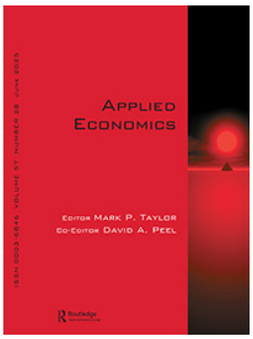

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Unpaid family workers and poverty reduction: a macro perspective

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ABSTRACT

While the significance of unpaid family workers (unpaid workers) to the social fabric of family-based economic activities is well acknowledged, their role in mitigating poverty at the macro level has received less attention. Achieving sustainable and inclusive growth that aligns with Sustainable Development Goals (SDGs) requires understanding their role in poverty reduction. The study examines the role of unpaid workers on poverty dynamics using macro-level data from 64 developing countries covering the period 1990–2021. While poverty incidence, depth and severity are measured using revised thresholds of $2.15 and $3.65 per day, unpaid workers are disaggregated by gender. Findings based on dynamic panel data analysis suggest that while unpaid workers reduce poverty, such effects are modest, nuanced and gender-specific. These findings gain significance in light of developing countries' efforts to achieve SDG 1 (poverty reduction) and SDG 8 (decent work and economic growth) and highlight the need for targeted policy interventions to value and support these workers.

KEYWORDS
Unpaid work; poverty; developing countries

SUSTAINABLE DEVELOPMENT GOALS
SDG 1: No poverty; SDG 8: Decent work and economic growth

JEL CLASSIFICATION
E24; I32; J46

I. Introduction

Within the context of Sustainable Development Goals (SDGs), the endeavour to eradicate poverty in its entirety and everywhere has been accorded paramount importance (SDG 1)[1] (United Nations 2022; World Bank 2022). The need for assigning such paramount importance is because poverty is intrinsically linked to improving healthcare (SDG 3) and education (SDG 4), fostering gender equality (SDG 5), and facilitating sustainable economic growth (SDG 8), ultimately resulting in a society that is more equitable and prosperous (SDG 10) (United Nations 2018). In 2021, approximately 670 million people lived in extreme poverty worldwide, an increase of 70 million over pre-pandemic levels, with the majority living in developing countries (United Nations 2023). Despite several policy initiatives, poverty's persistence in developing countries highlights its complexity.

International Classification of Status in Employment defines unpaid or contributing family workers (hereafter unpaid workers) as those who hold 'self-employment jobs' as own-account workers in a market-oriented establishment operated by a related person living in the same household (Frosch and Gardner 2022; ILO 2018). These workers are a specific group of self-employed workers whose vital role is supporting family-based economic activities, thus making them an integral and indispensable part of the informal workforce. Although compensation may be provided indirectly through family income, these workers do not receive explicit monetary compensation for their contributions. They also lack fundamental elements of a decent work framework, including formal employment contracts, social protection coverage, and recognized worker representation, rendering them the most vulnerable workers. Unlike paid informal workers who receive payment directly regardless of their informal status, unpaid workers suffer from the double vulnerability of being unpaid and unprotected (Frosch and Gardner 2022; ILO 2018).

Stylised facts on unpaid workers in developing countries

Globally, the share of unpaid workers in 2021 was only 9.94 per cent, down from 18.54 per cent in

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[1]SDG 1 calls for an end to poverty in all its forms by 2030 (United Nations 2018).
Supplemental data for this article can be accessed online at https://doi.org/10.1080/00036846.2025.2516159

