

# Income Determinants of Women in East Java's Informal Labor Market: Microdata Approach

Wildan Syafitri<sup>1\*</sup>, Bahtiar Fitanto<sup>1</sup>, Axellina Muara Setyanti<sup>1</sup>, Nurul Izza<sup>1</sup>

<sup>1</sup>Universitas Brawijaya, Indonesia

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## ABSTRACT

Women frequently engage in small businesses related to the informal sector and make a significant contribution to the economy but frequently face gender discrimination and poor working conditions. This study aimed to analyze the determinants of female workers' income in the informal sector using microdata from SAKERNAS 2020. This study found several vital conclusions emerge. Firstly, an increase in the number of years of schooling positively influences the likelihood of attaining a decent income. Secondly, age initially positively affects decent income, but it decreases after reaching a certain age, indicating diminishing returns. Marital status plays a significant role, as married women in the informal sector are less likely to achieve decent income. Additionally, rural residence reduces the likelihood of decent income compared to urban living. Lastly, proficiency in internet usage significantly enhances the likelihood of decent income. The research contributes novel insights into the determinants of female workers' income in the informal sector, shedding light on specific factors that influence income levels, offering a valuable resource for policymakers, researchers, and advocates working towards gender equality and improved economic conditions in this sector.

## 1. INTRODUCTION

The dualism of the formal and informal labor markets refers to the division of the labor market into two categories, namely the formal and informal labor markets (Shahid et al., 2020). The formal labor market includes jobs with working conditions regulated by laws, such as minimum wages, health insurance, social security, annual leave, and other labor rights. On the other hand, the informal labor market includes jobs that are not regulated by laws and are often performed by self-employed individuals or those working for small and micro-enterprises (Kesar & Bhattacharya, 2020; Williams et al., 2017).

The formal labor market usually offers more stability and better job security, with higher wages and comprehensive employee benefits. However, the formal labor market tends to be less accessible to many workers due to higher educational requirements, work experience, and specific technical skills (Pisani, 2015). In contrast, the informal labor market offers flexibility and greater job opportunities, with advantages such as flexible working hours and the opportunity to start one's own business. However, the informal labor market also has drawbacks such as lower wages, lack of employee benefits, job insecurity, and difficulties in obtaining credit for business development (Bolli et al., 2019; Nackerdien & Yu, 2019; Rothenberg et al., 2016)

East Java province serves as a major trade link between Western and Eastern Indonesia. Over the past two decades has shown a shift in the economic structure, indicated by a decline in the share of manufacturing and agriculture industries, while the trade sector has experienced a relatively significant increase (Fadlli, 2022). The increasing share of the trade sector is due to the large number of people transitioning from the formal sector to the informal sector following the economic downturn and job layoffs in the 1990s. Looking at the current conditions, the informal sector also absorbs the largest workforce compared to the formal sector. The formal-informal labor market structure in East Java province can be seen in the Table 1.

\*Corresponding author

E-mail addresses: [wildans@ub.ac.id](mailto:wildans@ub.ac.id)

**Table 1.** Population Aged 15 and Over Employed by Main Job Status in 2020

Status Main Job Status	Male	Female	Total
<b>Formal Employment:</b>	<b>4,967,161</b>	<b>2,655,087</b>	<b>7,622,248</b>
Assisted self-employed/employee worker	579,349	165,066	744,415
Labor/Employee	4,387,812	2,490,021	6,877,833
<b>Informal Employment</b>	<b>7,310,347</b>	<b>6,030,372</b>	<b>13,340,719</b>
Assisted self-employed/unpaid family worker	2,434,004	1,315,116	3,749,120
Self-employed	2,006,146	1,671,925	3,678,071
Own-account worker	1,923,784	631,703	2,555,487
Unpaid family worker	946,413	2,411,628	3,358,041
Total	12,277,508	8,685,459	20,962,967

Source: BPS East Java (2023)

The table above shows that the employment structure in East Java is dominated by informal workers. In general, male labor force participation still dominates compared to females; however, it has been identified that the number of workers in the informal sector predominates for both genders. Furthermore, the number of female informal sector workers being about two and a half times that of female formal sector workers. This indicates that the informal sector provides a significantly expansive space for the workforce in East Java to be employed.

Informal sector jobs are generally more flexible in terms of working hours, which can help women manage their work and family responsibilities. The informal labor market generally does not have strict formal education qualifications, although some types of jobs in the informal labor market may require specific skills or certifications. Even though formal education requirements are not the primary qualification in the informal labor market, having a good education can provide individuals with advantages in obtaining better jobs and higher income. Additionally, education can also help individuals develop the skills and abilities needed in the informal labor market and increase their income.

