separate analyses were implemented for urban, rural and entire provincial areas. The results provided different results regarding the predictors of women incomes in urban, rural and entire provincial areas. The results of the study can provide implications for researchers and policy makers regarding women income in the provinces of Vietnam.

Keywords: Women income, panel data, provincial data, Vietnam

1. Introduction

Despite many positive changes in women's income (Goldin, 1994), ILO report (Global Wage Report, 2018) shows that women are paid about 18.8% less than men worldwide. Furthermore, the report of the United Nations (2015) indicates that the majority of women work in informal jobs and the basic salary is low. About 75% of Asian women do not have access to public assistance benefits such as insurance, sickness benefits or maternity benefits.

In Asia, the gender pay gap against women has been increasing (Jain-Chandra et al., 2016). This situation began to increase significantly in the late 1990's and left women facing many difficulties in the process of improving their income(Balakrishnan et al., 2013). In the context of Vietnam, the salary of women is currently equal to about 75% that of men of, which is much lower than in other East Asian countries (World Bank, 2011). Although the rate of women in high-paying jobs in Vietnam has increased recently, it is still not high and most women are still working in low-income jobs, especially they often work in workplaces without high levels of education and technology requirements (ILO and IFC, 2012). In addition, Goodkind (1995) has identified four main factors to explain the reason why women in Vietnam often have low income. First, itis the influence of the war period before 1975 that undermined the positions of women in society, putting them in inferior job titles. Second, men's participation in war has made female workers redundant in the labor market, pushing their incomes down. Third, the commitment to policies of gender fairness in society pursued by Vietnam government are weakened during the 1980s. Moreover, confucianism and patriarchal monopoly in families tend to go up, and, as a result, women have to stand a lot of injustices in their life. Finally, due to a series of other policies and some historical factors, the desires to have sons, rather than daughters increased, leading to a decline in the position of women in society.Going deeper into the causes and factors affecting women's income in Vietnam, Liu (2004), using a data set of the private sector, showed that Vietnamese women are often underpaid because of their low levels of education, on average. Nguyen et al. (2011) used business data and showed that women in Vietnam often do not satisfy the high requirements in foreign-invested companies, who usually pay higher income for workers. As a result, women often decide to choose informal jobs or even unpaid housework.

The above studies imply that although there are a number of studies about predictors of women income in both Asia and Vietnam, those studies do not systematically investigate the factors related to policy instruments, state institutions, women's gender roles and human capital that may affect women income. Besides, most studies in Vietnam use data of private sectors and companies, so there is a paucity of research that uses provincial data in Vietnam. This study utilizes data of 63 provinces in Vietnam for 5-year period from 2014 to 2018 to analyze factors influencing women income. Specifically, based on data from 63 provinces, this study will analyze the impact of a system of factors related to

institutions, policy tools, gender roles, and human capital on women income in Vietnam. Because of the striking differences across provinces in terms of demographic, economic, social and historical aspects, results of this study can provide significant insights for the factors that may influence women income in each province of Vietnam.

2. Literature Review and Research Model

2.1. The Factors Impact on Female Income

There are some previous researches that have pointed out effect factor groups on female income, including: institutions (Rama, 2002; Gupta et al, 2006; Damill and Frenkel, 2012), human capital (Mincer, 1974; Knight et al, 1983; Kleven and Landais, 2017) and gender roles (Gneezy et al, 2003; Liu, 2004; Bowlin and Renner, 2008; Donald and Moussié, 2016; Fox et al., 2019). Specifically:

2.1.1. The Factors Related to the Institutions, Policy Instruments of the State

Damill and Frenkel (2012) have shown the role of fiscal policy, monetary finance policy in economics stabilization and job creation for workers. They suggest that these policies will contribute to improve the distribution of income in each country and women will have more opportunities to seek better jobs and improve the income of them. Rama (2002) also identified an important role of the government in reducing the gender pay gap through mediating effects such as reforming the economy in renovation period and improving the justice in the process of income distribution to ensure fairness in women income. Besides the positive impacts of the policy instruments of the state, Gupta et al. (2006) pointed out the negative effects of the policy tools on women's income in the Danish context. Specifically, the author points out that economic policies in Denmark have little concern for the welfare of women and these policies make a big number of working positions of women in the public sector decrease, which will cause many negative effects on women's income. So, it can be seen that the policy tools of the state have many different impacts on women's income.

