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APPLICATION OF THE COPULA-BASED DECOMPOSITION METHOD TO STUDY THE INCOME INEQUALITY BETWEEN RURAL AND URBAN AREAS IN VIETNAM

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The paper uses the copula-based decomposition method to study the incomeinequality in rural-urban areas in Vietnam, using 2016 Vietnam Household Living Standard Survey data. Empirical results show that level of education plays the most important role in explaining income disparities in the two populations. In addition, the results show that the dependenceeffect is negligible in all considered components.

Keywords: *inequality, income, rural - urban, decomposition method, copula.*

1. Introduction[1]

Income inequality (between genders, regions such as rural and urban areas, countries or two periods) is a central issue in economic research, in many developed and developing countries. While empirical applications of decomposition methods are popular, researchers continue developing new theories toobtain detailed factors/causes of inequality. There are two main approaches: access to characteristics of the population (education, age, region…); and access through structural income (several different sources of income). The first approach is initiatedby Oaxaca (1973) and Blinder (1973) and the second approach is based on Shorrocks (1982). Here, we focus on the first approach which has two steps:

- The first step (aggregate decomposition) divides the inequality into two parts: ***the composition effect*** is due to the different characteristic of the explanatory variable and *the structure effect* is due to the difference of the effect of the explanatory variables on the dependent variable.

- The second step (detailed decomposition) further decomposesthe composition effectinto the contribution of each explanatory variable.

These methods are widely using to study inequality in income, wages, expenditures, opportunities... of

1. This section refers primarily to [Tuan (2018)] two populations. Then, this decomposition approach canexplain the existence (or extension) of discrimination in the labor market.

The Oaxaca - Blinder decomposition method decomposes the inequality at an average, i.e the expectation of the dependent variable. It requires that the dependent variable is continuous and we make an assumption that the relation between the explanatory variables (independent variables, covariates) and the dependent variable is linearity. This method allows bothaggregate decomposition and detailed decomposition. Extensions of the Oaxaca-Blinder method aim to decompose at various inequality measures, such as a variance, quantiles/or quantile differences, and a Ginicoefficient (collectively referred to as statistics). Alternative extension includes non-parametric approach to reduce a linear hypothesis.

The most popular extension ofthe Oaxaca-Blinder decomposition method is based on (conditional) quantile regression [Machado-Mata (2005)]. The Machado-Mata method performs anaggregate decomposition at various quantile orders and a detailed decomposition for thecomposition effect[2].

Extensions based on the distribution regression [Chernozhukov (2013)] and the Recentered Influence Function (RIF) regression [Firpo (2007)] can be fully applied for aggregate decomposition and detailed decomposition. However, each method has its own advantages and disadvantages. An overview of various decomposition methods are in [Fortin (2011)].

The recent extension of [Rothe (2015)], based on copula theory, allows to aggregate decomposition and detailed decomposition for composition effect at various quantile orders. Rothe's method is consideredas a natural extension of the Oaxaca-Blinder method for statistics and for a nonlinear approach.A special case with interested mean value and a linear hypothesis, Rothe's method coincides consistent with the Oaxaca-Blinder method. This method allows for decomposing the compositioneffect into three components:

(i) A direct contribution of each covariate due to between-group differences in the respective marginal distributions;

(ii) k-way ($k \geq 2$) interaction effectsdue to the interplay between k marginal distributions;

(iii) Adependence effect accounting for between-group differences in dependence patterns among the covariates.

[Rothe (2015)] uses this method to study the evolution of the wage distribution in the US between 1985 and 2005. Their estimations suggest that the dependence effect alone can explain about one fifth of the increase in wage inequality over that period (as measured by the difference between the 90% and the 10% quantile).

The issue of inequality in Vietnam, in particular between rural and urban areas, has also attracted the attention of many domestic and foreign scientists. [Binh et al. (2007)] use the Vietnam Household Living Standards Survey (VHLSS) from 1993 and 1998 to examine the inequality in welfare between urban and rural areas in Vietnam. Real per capita household consumption expenditure (RPCE) is their measurement of welfare. They apply a quantile regression decomposition (the same method as Machado-Mata) to analyze the difference between the urban and rural distributions of log RPCE. In 1993, the causes of inequality were mainly due to the composition effect, which include education levels, ethnicity, and age. The figures are consistent across all quantiles. In 1998, the similar results were obtained at the lowest quantile, at the other quantiles, the gap was mainly due to the

2. This is a major disadvantage of the method, since the composition effect is more economic meaning than the structure effect, moreover, decomposition of the structure effect has the problem of "omitted group". [Machado-Mata (2005)] has suggested a technique for decomposing composition effect, but [Fortin (2011)] has shown that this solution is invalid.