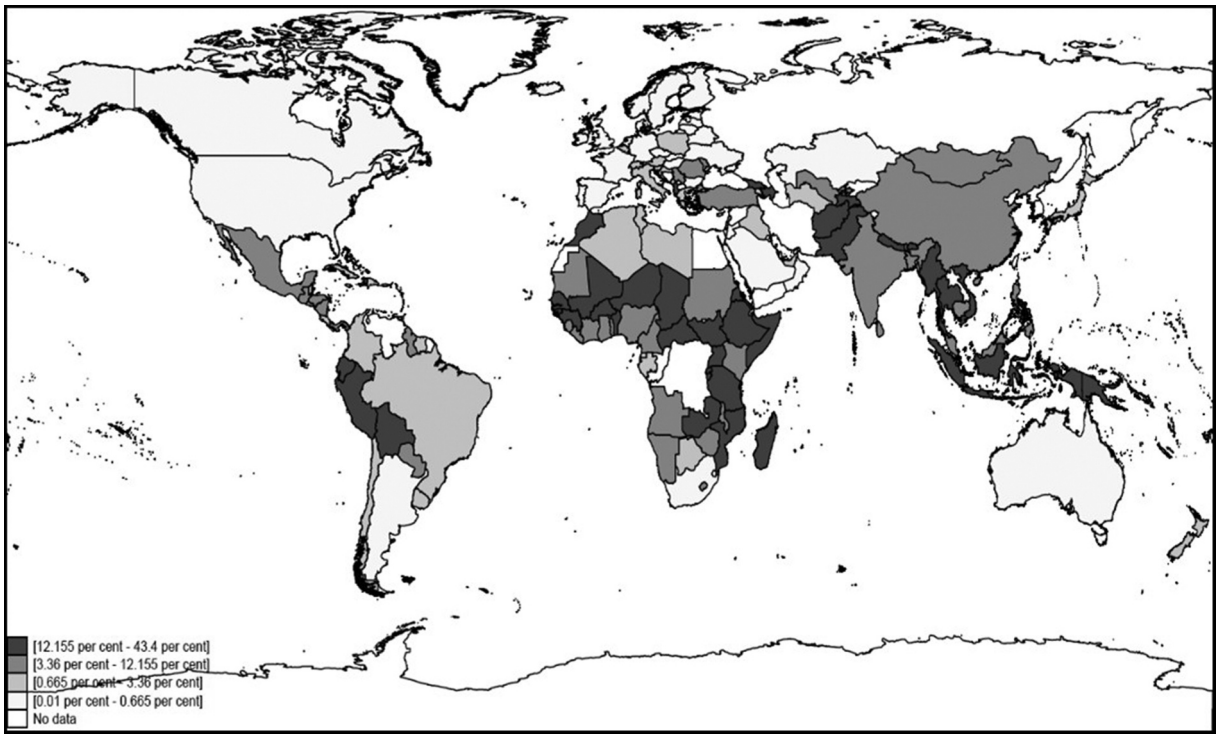

Figure 1. Share of unpaid workers in total employment around the globe in 2021. Source: Own estimates using data from World Development Indicators.

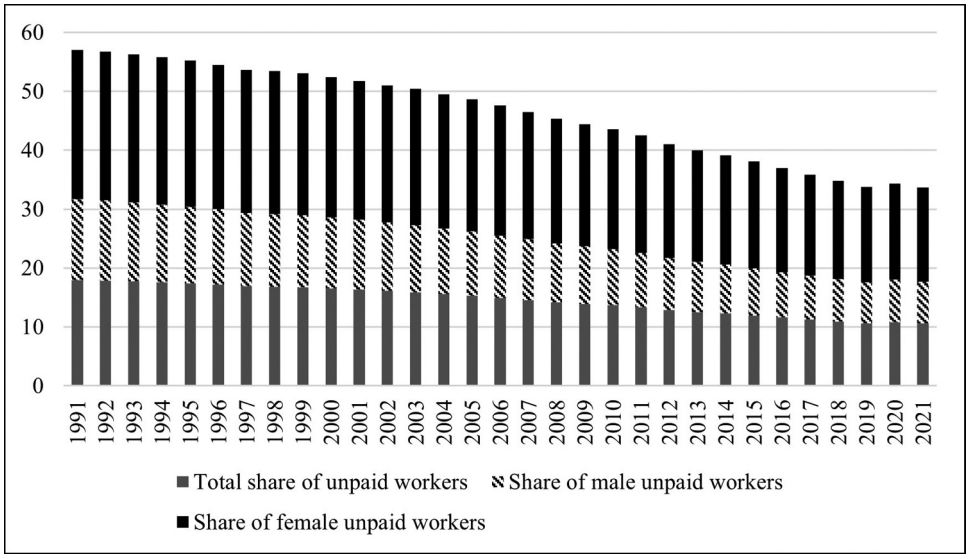

Figure 2. Share of unpaid workers across developing countries. Source: Own estimates using data from World Development Indicators. Although there is a decline in the share of unpaid workers in total employment since 1991, female unpaid workers still account for 16 per cent of total female employment.

1991. Nevertheless, these workers' share remains high in developing countries (see Figures 1 and 2). As of 2021, unpaid workers comprised less than 1 per cent of the labour force in developed countries. The comparable figure for developing countries is 10.53 per cent, with a significant gender disparity of 6.99 unpaid male workers compared with 15.98 unpaid female workers. Regionally, sub-Saharan Africa has the highest proportion of unpaid workers, with 12.58 per cent of

employed men and 29.21 per cent of employed women working unpaid. The South Asian region follows this suit, with 8.54 per cent of employed men and 34.57 per cent of employed women as unpaid workers, respectively. In the other regions, there is a noticeable gender gap among these workers (see Figure 3).

Constituting a considerable segment of the developing country's workforce (see Figures 1 and 2), often widespread in the rural areas, these workers play an essential role in the poverty dynamics of developing countries. While most working poor are employed as unpaid workers, most remain susceptible to poverty (Fields 2019). Kapsos and Bourmpoula (2013) observed that these workers represent an increasingly large proportion of extreme and moderate working poor in developing countries relative to wage employees. Consequently, unpaid workers are intrinsically entwined with the issue of poverty. Without understanding this intrinsic connection, poverty alleviation efforts remain ineffective.

Two interrelated dimensions substantiate the study's focus on developing countries. First, developing countries host the majority of the world's poor, and poverty is deeply entrenched. Assuring equitable global development requires a focus on poverty in these countries. Second, despite accounting for a substantial share of the informal workforce in developing countries, the contribution of unpaid workers to poverty reduction is largely overlooked. Considering the indispensable role of these workers in maintaining the social fabric of family-based economic activities, such oversight has implications for achieving SDGs 1 and 8. Recognizing their role in mitigating poverty is also vital for unlocking the economic potential of these workers and developing targeted policies and interventions to promote a more sustainable and inclusive society. As such, this study focuses on the role of unpaid workers in mitigating poverty in developing countries. In doing so, it contributes to two distinct streams of scholarly literature – development and labour economics.

