Southeast Asian Journal of Economics Vol.13(1), April 2025: 169-199
Received: September 9, 2022
Revision: August 30, 2023
Accepted: May 6, 2024

Informal Workers and Income Inequality in the Context of COVID-19 in Vietnam

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Abstract

This study provides empirical evidence on the impact of COVID-19 on the number of working hours and income of informal workers, thereby affecting overall income inequality in Vietnam. The least squares, Heckman Selection, Theil L index, and Blinder-Oaxaca decomposition method were implemented in the study. The results show that Vietnamese informal workers' working hours and income have decreased significantly due to the COVID-19 pandemic. The study also demonstrates that informal workers are the main cause of overall income inequality in Vietnam. The group of labor-employment and geographic characteristics increased income inequality within the informal workers group, while the opposite trend was true for the group of individual characteristics. Notable, this study analyzes the reduction in informal workers' working hours and income in Vietnam instead of approaching the reduction level as in previous

analyses. It not only points out the causes of changes in overall income inequality but also evaluates the role of informal workers in this relationship. This is expected to be an overview of informal workers and income inequality in the context of COVID-19 in Vietnam.

Keywords: COVID-19, informal workers, income inequality, Vietnam, Theil L.

1. Introduction

COVID-19 is the worst global crisis after World War II (Benhura & Magejo, 2020), which has had severe effects on the economy and workers (Chari et al., 2022). In particular, the impacts of the pandemic on informal workers are particularly serious because they are less able to access government policies, welfare, and social security (Sharma, 2019). Many studies have concluded on the influence of COVID-19 on reducing working hours and the income of informal workers (WHO, 2020; Collins et al., 2021; Balde et al., 2020). Specifically, Casale and Posel (2020) and Huang et al. (2020) assert that in South Africa and the United States, the decisions to lock down and social distance led to significant reductions in informal workers' working hours. The same is demonstrated by Seck et al. (2021) in the Asia-Pacific region. Thus, the government response to COVID-19 has caused workers, especially informal workers, to face working hours reduction and unemployment. At the same time, informal workers' income has also been seriously affected by the impact of the pandemic. The International Labor Organization (2020) estimates that the income of informal workers fell by 60% in the first month of the global crisis, with 82% in low-middle-income countries, 28% in upper-middle-income countries, and 76% in high-income countries compared to pre-pandemic.

In addition, income inequality in many countries is also affected by informal workers. Specifically, in Xue et al.'s (2014) study on income inequality in urban China in 2005, they asserted that income inequality between informal and formal workers accounted for 10.47 %, while informal workers contributed 47.04% to overall income inequality. Thus, it can be affirmed that income inequality among informal workers contributed a large proportion to income inequality. However, in the context of the COVID-19 pandemic, most current studies only analyze the influence of income gaps between groups on overall income inequality but have not yet confirmed the role of informal workers. Hence, this paper is expected to be a more in-depth analysis of the COVID-19 impact on the number of informal workers' working hours, income, and income inequality in a developing country like Vietnam.

Based on previous research, this study analyzes the informal workers' working hours and income as well as the contribution of these workers to the overall income inequality in Vietnam in the context of the COVID-19 pandemic. The study analyzes the change in informal workers' working hours during the pandemic using the ordinary least-squares regression (OLS). In addition, to measure the decrease in informal workers' income, we use the Heckman Selection method to not only deal with potential bias when selecting data

but also avoid bias and uncertainty in the estimated results (Heckman, 1979). Furthermore, the Gini index is often used by scholars when measuring income inequality (Søbjerg, 2012). However, this coefficient is sensitive to variation in inequality around the median, while the Theil index (including Theil L and Theil T) accounts for studied intergroup variability (Sokolovska et al., 2015). In addition, the use of the Gini index may result in the phenomenon of different income distribution models having the same Gini index. Because the Gini index only represents the degree of inequality, it cannot distinguish different types of inequality (De Maio, 2007). Therefore, the Theil index is a better measure of inequality than the Gini (Herrera-Serna et al., 2020). At the same time, Zuo (2016) and Xue et al. (2014) used the Theil L index to assess income inequality between informal and formal workers. Therefore, we use the Theil L index to analyze the contribution of informal workers to overall income inequality instead of referring to previous studies that only studied income differences between informal and formal workers (Du et al., 2008; Angel-Urdinola & Tanabe, 2012). One of the widely used methods in global economic analysis of group differences is the Blinder-Oaxaca decomposition method (Jann, 2008), but in Vietnam, however, this method is mostly used in the analysis of gender income inequality (Nguyen et al., 2021) without focusing on the assessment of income inequality according to the level of technical expertise. Therefore, the study uses the Blinder-Oaxaca decomposition method intending to analyze the difference between the informal workers with technical

expertise and non-technical expertise, affecting income inequality in three aspects: individual, labor-employment, and geographic characteristics.

