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THE IMPACT OF EARNINGS FROM THE ELDERLY WOMEN ON HOUSEHOLD INCOME INEQUALITY IN VIETNAM

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ABSTRACT

The relationship between household income inequality and a labor force participation from women has attracted less attention from academic and practical studies, in particular in the context of the emerging markets such as Vietnam. This paper is conducted to analyse the effect of earnings from the elderly women on the household income inequality in Vietnam. Data is utilized from the Vietnam's Living Household Standards Surveys in 2004, 2010, and 2016. Different measures of income inequality adopted in this paper include (i) the Gini coefficient; (ii) the P90/P10 ratio; and (iii) the CV^2. The CV^2 decomposition technique and four counterfactuals are used to compare the reference distribution with the simulated values. Findings from this paper indicate that earnings from the elderly women in Vietnam contribute to equalize the household income inequality, both at a particular point of time and over time. In particular, over time, changes in earnings from the elderly women from 2004 to 2016 contributed to the reduction of household income inequality by 8-18 per cent.

***Keywords*:** Earnings; Income inequality; The elderly women; Decomposition; Vietnam

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1. INTRODUCTION

Income inequality has been a long-established topic of interest in development economics since Kuznets (1955) introduced the relationship between income inequality and economic growth. Many studies have examined the association between income inequality and other aspects associated with economic development such as economic growth, investment, poverty, industrialization and urbanization, education and health systems, well-being, population aging, globalization (Babu, Bhaskaran, & Venkatesh, 2016; Bani, 2017; Gravelle & Sutton, 2009; Pare & Felson, 2014; Rözer & Kraaykamp, 2013; Tran & Vu, 2014; Wu & Hsu, 2012). However, the relationship between income inequality and labor force participation of women has attracted less attention, especially in the context of the emerging markets. This paper investigates the effect of wives' earnings on the household income distribution with the emphasis on the post-working age population for women, i.e. the elderly women, in Vietnam.

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This paper is motivated in the context of income inequality, population aging and public policies for the elderly people in Vietnam. After more than 30 years since the comprehensive economic reform under *Doi Moi* (Renovation) policy, Vietnam has achieved remarkable economic growth with an average GDP growth of 6.4 per cent per year since 2000. Estimated results from the up-to-date report of World Bank (2018) suggested that a record number of the Vietnamese households have been escaping poverty and the achievements in reducing poverty are continuing as all poverty measures have fallen consistently since 2010. However, in contrast with rapid growth and poverty reduction, inequality appears to be on the rise. Oxfam (2017) reported that the gap between the top quintile population and the rest has been expanding since 2004. In addition, different measures have indicated an increasing income inequality during the last two decades in Vietnam.

On the other hand, due to the combined force of recent decreasing fertility rate, mortality rate, and increasing life expectancy, the population is ageing rapidly in Vietnam. According to the United Nations (2017), the ratio of the population aged 60 and above has accounted for more than 10 per cent of total population of Vietnam and it is predicted to increase quickly in the coming decades. As such, this prediction raises concerns in relation to the appropriate policies for the elderly to protect their well-being after leaving the work force.

However, under the Clause 2 of Article 56 of the 2014 Law on Social Insurance, a new pension plan calculation which took effect at the beginning of 2018 appears to disadvantage women. Prior to 2018, the Law on Social Insurance prescribed that men and women would receive a pension rate at 45 per cent of their average monthly salary for those who have contributed to the social insurance funds for the continuous 15 years. For each additional year of paying the premiums, the pension rate of men and women would be added 2 and 3 per cent incremental, respectively. Since the retirement age for men and women are 60 and 55 years old, respectively, male workers need 30 years of social insurance contribution while 25 years of contributions are required for female workers to reach the maximum 75 per cent pension rate.

Under the new scheme of insurance contributions, men and women who have contributed the social insurance premiums for the continuous 20 and 15 years, respectively, will be eligible for the pension rate at 45 per cent. However, this new regulation provides male workers with an annual increment of one per cent during the 2018-2022 period. Another change in the new regulation is that both men and women will receive 2 per cent increase per year for each additional year of social insurance contribution after they reach the 45 per cent replacement rate. Thus, women need a longer period of social insurance contribution (30 years compared to 25 years in the previous social insurance scheme) to reach the 75 per cent rate and the new scheme for women takes effective immediately from the beginning of 2018. In particular, it is estimated that more than 91,000 workers who plan to retire in the period of 2018 – 2021 will receive a lower pension in comparison to their counterparts who had retired before 2018. Especially, more than 2,000 female workers will have their pension reduced by almost 8-10 per cent per year.