The Discussion about the income of workers in the informal sector is both interesting and important because the income of informal sector workers varies significantly and depends on the type of work they do, the level of skills they possess, location, and other factors such as competition, demand, and economic conditions. Most workers in the informal sector usually do not have fixed wages or clear benefits, and their earnings are often fluctuating or unstable. Some workers may not even earn sufficient income to meet their basic needs and those of their families. This aligns with the subsistence theory, which describes that informal labor market workers tend to work to meet their basic needs and those of their families (Fields, 2004; Gang & Gangopadhyay, 1990). Informal sector employment is often seen as a form of "subsistence" work because of the lack of other alternatives for livelihood. This theory highlights the importance of informal employment as a source of livelihood for those who struggle to find formal employment or live in areas with limited job opportunities.

On the other, there is the theory of labor market dualism, which states that there are two main segments in the labor market: the formal sector and the informal sector (Bremas, 1976; Hohberg & Lay, 2015). Workers in the formal sector have better access to benefits and social protection, while workers in the informal sector tend to be in more vulnerable economic conditions. This theory explains that the imbalance between these two sectors can lead to economic and social disparities in society. Based on the background above, an analysis of the determinants of income for female informal sector workers in East Java will be conducted.

This research aims to analyze the determinants of income for female informal sector workers in East Java. This research contributes to the analysis of the informal labor market, where the informal sector makes a significant contribution to the economy in many countries, and an analysis of the informal labor force can help identify opportunities to improve productivity and income in this sector. Additionally, because informal sector workers are often not protected by laws or social protection programs, an analysis of the informal labor force can help identify the most vulnerable groups and strengthen social protection programs. The research contributes to the understanding of the informal labor market, particularly in the context of East Java. By focusing on female workers in the informal sector, the study sheds light on a segment of the workforce that plays a crucial role in the regional economy. This analysis is essential for policymakers, researchers, and stakeholders seeking a comprehensive understanding of the dynamics within the informal labor market and also serves as a valuable resource for those involved in shaping labor market policies and interventions.

## 2. METHODS

This research adopts a quantitative approach to collect and analyze data objectively and measurably. This approach allows researchers to identify statistically significant factors influencing the income levels of female workers. The data collected encompass various variables such as education, age, training experience, residential region, internet proficiency, and the type of work they engage in. The data used in this study are secondary data sourced from the 2020 National Labor Force Survey (SAKERNAS). The total sample size in this research comprises 5,683 female informal sector workers. The analysis technique employed in this research consists of descriptive analysis in the form of cross-tabulation. Descriptive statistical analysis is used to describe the collected data (Ghozali, 2016). Cross-tabulation analysis is utilized to determine the frequency and percentage of a variable descriptively, making its meaning easily understandable (Tjiptono & Santoso, 2001).

Additionally, this research also employs logistic regression analysis because it aligns with the objective of analyzing the determinants of income for female informal sector workers. The income variable, as an independent variable, is a dummy variable consisting of two categories: income above the Provincial Minimum Wage (*Upah Minimum Provinsi/Ump*) and income below Ump. Although income in the informal sector is not regulated by minimum wage policies, the Ump serves as the basis for measurement because it is determined based on the Cost of Living Standards (*Kebutuhan Hidup Layak/KHL*), which can encompass various factors such as basic living costs, essential needs, environmental conditions, access to basic services like healthcare and education, and the ability to save or spend on non-essential items. Subsequently, the interpretation is carried out by calculating the antilog value of each coefficient, known as the odds ratio, among other things.

$$\text{Odds Ratio Model 1} = \frac{\text{Income } i}{1 - \text{Income } i} \quad (1)$$

Furthermore, with the coefficients obtained from the logistic regression estimation, one can calculate the odds of someone having an income above the Provincial Minimum Wage (Ump) based on the formula below.

$$P_i = \frac{1}{1 + e^{-Y_i}} \quad (2)$$

$$P_i = \frac{1}{1 + e^{-Z_i}} \quad (3)$$

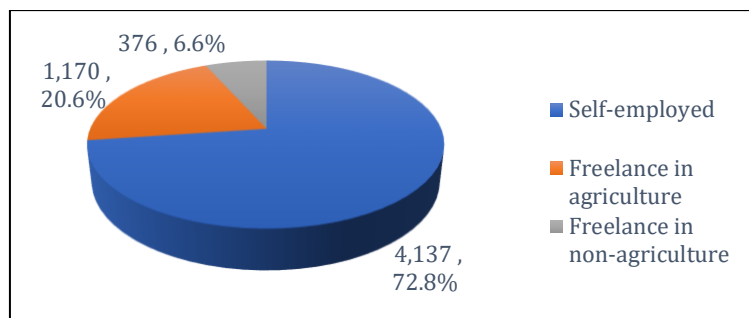
## 3. RESULTS AND DISCUSSIONS

### Overview of Female Workers in the Informal Sector in East Java

Informal labor refers to the economic sector that is irregular, unstructured, and often not regulated by the government. In this sector, work is typically performed without legal protections, formal contracts, social benefits, or job security as commonly found in the formal sector. Informal labor often includes temporary jobs, labor-intensive work, low-wage employment, and jobs outside regular working hours. Women working in the informal sector have specific characteristics that influence their participation in the labor market and their work experiences. The characteristics of informal sector workers in East Java according to SAKERNAS 2020 are as follows:

#### Female Workers Based on Activities in the Informal Sector

A deep understanding of the primary activities of female workers in the informal sector, including self-employment, self-employed in agriculture, and self-employed in non-agricultural sectors, has significant implications for designing economic and social policies that focus on women's economic empowerment and well-being improvement. These main activities depict their participation and economic contributions, which impact several crucial aspects.