Previous studies mainly analyzed the correlation between COVID-19 in terms of working hours and income separately but did not give an overview of the impact of COVID-19 on the above two aspects of informal workers. In addition, in Vietnam, scholars have only assessed the impact of the pandemic on labor in general but have not considered these aspects in informal workers—the vulnerable group that accounts for 70% of the total labor force in Vietnam (GSO, 2021). This study, therefore, will contribute to providing more evidence on the number of Vietnamese informal workers' working hours and income in the context of COVID-19 through the OLS and the Heckman Selection method. In addition, we evaluate the contributions of informal workers, formal workers, and these two groups of workers to the overall income inequality in Vietnam by means of the Theil L index. Finally, we make some recommendations to reduce the risks that informal workers face in terms of hours worked and income. From the research results, we also propose some solutions to improve and enhance skills and knowledge for informal workers and, at the same time, provide recommendations to create favorable conditions for workers in the informal sector to easily access career opportunities during shocks, thereby reducing overall income inequality. Thus, the study was conducted to give an overview of informal workers and income inequality in Vietnam under the impact of the COVID-19 pandemic, thereby drawing conclusions about this relationship in countries with a similar context as Vietnam.

The paper consists of 5 sections. After the introduction, Section 2 presents an overview of informal workers' working hours, income, and income inequality in Vietnam in the context of COVID-19. Section 3 focuses on presenting research methods. Section 4 discusses the results. Finally, conclusions and some policy implications are proposed in Section 5.

2. Literature Review and Theoretical Framework

2.1. The Definition of Informal Workers

According to the International Labour Organization (ILO) (2021), informal workers are defined as workers who have informal employment. This definition includes informal workers in both the formal and informal sectors. Informal employment includes all employment arrangements that do not provide individual workers with legal or social protection through their work, leaving them vulnerable to economic risks. They are considered to be among the most vulnerable to shocks because they receive little attention and support from their government (ILO, 2021).

2.2. Impact of COVID-19 on Informal Workers' Working Hours and Income

The ILO (2020) estimates that 1.6 billion informal workers from all over the world are significantly impacted by closure decisions or high-risk working conditions in the context of COVID-19. The short-term effects of the pandemic on the economy have greatly affected informal workers' working hours and income.

Many studies have confirmed the effect of COVID-19 on reducing the working hours of informal workers (WHO, 2020; Collins et al., 2021; Kabeer et al., 2021). In the United States, 49.90% and 27.60% of rural informal workers changed their status from full-time to temporary unemployment and part-time work, respectively (Mueller et al., 2021). Moreover, the COVID-19 pandemic had a serious impact on informal workers' income (Lemieux et al., 2020; Estupinan & Sharma, 2020) because they were often vulnerable and had to face risks when shocks occurred (Balde et al., 2020). According to the ILO report (2020), it is estimated that informal workers' income in Africa fell by 81% in the first month of the pandemic (March of 2020). Balde et al. (2020) also indicate that informal workers' income reduction in the countries of Burkina Faso, Mali, and Senegal was 60.50%, 77.60%, and 71%, respectively. Similarly, the average monthly income of informal workers in Thailand was THB 3,586.

This is only 27% of the income of informal workers before the pandemic (13,507 THB). Therefore, the COVID-19 pandemic not only negatively affected the number of working hours but also seriously reduced the income of informal workers, which has a particularly serious impact on developing countries characterized by a large proportion of informal workers (Le & Tran, 2019).