Our paper is also motivated by the presence of mixed results from previous studies from both theoretical and empirical approaches in relation to the effect of wives' earnings on household income inequality. Theoretically, Sudo (2017) argued that the impact may be simultaneously positive and negative, depending on households' earnings without the earnings of the wives. An increase in wives' earnings who belong to the low earnings households would be likely to reduce (or equalize) household income inequality. On the other hand, if wives' earnings are concentrated

among families with relatively wealthy families, they would increase inequality. Findings from previous empirical papers (Aslaksen, Wennemo, & Aaberge, 2005; Austen & Redmond, 2013; Cancian & Reed, 1999; Harkness, 2010; Karoly & Burtless, 1995; Sudo, 2017) have also presented mixed results.

The objective of this paper is to analyse the effect of wives' earnings on household income inequality in the context of Vietnam with the focus on the elderly women. This paper is expected to offer contributions to the current literature by providing an additional evidence to the ongoing debate on how wives' earnings can affect the households' income distribution. While most of the previous studies were conducted in the context of developed countries, a study in the context of emerging market such as Vietnam is important for further understanding on the current issue since the Vietnamese government has expressed her great concerns in relation to income inequality in Vietnam during the process of high and sustainable economic growth.

2. LITERATURE REVIEW

Empirical evidences related to the equalizing effect of wives' earnings on the households' income distribution have been conducted in different ways, including countries, research periods, samples of interests, and income inequality measures. While most of the previous studies focused on the developed countries (Austen & Redmond, 2013; Blackburn & Bloom, 1995; Cancian & Reed, 1999; Cancian & Schoeni, 1999; Del Boca & Pasqua, 2003; Harkness, 2010; Mastekaasa & Birkelund, 2011; Reed & Cancian, 2001; Sudo, 2017; Western, Bloome, & Percheski, 2008), few studies have been conducted for developing countries (Amin & DaVanzo, 2004; Paes de Barros, de Mendonca, & Silva, 1992). Cancian and Reed (1998) observed that wives' earnings contribute to the distribution of family income using Gini coefficient and coefficient of variation decomposition technique. Three counterfactual reference distributions includes (i) wives' earnings is zero, (ii) earnings of each wife will decrease by a small degree, and (iii) wives' earnings distributed equally are used. Findings from this study indicated that without wives' earnings, income distribution would be more unequal. It means that wives' earnings have provided an egalitarian effect on family's income inequality. Later, Cancian and Reed (1999) developed and expanded the counterfactual reference by adding the fourth counterfactual reference in which the correlation of wives' earnings with other sources such as husbands' earnings and residual income was kept unchanged. However, the empirical results suggested that wives' earnings only contributed marginally to reduce the household income inequality. Reed and Cancian (2001) examined the sources of changing in family income inequality and explored factors explaining the growth of family income. Similar counterfactuals were utilised and consistent results with their previous findings in which changing in male headed income accounted for substantial increase in income inequality, proxied by Gini coefficient, while female earnings contribute to reduce the household income inequality. Using the same counterfactuals, Amin and DaVanzo (2004) estimated the effect of wives' earnings on family income inequality among married couples in Malaysia and found that the equalizing effect of wives' earnings on the household income inequality is sustainable over time.

Del Boca and Pasqua (2003) decomposed income inequality in Italy. The paper attempted to examine whether change in the employment of the married women and wage resulted in a more severe income inequality using simulation techniques. In the simulations, the study employed the

first counterfactual reference distribution of Cancian and Reed (1998) in which wives have no earnings. The results indicated that the pattern of wives' employment has different intensity on inequality across the South and North areas in Italy. In America, Western et al. (2008) combined the labor market and demographic characteristics to explain the considerable increases in incomes variance of families with children from 1975 to 2005. Using the decomposition technique, findings from this study showed that a growth of women's labor force participation balanced the dis-equalizing effect caused by the differences in education and family structure.

Ding, Dong, and Li (2009) examined the situation in urban China in two different transition periods, including the gradual reform period (1988-1995) and radical reform period (1995-2002). The comparison between reference distribution and counterfactuals simulation values showed that wives' earnings and labor force participation rate resulted in a lower income inequality of the urban households. In addition, the equalizing effect of wives' earnings in the gradual reform period was greater than the radical reform period. Austen and Redmond (2013) investigated the household income inequality using different measurements and explored the trends of male's earnings, female's earnings and the impact of female's earnings on household income inequality. The results implied that (i) men earnings played a crucial role to determine family income in Australia, and (ii) the relation between women earnings and households' income inequality were complex.