Contributions to the literature

Several studies within development economics at a macro level have examined the role of labour and non-labour market factors on poverty dynamics (Balasubramanian, Burchi, and Malerba 2023; Britz et al. 2022; Fields 2019; Ravallion 1995; Ravallion and Chen 1997; Rutkowski 2015; Yerrabati 2022, 2023). Within this line of literature, several studies have examined the impact of informal sector engagement

Figure 3. Share of unpaid workers in total employment in 2021. Source: Own estimates using data from World Development Indicators. Regionally, as of 2021, sub-Saharan Africa had the highest share of unpaid workers in total employment. The gender disparity remained highest in South Asia, with more women than men remaining as unpaid workers.

on poverty dynamics, contributing to an in-depth understanding of the intricate relationship between informal labour markers and poverty (Fields 2019; Rutkowski 2015; Yerrabati 2022, 2023). Of particular interest are studies by Fields (2019) and (Yerrabati 2022, 2023) that have examined the role of self-employment and vulnerable employment in poverty dynamics. Nonetheless, unpaid workers, who constitute a subset of these categories of workers, received insufficient attention. This lack of explicit recognition perpetuates systematic inequalities and hinders inclusive development and the elimination of poverty, warranting careful consideration in research and policy formulation.

Within labour economics, there is also a growing body of evidence that examines the contribution of these workers to various aspects of economic well-being and social development. It should be noted, however, that many of these studies are carried out at the micro level, with particular attention given to the microeconomic dynamics of poverty (Alonso et al. 2019; Charmes 2019; Chen, Sebstad, and O'Connell 1999; Swiebel 1999). Consequently, these studies lack sufficient insights into how unpaid workers influence poverty dynamics at the macro level. A nation's economic health and poverty combat ability cannot be fully understood without recognizing unpaid workers' role at a macro level. Consequently, this study fills this gap by considering the broader economic impact of unpaid workers.

Theoretical underpinnings

Drawing on Vickery (1977) 's fundamental work on time as a central resource for household welfare, this study identifies two causal mechanisms for unpaid workers to affect poverty – income generation and cost reduction.

The income generation effect occurs when unpaid workers increase the income of the households in which they are employed, such as farmers or self-employed activities (Frosch and Gardner 2022). In rural areas, unpaid workers often support related households in crop cultivation and livestock care, working longer hours and increasing household income. In urban areas, they support informal sector activities carried out by their households, including street vending and other home-based businesses, by engaging with customers and fostering relationships that improve household income (see also Barrett, Reardon, and Webb 2001; Janvry and Sadoulet 2001).

The cost reduction effect operates when unpaid workers invest their time supporting self-employed workers' economic activities, which would otherwise require cost outlays. By dedicating their time to activities such as tending the household farm or managing the vending business, unpaid workers eliminate the need to hire external workers, reducing direct labour costs. This cost reduction results in a financial buffer that allows households to escape poverty (Ferrant, Pesando, and Nowacka 2014; Muriithi, Mutegi, and Mwabu 2020). Although unpaid workers contribute to poverty reduction, we hypothesize that such effects will be modest, differ by how poverty is measured and vary by gender.

Unpaid workers are likely to have a modest impact on reducing poverty due to their survival-oriented nature and financial constraints. First, drawing from Chayanov (1966)'s theory of peasant economy, unpaid workers are typically employed to support associated households operating at subsistence levels, with household survival as the primary objective rather than maximizing profits. Second, drawing from Banerjee and Newman (1993), even if unpaid workers desire to contribute more, the inherent constraints the self-employed family members face will limit how much they can contribute to poverty reduction, regardless of labour intensity. Consequently, even if unpaid workers contribute to poverty reduction by generating additional income and reducing costs, their ability to lift households significantly above poverty remains constrained.

We also argue that the magnitude of the effects will vary depending on how we measure and define poverty. Based on the revised international poverty lines set by the World Bank ($2.15 and $3.65 a day) and Foster, Greer, and Thorbecke (1984)'s conceptualization of poverty, it is likely that the poorest of the poor, i.e. those experiencing poverty severity and falling below the extreme poverty threshold, will experience the greatest impact. This is because, for those households facing the most acute deprivation, any improvements in income or costs, even

modest, can be crucial for fulfilling their basic needs. This theoretical reasoning resonates with Banerjee and Duflo (2011), who note that even a small change in income can significantly impact the lives of the poor.

Finally, following Becker (1965)'s theory of household time allocation and Sen (1990)'s cooperative conflict model, we argue that the poverty reduction effects will be gender-specific, with males having larger effects than females. Becker (1965)'s theory suggests that sociocultural norms and gender roles lead to women's time being divided between productive and reproductive responsibilities. The latter's burden, including childcare, caregiving and household management, is disproportionately borne by women in developing countries, constraining their ability to support self-employed family members. This, combined with Sen (1990) 's model, indicates that despite women's efforts to assist related household workers, their limited bargaining power and inaccessibility to resources limit their capacity to engage in productive activities, thus limiting their potential impact on poverty reduction (see also Clapton 2016; Rathnayaka and Weerahewa 2015).

The remainder of the article proceeds as follows. Section II presents the study's methodology, followed by a discussion of its findings in Section III. A summary of key policy implications concludes the article.

II. Methodology

Data and sources

The study used an unbalanced dataset covering 64 developing countries between 1990–2021. Due to the dataset's unbalanced nature without long uninterrupted time gaps, spurious correlation issues caused by non-stationarity are unlikely to arise. The study uses three measures of poverty – incidence, depth, and severity, all measured at revised thresholds of $2.15 (extreme poverty) and $3.65 (moderate poverty) a day. These measures are part of the poverty indicators of the generic class of additive indices proposed by Foster, Greer, and Thorbecke (1984) (FGT).[2,3]

A poverty headcount index, commonly called FGT (0), measures the percentage of people living below the poverty line. Poverty depth or FGT (1) measures the gap between the standard of living of the poor and the poverty line to assess the depth of poverty. The third index, poverty severity or FGT (2), measures the severity of poverty and reflects the average square relative poverty gap of the poor. Rather than using yearly data, we transformed our data into four-year equal interval averages for two methodological reasons. First, our dataset exhibits some gaps that might compromise the reliability of annual observations. Second, it also helps reduce short-term fluctuations and statistical noise, allowing us to examine the long-run effects of unpaid workers on poverty dynamics.