In Vietnam, there have been many studies showing the serious impact of the COVID-19 pandemic on workers' lives in terms of working hours and income. During the pandemic, informal workers' income decreased, which had a serious impact on developing countries characterized by a large proportion of informal workers (Le & Tran, 2019). Specifically, in the Labor and Employment report for the first and second quarters of 2020 by the General Statistics Office (GSO), in each quarter, Vietnam had more than 1 million underemployed workers based on the number of working hours (GSO, 2020). Regarding income, the Vietnamese General Statistics Office (2021) confirmed that the average monthly income of workers in the third quarter of 2021 was 5.2 million dongs, 877,000 dongs lower than the previous quarter and 603,000 dongs lower than the same period the previous year. This level of income is significantly lower than the second quarter of 2020 (5.5 million dongs), which was recorded as the lowest average income of workers within 10 years (2012–2021). Most of the studies on Vietnam have only focused on analyzing the reduction of working hours as well as the income of workers, except for informal workers. Therefore, this paper is expected to answer the research question:

How has the COVID-19 pandemic affected Vietnamese informal workers' working hours and income?

2.3. Impact of Informal Workers on Income Inequality

Around 20–30% of workers in developed countries and more than 40% in developing countries work in the informal sector (Hu & Yang, 2001). Despite the relatively large number of informal workers, they still suffered from

low wages, lack of social protection, and other problems (ILO, 2002). This not only had a negative effect on the distribution of wages but also increased income inequality (Maloney, 1999), specifically:

Xue et al. (2014) showed that income disparities among informal workers contributed largely to overall income inequality. Specifically, in 2010, the income gap among informal workers accounted for 37.34% of the overall income inequality, while the income gap between informal and formal workers only constituted 15.06%. The study concludes that informal workers are the most important contributor to overall income inequality in urban cities in China (52.48% in 2010). Similarly, Binelli (2016) shows that income inequality among informal workers accounted for more than 60% of overall income inequality, even being up to 70% in 1995–1997. According to Zuo (2016), in China in 2013, intra-informal workers' contribution to the overall income inequality was 35.60%, being higher than the intra-formal workers' contribution (30.01%), and becoming the main source of overall income inequality. Therefore, income disparities among informal workers contribute a large part to overall income inequality. When the size of the informal labor market expands, the income gap among these precarious workers deepens, thereby increasing income inequality (Henley et al., 2009).

Fields (1990) asserts that there is a segmentation in the informal labor market, specifically into two groups: (1) voluntary informal workers (self-employed) with high incomes, which are even higher than formal workers, and (2) low-level informal workers who have precarious income and are unable to find formal employment. Cunningham and Maloney (2001) argue that this segmentation is the main cause of increasing income inequality within the informal workers group. Similarly, Tansel and Acar (2016) found that voluntary informal workers in Turkey earned higher wages than low-level informal workers (53.1%). This figure is significantly larger than the wage gap between the two groups of informal and formal workers. This contributes more to the increase in overall income inequality compared to the causes identified in the

previous research. Thus, when considering the impact of informal workers on income inequality, most studies point to a negative relationship. In particular, informal workers are the main cause of increasing income inequality. Therefore, we pose the research question:

To what extent do informal workers contribute to overall income inequality in Vietnam?

3. Research Methods

3.1. Database

This paper uses data from the Labor Force Survey (LFS) for the first 3 quarters of 2021 conducted by the Vietnamese General Statistics Office (GSO) with the support of the ILO. Each quarterly survey covers more than 200,000 workers in 63 provinces in Vietnam.

3.2. Research Process

Firstly, this paper analyzes the effects of the COVID-19 pandemic on informal workers' working hours through the Ordinary Least Squares model (OLS). Many studies have used the OLS model to investigate workers' working hours (Geyer & Steiner, 2007; Böheim & Taylor, 2004; Giang & Nguyen, 2021). Specifically, Geyer and Steiner (2007) estimated the change in weekly working hours in European countries by the OLS model. Giang and Nguyen (2021) also used this model to analyze the factors affecting the working hours of child labor in Vietnam. Therefore, we use the OLS model to consider the effects of the pandemic on informal workers' working hours, as seen in Equation (1).

Secondly, to assess the effects of the COVID-19 pandemic on the income of informal workers in Vietnam, this paper uses the Heckman Selection method (1979) instead of the OLS method because the OLS method is only conducted on employees with income data. Heckman (1979) showed that estimating the wage function based on sampling data only in those who are employed and receiving wages but ignoring non-working workers will make the OLS

estimation obtained biased and unstable. Heckman called this "Sample Selection Bias." Heckman proposed a two-stage estimator to minimize potential sample selection bias arising from a non-random sample consisting of positive, non-zero values (Schmidt et al., 2021). Therefore, the Heckman Selection method is recommended to address potential biases caused by the data analysis selection process (Puhani, 2000; Do & Park, 2019). The advantage of the Heckman Selection method over the conventional regression is that it can control the problem of endogenous variables due to the lack of unobserved variables.