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structure effect. [Huong (2014)] also applied the RIF regression [Firpo (2007)] at the similar period, from 1993 to 2006. The results show that education levels play the most important role in generating disparity. The structure effect reveals a significant contribution of the intercept coefficient, which demonstrates the role of unobserved variables. In the same direction, [Thanh (2017)] also uses the same method as [Huong (2014)] for the period 2008-2012. Besidesto those using variable consumption expenditures, a number of authors accessthe inequality between rural and urban areas on wage variable. [Tran (2015)] use the Machado-Mata method to decomposewage on the VHLSS data in 2012. The results show that compositioneffects account for more than 50% of the wage gap in all quantiles are considered.

The copula-based decomposition method of [Rothe (2015)] is first applied in Vietnam using VHLSS in [Huong (2017)], where authors focus on inequality on expenditure between 2004 and 2014. The results show that, in most cases, the structure effect is about two-thirds of the difference, and the dependent effect can take up to half of the compositioneffect (for the Gini coefficient in 2004). The results also show that educational factors play the largest role in explaining the welfare (here, per expenditure) Vietnam during 10 years.

This paper will use the copula-based decomposition of [Rothe (2015)] to study income inequality between rural and urbanareas in Vietnam. Experimental results are based on the VHLSS data in 2006.

2. The fundamental theory of the copula-based decompositionmethod[3]

We consider a population with two non-overlapping subgroups indexed by $g \in \{0, 1\}$. For each group, for example group g, we denote an outcome variable, a d-dimensional vector of observable characteristicsand a conditional CDFareY^g, X^g and $F^g_{Y|X}$ respectively. In addition, their corresponding distribution functionsare F^g_Y and F^g_X. Furthermore, our interested distribution features are $\upsilon(F)$, where : $F \to R$. Function refers to many statistics figures such as amean : $F \to \int y dF(y)$, aτ-quantile : $F \to F^{-1}(\tau)$, higher-order centered or uncentered moments, quantile-related statistics, and inequality measures such as the Gini coefficient. Our research question is how the distributional featuresdifference between two groups, i.e between $\upsilon(F^1_Y)$ and $\upsilon(F^0_Y)$ links to the differences between the distributions F^1_X and F^0_X. Denote the total difference by

$$\Delta^{\nu}_{O} = \nu(F^1_Y) - \nu(F^0_Y)$$

We define a counterfactual outcome distribution $F^{g|j}_Y$ which combines the conditional distribution in group g with the covariate distribution in group $j \neq g$

$$F^{g|j}_Y(y) = \int F^g_{Y|X}(y, x) dF^j_X(x)$$

Then, we can write (called aggregate decomposition):

$$\Delta^{\nu}_{O} = \Delta^{\nu}_{S} + \Delta^{\nu}_{X}$$

where

$$\Delta^{\nu}_{S} = \nu(F^1_Y) - \nu(F^{0|1}_Y)$$

and

$$\Delta^{\nu}_{X} = \nu\left(F^{0|1}_Y\right) - \nu(F^0_Y)$$

Here, Δ^{υ}_X is a composition effect which measures the differences in the distribution of the covariates between the two groups; and Δ^{υ}_S is a structure effect, solely due to differences in$F^1_{Y|X}$ and $F^0_{Y|X}$.

The basis of the copula-based decomposition method is Sklar's theorem as follows:

The CDF of X^g can always be written as

$F^g_X(x) = C^g\left(F^g_{X_1}(x_1), \ldots, F^g_{X_d}(x_d)\right)$ *for $g \in \{0, 1\}$,*

where C^g is a copula function, i.e. a multivariate CDF with standard uniformly distributed marginals,

3. This sectionrefersprimarily to [Rothe (2015)]

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and $F^g_{X_k}$ is the marginal distribution of the kth component of X^g. The copula help determining the dependence structure.

Sklar's formula can be used to define counterfactual outcome distributions that combine the conditional distribution in group g with hypothetical covariate distributions that share properties of both F^1_X and F^0_X. For simplicity, we will assume that the dependent structures follow a Gaussian copula.