There are a few studies which examined the research problem in the context of multiple countries. For example, Blackburn and Bloom (1994) presented that the equalizing effects of wives' earnings both at a point of time and over time in US, Canada, and Australia. Cancian and Schoeni (1999) and Harkness (2010) utilised the comprehensive data from 10 and 17 industrialized countries from Luxembourg's Income Survey, respectively. Both studies found that wives' earnings could mitigate the households' income inequality at a particular point of time in all countries included in the study.

3. METHODOLOGY

Required data are collected from the Vietnam's Living Household Standards Survey (VHLSS), which was conducted in every two years (the even years) by the General Statistical Office of Vietnam with the technical supports from the World Bank. The sample sizes were selected using the random cluster sampling method to ensure the representative properties at the regional level. The purpose of the survey is to monitor and evaluate living standards of the population for policy purposes. These surveys are often utilized in academic studies on the topic of income distribution in Vietnam.

At the households' level, the VHLSS includes information in relation to demographic characteristics, working status, income, education, health, expenditure and others. Since this paper focuses on the effect of elderly women' earnings on households' income inequality, the sample includes women who are over 55 years of age. In addition, information related to their family members such as husbands and children is also collected.

Individuals' annual total income in three separate years including 2004, 2010, and 2016 are used to measure earnings. Accordingly, a person's earnings consist of pension (if available) and income received from all jobs during the last 12 months. Total family income is calculated as the total of

all individual members' income. For further analysis as the robustness check, family income is then classified into three main sources: wives, husbands, and other members. All types of income are adjusted for inflation using the consumer price index with the base year of 2010.

The squared coefficient of variation (CV^2) is utilized to measure income inequality in this paper. Among various measures, CV^2 is specifically sensitive to inequality at the top distribution. Moreover, CV^2 can be decomposed into sub-components to identify the contribution of wives' earning to households' income distribution. The decomposition function of CV^2 can be express as follows:

$$CV_f^2 = S_w^2 CV_w^2 + S_h^2 CV_h^2 + S_o^2 CV_o^2 + 2\rho_{wh} S_w S_h CV_w CV_h + 2\rho_{wo} S_w S_o CV_w CV_o + 2\rho_{ho} S_h S_o CV_h CV_o \quad (1)$$

Where CV_k is the coefficient of variation of income component k, S_k is the share of income component k in the total family income, ρ is the correlation between two components. Subscripts f, w, h, o denote family, wives, husband, and other members, respectively.

To investigate the impact of wives' earnings on households' income inequality, it is crucial to compare the households' income distribution which would prevail if wives' earnings change in each year. In accordance with previous studies (Amin & DaVanzo, 2004; Austen & Redmond, 2013; Cancian & Reed, 1999), a number of standard counterfactuals are considered in this paper, including:

CF1: All women had zero earnings.
CF2: All women had a marginal decline in earnings. Following Austen and Redmond (2013), this paper examines this effect by reducing current wives' earnings by 5 per cent.
CF3: The mean and dispersion of wives' earnings had not changed in comparison with previous years.
CF4: The mean, dispersion, and correlation wives' earnings with other sources of income had not changed in comparison with previous years.

Cancian and Reed (1999, p.174) noted that CF1 and CF2 considered "the effect of wives' earnings at a particular point of time", while CF3 and CF4 analysed the impact of wives' earnings on household income inequality over time. In other words, the two former counterfactuals, CF1 and CF2, investigate the changes in impact of wives' earnings on household income inequality and the latter two counterfactuals, CF3 and CF4, assess the impact of changes in wives' earnings.

In addition to the CV^2, Gini coefficient and P90/P10 ratio are also calculated using relevant data from the VHLSS to form a broader picture of the current income inequality situation in Vietnam. The P90/P10 is defined as the ratio of the upper bound value of the ninth decile (i.e. the 10 per cent of people with the highest income) to that of the first decile (i.e. the 10 per cent of people with the lowest income). Gini coefficient is defined as the ratio of the area lies under the 45-degree line and the Lorenz curve over the total area lies under the 45-degree line, which can be expressed as follows:

$$Gini = \frac{1}{n}\left[n+1-2\left(\frac{\sum_{i=1}^{n}(n+1-i)\,y_i}{\sum_{i=1}^{n} y_i} \right) \right] \quad (2)$$

The Gini coefficient ranges between 0, which indicates perfect equality, and 1, which represents perfect inequality. Statistically, while Gini coefficient focuses on the median of the distribution, CV^2 and P90/P10 ratio concentrate more on the top distribution of income.