In addition, Abbasi et al. (2021) stated that the Heckman Selection method has an advantage over the OLS model in adding causal factors to explain the relationship between variables. Bacha et al. (2011) indicated that both models give similar results; however, based on the statistical significance of the lambda variable, it has been shown that the OLS model underestimates the impact of the independent variable on the dependent variable compared to the Heckman Selection model. In fact, the LFS dataset that we used only collected 167,055/211,684 (78.92%) income data, missing 44,629 data. Therefore, according to the above recommendation, this paper uses the Heckman Selection method to address potential biases caused by the data analysis selection process.

Many studies have also used the Heckman Selection method to analyze income (Miyata et al., 2009; Wirba et al., 2021). However, it is still very limited in the context of the COVID-19 pandemic in Vietnam. The specific Heckman Selection model is in Equation (2).

In the LFS, informal workers' total income was calculated based on specific data, e.g., total income from the main job and other jobs and wages/salary, including wages overtime, bonuses, allowances, and other benefits. This paper also calculates informal workers' working hours, including the hours of main jobs and other jobs.

$$hours_{it} = \alpha_{it} + \beta_{it}Covid_{it} + \gamma_{it}X_{it} + \ldots + u_{it} \quad (1)$$

$$Ln(income_{it}) = \alpha_{it} + \beta_{it}Covid_{it} + \gamma_{it}X_{it} + u_{it} \quad (2)$$

where $hours_{it}$ is the average working hours per week of informal workers i in quarter t; $Ln(income_{it})$ is the average income of informal workers i in quarter t; $Covid_{it}$ receives a value of 1 if informal workers are affected and 0 if they are unaffected by COVID-19 in quarter t; X_{it} are control variables including dummy variables of gender, age group, marital status, technical expertise, geographic region, urban-rural areas of informal workers, and surveyed quarter; and u_{it} is random error.

Thirdly, this paper considers the contribution of income inequality within informal and formal workers groups and between these two groups to overall income inequality in Vietnam by the Theil L index. This method is widely used to examine the role of informal and formal workers in income inequality around the world and is based on the studies of Xue et al. (2014) and Zuo (2016) in urban China. The Theil L decomposition method is split into two parts: measurement of inequality within groups and measurement of inequality between groups, as seen in Equation (3):

$$Theil\ L = \sum_{j=1}^{j}\left(\frac{N_j}{N}\right)L_j + \sum_{j=1}^{j}\left(\frac{N_j}{N}\right)ln\left(\frac{\frac{N_j}{N}}{\frac{Y_j}{Y}}\right) \quad (3)$$

where Y_j is the total income of group j; Y is total income $(Y=\sum_{j=1}^{j} Y_j)$; L_j is Theil L of group j; N_j is the number of workers of group j; and N is the total number of workers $(N=\sum_{j=1}^{j} N_j)$.

Fourthly, this paper analyzes the differences within the informal workers group in order to determine the causes of inequality by using the Blinder-Oaxaca decomposition method. According to the General Statistics Office of Vietnam (2021), the gap in technical expertise is one of the reasons for increasing income inequality in Vietnam. Meanwhile, according to a calculation by the GSO & ILO (2018), informal workers with technical expertise in Vietnam only account for 12%. Therefore, a large disparity in technical

expertise exists in this group. The study will analyze the difference between informal workers with technical expertise and those without technical expertise to find out the causes of income inequality among informal workers.

Based on the Mincer equation (1997), this study analyzes the income gap between informal workers by technical and non-technical expertise and uses the Blinder-Oaxaca decomposition, which is divided into three parts: (1) the observable part (E), (2) the unobserved part (C), and (3) the interaction between E and C, through Equation (5):

$$Ln(income^{S}_{it}) - Ln(income^{L}_{it}) = (X^{S}_{it} - X^{L}_{it})\,\beta^{i}_{t} + (\beta^{S}_{t} - \beta^{L}_{t})\,X^{L}_{it} + (X^{S}_{it} - X^{L}_{it})\,(\beta^{S}_{t} - \beta^{L}_{t}) + u_{t} = E + C + I \quad (4)$$

where $Ln(income^{S}_{it})$ and $Ln(income^{L}_{it})$ are the income of informal workers with technical and non-technical expertise in quarter t; X^{S}_{it} and X^{L}_{it} are characteristics of informal workers with technical and non-technical expertise (including gender, age group, marital status, type of business, job positions, and areas); and B^{T}_{t} and β^{N}_{t} are estimated coefficients.