Denoting any element of the d-dimensional product set $\{0, 1\}^d$ by a boldface letter, we define the distribution of the outcome in a counterfactual setting where the structure is in group g, the covariate distribution has the copula function of group j, and the marginal distribution of the lth covariate is equal to the that in group k_l by

$$F_Y^{g|j,\boldsymbol{k}}(y) = \int F^g_{Y|X}(y,x)\,dF_X^{j,\boldsymbol{k}}(x)$$

with

$$F_X^{j,\boldsymbol{k}}(x) = C^j(F_{X_1}^{\boldsymbol{k}_1}(x_1), \dots, F_{X_d}^{\boldsymbol{k}_d}(x_d))$$

We also write **1** = (1, 1,…,1) and **0** = (0, 0, …, 0), denote by e_l the lth unit vector, and put $|k| = \Sigma^d_{l=1} k_l$. Next, for any distributional feature υ we define:

$$\beta^\nu(\boldsymbol{k}) = \nu\left(F_Y^{0|0,\boldsymbol{k}}\right) - \nu(F_Y^0)$$

which can be interpreted as the effect of a counterfactual experiment conducted in group 0 that changes the respective marginal distribution of those |k| covariates for which $k_l = 1$ to their corresponding counterpart in group 1, while holding everything else (including the dependence structure among the covariates) constant.

Finally, we define:

$$\Delta_M^\nu(\boldsymbol{k}) = \beta^\nu(\boldsymbol{k}) + \sum_{1\le|\boldsymbol{m}|\le|\boldsymbol{k}|-1} (-1)^{|\boldsymbol{k}|-|\boldsymbol{m}|}\beta^\nu(\boldsymbol{m})$$

with the empty sum equal to zero (so that, $\Delta^\upsilon_M(e^l) = \beta^\upsilon(e^l)$).

A detailed decomposition of the compositioneffectfollows:

- As a first step, Δ^υ_X can be decomposed into a dependence effect Δ^υ_D and a total marginal distribution effect Δ^υ_M :

$$\Delta_X^\nu = \Delta_D^\nu + \Delta_M^\nu$$

where

$$\Delta_D^\nu = \nu\left(F_Y^{0|1,\boldsymbol{1}}\right) - \nu\left(F_Y^{0|0,\boldsymbol{1}}\right)$$

and

$$\Delta_M^\nu = \nu\left(F_Y^{0|0,\boldsymbol{1}}\right) - \nu\left(F_Y^{0|0,\boldsymbol{0}}\right)$$

- In a second step, we further decompose Δ^υ_M into several partial marginal distribution effects:

$$\Delta_M^\nu = \textstyle\sum_{1\le|\boldsymbol{k}|\le d} \Delta_M^\nu(\boldsymbol{k})$$

So, we have:

$$\Delta_X^\nu = \textstyle\sum_{1\le|\boldsymbol{k}|\le d} \Delta_M^\nu(\boldsymbol{k}) + \Delta_D^\nu$$

In case |k| = 1, i.e. when $k = e^l$ is the *l*th unit vector, $\Delta^\upsilon_M(e^l)$ is interpreted as a direct contribution of between-group differences in the marginal distribution of the lth covariate to the composition effect. With |k| > 1, the terms $\Delta^\upsilon_M(k)$ capture the contributions to the composition effect of |k|-way interaction effects between the marginal distributions for which respective component of k is equal to one.

3. Experimental results in Vietnam

This study uses the most recent Vietnam Household Living Standards Survey (VHLSS), in 2016. This survey has been conducted by the General Statistics of Vietnam (GSO) with the technical assistance of World Bank every year since 2002. The dataset includes a broad range of information about Vietnamese households: income, household expenditure (on food, insurance, education, etc.), and demographic characteristics among many others. The survey is conducted in all 64 Vietnamese provinces and about 9000 households participate in each wave. This study decomposes the inequality of the logarithm of house-

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holdin come. For all statistics computed in this study, we use household sample-selection weights provided with the VHLSS data so that all results are representative of the whole population in Vietnam.

3.1. Descriptive statistics

We are interested in the influence of 11 socio-demographic characteristics on income. These explanatory variables are:

+ Gender: A dummy variable indicating the gender of the head of household, Gender = 1 if male and Gender = 0 if female.

+ Ageh: A continuous variable which shows the age of the household head.