4. RESULTS AND DISCUSSION

Table 1 presents income inequality measures of the elderly women in Vietnam in the years 2004, 2010, and 2016. All indicators present a common decreasing trend of the family's income inequality. However, two different patterns are observed. In particular, the Gini coefficient declines slightly throughout the two periods including the 2004-2010 and 2010-2016 periods, by 1 per cent and 9 per cent, respectively. The P90/P10 decreases substantially by 19 per cent between 2004 and 2010 and 15 per cent between 2010 and 2016. The CV^2 shows a similar trend with P90/P10 measure at almost 30 per cent. The larger decrease in CV^2 in contrast with Gini coefficient suggests remarkable growth of inequality at the top of income distribution.

Table 1: Inequality measures for households, Vietnam, 2004 - 2016

	Gini	**CV^2**	**P90/P10**
2004	0.51	0.68	19.31
2010	0.50	0.53	15.68
2016	0.46	0.38	13.39
% change 2004-2010	-1	-22	-19
% change 2010-2016	-9	-29	-15

Source: *Authors' analysis*

Inequality measures for elderly men and women over the research period are presented in Table 2. Significant differences between income inequality for women and men are found. All measures present that women's income inequality decreased in both periods. The Gini coefficient fell by just under one third between 2004 and 2010 and kept falling by 11 per cent between 2010 and 2016. On the CV^2 and P90/P10 measures, income inequality of the elderly women reduced more than a half between 2004 and 2010 and fell slightly under a third between 2010 and 2016.

Table 2: Inequality measures for elderly men and women, Vietnam, 2004-2016

	Women			Men		
	Gini	**CV^2**	**P90/P10**	**Gini**	**CV^2**	**P90/P10**
2004	0.57	1.51	28.61	0.42	0.61	12.70
2010	0.38	0.63	13.45	0.35	0.45	6.73
2016	0.34	0.43	9.80	0.37	0.65	7.70
% change 2004-2010	-32	-59	-53	-18	-25	-47
% change 2010-2016	-11	-32	-27	7	43	15

Source: *Authors' analysis*

The earnings inequality figures of elderly men are somewhat different. Between 2004 and 2010, Gini coefficient indicates a less than a fifth reduction while CV^2 dropped by a quarter. The P90/P10 ratio presented a higher decrease, at nearly a half. These figures indicate a decrease in income inequality among elderly men between 2004 and 2010. However, the opposite pattern is found between 2010 and 2016. The Gini coefficient and P90/P10 ratio rose by 7 per cent and 15 per cent, respectively, while the CV^2 increased by more than two fifths.

The components of the CV measure of households' income inequality for each year in 2004, 2010, and 2016 are shown in Table 3. For all years, wives' earnings accounted for about 20 per cent of the total family income. In 2004, the share of husbands' earnings was almost equal with wives' share, at about 21 per cent. In both 2010 and 2016, the share of husbands' earnings was higher than those of wives' since it increased to 30 per cent and 28 per cent, respectively. Other members rather than wives and husbands earned about a half of total family income. For the income dispersion as measured by the CV, it is shown that husbands' earnings were less dispersed than wives' earnings in 2004 (0.78 for husbands versus 1.23 for wives) and 2010 (0.67 for husbands versus 0.79 for wives). In contrast, wives' CV in 2016 was 0.65, less than husbands' estimate, at 0.81. The CV of other members was at the highest degree of the three in 2010 and 2016. In terms of the correlation, all figures suggest positive relations between different sources of family income. The correlation between wives' and husbands' earnings increased more than double between 2004 (at 0.32) and 2010 (at 0.65).