4. Data Analysis and Discussion of Results

4.1. Impacts of COVID-19 Pandemic on Vietnamese Informal Workers' Working Hours and Income

This study analyzes the impacts of the COVID-19 pandemic on the working hours and income of Vietnamese informal workers by using the OLS and Heckman Selection methods (Table 1).

Table 1. Results of the impact of COVID-19 pandemic on working hours and income of informal workers in Vietnam

Variable name	**Working hours (OLS)**	**Income (Heckman Selection)**
	Regression coefficient	Regression coefficient
COVID-19	-5.300***	-0.027***

Gender *(Reference: Male)*	Female	-3.107***	-0.343***
Marital status *(Reference: Unmarried)*	Married	-0.027	0.110***
	Widowed	0.160	0.045***
	Divorced	1.536***	0.103***
	Separated	-0.140	0.019***
Age group *(Reference: age group 15-19)*	Aged 25-34	1.919***	0.122***
	Aged 35-44	1.711***	0.160***
	Aged 45-54	0.188	0.101***
	Aged 55-64	-3.249***	-0.129***
	Aged over 65	-7.615***	-0.424***
Technical expertise *(Reference: Non-technical expertise)*	Primary	0.964***	0.228***
	Intermediate	-0.478**	0.073***
	Colleges	0.338	0.174***
	University and higher	-0.795***	0.266***
Economic zone *(Reference: Northern Midlands and Mountains)*	Red River Delta	4.660***	0.327***
	North Central and Central Coast	-1.010***	0.148***
	Highlands	1.175***	0.201***
	South East	-0.605*	0.462***
	Mekong Delta	-4.782***	0.229***
	Hanoi	3.622***	0.499***

	Ho Chi Minh	-0.122***	0.524***
Areas *(Reference: Urban areas)*	Rural areas	-2.622***	-0.152***
Quarter *(Reference: Quarter I)*	Quarter II	-0.0135	-0.053***
	Quarter III	-5.309***	-0.140***
Cons		43.392***	8.303***
R-squared		0.1310	athrho: 0.026** lnsigma: -0.402***
Number of observations		211,684	
Prob > F		0.0000	

Note: * = $p < 0.1$, ** = $p < 0.05$, and *** = $p < 0.01$.

Source: Estimation from authors.

Firstly, the coefficient of regression for the COVID-19 variable is -5.300, meaning that the pandemic reduced the working hours of informal workers by an average of 5.3 hours/week compared to unaffected informal workers in Vietnam. Skinner et al. (2021), Mueller et al. (2021), Collins et al. (2021), and Kabeer et al. (2021) reached similar conclusions that the influence of COVID-19 severely reduced the informal workers' working hours. In Vietnam, due to the rapid and complicated spread of the pandemic, many localities had to limit production, business, and supply of non-essential products; thereby, the number of informal workers' working hours decreased. In the third quarter of 2021, many provinces and cities in Vietnam implemented strict social distancing under Directive 16[1]or Directive 15[2], resulting in stagnated

[1] Directive 16 includes: (1) Complete social isolation; people only go out when absolutely necessary; (2) Do not gather more than 2 people in public places; (3) Only establishments dealing in essential goods and services may operate; (4) Stop public passenger transport, except in necessary cases; (5) Keep a minimum distance of 2 meters when communicating in public.

[2] Directive 15 includes: (1) Do not gather more than 10 people outside offices, hospitals, or schools; (2) Only establishments dealing in essential goods and services are allowed to open; (3) Restrict movement from epidemic areas to other localities; (4) Keep a minimum distance of 2 meters when communicating in public.

commercial activities, accommodation, and meals. Therefore, when the social distancing orders were applied, a large number of informal workers working in the service sector, restaurants, cafeterias, construction, etc., were immediately reduced in working hours (GSO, 2021).

Secondly, with the regression coefficient of the COVID-19 variable bearing a negative sign, the income of informal workers decreased (e0.027-1)*100%=2.74% due to the influence of COVID-19 (Table 2). This result is similar to studies in other regions, e.g., Balde et al. (2020) and Schwettmann (2020) in sub-Saharan Africa. Komin et al. (2020) showed that closures and social distancing decisions affected many sectors, forcing them to leave the employed workforce and thereby reducing their income.