+ Serv: A dummy variable to indicate whether a householdisself-employedinmanufacturing, sale, service.

+ South: A dummy variable indicates whether the household lives in the southern half of Vietnam. South = 1 if southern and South = 0 otherwise.

+ Rem-lrs: A dummy variables to indicate whether a household received remittances in the past year from within Vietnam.

+ Rem-frs: A dummy variables to indicate whether a household received remittances in the past year from foreign sources.

Table 1: *Descriptive statistics*

	Urban					Rural				
	Mean	SD	Q10	Q50	Q90	Mean	SD	Q10	Q50	Q90
Income	4.09	2.19	1.71	3.67	7.12	2.45	1.71	0.80	2.03	4.61
Gender	0.65	0.48	0.00	1.00	1.00	0.79	0.41	0.00	1.00	1.00
Ageh	53.15	13.70	36.00	53.00	72.00	51.63	14.11	34.00	51.00	71.00
Ethnic	0.94	0.24	1.00	1.00	1.00	0.81	0.39	0.00	1.00	1.00
Hsize	3.78	1.59	2.00	4.00	6.00	3.78	1.58	2.00	4.00	6.00
Yedu	10.55	4.88	5.00	12.00	16.00	7.59	4.51	0.00	9.00	14.00
Wage	0.40	0.49	0.00	0.00	1.00	0.39	0.49	0.00	0.00	1.00
Agri	0.17	0.37	0.00	0.00	1.00	0.66	0.47	0.00	1.00	1.00
Serv	0.26	0.44	0.00	0.00	1.00	0.17	0.37	0.00	0.00	1.00
South	0.43	0.50	0.00	0.00	1.00	0.29	0.45	0.00	0.00	1.00
Rem-lrs	0.84	0.37	0.00	1.00	1.00	0.85	0.36	0.00	1.00	1.00
Rem-frs	0.05	0.21	0.00	0.00	0.00	0.03	0.18	0.00	0.00	0.00

+ Ethnic: A dummy variable indicating the ethnicity of the head of household. Ethnic = 0 if minority and Ethnic = 1 if Kinh.

+ Hsize: A continuous variable which shows the number of people in the household.

+ Yedu: A continuous variable which counts the years of schooling completed by the head of household.

+ Wage: A dummy variable to indicate whether a household worksto get a salary, pay.

+ Agri: A dummy variable to indicate whether a householdisself - producedin agriculture, forestry, aquaculture.

Table 1 presents the descriptive statistics of variables for the years 2016. Clearly, household income in the urban area is higher than those in rural area at mean values as well as at various quantiles. The average number years of schooling of the household heads in an urban area are higher than the figures in rural area, around 3 years. Another important characteristic is the proportion of householdself-producedin agriculture, forestry, aquaculture 66% in a rural areaand 17% in an urban area. The different in other variables are not significant.

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3.2. Decomposition results

Table 2 describes the results of decomposition at five statistic measurements: mean, 10^{th} quantile, median, 90^{th} quantile, and Gini coefficient. The table shows all two-way interactive effects but the values are not significant.

First of all, we consider the estimation of structural effect and compositioneffect. In all cases, the compositioneffect may account for 40% of the total difference. Thus, demographic and occupational and regional characteristics can account for at least about a third of the income inequality in rural-urban populations. These results are consistent with the decomposition results on previous empirical studies ([Binh (2007)] and [Huong (2017)]).

Next, we focus on the dependence effect, which is a new effect in the decomposition method of [Rothe (2005)]. However, the results show that these effects in all cases are negligible.

Finally, we will consider a direct contribution of each explanatory variable. Except the figures for the Gini coefficient, the results show that the direct contribution of education level variable accounts the largest proportion of the composition effect, approximately 50%. In other words, the cause of the gap between rural-urban incomes is that urban populations are more educated than rural populations.