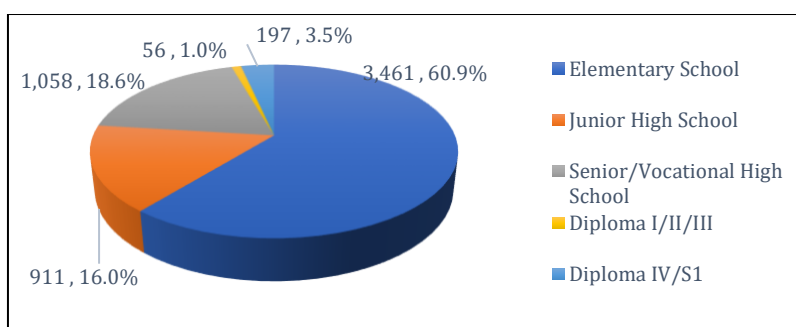
**Figure 1.** Female workers Based on Activities in the Informal Sector in East Java  
Source: SAKERNAS (2020), processed.

Approximately 72.8% of female labor force in East Java falls into this classification. This reflects a high level of entrepreneurship among women in the region. This classification suggests that a significant proportion of women are engaged in managing small businesses or microenterprises, including ventures such as convenience stores, culinary enterprises, and handicrafts. The high percentage underscores the active economic participation of women in East Java, showcasing their role in diverse entrepreneurial activities that contribute to the local economy. These women may be involved in a range of enterprises, demonstrating their resilience and capacity to contribute to the economic landscape through various entrepreneurial endeavors. For many women, this may serve as a solution to generate income and cope with economic uncertainty.

Next, as much as 20.6% of informal female labor force is involved in agricultural work. This underscores the importance of women in agriculture, often serving as the primary source of food for families and communities. They may engage in various agricultural activities such as planting, tending to crops, or livestock farming. These jobs are often seasonal and dependent on weather and soil factors. Furthermore, approximately 6.6% of informal female labor force in East Java is engaged in non-agricultural sector work. These activities encompass various types of work, such as selling goods in local markets, household services, or jobs in other service sectors. While their numbers may be smaller compared to the previous two categories, this sector remains significant as it contributes to diverse economic sectors in the region. Overall, the data above illustrates the diversity of roles and activities of female labor force in the informal sector in East Java. They contribute significantly to the regional economy in various ways, ranging from entrepreneurship to involvement in agriculture and non-agricultural sectors. Understanding their roles and needs in these various sectors is essential in designing policies that support the economic empowerment and well-being improvement of female labor force in East Java.

#### Female Informal Workers Based on Education Level

Understanding the educational composition of the female workforce in the informal sector holds significant implications for designing inclusive and sustainable social and economic development policies. This educational composition provides a profound insight into the social and economic conditions of this group, enabling the design of education and training programs tailored to the needs of women in the informal labor market. By discerning the predominant educational levels, the government and other stakeholders can strategically allocate their resources and efforts to enhance skills and knowledge accordingly. This strategic approach can facilitate improved access to better employment opportunities and higher income prospects for this workforce.



**Figure 2.** Female Informal Workers Based on Education Level in East Java  
Source: SAKERNAS (2020), processed.

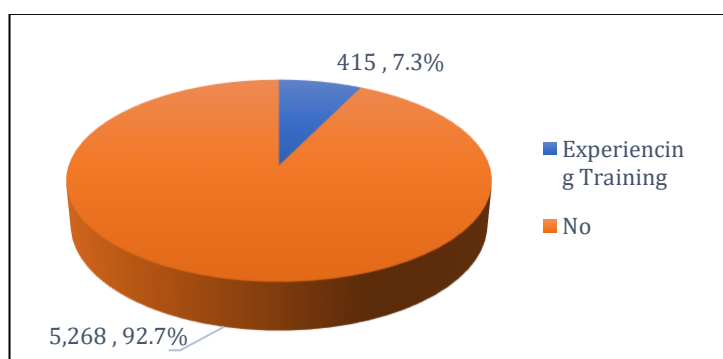
The data shows that the majority of female informal labor force in East Java have low levels of education. This is reflected in the fact that approximately 60.9% of them have only completed primary education (elementary school) as their highest level of education. The prevalence of low educational levels, particularly the completion of only primary education, suggests a potential barrier for these female informal sector workers and at the same time it shows the characteristic of informal workers. This group may face challenges in accessing opportunities for higher-skilled and better-paying jobs, as many formal and higher-paying positions often require a more advanced educational background. Next, around 16% of female informal labor force have completed Junior High School (SMP), which, although still considered a low level of education, represents an improvement compared to primary education. Completing Junior High School can provide them with more basic skills and knowledge, potentially improving their access to slightly better job opportunities.