In terms of the control variables, following the extant literature, several variables are included in the analysis. We include economic growth as the literature provides evidence to suggest that it plays a significant role in alleviating poverty (Fosu 2017; Ravallion and Chen 1997). By enhancing the necessary knowledge and skills of workers, education is expected to reduce poverty (Bonal 2016). Foreign direct investment are expected to benefit the poor by providing livelihood opportunities (Kaulihowa and Adjasi 2018). Inflation is shown to harm the poor (Easterly and Fischer 2001). By increasing financial burdens on working-age populations to support dependent age groups, a higher age dependency ratio exacerbates poverty (Duval-Hernández 2021). By improving the

[2]The generic form of these measures is represented as: $pov_{\phi} = \int_0^z \left[\frac{z-x}{z}\right] f(x)d(x)$. Where $\phi \in \{0, 1, 2\}$ is a parameter of inequality aversion, and z is the poverty threshold. While x measures the income, $f(x)$ represents the density function of income. When $\phi = 0$, it results in poverty headcount index. Similarly, when $\phi = 1$ and $\phi = 2$, the equation results in a poverty gap and squared poverty gap. For more on these measures, please read Foster, Greer, and Thorbecke (1984).

[3]Considering the inherent limitations of FGT poverty measures, it may be more appropriate to use other poverty measures, such as the income share of the lowest quintile (Dollar and Kraay 2004) or the multidimensional poverty index (Alkire and Emma Santos 2014). It is, however, not possible to select any of the two measures due to inherent gaps in the availability of data.

welfare of the poor, financial development (Coulibaly and Thierry Yogo 2020) and democracy (Ross 2006) are expected to reduce poverty.

Estimation approach

The following estimation model is used to examine the effects of unpaid workers on poverty.

$$pov_{it} = \alpha + \varphi pov_{it-1} + \gamma uw_{it-1} + \psi_1 x_{it-1} + \nu_t + \eta_i + \varepsilon_{it-1} \quad (1)$$

Where pov_{it} represents three different measures of poverty listed in Section 2.1 in country i in year t; uw_{it} represents three groups of unpaid workers – total, male and female; γ measures the impact of unpaid workers on poverty. x_{it} is the matrix of control variables as discussed under Section 2.2 and ψ_1 measure their impact on poverty. ν_t, η_i and ε_{it} represent the time-specific, country-specific and error term, respectively. φpov_{it-1} accounts for poverty persistence – defined as poverty that exists over time regardless of economic conditions or interventions, as observed by Biewen (2014) and Fabrizi and Mussida (2020).

Due to the positive correlation between pov_{it-1} and η_i, the estimates of φ obtained using the Ordinary Least Squares (OLS) and the Fixed Effects Estimate (FEE) remain biased. The use of difference GMM is insufficient to address the issue due to its criticisms (Alonso-Borrego and Arellano 1999; Blundell and Bond 1998). Consequently, a more efficient approach, i.e. the two-step system GMM proposed by Arellano and Bover (1995) and Blundell and Bond (1998). The approach is suitable for the current study as poverty is persistent over time, and the sample size is small (Arellano and Bover 1995; Roodman 2009a). Furthermore, given our dynamic panel specification, the approach is particularly suitable as it addresses Nickell (1981), which results from the correlation between pov_{it-1} and fixed effects in panel estimations.

The study employed a two-step system GMM with forward orthogonal deviation transformation to address the unbalanced nature of our data and minimize data loss. As a standard approach, Windmeijer (2005) correction is applied to correct standard errors. To prevent instrument proliferation, the study used the 'collapse' option to limit the number of instruments below the number of countries. This is in line with the general rule of thumb suggested by Roodman (2009b), which states that the number of instruments should not exceed the number of cross-sectional units. To validate the set of instruments, Hansen (1982) J test of overidentification restriction and Arellano and Bond (1991) AR (2) test for serial correlation are applied.

It is important to note that the impact of unpaid workers on poverty reduction through income generation and cost reduction effects discussed in Section 1.3 is not immediate and takes time. The variables on the right-hand side of Equation (1) lagged by one period to reflect this time delay. In line with the literature in Sections 1.3 and 2.1, unpaid workers, economic growth, foreign direct investments, inflation, education and financial development are treated as endogenous, and age dependency and democracy are considered strictly exogenous variables.

III. Findings

Descriptive statistics and correlation analysis

Tables 1 and 2 in the Appendix list the variables and the sample of countries used in the study, followed by Tables 3 and 4, showing descriptive statistics and correlation analyses. Descriptive statistics suggest that the average poverty levels in developing countries are high. More females (20.90 per cent) than males (8.98 per cent) are employed as unpaid workers. Variance inflation factor analysis shows no significant multicollinearity issues (see Tables 6a-6c in the Online Appendix).

Regression analysis

Table 5a–c present two-step GMM estimates for Equation (1) for poverty incidence, depth and severity, respectively. While the first three columns of these tables measure poverty at $2.15 a day, the last three columns measure poverty at $3.65 a day. The diagnostic tests at the bottom of these tables suggest no evidence of second-order correlation or

Table 1. Definitions of the variables used in the study and their data source.