4. Conclusions

There are significant disparities in the income of the population between rural-urban areas in Vietnam. This inequality is largely due to structure effects; however, compositioneffects also play an important role. In all cases, the dependence effects play a negligible role in the total difference. The number years of schoolingof the household head plays the largest role in explaining the income inequality of rural-urban areas. This result is similar to previous studies which confirm the philosophy of "putting the acquisition of knowledge at the heart of economic analysis", or the point of development "Education and training is the leadingnational policy".?◆

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Table 2: *Estimated Decomposition of Differences in Distribution of Log Income (×100)*

	mean	mean.se	q10	q10.se	q50	q50.se	q90	q90.se	gini	gini.se
Total Difference	58.73	(1.29)	75.04	(2.93)	60.44	(1.74)	43.68	(2.17)	-1.13	(0.07)
Structure Effect	33.92	(1.01)	44.58	(2.16)	32.44	(1.49)	27.43	(2.5)	-0.60	(0.06)
Composition Effect	24.81	(1.07)	30.46	(1.72)	27.99	(1.82)	16.25	(2.34)	-0.53	(0.04)
Dependence Effect	0.08	(0.12)	0.15	(0.35)	-0.01	(0.07)	0.17	(0.42)	-0.00	(0.01)
Marginal Distr. Effect	24.73	(1.04)	30.31	(1.73)	28.00	(1.81)	16.07	(2.35)	-0.53	(0.04)
Gender	-1.92	(0.31)	-2.06	(0.47)	-2.29	(0.48)	-2.27	(0.61)	0.01	(0.01)
Ageh	0.06	(0.1)	0.55	(0.29)	-0.00	(0.14)	-0.16	(0.17)	-0.02	(0.01)
Ethnic	5.15	(0.38)	7.98	(0.72)	5.11	(0.63)	1.71	(0.4)	-0.20	(0.02)
Hsize	-0.02	(0.13)	-0.00	(0.03)	-0.03	(0.14)	-0.04	(0.28)	-0.00	(0.01)
Yedu	13.16	(0.81)	12.27	(1.21)	14.86	(1.15)	11.55	(1.89)	-0.10	(0.02)
Wage	0.06	(0.06)	0.22	(0.2)	0.07	(0.06)	-0.07	(0.08)	-0.01	(0.01)
Agri	3.18	(0.69)	3.34	(1.5)	3.76	(1.1)	1.22	(1.39)	-0.11	(0.04)
Serv	2.35	(0.29)	2.60	(0.46)	2.53	(0.54)	2.31	(0.44)	-0.02	(0.01)
South	3.57	(0.49)	3.78	(0.66)	3.58	(0.64)	3.20	(0.59)	-0.03	(0.01)
Rem_lrs	-0.05	(0.09)	-0.12	(0.18)	-0.08	(0.11)	0.02	(0.03)	0.00	(0)
Rem_frs	0.35	(0.14)	0.35	(0.15)	0.39	(0.2)	0.34	(0.19)	0.00	(0)
Gender:Ageh	0.01	(0)	-0.03	(0.06)	0.03	(0.04)	-0.04	(0.07)	-0.00	(0)
Gender:Ethnic	0.01	(0.01)	0.44	(0.53)	0.50	(0.31)	-0.07	(0.31)	0.00	(0)
Gender:Hsize	0.00	(0)	0.00	(0.01)	0.00	(0.02)	0.00	(0.08)	-0.00	(0)
Gender:Yedu	-0.00	(0.03)	0.11	(0.44)	0.80	(0.46)	-0.74	(0.91)	0.01	(0)
Gender:Wage	0.00	(0)	-0.02	(0.02)	-0.00	(0.02)	0.01	(0.03)	0.00	(0)
Gender:Agri	0.02	(0.02)	0.05	(0.58)	0.70	(0.41)	-0.02	(0.38)	0.00	(0)
Gender:Serv	0.01	(0.01)	0.13	(0.32)	0.51	(0.41)	-0.00	(0.34)	0.00	(0)
Gender:South	0.00	(0.01)	0.25	(0.42)	0.66	(0.39)	0.24	(0.39)	0.00	(0)
Gender:Rem_lrs	-0.00	(0)	0.01	(0.01)	0.00	(0.03)	-0.01	(0.01)	-0.00	(0)