4.2. Extent to Which Informal Workers Contribute to Overall Income Inequality in Vietnam

The Theil L index is used to measure the contribution of informal workers to income inequality. Table 2 shows that the total Theil L index in 2019 (0.28282) is much higher than in the first three quarters of 2021, which shows that after the COVID-19 pandemic hit, overall income inequality and within the group decreased. In addition, the income inequality index of informal workers is higher than that of formal workers.

Income inequality in the first quarter of 2021 decreased significantly compared to 2019. Because Directives 15 and 16 were issued to prevent the pandemic from spreading in 2021 in Vietnam, according to the author's calculations, the total number of employed workers decreased by more than 4.76/54.6 million workers (8.71%), including 4.28/38.25 (11.19%) million informal workers and 0.48/16.41 (2.9%) million formal workers compared to 2019. Thus, 11.19% and 2.9% of informal and formal workers, respectively, lost their jobs. When COVID-19 began to impact the labor market negatively, the vulnerable, uncontracted low-income workers were the first to lose their jobs, leading to a decreased income gap (GSO, 2022). As a result, the income

gap in the formal workers' intra-group, informal workers' intra-group, and between these two groups was reduced, especially in the informal workers' group.

In 2021, when the pandemic broke out in Vietnam, the government issued blockade orders and social distancing, and the total Theil L index increased from 0.20990 to 0.23281 in the first three quarters. Thus, income inequality increased during the pandemic. Similarly, in China, income inequality was increasingly severe in areas with long periods of strict social distancing (Shen et al., 2021). That study also shows that the pandemic reduced the income of the lowest-income workers in the market due to their lower financial capacity to deal with the crisis. Furthermore, Albert et al. (2023) indicate that high-income informal workers performed better during the pandemic because they had the means to exploit new business opportunities thanks to their larger assets and better access to external finance. As a result, the income gap widened further, leading to an increase in income inequality again.

In particular, the Theil L index of informal workers' intra-group increased from 0.224 to 0.259. This contributed to the overall income inequality of 71.12%, 74.18%, and 74.01%, respectively, which are much higher than the formal workers' intra-group. Xue et al. (2014) and Zuo (2016) also stated that income inequality among informal workers is always larger than formal workers due to the significant difference in informal workers' income. In addition, income inequality between the two groups of workers contributed 10.58%, 7.98%, and 7.74%, respectively, to the overall income inequality in the first three quarters of 2021 in Vietnam. Thus, informal workers contributed to the overall inequality by the proportion of intra-group and inter-group contributions reaching 81.70%, 82.16%, and 81.75%, respectively, in the first 3 quarters of 2021. Therefore, it can be concluded that informal workers were the main cause of overall income inequality in Vietnam.

Table 2. Disintegration results of Theil L index of informal and formal workers in Vietnam

	Informal workers	**Formal workers**	**Total**
2019			
Theil L	0.30373	0.13169	0.28282
Labor rate (%)	69.98	30.02	100
Internal group (%)	77.14	10.67	87.81
Between groups (%)	_	_	12.19
Q1–2021			
Theil L	0.22407	0.12293	0.20990
Labor rate (%)	68.07	31.93	100
Internal group (%)	71.12	18.30	89.42
Between groups (%)	_	_	10.58
Q2–2021			
Theil L	0.24756	0.12652	0.22255
Labor rate (%)	68.00	32.00	100
Internal group (%)	74.18	17.84	92.02
Between groups (%)	_	_	7.98
Q3– 2021			
Theil L	0.25909	0.13350	0.23281
Labor rate (%)	67.64	32.36	100
Internal group (%)	74.01	18.24	92.26
Between groups (%)	_	_	7.74

Source: Estimation from authors.

4.3. Causes of Income Inequality Within Informal Workers Group in Vietnam

The study uses the Blinder-Oaxaca decomposition method to analyze the differences within the informal workers group through technical expertise (Table 3).

Table 3. Blinder-Oaxaca decomposition results

Differential	**Lnincome**	**Decomposition**	**Lnincome**
Prediction_1	8.674***	Endowments	0.140***
Prediction_2	8.343***	Coefficients	0.197***
Difference	0.330***	Interaction	-0.007*

Note: Number of observations: 168715. _1 = Informal workers with technical expertise; _2 = Informal workers with non-technical expertise. $^{*} = p < 0.1$, $^{**} = p < 0.05$, and $^{***} = p < 0.01$.
Source: Estimation from authors.