2.1.2. Factors Related to Human Capital

Knight et al (1983) pointed out that the accumulation process of human capital through going school and participation in professional education programs can help increase the competitiveness of women in the labor market, this means that women 's incomes will be improved when they take part in education and training programs. Besides, the quality of education of each country can help improve the income of female and male workers (Kleven and Landais, 2017) . However, female income can be improved or not, depending on the ways that each country invests in education programs (Mincer, 1974). So, it can be seen that education and training brings different influences on women's income.

2.1.3. Factors Related to Gender Roles

Women often have to leave the labor market for a long time to give birth and take care of their children (Bowlin and Renner, 2008; Donald and Moussié, 2016).In addition, childbirth makes female labor productive decrease when they return to work after a long time of maternity leave (Gneezy et al., 2003). This will influence the income of women and their career because they will face many problems in their work and the process of raising their income (Liu,2004) . However, the negative effects of childbirth on women's incomes can decrease when the living standards of people and economic growth reach a certain level (Fox et al., 2019) So, it can be seen that childbirth is a characteristic factor of women and it has many influences on their working process and earning money.

2.2. Research Model

2.2.1. Propose Independent Variables in the Model

2.2.1.1. Variables Related to Institutions and Policy Instruments of the Government

2.2.1.1.1. Provincial Competitiveness Index - PCI

The policy instruments and institutions have significant effects on women income (Helena Santos and Arbache, 2005). At provincial level, the selection of an indicator to reflect the quality of the management activities of the provinces plays an important role in assessing the effects of factors on female income of the provinces in Vietnam. Liu (2004) showed that provincial competitiveness index (PCI) is the index that helps explain why there are differences in the results of economic activity, creating jobs for people in the provinces. PCI is one of the tools to help leaders of the provinces to clearly recognize the strengths and weaknesses of the provinces. Hong Ming (2019) showed that PCI has a positive effect on FDI. Attracting FDI through improving PCI of the province is also a way to help them get fair competition and can raise incomes for local people through extending employment opportunities (Chen, 2011). Therefore, it can be seen that the PCI index plays an important role in improving workers' income, this also means that women's income could also be improved. So, the research proposes that:

- H1: *Provincial competitiveness index positively influences province-average women income.*

2.2.1.1.2. Public Administration Reform Index - PAR

Public administration reform is a global wave that has a lot of effects on employment and income of people (Wise, 2002). PAR plays an important role in assessing the effectiveness of policy instruments in the public governance

sector in provinces, so women's incomes can be affected negatively or positively, depending on the ways that administrative reforms are implemented in provinces (Dreger, 2016). Wise (2002) pointed out that when the administrative reforms are well performed, they can help ensure fairness in employment opportunities and the thereby raise the income for workers, including women. Therefore, the study proposes that:

- H2: P*ublic administration reform index of provinces positively influences province-average income of woman.*

2.2.1.2. Variables Related to Education and Training

2.2.1.2.1. The Proportion of Trained Workers Aged Over Fifteen of Provinces

Winkelmann (1996) showed that trained workers are less likely to be unemployed than untrained workers, so participating in training programs can help women increase their competitiveness at work and have a stable salary.Most companies have many training courses to improve employees' productivity, which can bring about positive changes in women income(Harhoff and Kane, 1993). Based on the above analysis, the research team recognized that the proportion of trained workers in the provinces can have positive effects on the average income of women in those provinces. Therefore, it is hypothesized that:

H3: The proportion of trained workers aged over fifteen of provinces is positively related to the average income of women in those provinces

2.2.1.2.2. The Number of Students per 1000 People of Provinces

Women's incomes will be improved significantly when they receive a better education system, especially professional education can help women improve their productivity and give them more choices in choosing jobs that they want(Kleven and Landais, 2017). Chiswick (1971) pointed out that when the time spent studying by women increases, their income is also improved. Shukla and Mishra (2020) show that in India, increasing the number of university graduates and improving the quality of professional education makes the process of income distribution more equitable and women's incomes will also improve through taking part in professional education programs at universities. The result is similar to research results of Winkelmann (1996) in Pakistan, which report positive effect of professional education on improving female income. Therefore it is proposed that:

- H4: The number of students per 1000 people of provinces is positively related to the average income of women in those provinces.

