Journal of Development Policy, Research & Practice

ISSN (P): 2522-3410
ISSN (E): 2663-3698



Volume 10, 2026

Article History
Submitted:
16 Jan. 2026
Last Revised:
25 July 2026
Accepted:
7 Oct. 2026

Funding:
No

Copyright:
The Authors

Scan here to read

Urbanisation, Economic Development and Feminisation of Informal Employment

Haniya Shoukat Randhawa,[1] Rahima Omar[2] and Ammar Shoukat Randhawa[3]
[1,2,3] Independent Researcher, Islamabad, Pakistan

Correspondence:
Haniya Shoukat Randhawa: haniya22shoukat@gmail.com

Article Link:
https://journals.sdpipk.org/index.php/JoDPRP/article/view/270

DOI: https://doi.org/10.59926/jodprp.vol10/2026/10

Citation:
Randhawa, H.S., Omar, R. and Randhawa, A.S. 2026, 'Urbanisation, Economic Development, and Feminisation of Informal Employment', *Journal of Development Policy, Research & Practice,* vol. 10, pp. 196–215.
Conflict of Interest: The authors declare no conflict of interest.
Acknowledgement: No administrative, financial or technical support was received for this research.
AI Declaration/Use of Generative AI: No generative AI tools were used in the preparation of this manuscript.

Licensing:
Licensed under a Creative Commons Attribution 4.0 International License

An Official Publication of the Sustainable Development Policy Institute, Islamabad, Pakistan

Journal of Development Policy, Research & Practice

Vol. 10 (January – December 2026)

Urbanisation, Economic Development and Feminisation of Informal Employment

Haniya Shoukat Randhawa, Rahima Omar and Ammar Shoukat Randhawa[*]

ABSTRACT

The study builds upon the widely studied relationship between urbanisation and the proportion of females in informal employment by analysing a unique correlation across varying national income levels. To examine how this relationship changes non-linearly across different stages of economic development, denoted by the country's Gross Domestic Product (GDP), the study applies a high-dimensional fixed effects model with interaction terms to a panel dataset of 126 countries, across a time period of 15 years, from 2010 to 2024. The study's quantitative analysis on the secondary dataset sourced from the International Labour Organization and the World Bank reveals that the effect of urbanisation on female informal employment is non-linear and conditional upon the level of economic development in a country. Moreover, the marginal effect of urbanisation on female informal employment decreases as GDP per capita increases, resulting in a U-shaped, non-monotonic transformation. Thus, the effect of urbanisation on female informal employment gradually neutralises as the national income level increases. The nature of the study's results calls for female-oriented labour policies to be context-driven rather than uniform, depending on the country's level of economic development. Specifically, the study opens a path to investigating the differing requirements of the labour landscape across three categories of income levels and suggests policies to be tailored differently for each.

Keywords: Urbanisation, Informal Sector, Feminisation, Employment, Women, Panel Data

JEL Classification Codes: O17, O11, O18, J46

[*] **Haniya Shoukat Randhawa** is an independent researcher based in Islamabad, Pakistan. Email: haniya22shoukat@gmail.com. **Rahima Omar** and **Ammar Shoukat Randhawa** are also independent researchers from Islamabad, Pakistan.

1. INTRODUCTION

The global landscape of economic development is fundamentally shaped by two parallel and transformative processes: rapid urbanisation and the persistent reorganisation of labour markets. Characterised by the demographic shift from rural to urban settlements, urbanisation represents an important dimension of structural economic change. This transition is especially acute across developing nations, where the growth of formal economic institutions and the creation of jobs are often outpaced by urban growth rates (Ortiz-Ospina et al., 2026). The UN now projects that the world's urban population will grow by a further 2.5 billion people by 2025, with close to 90% of that growth concentrated in Asia and Africa (United Nations, Department of Economic and Social Affairs, Population Division 2025).

Lewis's (1954) dual-sector model offers a useful theoretical starting point. Lewis posited that economic development proceeds through the reallocation of surplus labour from a low-productivity traditional sector (mainly subsistence agriculture) to a higher-productivity modern capitalist sector. Harris and Todaro (1970) later offered a microeconomic explanation for the rapid pace at which urbanisation is occurring, in particular in the Global South today. They argued that rural-to-urban migration, the primary driver of urban population growth, is a traditional response not to existing wage differentials but to expected income differentials, factoring in the probability of attaining formal sector employment.