Approximately 18.6% of female informal labor force have completed Senior High School (SMA) or Vocational High School (SMK). This can be considered a middle-level of education, which can provide them with more specific skills and deeper knowledge. However, there are still challenges in securing jobs that match their education level, especially in the informal sector. Only about 4.5% of female informal labor force have higher education degrees, such as diplomas or bachelor's degrees. Higher education degrees are generally associated with more skilled and higher-paying jobs, but in the informal sector, access to such jobs may be limited.

Higher levels of education typically open doors to greater social mobility. Skills and knowledge gained through education can help individuals move into better jobs and earn higher incomes. Therefore, improving access to and the quality of education can contribute to the economic and social well-being of female informal labor force in East Java. By understanding the educational composition of female informal labor force, the government and other stakeholders can design more suitable education and training programs to enhance their skills and job opportunities, with the hope of improving their standard of living and reducing inequality.

#### Female Informal Workers Based on Training Experience

Understanding whether female informal sector workers have experience in undergoing training, courses, or obtaining specific skill certifications is crucial because it directly impacts their readiness to face the ever-evolving job market. Possessing training experience or certification in specific skills can also pave the way for access to better employment opportunities and higher income. Certain occupations, particularly within the formal sector, often require specific qualifications or certifications, and an understanding of these certification levels can assist women in the informal workforce in pursuing improved job prospects. This knowledge enables them to navigate and pursue opportunities in employment that may demand specialized qualifications or certifications, thus enhancing their prospects for securing better-paying positions.



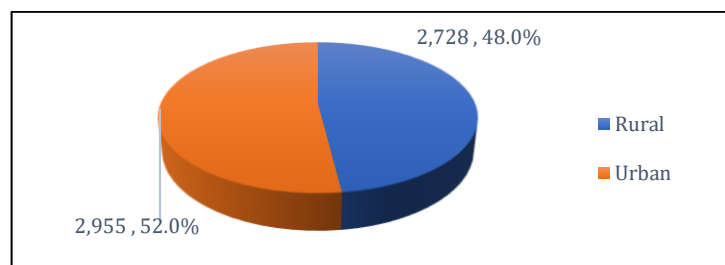
**Figure 3.** Female Informal Workers Based on Training Experience in East Java  
 Source: SAKERNAS (2020), processed.

Based on training experience, the majority of the workforce reported never having participated in training programs, certifications, or specific skill courses, while only 7.3% have training experience. Data indicating that as many as 92.7% of the workforce have never participated in training programs, certifications, or skill courses reflects significant challenges in their skill development and economic mobility. Most female informal sector workers appear to have limited or unskilled skills in the context of their work. Without training or certification, they may face difficulties competing in an increasingly competitive job market.

The presence of only 7.3% of workers with training experience indicates that their access to training and skill education is still limited. This could be due to various factors such as the availability of training programs, costs, or awareness of available training opportunities. Without relevant skills or certifications, female informal sector workers may be limited to lower-paying and less stable jobs. They may also be less able to pursue higher-paying jobs or more promising entrepreneurial opportunities. By improving access to training and skill certifications, female informal sector workers have a broader opportunity to enhance their skills, seek better employment, or even start their own businesses. This can contribute to increasing their income and well-being.

#### Female Informal Workers Based on Rural-Urban Region

Understanding the regional activities of female informal sector workers, whether in rural or urban areas, has significant implications in designing sustainable and inclusive development policies. Economic activities associated with the informal sector can vary significantly between rural and urban settings. In rural areas, dominant activities may include agriculture, horticulture, and craftsmanship, whereas urban areas may witness a prevalence of micro-enterprises, household services, or occupations related to trade and services. Understanding these distinctions is crucial for designing programs and policies that align with local contexts and address the specific needs of the female workforce. This comprehension facilitates the development of initiatives tailored to the unique economic landscapes of both rural and urban environments, contributing to more effective and contextually relevant interventions for women in the workforce.



**Figure 4.** Female Informal Workers Based on Residential Region in East Java

Source: SAKERNAS (2020), processed.