2.2.1.3. Independent Variables Related to Gender Roles

2.2.1.3.1. Crude Birth Rate (CBR)

There is no monotonous linear relationship between female income and fertility, the reason for this is that when the fertility rate increases, female income may increase or decrease depending on the quality of the process's distribution income of each country and the perception of each family (Docquier, 2004). Lee (1987) showed that when the general income of the population is low, the increase in the fertility rate will make the female income decrease due to childbirth and take care of children. However, when economic growth achieves a certain point, a suitable fertility rate will help women's income increase (Galor and Weil, 1993). Another reason related to fertility causes women's income to decline is due to the fertility associated with the labor productivity of women. Clearly, when women are pregnant and take care of their childcare leading to their productivity being decreased and they are limited in the process of raising income for themselves (Bowlin and Renner, 2008; Donald and Moussié, 2016). Based on the analysis above, the study recognized that the crude birth rate has effects on female income. Therefore, the following hypothesis is proposed:

H5: Provincial Crude birth rate is negatively related to province-average women income.

2.2.2. Proposed Control Variables for the Model

2.2.2.1. FDI of provinces (FDI)

FDI contributes a significant part to the economic growth and development of developing countries, including Vietnam through capital formation, job creation, technology transfer and knowledge diffusion. FDI can help improve workers' incomes and bring them more job opportunities (Alfaro,2003;Chen, 2011). Aggarwal (2018) pointed out FDI plays an important role in creating jobs for women, even as for women not qualified skilled in India. Therefore, this study chooses FDI of provinces to become a control variable of the research model with the positive effects on female income.

2.2.2.2. The Number of Companies of Provinces

Brown and Medoff (1989) showed that raising the number of companies will make the number of working positions and career opportunities of women increase, so they can improve incomes for themselves. In addition, when more new businesses are established leading to more different job positions will appear in the labor market, so women can have more options in finding jobs and income improvement (Birley, 1986). Furthermore, the recruitment demand can increase dramatically when many new companies appear in the market, so women can easily seek jobs with attractive salaries (Stiglitz, 1987). Based on the above analysis, this study will use the number of companies of provinces as a control variable in the research model with positive effects on female income.
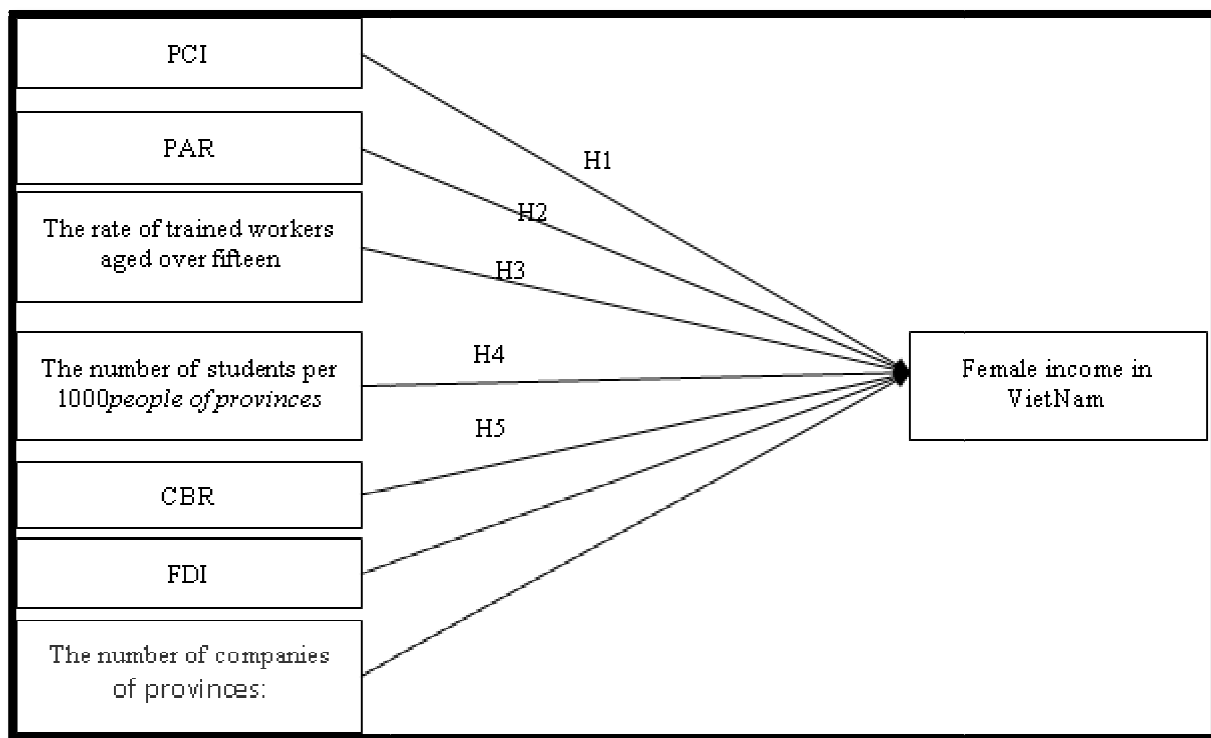
Figure 1: Research Model
Source: Authors' Proposal