Table 3: Decomposition of household CV, 2004-2016

		Mean	Std.	CV	Earnings share	$\rho_{w,k}$	$\rho_{h,k}$
2004	Total	21663.87	23264.45	1.07			
	Wife	7347.32	9035.40	1.23	0.20	1.00	
	Husband	7590.66	5920.51	0.78	0.21	0.32	1.00
	Other	21883.76	23175.68	1.06	0.59	0.40	0.24
2010	Total	42631.75	47637.03	1.12			
	Wife	18721.92	14810.61	0.79	0.22	1.00	
	Husband	25013.30	16855.45	0.67	0.30	0.65	1.00
	Other	39792.00	43493.78	1.09	0.48	0.35	0.36
2016	Total	55878.64	52561.94	0.94			
	Wife	22980.07	15017.37	0.65	0.22	1.00	
	Husband	29475.75	23791.29	0.81	0.28	0.37	1.00
	Other	53143.63	47331.46	0.89	0.50	0.29	0.22

Note: *Total family income is the sum of the income from wife, husband, and other members. Earnings are adjusted for inflation using the consumer price index with the base year in 2010.* $\rho_{w,k}$ *and* $\rho_{h,k}$ *represent the correlation between wives' and husbands' earnings with other sources, respectively.*

Next, in order to examine the equalizing effect of wives' earnings on the elderly household income inequality, the comparison of the reference distribution with those under different counterfactuals is conducted, using the CV^2 decomposition technique. As such, this paper addresses the question of what would be the effect on households' income inequality if: (i) all women had zero earnings; (ii) all women's earnings were reduced by 5 per cent; (iii) the mean and dispersion of wives' earnings were kept at the previous year level; and (iv) the mean, dispersion, and correlation of wives' earnings with other sources of earnings were kept at the previous year level. These analyses were conducted using equation (1) above. The results of these four counterfactuals are presented in Table 4. Generally, wives' earnings tend to equalize the elderly household income inequality.

Table 4: Equalizing effect of wives' earnings on household income inequality using CV^2

	Actual value	CF1	% Difference	CF2	% Difference	CF3	% Difference	CF4	% Difference
	(1)	(2)	(3)=(2)/(1)	(4)	(5)=(4)/(1)	(6)	(7)=(6)/(1)	(8)	(9)=(8)/(1)
2004	**0.68**	0.74	8.01%	0.68	0.03%				
2010	**0.53**	0.65	21.64%	0.53	0.62%	0.63	18.13%	0.62	16.06%
2016	**0.38**	0.49	28.47%	0.38	0.86%	0.41	8.18%	0.44	15.40%

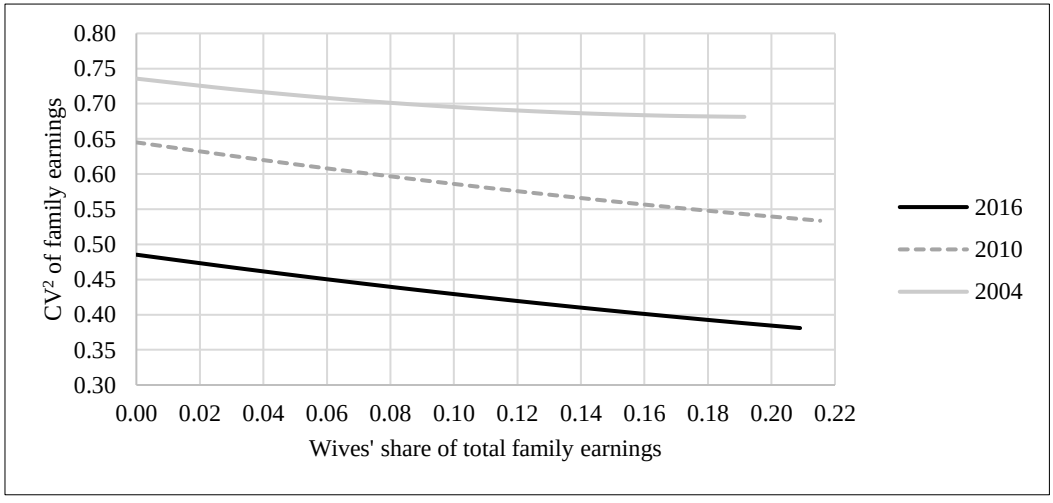
Source: *Authors' analysis*

Column (2) and (3) present the results of the first counterfactual. The figures indicate that if all wives had zero earnings, the elderly family income inequality would increase over the periods. In particular, in 2004, without wives' earnings, the CV^2 of family earnings would be 0.74, compared to the actual value at 0.68. In 2010 and in 2016, similar differences between counterfactual values and observed values are found. However, in the relative terms, with wives' earnings, the households' income inequality in 2016 was improved in comparison with the level in 2010 (28 per cent versus 21 per cent), and even more than 2004 (by about 8 per cent). For the second

counterfactual, the results on the columns (4) and (5) show that a 5 per cent reduction in wives' earnings would keep the income inequality of households almost remain unchanged. Although the magnitudes are higher in the later years (i.e. 2010 and 2016 compared to 2004), the changes in income inequality are less than 1 per cent.