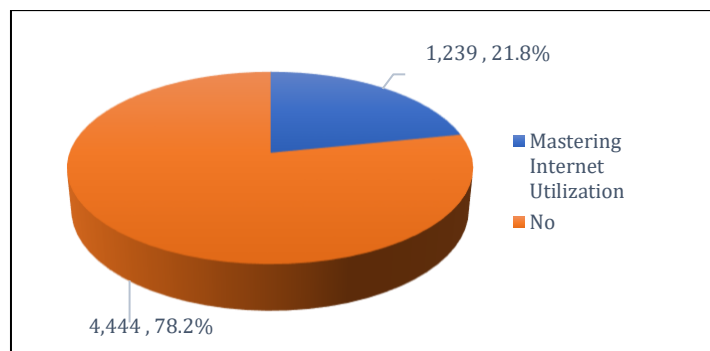
When classified based on their residential regions, 52% of female informal workers live in urban areas, while the remaining 48% reside in rural areas in East Java. With more female informal workers living in urban areas, this reflects an increasing trend of urbanization, where many people migrate to cities in search of better economic opportunities and services. Urban areas offer better access to formal employment, infrastructure, education, and healthcare services. However, urbanization can also bring challenges, such as higher living costs and greater social inequalities. Therefore, it is important to ensure that women in urban areas have equal access to decent jobs and basic services.

Conversely, 48% of female informal workers live in rural areas. This indicates that many women in rural areas still rely on livelihoods related to agriculture, plantations, and other agricultural sectors. Rural areas often face their own challenges, such as limited access to quality healthcare and education services, as well as a lack of economic diversification. Therefore, initiatives should be developed to support women in rural areas, such as sustainable farming programs, skill training, and better access to markets. Ultimately, the differences in the geographical distribution of female informal workers between urban and rural areas create different challenges and opportunities. Policymakers should consider these differences when designing programs aimed at improving the well-being and economic mobility of women. By doing so, it will be possible to address geographical inequalities and create more equitable opportunities in various regions.

#### Female Informal Workers Based on Internet Usage Skills

Understanding the ability of female informal sector workers to use the internet has significant implications in the context of the growing digital economy. Proficiency in utilizing the internet can unlock opportunities for female workers in the informal sector to participate in various rapidly growing economic sectors, including e-commerce, freelance work, and online services. This capability enables them to broaden employment prospects and contribute to the increasingly significant digital economy within the global economic landscape. Such understanding is pivotal in assessing the economic and social impact of digital inclusion on female workers in the informal sector.





**Figure 5.** Female Informal Workers Based on Internet Usage Skills in East Java  
Source: SAKERNAS (2020), processed.

Accounting for 78.2%, have not yet mastered internet usage, while only 21.8% have internet usage skills. This reflects a level of limitation in access and digital skills among them. Most female informal workers who have not mastered internet usage may face challenges in terms of physical access to internet infrastructure, such as the availability of affordable internet connections in their areas. This may be particularly problematic in rural or remote regions.

This data also highlights a low level of digital skills among female informal workers. They may not be familiar with using computers or mobile devices to access the internet, or they may not be accustomed to online applications and services. However, having skills in using the internet can open up new opportunities, such as remote work, online marketing, or digital business development. Therefore, workers who master the internet may be better equipped to overcome economic challenges and leverage existing opportunities. This data underscores the need for efforts to improve digital literacy among female informal workers. This includes training on the use of technology devices and internet access, as well as understanding online security and the benefits that can be gained through digital skills.

**The Estimation of Income Determinants for Female workers in the Informal Sector in East Java**

Understanding the determinants of income for female informal sector workers has significant implications in designing effective policies to improve their economic well-being. Income determinants refer to the factors that influence the amount of income received by female workers in the informal sector. By understanding what affects the income of female workers, governments and non-governmental organizations can make more effective policy decisions. For example, if low income is influenced by a lack of access to skill training, training programs can be designed and implemented to enhance the skills and earnings of workers. Furthermore, a good understanding of income determinants can help female informal sector workers identify steps they can take to increase their own income. This includes efforts to improve skills, access training, and run more productive businesses. By understanding the income determinants of female workers in the informal sector, we can develop more accurate and sustainable strategies to support income improvement and well-being, especially in the informal sector. This is not only important for these individuals but also contributes to broader economic and social development in society.

**Table 2.** Estimation Results of Income Determinants for Female workers in the Informal Sector in East Java

Variable	Coefficient	Odds Ratio	Std. Error	z	P> z
Years of Education	0.117	1.124	0.016	7.04	0.000*
Training	-0.109	0.896	0.142	-0.77	0.443
Age	0.150	1.162	0.020	7.45	0.000*
Age Squared	-0.001	0.998	0.000	-6.88	0.000*
Marital Status	-0.188	0.828	0.092	-2.03	0.042*
Household Size	0.021	1.021	0.029	0.72	0.469
Rural Area	-0.197	0.821	0.082	-2.38	0.018*
Internet Access	0.514	1.672	0.106	4.85	0.000*
Constant	-6.419	0.001	0.538	-11.92	0.000
Observations	5,683				
LR chi <sup>2</sup> (13)	203.71				
Prob>chi <sup>2</sup>	0.000				
Pseudo R <sup>2</sup>	0.043				

Note: \*significant at alpha=0.05

Source: Sakernas (2020), processed"

Based on the above estimation results, it is known that years of education, worker's age, marital status, residing in rural areas, and internet access significantly affect the likelihood of decent income for female informal sector workers in East Java. Firstly, the logistic regression estimation results show that years of education have a significant positive impact on the income of female informal sector workers, with an odds ratio of 1.124. This can be interpreted as those who have longer years of education are 1.124 times more likely to have a decent income compared to those with shorter years of education.