Variable	Definition	Data source
pov1	Poverty headcount ratio is $2.15 a day (2017 PPP) as the percentage of the population.	World Development Indicators
pov2	Poverty headcount ratio is $3.65 a day (2017 PPP) as the percentage of the population.	
pov3	Poverty gap is $2.15 a day (2017 PPP) as the percentage of the population.	
Pov4	Poverty gap is $3.65 a day (2017 PPP) as the percentage of the population.	
pov5	Poverty severity gap is $2.15 a day (2017 PPP) as the percentage of the population.	
pov6	Poverty severity is $3.65 a day (2017 PPP) as the percentage of the population.	
total	Total contributing family workers as the percentage of total employment.	
male	Male contributing family workers as the percentage of male employment.	
female	Female contributing family workers as the percentage of female employment.	
gdp	Real gross domestic product at constant 2017 national prices (in mil. 2017 dollars)	
edu	Primary gross school enrolment ratio	
fdi	Percentage of gross domestic product	
infla	Annual percentage change in the gross domestic product deflator	
age	Age dependency ratio, young as the percentage of the working-age population	
fd	financial system deposits as the percentage of the gross domestic product	Global Financial Development
dem	Democracy index. Countries are ranked from −10 to + 10, with −10 being the least democratic and + 10 being the most democratic.	Polity IV

Table 2. List of countries included in the sample.

East Asia and Pacific - China, Fiji, Indonesia, Korea, Rep., Lao PDR, Malaysia, Mongolia, Philippines, Thailand, Viet Nam.

Europe and Central Asia - Turkiye.
Latin America and the Caribbean - Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela, RB.
The Middle East and North Africa - Egypt, Arab Rep., Iran, Islamic Rep., Israel, Morocco, Tunisia.
South Asia - Bangladesh, Bhutan, India, Pakistan, Sri Lanka
Sub-Saharan Africa - Benin, Botswana, Burkina Faso, Burundi, Cote d'Ivoire, Eswatini, Ethiopia, Gambia, The, Ghana, Guinea, Kenya, Madagascar, Malawi, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Tanzania, Togo, Uganda, Zimbabwe.

Table 3. Descriptive statistics.

Variables	No of observations	Mean value	Standard deviation	Minimum value	Maximum value
pov1	222	1.92	1.53	−1.7	4.4
pov2	222	3.01	1.14	−0.7	4.5
pov3	222	0.67	1.71	−3.7	3.7
pov4	222	1.94	1.32	−1.9	4.1
pov5	222	1.35	3.42	−7.4	7.4
pov6	222	3.88	2.64	−3.8	8.2
total	222	13.34	10.90	0.0	51.0
male	222	8.98	7.71	0.0	37.0
female	222	20.90	16.97	0.1	73.4
gdp	222	11.93	1.89	8.2	16.9
edu	222	99.42	11.41	49.4	128.1
lnfdi	222	0.91	0.85	−2.0	3.2
infla	222	8.61	19.98	−2.3	286.1
age	222	56.04	20.15	18.6	106.6
fd	222	39.88	24.93	0.8	132.0
dem	222	4.36	5.37	−7.0	10.0

Pov, gdp, and fdi are expressed in their natural logarithmic forms.
Source: Own estimates using data from sources listed in Table 1. Coverage: 1990–2021 period.

rejection of the null hypothesis of joint validity. Confirming the persistence of poverty (Biewen 2014; Fabrizi and Mussida 2020), the coefficient of the lagged dependent variable in all tables is positive and statistically significant at 1 per cent. As the study's key finding, we observe a negative and statistically significant association between unpaid workers and poverty, suggesting that unpaid workers play an essential role in the poverty dynamics of developing countries.

As hypothesized in Section 1.3, these effects differed by how poverty is measured and varied by gender. In terms of the threshold, from columns 1 and 4 of Table 5a, while a one per cent increase in the unpaid workers is associated with a fall in poverty incidence measured at $2.15 a day threshold by 0.007 per cent, at a higher threshold of $3.65 a day, the corresponding fall is 0.004 per cent. The corresponding poverty depth and severity figures in Table 5b,c are −0.010 and −0.006 and −0.019 and

Table 4. Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
pov1 (1)	1															
pov2 (2)	0.940***	1														
pov3 (3)	0.976***	0.854***	1													
pov4 (4)	0.987***	0.980***	0.939***	1												
pov5 (5)	0.976***	0.854***	1	0.939***	1											
pov6 (6)	0.987***	0.980***	0.939***	1	0.939***	1										
total (7)	0.512***	0.587***	0.433***	0.558***	0.433***	0.558***	1									
male (8)	0.537***	0.597***	0.468***	0.576***	0.468***	0.576***	0.953***	1								
female (9)	0.389***	0.518***	0.281***	0.457***	0.281***	0.457***	0.917***	0.802***	1							
gdp (10)	−0.378***	−0.321***	−0.405***	−0.365***	−0.405***	−0.365***	−0.284***	−0.382***	−0.081	1						
edu (11)	0.114	0.151*	0.074	0.132	0.074	0.132	0.154*	0.144*	0.165*	−0.101	1					
fdi (12)	−0.032	−0.078	−0.001	−0.053	−0.001	−0.053	−0.174*	−0.164*	−0.260***	−0.173*	−0.016	1				
infla (13)	0.061	0.056	0.064	0.060	0.064	0.060	−0.067	−0.056	−0.063	−0.057	0.034	−0.093	1			
age (14)	0.779***	0.754***	0.750***	0.784***	0.750***	0.784***	0.546***	0.595***	0.427***	−0.579***	0.182**	−0.057	0.067	1		
fd (15)	−0.468***	−0.408***	−0.480***	−0.449***	−0.480***	−0.449***	−0.239***	−0.256***	−0.131	0.247***	−0.022	0.053	−0.092	−0.401***	1	
dem (16)	−0.103	−0.221**	−0.029	−0.160*	−0.029	−0.160*	−0.357***	−0.318***	−0.398***	−0.001	−0.117	0.114	−0.044	−0.208**	−0.055	1

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Pov, gdp, and fdi are expressed in their natural logarithmic forms. Source: Own estimates using data from sources listed in Table 1. Coverage: 1990–2021 period.