Gender:Rem_frs	0.00	(0)	-0.04	(0.04)	-0.02	(0.09)	0.01	(0.11)	0.00	(0)
Ageh:Ethnic	-0.01	(0.01)	-0.08	(0.16)	-0.02	(0.05)	-0.02	(0.05)	0.00	(0)
Ageh:Hsize	0.00	(0)	-0.00	(0)	0.00	(0)	0.00	(0.01)	0.00	(0)
Ageh:Yedu	-0.04	(0.02)	-0.04	(0.13)	-0.06	(0.1)	-0.23	(0.24)	0.00	(0)
Ageh:Wage	-0.00	(0)	0.00	(0.03)	-0.00	(0.01)	0.00	(0)	0.00	(0)
Ageh:Agri	-0.01	(0.01)	-0.10	(0.18)	-0.03	(0.06)	-0.03	(0.07)	0.00	(0)
Ageh:Serv	-0.01	(0)	-0.12	(0.11)	-0.05	(0.04)	-0.02	(0.06)	0.00	(0)
Ageh:South	-0.01	(0.01)	-0.14	(0.12)	-0.04	(0.05)	0.00	(0.07)	0.00	(0)
Ageh:Rem_lrs	0.00	(0)	-0.00	(0.01)	0.00	(0.01)	-0.00	(0)	-0.00	(0)
Ageh:Rem_frs	-0.00	(0)	0.01	(0.02)	-0.00	(0.01)	-0.00	(0.01)	0.00	(0)
Ethnic:Hsize	-0.00	(0)	0.00	(0.01)	0.00	(0.04)	0.00	(0.05)	0.00	(0)
Ethnic:Yedu	-0.18	(0.03)	1.08	(0.89)	-0.75	(0.64)	-0.48	(0.52)	-0.02	(0)
Ethnic:Wage	-0.01	(0.01)	-0.03	(0.07)	-0.01	(0.02)	0.01	(0.02)	0.00	(0)
Ethnic:Agri	-0.07	(0.03)	1.67	(1.11)	0.67	(0.71)	-0.16	(0.32)	-0.01	(0)
Ethnic:Serv	-0.06	(0.01)	0.08	(0.49)	-0.05	(0.39)	-0.28	(0.18)	-0.00	(0)
Ethnic:South	-0.06	(0.01)	0.44	(0.49)	-0.02	(0.44)	-0.46	(0.27)	-0.00	(0)
Ethnic:Rem_lrs	0.00	(0)	0.02	(0.04)	0.01	(0.03)	0.00	(0.02)	0.00	(0)
Ethnic:Rem_frs	-0.01	(0)	-0.04	(0.1)	-0.05	(0.11)	-0.01	(0.05)	-0.00	(0)
Hsize:Yedu	-0.00	(0.01)	-0.00	(0.02)	0.00	(0.04)	-0.01	(0.17)	0.00	(0)
Hsize:Wage	0.00	(0)	-0.00	(0)	0.00	(0)	-0.00	(0)	0.00	(0)
Hsize:Agri	0.00	(0)	0.00	(0.01)	0.01	(0.04)	-0.00	(0.06)	0.00	(0)
Hsize:Serv	-0.00	(0)	0.00	(0.01)	0.01	(0.03)	0.00	(0.06)	0.00	(0)
Hsize:South	-0.00	(0)	0.00	(0.01)	0.00	(0.04)	0.01	(0.08)	0.00	(0)
Hsize:Rem_lrs	-0.00	(0)	0.00	(0)	0.00	(0.01)	-0.00	(0)	-0.00	(0)
Hsize:Rem_frs	-0.00	(0)	-0.00	(0)	0.00	(0.01)	0.00	(0.04)	-0.00	(0)
Yedu:Wage	-0.02	(0.02)	-0.01	(0.05)	-0.04	(0.03)	-0.03	(0.11)	-0.00	(0)
Yedu:Agri	-0.27	(0.09)	0.98	(1.36)	0.21	(1.08)	-1.03	(1.2)	-0.03	(0.01)
Yedu:Serv	-0.10	(0.03)	-0.17	(0.37)	-0.62	(0.52)	0.18	(0.83)	-0.01	(0)
Yedu:South	-0.10	(0.04)	-0.15	(0.49)	-0.52	(0.55)	0.85	(1.26)	-0.01	(0)

Note: Bootstrapped standard errors are in parenthesis.

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Summary

Bài viết sử dụng phương pháp phân rã dựa trên copula để nghiên cứu bất bình đẳng trong thu nhập giữa nông thôn và thành thị của Việt Nam (trên bộ dữ liệu VHLSS). Kết quả thực nghiệm cho thấy yếu tố giáo dục đóng vai trò quan trọng nhất trong việc giải thích sự chênh lệch thu nhập của dân cư ở hai khu vực này. Bên cạnh đó, kết quả còn cho thấy hiệu ứng phụ thuộc có vai trò đáng kể trong một số trường hợp (giải thích 1/6 chênh lệch thu nhập khi xét cho phân vị 90^{th} ở năm 2014).

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