Next, the variable "age" also significantly influences the tendency for decent income among female informal sector workers in East Java, with a positive impact and an odds ratio of 0.162. This means that as the age of the worker increases, the likelihood of earning a decent income increases by a factor of 0.162. However, it will decrease after a certain age by a factor of 0.998, as indicated by the odds ratio value for the variable "Age Squared." This suggests the presence of diminishing returns on income as the worker's age increases. Regarding marital status, the estimation results show a significant negative impact with an odds ratio of 0.828. It can be interpreted that married female informal sector workers have a 0.828 smaller likelihood of earning a decent income.

In the variable "rural area," a significant negative influence is found on the tendency for income among female informal sector workers. The odds ratio of 0.821 indicates that female informal sector workers residing in rural areas have a 0.821 lower likelihood of earning a decent income compared to those living in urban areas. Lastly, in the variable "internet access," a significant positive impact is observed with an odds ratio of 1.672. This means that female informal sector workers who have internet usage skills are 1.672 times more likely to have a decent income compared to those who do not have internet usage skills.

#### Years of Education and Income of Female Informal Sector Workers

The logistic regression estimation results, which show a significant positive relationship between years of education and the income of female informal sector workers, have important implications for understanding the factors influencing their economic well-being. The odds ratio of 1.124 indicates that for each additional unit of education, such as completing a certain level of education or adding years of education, the likelihood of having a decent income increases by 1.124 times compared to those with shorter years of education.

The possibility of female informal sector workers having higher income associated with longer years of education can be attributed to several factors. Firstly, higher levels of education often provide access to jobs that require specialized skills and knowledge, which tend to pay higher wages. For example, jobs in the formal sector that require higher levels of education typically have better salaries. Therefore, longer years of education can enhance their chances of obtaining more lucrative employment. Additionally, education can also improve a person's ability to adapt to changes in the economy and technology. Individuals with a strong educational background may be more inclined to seize opportunities in the digital economy, such as online jobs or technology-based businesses. The relevance of this research is that education plays a crucial role in enhancing the economic well-being of female informal sector workers. This aligns with many studies that show a positive relationship between education and income, especially in the context of both formal and informal sectors. In this context, a study by Psacharopoulos & Patrinos (2004) demonstrated the positive and significant impact of education on workers' income. They evaluated the "Returns to Investment in Education" and showed that longer years of schooling correlate with higher income.

#### Age and Income of Female Informal Sector Workers

The variable "Age" shows a significant positive influence on the likelihood of decent income among female informal sector workers in East Java, with an odds ratio of 0.162. This suggests that as the age of the worker increases, the likelihood of earning a decent income also increases. However, it was also found that the likelihood of earning a decent income decreases after a certain age, by a factor of 0.998, as indicated by the odds ratio for the variable "Age Squared." This finding indicates the presence of diminishing returns on income as the worker's age increases.

In the context of increasing income, Becker (2009), in his work "Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education," formulated the human capital theory, emphasizing the relationship between education, work experience, and income. In this context, the progression of age is often associated with the accumulation of experience and knowledge that can enhance income potential. However, the possibility of a decline in income due to age may also arise due to various factors. As individuals age, some workers may experience a decline in physical productivity, which can affect their ability to perform specific tasks with the same efficiency as when they were younger.

The relevance of these findings is that age and income are linked, and they reflect the accumulation of work experience and skills that can increase income potential. However, the possibility of decreasing



income with age can also be due to several factors. As individuals age, some may experience a decline in physical productivity, which can affect their ability to perform certain tasks as efficiently as when they were younger. Furthermore, some workers may choose to reduce their level of employment or enter lighter work after reaching a certain age. This can lead to a decrease in income, especially if the lighter work pays less. As people age, they may also change their career direction, which can affect their income. For example, they may transition to self-employment or entrepreneurship, which can result in income fluctuations.

#### Marital Status and Income of Female Informal Sector Workers

Female informal sector workers who are married have a significantly lower likelihood, by a factor of 0.828, of earning a decent income compared to those who are not married. In other words, unmarried or non-married workers have a higher likelihood of earning a decent income in the context of the informal sector. This condition can be attributed to various factors related to individual and family circumstances. For example, married female workers may have additional family responsibilities, such as caring for children or other family members (Olu-Owolabi et al., 2020). This can hinder them from seeking or engaging in jobs with longer working hours or more flexible work arrangements that could potentially lead to higher income. Married female workers may also have limited mobility, especially if they have to take care of children or manage household chores (Moussié & Alfes, 2018). This can affect their ability to seek employment outside the home or work longer hours. Social and cultural factors in certain societies can influence the roles and expectations of married female workers. Some cultures may encourage married women to focus on domestic roles rather than pursuing a career.