−0.012, respectively. While modest, these findings suggest that the contributions of unpaid workers are more effective in alleviating extreme poverty than moderate poverty. Essentially, in developing countries where formal coping mechanisms are often ineffective, this finding has profound implications for understanding the informal mechanisms used by the poorest households in society. This aligns with the growing importance of family-based support systems in alleviating poverty (Barrett, Reardon, and Webb 2001; Janvry and Sadoulet 2001; Vickery 1977).

In terms of the measure, at a threshold of $2.15 a day, while a one per cent increase in the share of unpaid workers is associated with a fall in the poverty incidence by 0.007 units (Table 5a), the same increase is associated with a fall in the poverty depth (Table 5b) and severity (Table 5c) by 0.010 units and 0.019 units, respectively. A similar pattern can be observed at a threshold of $3.65 a day. Considering the larger effects of unpaid workers on poverty severity, we conclude that they are especially critical to households experiencing the most intense forms of deprivation. To put these findings into perspective, in developing countries where there are not enough formal employment opportunities and a comprehensive social security system (Cattaneo et al. 2024), the contributions of these workers are significant in ensuring that poverty does not further deepen among those suffering the most intense forms of deprivation.

Columns 2 and 3 of Table 5a show that while the estimate for male workers is −0.010, the estimate for female workers is −0.005. The corresponding figures in columns 5 and 6 are −0.007 and −0.003, respectively. A similar pattern can be observed in Table 5b,c. These differences are particularly evident in extreme poverty and poverty severity. These findings suggest that the poverty-reducing effects of unpaid workers follow a gender-specific pattern, with females showing lower effects. In other words, female workers contribute less to reducing poverty than male workers despite a large share of unpaid workers being females. This misalignment aligns with our theoretical perspectives in Section 1.3, where gendered constraints hinder female unpaid contributions.

Overall, in line with our theoretical arguments, the study's findings suggest that, while statistically significant, the poverty reduction effects of unpaid workers are modest, nuanced and gender-specific. These worker's contributions are more substantial in mitigating the poverty severity among those living in extreme poverty than those facing modest poverty. The findings also align with ILO (2018)'s view that a high percentage of the unpaid workforce does not significantly mitigate poverty levels in developing countries, as it serves those experiencing the greatest hardship in extreme poverty rather than reducing poverty in general. Highlighting the disadvantage that women face in developing countries, their poverty-mitigating effects are lower than those of male workers.

As for the effects of control variables, they reveal intriguing effects on poverty dynamics. In line with the extant literature, foreign direct investments (Fosu 2017; Ravallion and Chen 1997) and education (Bonal 2016) have negative and statistically significant effects, suggesting they are pro-poor. In line with Easterly and Fischer (2001), inflation positively and significantly affects poverty, suggesting it hurts the poor. In line with Ravallion and Chen (1997) and Fosu (2017) state that while economic growth is negatively related to poverty, the effects are statistically insignificant. These findings suggest that growth does not reduce poverty automatically and that complementary interventions may be needed to maximize the benefits of growth. In line with Duval-Hernández (2021), the age dependency ratio's positive and statistically significant effects suggest that a higher proportion of non-working age individuals increases poverty. Financial development and democracy have inconsistent effects across estimation models, suggesting that their effects are more context-specific.

Robustness checks

A battery of checks is employed to validate the findings obtained in Table 5a–c. First, we use the IV2SLS method (see Tables 7a-7c in the Online Appendix), which helps address potential endogeneity, where unobserved factors may

Table 5a. A two-step GMM regression analysis of poverty headcount.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	*Total share of unpaid workers*	*Male share of unpaid workers*	*Female share of unpaid workers*	*Total share of unpaid workers*	*Male share of unpaid workers*	*Female share of unpaid workers*
Dependent variable	*Poverty headcount at $2.15 a day*			*Poverty headcount at $3.65 a day*		
lag pov1	0.825***	0.892***	0.941***			
	(0.106)	(0.112)	(0.132)			
lag pov2				0.915***	0.991***	0.953***
				(0.072)	(0.080)	(0.083)
lag total	−0.007**			−0.004**		
	(0.003)			(0.002)		
lag male		−0.010**			−0.007***	
		(0.005)			(0.002)	
lag female			−0.005**			−0.003**
			(0.002)			(0.001)
lag gdp	0.007	−0.009	−0.008	0.003	−0.007	0.002
	(0.016)	(0.018)	(0.020)	(0.009)	(0.011)	(0.011)
lag edu	−0.008***	−0.006**	−0.005**	−0.004***	−0.004***	−0.004***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
lag fdi	−0.132**	−0.121**	−0.132**	−0.101***	−0.094***	−0.104***
	(0.056)	(0.059)	(0.051)	(0.030)	(0.028)	(0.033)
lag infla	0.001***	0.001**	0.001*	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lag age	0.017***	0.013**	0.010*	0.009***	0.007**	0.008**
	(0.005)	(0.005)	(0.006)	(0.003)	(0.003)	(0.003)
lag fd	−0.002*	−0.002	−0.001	−0.001	0.001	0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
lag dem	0.013**	0.014**	0.016**	0.006	0.007	0.008*
	(0.005)	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)
No of observations	222	222	222	222	222	222
No of countries	64	64	64	64	64	64
No of instruments	40	38	38	37	36	36
Hansen p-value	0.270	0.318	0.404	0.517	0.423	0.568
AR (2) p-value	0.800	0.788	0.750	0.633	0.629	0.640

Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; The Hansen test is used to evaluate the joint validity of the instruments used. AR (2) is used to test second-order serial correlation in the error term. Constant included but not reported. Pov, gdp, and fdi are expressed in their natural logarithmic forms.