The effect of the higher reductions in wives' earnings on households' income inequality are expressed in turn using the downward sloping lines in Figure 1. When the wives' earnings are reduced from 5 per cent to 100 per cent with the magnitude of 5 per cent, and the corresponding changes are then combined into Figure 1. That is, a marginal reduction in wives' earnings, which would lead to a reduction in their share of total family earnings, would result in an increase in family's income inequality. These results are consistent with those found in previous papers (Amin & DaVanzo, 2004; Blackburn & Bloom, 1994; Cancian & Schoeni, 1999; Paes de Barros et al., 1992).

Figure 1: Wives' Shares and CV^2 of Family Earnings



Next, this paper examines the effect of wives' earnings over time using the third and the fourth counterfactuals. The results on the third counterfactual are summarized in the columns (6) and (7). That is, for the first sub-period from 2004 to 2010, if the mean and dispersion of wives' earnings in 2010 were kept at the levels in 2004, the CV^2 of the households' income inequality would have increased about 18 per cent (with an estimated value at 0.63, compared to the actual value of 0.53). Although this effect was held for the second sub-period from 2010 to 2016, the magnitude was substantially lower, at about 8 per cent increase in income inequality.

The final counterfactual is investigated in columns (8) and (9). together with holding the mean and dispersion, the correlation of wives' earnings with two remaining sources of income, husbands' earnings and other members' earnings, were also kept at the previous year levels. That is, if the mean, dispersion, and correlation of wives' earnings with other sources of earnings in 2010 were held at 2004's levels, the CV^2 would be at 0.62, a 16 per cent higher than the actual CV^2 value in

2010. Holding the mean, dispersion, and correlation of wives' earnings in 2016 at their levels in 2010 would increase the households' income inequality by about 15 per cent. These findings imply that the changes of wives' earnings over time contributed to reduce the households' income inequality. These findings are consistent with previous studies (Amin & DaVanzo, 2004; Reed & Cancian, 2001).

The comparison of columns (6) and (8) provides us with further insights related to the effect of the change in the correlations of wives' earnings with husbands' earnings and other members' earnings. For the first sub-period, the equalizing effect of wives' earnings on household income inequality was not significantly different when holding correlations of wives' earnings constant at the 2004 levels (18 per cent and 16 per cent, respectively). Indeed, a large proportion of an increase in households' income inequality was explained by the decrease in the share of wives' earnings using the mean of earnings in 2004 and the increase in the share of other members' earnings. However, for the second sub-period, when the correlations of wives' earnings were kept at the 2010 levels, the impact of wives' earnings on households' income inequality increased considerably from 8 per cent to 15 per cent. This was explained by the decrease in the correlations between wives' earnings and other earnings sources between 2010 (0.65 with husbands' earnings and 0.35 with other members' earnings) and 2016 (0.37 with husbands' earnings and 0.29 with other members' earnings). This indicates that increases in wives' earnings in the first sub-period were focused on those families with low earnings husbands.

5. CONCLUDING REMARKS

Household income inequality is the central issue for public policy in every country, especially for an emerging market like Vietnam. This paper analyzes the effect of wives' earnings on the household income inequality, with the focus on earnings from the elderly women in the context of Vietnam. Vietnam is an excellent choice for this study to be investigated as Vietnamese government has expressed great concerns in relation to country's current income inequality level.

With the focus on the elderly women, data in this paper is utilized from the Vietnam's Living Household Standards Surveys over the 2004 – 2016 period. Different measures of income inequality adopted in this paper include (i) the Gini coefficient; (ii) the P90/P10 ratio; and (iii) the CV^2. Using the decomposition technique, together with four standard counterfactuals and comparing estimates from these counterfactuals with a reference distribution, the results indicate that increases in wives' earnings would equalize the household income inequality, both at a particular point at time and over time. The increases in wives' earnings may contribute to the reduction of the household income inequality by about 18 per cent and 16 per cent between 2004 and 2010. The reduction of 8 per cent and 16 per cent are found between the 2010 and 2016 period.

On the grounds of the findings from this empirical study, caution is required to formulate and implement any public policy which may result in a reduction of earnings from the elderly women. It is because any reduction in their earnings will be associated with an increase in the household income inequality which is a great concern by the government during the process of economic growth and development.

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