Table 3 shows that the logarithm of the income gap between informal workers with technical and non-technical expertise is 0.330. This means that the average income of informal workers with technical expertise is $e^{0.52}=1.68$ times that of informal workers with non-technical expertise. Observable factors (E) have increased income inequality by 14% between informal workers with technical and non-technical expertise. Meanwhile, unobserved factors (C) have increased the inequality by 19.7%, and the group of factors affecting both the observed and unobserved components (I) have reduced the income inequality between these two groups of informal workers (0.7%). Specifically, we assess the difference in this income through the group of individual, labor-employment, and geographic characteristics (Table 4).

Table 4. Income disparity results between informal workers with technical and non-technical expertise in Vietnam

Individual Characteristics		**E**	**C**	**I**	**Total**
Gender *(Reference: Male)*	Female	0.046***	0.009***	-0.003***	0.052
Age group	Age	0.038***	-0.249***	0.028***	-0.183
Marital status *(Reference: Unmarried)*	Married	-0.003***	-0.005**	0.000**	-0.003
	Widowed	-0.004***	-0.007***	0.004***	-0.007
	Divorced	-0.001***	-0.001	0.000	-0.002
	Separated	-0.000	0.000	-0.000	0.000
Labor-employment Characteristics		**E**	**C**	**I**	**Total**
Type of business *(Reference: State)*	Group	0.001***	0.000	-0.000	0.001
	Private	0.068***	-0.006***	-0.013***	0.049
	Household Agriculture, Forestry and Fisheries / Individuals & Individual businesses	-0.08***	-0.069***	0.013***	-0.136
	FDI	0.002***	-0.001**	-0.001**	0.000
Job positions *(Reference: Owner/ Employer)*	Self-employed worker	0.121***	0.068**	-0.018***	0.171
	Family worker	0.02***	0.001**	-0.001**	0.02
	Cooperative members	-0.001***	0.000**	0.001**	-0.000
	Salaried worker	-0.098***	0.003	0.001	-0.094
Geographic Characteristics		**E**	**C**	**I**	**Total**
Areas	Rural areas	0.004***	0.057***	-0.018***	0.079

(Reference: Urban areas)					
_Cons			0.392***		0.392***
Total		0.140***	0.197***	-0.007*	0.330***

Note: * = $p < 0.1$, ** = $p < 0.05$, and *** = $p < 0.01$.

Source: Estimation from authors.

Firstly, the group of individual characteristics decreased income inequality by 14.3% between informal workers with technical and non-technical expertise in Vietnam. Age characteristics reduced income inequality by 18.3% between these two groups of workers because the older the informal workers are, the more their working hours tend to decrease due to factors such as health and mental acuity. Gender characteristics contributed to a 5.2% increase in income inequality between technical and non-technical expertise in Vietnam because, in some informal occupations, the level of technical expertise of informal women workers is lower than that of men. Therefore, women tend to have more vulnerable jobs and lower wages than men in similar conditions (GSO & ILO, 2018). In addition, the marital characteristics reduced this income inequality by 1.2% in the context of COVID-19 in Vietnam.

Secondly, the group of labor-employment characteristics increased by 1.1% income inequality between informal workers with technical and non-technical expertise in Vietnam, in which Household Agriculture, Forestry, and Fisheries and Individuals & Individual businesses decreased this income inequality by 13.6%. In addition, the group of job positions increased income inequality by 7.5% between informal workers with technical and non-technical expertise. The number of self-employed workers increased by 17.1%, while salaried workers decreased by 9.4%. Salaried workers can rely on technical expertise to increase their income, so the higher the technical expertise workers have, the higher the salary they receive. Fields (1990) argued that informal workers with high technical expertise have high incomes, even higher than formal workers, while informal workers at low-level or without technical expertise have a precarious income. This makes the income disparity among

informal workers more clear and similar to the results of Günther and Launov (2012).

Thirdly, geographic characteristics, i.e., urban-rural areas, increased income inequality by 7.9% between informal workers with technical and non-technical expertise. According to GSO (2022), up to 51.9% of informal workers are in agriculture, forestry, and fishery. They don't have technical expertise and must work in vulnerable and unsafe jobs that are not sponsored by legal policies on labor. In contrast, in urban areas, informal workers with professional and technical expertise are concentrated mainly in the service sector with higher income levels. As a result, the income gap between informal workers with technical and non-technical expertise in urban and rural Vietnam is becoming more acute.