Source: Own estimates using data from sources listed in Table 1. Coverage: 1990–2021 period.

Table 5b. A two-step GMM regression analysis of poverty depth.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	*Total share of unpaid workers*	*Male share of unpaid workers*	*Female share of unpaid workers*	*Total share of unpaid workers*	*Male share of unpaid workers*	*Female share of unpaid workers*
Dependent variable		*Poverty depth at $2.15 a day*			*Poverty depth at $3.65 a day*	
lag pov3	0.928***	0.876***	0.991***			
	(0.081)	(0.082)	(0.095)			
lag pov4				0.937***	0.938***	0.953***
				(0.122)	(0.127)	(0.133)
lag total	−0.010***			−0.006**		
	(0.003)			(0.002)		
lag male		−0.012***			−0.008**	
		(0.004)			(0.004)	
lag female			−0.006**			−0.004***
			(0.003)			(0.001)
lag gdp	−0.001	−0.007	0.003	0.001	−0.003	0.001
	(0.017)	(0.015)	(0.020)	(0.014)	(0.014)	(0.014)
lag edu	−0.008***	−0.008***	−0.007**	−0.005***	−0.005***	−0.006***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
lag fdi	−0.161*	−0.134**	−0.170*	−0.106**	−0.099**	−0.127***
	(0.089)	(0.066)	(0.093)	(0.044)	(0.040)	(0.042)
lag infla	0.001**	0.001***	0.001**	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lag age	0.012***	0.014***	0.009**	0.009*	0.010*	0.009*
	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)	(0.005)
lag fd	−0.001	−0.002	−0.001	−0.001	−0.001	−0.001
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
lag dem	0.011	0.013**	0.014	0.009*	0.008*	0.011*
	(0.007)	(0.006)	(0.008)	(0.005)	(0.004)	(0.006)
No of observations	222	222	222	222	222	222
No of countries	64	64	64	64	64	64
No of instruments	37	37	38	40	40	34
Hansen p-value	0.281	0.428	0.511	0.359	0.427	0.546
AR (2) p-value	0.811	0.769	0.825	0.644	0.672	0.642

Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; The Hansen test is used to evaluate the joint validity of the instruments used. AR (2) is used to test second-order serial correlation in the error term. Pov, gdp, and fdi are expressed in their natural logarithmic forms.

Source: Own estimates using data from sources listed in Table 1. Coverage: 1990–2021 period.

Table 5c. A two-step GMM regression analysis of poverty severity.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	*Total share of unpaid workers*	*Male share of unpaid workers*	*Female share of unpaid workers*	*Total share of unpaid workers*	*Male share of unpaid workers*	*Female share of unpaid workers*
Dependent variable	*Poverty severity at $2.15 a day*			*Poverty severity at $3.65 a day*		
lag pov5	0.913***	0.875***	0.845***			
	(0.129)	(0.103)	(0.108)			
lag pov6				0.937***	0.988***	0.948***
				(0.122)	(0.120)	(0.130)
lag total	−0.019**			−0.012**		
	(0.007)			(0.005)		
lag male		−0.021**			−0.016**	
		(0.009)			(0.006)	
lag female			−0.012***			−0.007***
			(0.004)			(0.003)
lag gdp	−0.013	−0.019	−0.001	0.001	−0.014	0.004
	(0.033)	(0.029)	(0.035)	(0.028)	(0.030)	(0.028)
lag edu	−0.015***	−0.016***	−0.017***	−0.010***	−0.010***	−0.012***
	(0.005)	(0.005)	(0.005)	(0.003)	(0.004)	(0.003)
lag fdi	−0.260*	−0.241**	−0.244**	−0.213**	−0.189**	−0.254***
	(0.139)	(0.114)	(0.121)	(0.089)	(0.081)	(0.081)
lag infla	0.001**	0.002***	0.002***	0.001**	0.001**	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
lag age	0.026**	0.029***	0.030***	0.019*	0.015	0.018*
	(0.010)	(0.009)	(0.008)	(0.009)	(0.010)	(0.010)
lag fd	−0.003	−0.004	−0.005	−0.002	−0.001	−0.001
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)
lag dem	0.022	0.024*	0.023	0.017*	0.019*	0.022**
	(0.015)	(0.013)	(0.014)	(0.010)	(0.011)	(0.011)
No of observations	222	222	222	222	222	222
No of countries	64	64	64	64	64	64
No of instruments	40	40	36	40	37	35
Hansen p-value	0.259	0.436	0.584	0.359	0.503	0.591
AR (2) p-value	0.787	0.749	0.778	0.644	0.659	0.645

Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; The Hansen test is used to evaluate the joint validity of the instruments used. AR (2) is used to test second-order serial correlation in the error term. Constant included but not reported. Pov, gdp, and fdi are expressed in their natural logarithmic forms.