3. Research Methods

This research uses a quantitative research method to analyze the relationship and influence of independent variables on dependent variables. This study used secondarydata, collected through official Statistical Yearbook of Vietnam published by General Statistical Office (GSO). Provincial datain the period from 2014 to 2018 with a 1-year gap were extracted from annual Statistical Yearbook. Data will be organized as panel data and processed by Stata software. The use of panel data has many advantages and is more relevant than regular time series and cross-data data. Especially, for data panel data, 3 types of models: models with fixed effects (FE), models with random effects (RE) and OLS pool models were examined to find out the most suitable model for the available data.

3.1. Variables and Data Sources

3.1.1. Female Income

Reflecting women's income over the years in provinces and cities in Vietnam

3.1.2. Provincial Competitiveness Index (PCI)

PCI is an index that helps to reflect and measure the quality of economic management, the degree of convenience and friendliness of the business environment and the administrative reform efforts of provincial and city governments in Vietnam.

3.1.3. TheNumber of Companies of Provinces

According to the information page of the General Statistics Office, the number of enterprises by locality is defined as the number of registered enterprises and is in the state of operation in the province. The number of these businesses is statistics annually.

3.1.4. TheNumber of Students Per 1000 People of Provinces

The number of students per 1000 local population reflects on average how many students per province will attend universities and colleges across the country.

3.1.5. Provincial Administration Reform Index (PAR)

Ministry of Home Affairs (MOHA) (2012) pointed out the par provincial administrative reform index (Public Administration Reform) as an objective and fair assessment of the results of the annual implementation of administrative reforms of provinces and programs which in the process of implementing the overall program of state administrative reform in the period of 2011 - 2020.

Evaluation method: Rating on a scale of 100 including:
- Self-assessment of provinces accounts for 64.5 points based on table 2 in decision No.1294/QĐ-BNV.

- Judging by socio socio-study accounting for 33.5 points based on criteria and annotations in table 2 in decision No.1294/QĐ-BNV.
- Although the Review is made up of 2 points by the Ministry of Home Affairs, it also considers recognition and adjustment of assessment scores if necessary.

3.1.6. Foreign Direct Investment of Provinces (FDI)

According to the website of the General Statistics Office, foreign direct investment (FDI) is the total amount and legal artifacts of foreign investors brought into provinces in Vietnam, invested in approved projects. It is shown in the following forms: money, machinery, equipment, supplies, raw materials, fuel, finished goods, semi-finished goods; value of industrial property rights, technical know-how, technological processes, technical services, intellectual property rights and other legal assets.

3.1.7. Crude Birth Rate of Provinces (CBR)

The crude birth rate of the provinces is the indicator measuring the fertility of the provinces and is one of two components of the natural population growth. The large or small crude birth rate has a great influence on the size, structure and speed of population growth. The crude birth rate shows for every 1000 people how many live births in the year.

Formula for calculation:

CBR = (B / P) x 1000

Inside:

B: Total number of births in the year

P: Average population (or mid-year population).

3.1.8. TheRate of Trained Workers Aged Over Fifteen

The rate of trained workers aged over fifteen is an indicator that reflects the rate comparing the number of trained workers with degrees and certificates with the total workforce in the period.

$$\text{Percentage of trained workers (\%)} = \frac{Number\ of\ trained\ working\ workers\ at\ the\ time\ of\ t}{Total\ workforce\ at\ time\ of\ t} \times 100$$

4. Research Results

From data collected through statistical publications such as statistical yearning, employment census reports over the years and government information pages. The team using panel data conducted a research model estimative revoicing for all three areas: the province as a whole, urban and rural areas. At the same time, the team also conducted Hausman testing to select the type of model that matches the data, the results of which showed that the FE model (the one that runs with fixed data time) is the right model for data. Besides, the result of fixed effect inspection time obtained $P<0.05$. Therefore the team concludes that a fixed-time effect is necessary and that the use of the FE model is appropriate. Next, we conduct an inspection of defects in the model. The test results show that for multi-line multi-line phenomena testing the VIF <10 system shows that there is a low and acceptable multiline phenomenon. In addition, the model result does not appear the same phenomenon, instead the pattern appears the phenomenon of errors changing with P-value <0.05. Therefore, the authors team proceeded to correct the defect of the model according to the GLS method and obtained the results in the following table:

Suggested Variables		Female Income of General Areas	Female Income of Urban Areas	Female Income of Rural Areas
Independent variables	Provincial Competitiveness Index	93.59625 ***	91.7309***	66.73007***
	Public Administration Reform	-19.40779***	-50.47785***	-31.63772***
	The rate of trained workers aged over fifteen	48.9341***	48.32079 ***	43.13573***
	The number of students per 1000 people of provinces	-8.393563***	-10.10386 ***	-10.83408***
	Crude Birth Rate	77.54316 ***	82.0385 ***	66.46739***
Control variables	FDI of provinces	0.1622808***	0.139489***	0.1854502***
	The number of companies of provinces	0.0072757***	0.0085355***	0.0026632n.s
Coefficient of freedom		-2133.292**	-930.3539n.s	540.5585n.s
Prob > chi2		0.0000	0.0000	0.0000
Wald chi2(7)		1322.99	567.32	426.15
Number of observation		282	282	282

Table 1: The Results Table Estimates the Impact of the Independent Variables
Source: Authors' Calculations
*Statistical Significance: * P <0.05; ** P <0.01; *** P <0.001; N.S: None the Significant*

The results were obtained for PCI variables in common areas of provinces and urban areas of statistical significance (P<0.001), impact indicators are β= 93.59625 >0 and β= 91.7309 >0. This suggests that increasing PCI will cause women's incomes to increase, so the H1 hypothesis of the province's general area and urban areas is supported. The PAR variable is statistically significant (P<0.001) and the negative impact index shows that PAR has a negative effect on women's incomes so the H2 hypothesis which the team set out is rejected in both general areas and urban areas. The rate of trained workers aged over fifteen is meaning (P<0.001) and the index in general areas and urban areas are β= 48,9341>0 and β= 48.32079 >0, which shows that increasing the income of women in the common areas of the province and urban areas increases. Therefore, the H3 hypothesis is supported in general areas of provinces and urban areas. The H4 hypothesis is rejected in the general area of the province and urban areas because the student variables per 1000 inhabitants in the provinces have statistical significance (P<0.001). But the impact of the variable shows that the opposite relationship with female income variables, the result in the common and urban areas is β= -8.393563<0 and β= -10.10386 <0. This was followed by CBR, a statistically significant variable (P<0.001) and a common provincial β= 77.54316 >0, a β= 82,0385>0 that demonstrated a positive impact on female income. Therefore, the H5 hypothesis of the research team is rejected in the common areas of the province and urban areas. For the two control variables of the model, the locally significant FDI variables (P<0.001), β= 0.1622808>0 and β= 0.139489>0 in common and urban areas, which suggests that local FDI has the same impact as women's incomes in these two regions. Therefore the H6 hypothesis is supported in the general area of the province and urban areas. For variables in the number of enterprises by locality, variables of statistical significance (P<0.001) and positive impact weights, therefore the H7 hypothesis of the research team set out in the general area of the province and urban areas is supported.

In rural areas, the results for the hypothesis correspond to independent variables PCI, PAR, the rate of trained workers, number of students, CBR and FDI are similar to urban areas and common areas of the province. Contrary to the control variable: 'The number of companies', the weight of the variable is not statistically significant in rural areas (P>0.05) so the H6 hypothesis set out in rural areas of the province is not supported.

Hypothesis	Content of Hypothesis	Results		
		General Areas	Urban Areas	RuralAreas
H1	Raising provincial competitiveness index of provinces can help increase female income of provinces in Vietnam	Be supported	Be supported	Be supported
H2	Raising public administration reform index of provinces can help improve female income of provinces in Vietnam	Be rejected	Be rejected	Be rejected
H3	Increasing the rate of trained workers aged over fifteen of provinces will help improve women's incomes	Be supported	Be supported	Be supported
H4	Increasing the number of students per 1000 people of provinces will help improve women's incomes	Be rejected	Be rejected	Be rejected
H5	An increase in the crude birth rate will decrease female income	Be rejected	Be rejected	Be rejected