#### Rural Area and Income of Female Informal Sector Workers

The logistic regression estimation results showing the negative and significant impact of the rural area variable on the income tendency of female informal sector workers have significant implications for understanding economic inequality between rural and urban areas. The odds ratio value of 0.821 indicates that female informal sector workers residing in rural areas have a 0.821 lower likelihood of earning a decent income compared to those living in urban areas. Rural areas often have limited access to high-quality economic opportunities (Cattaneo et al., 2022), especially in terms of formal employment or higher-paying jobs (Huu Thu et al., 2021). This can limit job options for female workers in rural areas and affect their income. Rural areas may also have underdeveloped infrastructure and limited social services, such as limited access to higher education or skills training. This can impact the qualifications of female workers for higher-paying jobs. Technological advancements and internet connectivity are often more limited in rural areas (Freeman et al., 2016). This can hinder rural female workers' access to online job opportunities or digital-based businesses that could potentially increase their income.

#### Internet Proficiency and Income of Female Informal Sector Workers

The logistic regression estimation results showing the significant positive impact of internet proficiency on the income tendency of female informal sector workers have highly relevant implications in the current digital era. With an odds ratio of 1.672, this indicates that female informal sector workers who have internet usage skills. The rationale behind these findings lies in the fact that internet mastery can broaden female workers' access to various economic opportunities. The internet opens doors to online employment, e-commerce, or other opportunities that enable them to generate additional income or even establish their own businesses. With access to online platforms, female workers can sell their products or services, seek freelance work, or engage in online training to enhance their skills. This enhances their prospects for higher income.

Furthermore, internet mastery enables female workers to explore broader markets and opportunities. They can seek potential customers or clients beyond their local region, reducing the geographical limitations that may exist in the informal sector (Si & Li, 2023). Additionally, the internet provides access to information about market trends, prices, and demand, aiding female workers in making better business decisions. In other words, the internet helps them operate more efficiently and effectively in achieving better income. Lastly, internet mastery also influences the enhancement of digital skills among female workers, opening doors to more technical and higher-paying jobs. In an increasingly digitized world, possessing information technology skills becomes more crucial. Female workers proficient in the internet may be more inclined to pursue additional technical training or seek employment in sectors more closely related to technology. This can significantly boost their income.

#### 4. CONCLUSIONS AND RECOMMENDATIONS

Based on the discussion of the research findings, several important points can be concluded. First, an increase in the number of years of schooling has a positive impact on the likelihood of having a decent income. The research results indicate that each one-unit increase in years of schooling, such as completing a specific level of education or adding years of education, increases the likelihood of having a decent income by a factor of 1.124. Second, age also has an initially positive effect on the likelihood of decent income. However, after reaching a certain age, the likelihood of having decent income may start to decrease. The odds ratio for the age squared variable indicates the presence of diminishing returns on income. On the other hand, marital status has a significant influence in this study. Women working in the informal sector who are married have a lower likelihood of obtaining decent income, with an odds ratio of 0.828. Furthermore, the place of residence also has a significant impact. Women working in the informal sector who reside in rural areas have a lower likelihood of earning a decent income, with an odds ratio of 0.821 compared to those living in urban areas. Moreover, internet proficiency has a significant positive impact on the likelihood of achieving decent income. Women working in the informal sector who are proficient in using the internet have a higher likelihood of earning a decent income, with an odds ratio of 1.672. The research findings and conclusions suggest several actionable recommendations to enhance the income of women working in the informal sector. Firstly, there is a need for the establishment of Skill-Based Education and Training Programs. The government and relevant organizations should initiate accessible training programs, focusing on practical skills such as digital proficiency, entrepreneurship, and market-relevant job skills. Secondly, it's essential to provide education and skill assistance for older workers. Empowerment programs should cater to older female workers, offering advanced education and age-appropriate skill training to help them sustain decent incomes. Special support, including access to business capital and marketing assistance, can be extended by the government. Additionally, policies should be designed to support married female workers by providing affordable and flexible childcare facilities, enabling them to balance work and achieve better income. Infrastructure and Rural Services Development is crucial to reduce geographical inequality. Investments in rural areas, improving access to education, healthcare, transportation, and information technology, are vital steps. Furthermore, the establishment of Information and Internet Access Centers, especially in rural areas, can greatly benefit women in the informal sector. These centers would provide access to market information, online job opportunities, and valuable online resources, contributing to increased income opportunities.