Source: Own estimates using data from sources listed in Table 1. Coverage: 1990–2021 period.

simultaneously determine unpaid workers and poverty. As discussed below, using three instrumental variables satisfying relevant and exclusion criteria[4] - social norms, labour regulations, and legal systems, allows us to isolate the causal effects of unpaid workers on poverty.

Following Becker (1965) and Sen (1990), as discussed in Section 1.3, deeply ingrained social norms directly affect the prevalence of unpaid work. Following Almeida and Carneiro (2012), labour regulations significantly determine unpaid employment as more stringent regulations, for example, often increase the cost of hiring formal labour, forcing more self-employed workers to utilize unpaid family workers. Furthermore, tighter labour regulations may adversely affect formal sector worker's productivity and earnings, indirectly pushing them into unpaid work. Finally, following the seminal work by Porta, Rafael, and Shleifer (2008), legal origin is critical in shaping unpaid employment. Countries that adhere to common law, have strict property rights and enforce contracts effectively tend to discourage unpaid employment. Furthermore, countries that follow the common law tend to have stronger labour unions that advocate for enhanced social benefits, affecting unpaid employment. The relevance of the instruments is validated using the Kleibergen-Paap rk LM and the Wald F statistics. The Hansen J statistic confirms over-identification validity. The endogeneity tests confirm that the instruments are suitable for addressing any endogeneity.

Second, one concern with the estimation in Table 5a–c is that they included observations covering various years, regions and income levels (please see Section 1.1). Such unobserved heterogeneity across years, regions and income levels may result in potentially biased estimates. To account for these variations and obtain more accurate estimates, the estimates in Table 5a–c are re-estimated by including year, income and region dummies[5,6] (please see Tables 8a-8c, 9a-9c, 10a-10c in the Online Appendix). Third, to ensure that our core findings are not an artefact of specific model choices or variables, the next robustness check involved dropping the following control variables in separate estimations: financial development and growth (please see Tables 11a-11c, 12a-12c in the Online Appendix).

The findings obtained in Table 5a–c remained robust to all the above checks. Regarding our IV 2SLS findings, we note that the unbalanced nature of our panel data may result in Nickell (1981) bias affecting estimations. Thus, we view them as complementary evidence rather than as separate conclusions. Year and income dummies proved insignificant, suggesting consistent poverty effects of unpaid workers across years and income levels. Regarding the regional dummies, while the coefficients on the Latin America and the Caribbean dummies are positive, their statistical significance varies based on poverty measure and threshold, necessitating further research to understand the nuanced dynamics of the impact of unpaid work on poverty.

IV. Concluding remarks

Unpaid workers are the backbone of developing countries' informal economies, sustaining the livelihoods of millions of poor people. Yet, their role in combating poverty at the macro level has received little attention. This article filled this void in the literature by using data from 64 developing countries spanning 1990–2021. Data on unpaid workers is considered by gender, and poverty incidence, depth, and severity are measured based on revised daily thresholds of $2.15 and $3.65 a day. Dynamic panel data techniques are employed to analyse the findings, and several robustness checks are used to validate them.

The study's findings suggest that, while statistically significant, the poverty reduction effects

[4]To understand more about the criteria, please read Yerrabati (2022) and Yerrabati (2023).
[5]The classification of countries into income groups is based on the United Nations (2020)'s classification based on their gross national income per capita into high-income, upper middle income, lower-middle income and low-income categories. Dummy variables are included for countries coming from each income group, with countries coming from upper-middle income as reference group.
[6]The classification of countries into geographical subgroups is based on the World Bank (2024) classification as listed in Table 2 of the Appendix. Dummy variables are included for each country coming from a specific region, with countries from East Asia and the Pacific taken as reference group.

of unpaid workers are modest, nuanced and gender-specific. The contributions of unpaid workers are more substantial in mitigating the poverty severity among those living in extreme poverty than those facing modest poverty. Highlighting the disadvantage that women face in developing countries, the poverty-mitigating effects of female workers are lower than their counterparts.

The above findings entail key policy implications. First, given the positive impact of unpaid workers on poverty, policy focus should be on empowering them to play a greater role in poverty combating efforts. This requires concerted efforts on two fronts: formalization and targeted skill development programme. Formalization involves the legal recognition of unpaid workers and their support to integrate them into formal economic systems, as in countries like France, Portugal, Luxembourg, and Germany, which have already formalized these workers' activities and provided social protection.[7] This, in turn, requires appropriate policies and procedures to officially recognize and acknowledge their economic activities and extend protection and rights accordingly.

Unpaid workers should be provided with selective and targeted skill development programmes as a second policy intervention. With tailored training and skill development opportunities, these individuals can enhance their capabilities and productivity, thereby increasing their contribution to the fight against poverty. In recognition of the cultural barriers that may hinder the recognition of female worker's contributions, policies can be developed to promote gender equality and empowerment through targeted educational and awareness campaigns. In addition to recognizing female worker's significant contributions, these policies also contribute to inclusive growth and sustainable development.

This study's main limitation is its reliance on income-based poverty measures. While income-based poverty measures account for unpaid worker's financial contributions, their effectiveness in capturing poverty's multifaceted nature remains unclear. This limitation becomes particularly significant when unpaid workers contribute to households through their time. Future research could take a more comprehensive approach to measuring contributions to poverty dynamics by using time-use data in conjunction with multidimensional poverty measures that consider education, health, and living standards to gain a deeper understanding of the contributions of these workers to poverty dynamics.

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Data availability statement

The data supporting the study findings are available from the author upon reasonable request.

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[7]For a detailed understanding of how unpaid workers are recognized in these countries, please read Frosch and Gardner (2022).

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