Table 2: Summary Hypotheses Testing
Source: Synthesis of the Research Team

5. Discussion

The purpose of the group's research is to look at the impact of factors on women's incomes in provinces and cities in Vietnam. The influences of selected factors on women's incomes in 3 regions: urban, rural and common areas of the province were assessed. The results of the study showed a positive effect of provincial competitiveness (PCI), foreign investment in provinces (FDI), crude birth rate (CBR), and the rate of trained workers aged over fifteen of provinces on women's incomes. The results obtained with the PCI variable are similar to those of Hong Minh (2019), who also believes that the active role of PCI in economic activities, creating jobs for workers and attracting investment capital. Accordingly, improving competitiveness in the province will help the local economy go up by attracting external investment and therefore, create opportunities for women workers to get jobs and raise their incomes. The result of the variable rate of labor from 15 years of age or older through training also positively affects the income of women. As a result of Knight et al. (1983), improving professional capacity for workers will help reduce the gender paygap, which will help increase female competitiveness as well as income (Winkelmann, 1996). This study found negative impact of PAR on women's incomes in all three regions. The causes of this were pointed out by Ricci and Civitillo (2017) that public administrative reforms largely focused on financial indicators with the lack of systemal and social-related indicators, thus making the assurance in the distribution of income by gender ineffective. With the number of students in the province, different from the Chiswick study (1971) who pointed out that increasing the proportion of students participating in higher education would help raise incomes for women, this research found that the number of student per 1000 population exerts a negative effect on women's incomes. This result is similar to that of Shahabadi et al. (2018) who argue that increasing the number of students participating in higher education will increase the gender pay gap due to the high cost of such education and the lack of economic support from the government. In more men-favored society the rate of women participating in higher education is not high. Therefore, women's competitiveness at work could be lower than that of men, leadingto lower income among women. This view has also been demonstrated by Qazi et al. (2018) in Pakistan. Therefore, the results obtained by the research team are acceptable in the Vietnamese environment. For variables belonging to the level of birth (CBR) the results obtained show its positive effect on the raising of female income. This differs from the results of research by Kleven et al. (2016), who argue that increasing birth rates will lead to an increase in the burden of family care and raising a woman's children. According to the author, the reason is that during childbirth the woman must leave the labor market to spend time caring for her young children, thereby reducing the income in their work. Interestingly, however, Fox et al. (2019) shows that when society reaches a certain level of development, increasing birth rates can help the process of economic development in countries. Economic development increases social welfare and aims to be fair in both genders' incomes. In addition, Docquier (2004) showed that when the distribution of local income and population is high, the welfare of women with children will be guaranteed, positively impacting the woman's income. Therefore, the estimated results of the team obtained with the CBR variable are consistent.

Unlike rural areas, the results obtained with the enterprise size factor in urban areas and the general area of the province show its positive effect on raising women's incomes. This result is similar to Brown and Medoff's (1989) study, which implies that increasing the number of businesses in rural areas of the provinces can help increase career opportunities for people in this region thereby improving economic development, women's chances of having jobs, reducing the gender pay gap and improving incomes for women. In particular, Vietnam's key industry is usually manufacturing and textiles, which need a large number of female employees. However, in rural areas, the explanation for the results is not statistically significant because in which people often work in agriculture and small household business, businesses are ineffective in agriculture. Inevitably, these businesses gradually shift to the city or because the efficiency is not high, the cost for labor is only low average. With Bel and Fageda (2011), the authors also argue that the influence of

large-scale businesses is often effective in cities, where populations are concentrated, and with businesses operating in rural areas that are often less efficient.

6. Conclusion

The results of the study have shown the influence of selected factors on female income in the provinces of Vietnam. Accordingly, the results show that FDI of provinces, PCI, the rate of trained workers aged over fifteen of provinces and CBR have a positive effect on female income. In contrast to the factors related to the administrative reform of provinces (PAR) and the number of students per 1000 people of provinces, the results found that these two factors have a negative effect on women's income. Although the study shows that the factor related to the number of companies of provinces has positive effects on female income in both urban and entire provincial areas, it has no impact on women's income in rural areas.

7. Limitation

The selected data just from 2014 to 2018. So this can lead to some limitations in the result of study. Besides, some important factors due to lack of data that study does not examine effects of them on female income such as factors related to the culture and ethnic factors. Therefore, this is an aspect so that the researchers can consider and discover in the future.

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