#### 5. REFERENCES

- Becker, G. S. (2009). Human capital revisited. In *Human capital: A theoretical and empirical analysis with special reference to education, third edition* (pp. 15–28). The University of Chicago Press.
- Bolli, T., Parajuli, M. N., & Renold, U. (2019). Changes in the Relationship Between Formal Education and Formal Employment Sector in Nepal Between 1995 and 2014. *Journal of Education and Research*, 9(2), 49–73. <https://doi.org/10.3126/jer.v9i2.30462>
- Breman, J. (1976). A dualistic labour system? A critique of the 'informal sector' concept: I: The informal sector. *Economic and Political Weekly*, 1870–1876.
- Cattaneo, A., Adukia, A., Brown, D. L., Christiaensen, L., Evans, D. K., Haakenstad, A., McMenomy, T., Partridge, M., Vaz, S., & Weiss, D. J. (2022). Economic and social development along the urban–rural continuum: New opportunities to inform policy. *World Development*, 157, 105941. <https://doi.org/10.1016/j.worlddev.2022.105941>
- Fadlli, M. D. (2022). The Role of East Java as A Trade Hub for Eastern Indonesia. *East Java Economic Journal*, 6(1), 95–110. <https://doi.org/10.53572/ejavsec.v6i1.80>
- Fields, G. S. (2004). Dualism in the labor market: A perspective on the Lewis model after half A century. *Manchester School*, 72(6), 724–735. <https://doi.org/10.1111/j.1467-9957.2004.00432.x>
- Freeman, J., Park, S., Middleton, C., & Allen, M. (2016). The Importance of Broadband for Socio-Economic Development: A Perspective from Rural Australia. *Australasian Journal of Information Systems*, 20, 1–18. <https://doi.org/10.3127/AJIS.V20I0.1192>
- Gang, I. N., & Gangopadhyay, S. (1990). A Model of the Informal Sector in Development. *Journal of Economic Studies*, 17(5). <https://doi.org/10.1108/01443589010138364>
- Ghozali, I. (2016). *Aplikasi Analisis multivariete dengan program IBM SPSS 23 (Edisi 8)*. Badan Penerbit Universitas Diponegoro.
- Hohberg, M., & Lay, J. (2015). The impact of minimum wages on informal and formal labor market outcomes: evidence from Indonesia. *IZA Journal of Labor and Development*, 4(1). <https://doi.org/10.1186/s40175-015-0036-4>
- Huu Thu, N., Bao Duong, P., & Huu Tho, N. (2021). Filling the voids left by the formal sector: informal

- borrowings by poor households in northern mountainous Vietnam. *Agricultural Finance Review*, 81(1), 94–113. <https://doi.org/10.1108/AFR-12-2019-0134>
- Kesar, S., & Bhattacharya, S. (2020). Dualism and Structural Transformation: The Informal Manufacturing Sector in India. *European Journal of Development Research*, 32(3), 560–586. <https://doi.org/10.1057/s41287-019-00228-0>
- Moussié, R., & Alfors, L. (2018). Women informal workers demand child care: Shifting narratives on women's economic empowerment in Africa. *Agenda*, 32(1), 119–131. <https://doi.org/10.1080/10130950.2018.1427690>
- Nackerdien, F., & Yu, D. (2019). A panel data analysis of the formal-informal sector labour market linkages in South Africa. *Development Southern Africa*, 36(3), 329–350. <https://doi.org/10.1080/0376835X.2018.1487830>
- Olu-Owolabi, F. E., Amoo, E., Oni, S., Oyeyemi, A., & Adejumo, G. (2020). Female-dominated informal labour sector and family (in) stability: The interface between reproduction and production. *Cogent Arts and Humanities*, 7(1). <https://doi.org/10.1080/23311983.2020.1788878>
- Psacharopoulos, G., & Patrinos, H. A. (2004). Returns to investment in education: A further update. *Education Economics*, 12(2), 111–134. <https://doi.org/10.1080/0964529042000239140>
- Rothenberg, A. D., Gaduh, A., Burger, N. E., Chazali, C., Tjandraningsih, I., Radikun, R., Sutera, C., & Weiland, S. (2016). Rethinking Indonesia's Informal Sector. *World Development*, 80, 96–113. <https://doi.org/10.1016/j.worlddev.2015.11.005>
- Shahid, M. S., Williams, C. C., & Martinez, A. (2020). Beyond the formal/informal enterprise dualism: Explaining the level of (in)formality of entrepreneurs. *International Journal of Entrepreneurship and Innovation*, 21(3), 191–205. <https://doi.org/10.1177/1465750319896928>
- Si, X., & Li, M. (2023). Impact of the internet use on informal workers' wages: Evidence from China. *PLoS ONE*, 18(5 May), 1–19. <https://doi.org/10.1371/journal.pone.0285973>
- Tjiptono, F., Santoso, S. (2001). *Riset Pemasaran: Konsep Dalam Aplikasi SPSS*. PT Elex Media Computindo.
- Williams, C. C., Horodnic, I. A., & Windebank, J. (2017). Evaluating the internal dualism of the informal sector: evidence from the European Union. *Journal of Economic Studies*, 44(4), 605–616. <https://doi.org/10.1108/JES-07-2016-0144>