5. Conclusion and Policy Implications

This study has not only provided a specific picture of the informal workers' working hours and income in the context of the COVID-19 pandemic but also deeply analyzed the role of informal workers in overall income inequality in Vietnam. The results show that in the face of COVID-19, informal workers suffered a serious reduction in working hours and income. This affected the income gap among the informal workers, leading to an increase in income inequality among this group. In addition, the study also confirms that informal workers are the main cause of income inequality in Vietnam.

In addition, the results from the Blinder-Oaxaca decomposition show that geographic and labor-employment characteristics contributed to increasing income inequality between informal workers with technical expertise and those without technical expertise, while the opposite trend was true for the individual characteristics. The results give us some theoretical and practical implications.

Theoretically, this study enriches the understanding of vulnerable workers and income inequality in the context of great shocks. Many studies

have examined this relationship, but there are still few in-depth analyses of developing countries. In a country with a large number of informal workers, such as Vietnam, this is a necessary study. The study draws conclusions about the informal workers' income reduction in the context of shock through the OLS. Based on previous studies, the Heckman Selection method was used to handle potential biases in the data selection process and draw conclusions about the decrease in income of informal workers during the pandemic. The Theil L index helps us to assess the contribution of informal and formal workers as well as income inequality between these two groups to overall income inequality. Moreover, the causes of income inequality within the informal workers group were also clarified through the Blinder-Oaxaca decomposition method.

Practically, the study analyzed the overall relationship between the COVID-19 pandemic, informal workers, and income inequality instead of looking at these issues individually and independently as in previous studies. The results are an important basis for the government and informal workers in Vietnam, as well as in developing countries to have appropriate awareness and orientation in the context of major shocks such as the COVID-19 pandemic in the future, specifically:

The results indicate that the number of informal workers' working hours and income decreased significantly in the context of COVID-19. The Vietnamese government should concentrate on public investment activities to provide employment and ensure current working hours for informal workers. The government needs to ensure the minimum benefits for informal workers in terms of employment, including protection through labor contracts, participation in voluntary insurance, assurance of employment, working conditions insurance, fairness in wages, protecting workers against infringement and abuse by employers, and other subjects.

The results show that the index of income inequality among informal workers in the first three quarters of 2021 was always higher than that of formal workers in the context of the COVID-19 pandemic. Therefore, the government needs to create policies on subsidies for informal workers with appropriate

regulations so that this group can easily access and improve income in the context of the shock. Moreover, in addition to widening the beneficiaries of the policies, the government needs to work closely with localities to ensure that no informal workers are left out in accessing support resources. At that time, the income of informal workers is still guaranteed in the context of the pandemic. In addition, the government needs to provide decent jobs to ensure that informal workers maintain their jobs, thereby contributing to reducing the wage gap among informal workers and between informal workers and formal workers.

In addition, the group of labor-employment and geographic characteristics increased income inequality between informal workers with technical and non-technical expertise. Therefore, the government needs to promote investment in education and training for informal workers in Vietnam to improve the employment position of this group of workers, increase the number of salaried workers, and, subsequently, reduce income inequality. This not only provides knowledge and skills but also contributes to the development of thinking for workers or those preparing to enter the labor market. It is vital to focus on promoting policies on education, skills training, and qualifications for informal workers, e.g., encouraging workers to participate in human resource training courses and supporting informal workers in training courses. The Vietnamese government needs to design training programs based on workers' practical needs, thereby enabling them to get formal employment with a high degree of protection and a more stable income. In addition, the government should also cooperate with local authorities to come up with policies to reduce poverty, promote labor restructuring toward industrialization in rural areas, and create favorable conditions to attract large enterprises' investment in creating jobs for local workers, especially informal workers. This not only increases the quality of the labor force but also contributes to reducing overall income inequality.

Thus, in addition to the contributions of this research topic, we also recognize some limitations that need to be overcome in the future. Firstly, within the scope of this study, we only approached the number of informal

workers' working hours and income in the context of COVID-19 without considering the aspects of health, public health, and food security in the face of major shocks. Therefore, in subsequent studies, we hope to provide a comprehensive and in-depth analysis of the above aspects of informal workers before the pandemic. In addition, the study only exploited income inequality but did not mention gender inequality and education inequality under the impact of the pandemic. Therefore, we also hope to be able to expand our reach and draw conclusions about multidimensional inequality in Vietnam and other countries with similar contexts.

Acknowledgements

This research is funded by the National Economics University, Hanoi, Vietnam.

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