The model of expected urban income creates a compelling migration pull despite significant urban unemployment, as individuals are drawn by the prospect of higher lifetime earnings, however probabilistic. Recent applications of the model, for instance to internal migration in Romania, continue to confirm this logic in other developing and transition economies (Tomoiagă and Pop Silaghi 2023). As a result, migration flows regularly outpace what the formal urban economy can absorb, and the resulting surplus of labour spills into a growing informal sector instead of structured wage employment.

This absorptive gap has a gendered face: the feminisation of informality. This concept extends from the broader idea of 'feminisation of poverty', which characterises the tendency in which women are disproportionately represented among the impoverished because of structural disparities in employment and resource access (United Nations Department of Public Information 2000). The feminisation of informality looks at how women make up a large portion of the informal workforce. Informal employment, according to the International Labour Organization (ILO), includes jobs that usually lack social protection, security, and standard employment benefits. This category covers work in unregistered businesses, unpaid family labour, and casual positions (ILOSTAT 2025). In South Asia specifically, urbanisation has not pulled women into paid work the way it theoretically should, since rising participation is offset by social norms that make leaving the home for wages more costly for women than for men (Bussolo and Rexer 2025).

Modernisation theory attributes underdevelopment to cultural barriers within 'traditional societies', such as collectivism and patriarchy, which limit women's participation in the economy to low-status roles (Thompson 2017). A more critical economic perspective, however, puts forth the logic that the imperative for flexible, low-cost labour in rapidly growing capital-constrained urban economies creates a demand for a precarious workforce, a role that often falls to women due to existing social norms, segmented labour markets, and the traditional expectation of women being responsible for unpaid care work (Rawat 2025).

Where growth in the modern capitalist sector is too weak or insufficiently labour-absorbing to absorb migrants at the pace of their arrival, the transferred workers are not absorbed into formal, productive wage employment but instead into low-productivity informal activities. In this reconceptualisation, the informal sector acts as a holding zone or a distinct subsistence enclave within urban space. This sector is characterised not by the profit-maximising logic of capitalist firms but rather by income-sharing and livelihood-sustaining activities in which individuals may work with a marginal product that is close to zero. The feminisation of informality is magnified in this structural chasm. Gender-segmented labour markets, social norms limiting women's mobility, and their disproportionate burden of unpaid care work systematically push female migrants and urban-born women into the most flexible, unprotected, and accessible niches of this holding zone. Empirical evidence shows that women are indeed disproportionately employed in the informal economy, with as many as 92.1% of all employed women in less developed countries employed in informal work (ILOSTAT 2025). Moreover, studies find that while greater labour force participation for women is generally linked to lower income inequality, this equalising effect is offset in cases where the informal sector is large. Hence, the interaction between Todaro's migration drivers and Lewis's structural transformation, mediated through gendered institutions and limited by early wage or other factors, creates the conditions for a gendered segmentation of urban labour, where women are disproportionately concentrated in the informal margins of the urban economy.

This paper looks at how demographic shifts affect gendered precarities in developing countries. It explores the magnitude and nature of the association between urban growth and the increasing concentration of women in informal employment. The paper also examines whether this relationship transforms across different stages of development, using each country's Gross Domestic Product (GDP). By rigorously testing both linear and non-linear dynamics within cross-national panel data, the study aims to explore how urbanisation alters its impact on the feminisation of informal employment across different GDP levels, thereby contributing a nuanced structural perspective to debates on inclusive growth. More specifically, the paper lays out a central hypothesis which is tested empirically. Guided by notable literature, the paper undertakes a nuanced inquiry into the nature of the relationship between urbanisation and female informal employment across different GDP levels.

H_1: The association between urbanisation and the feminisation of informal employment changes non-linearly across levels of Gross Domestic Product (GDP).

To test this hypothesis, the study employs econometric modelling that captures non-linear dynamics, especially observing how the effect of urbanisation on female informal employment varies with GDP levels. The study builds on the broad body of literature exploring the relationship between urbanisation and female informal employment, while offering a unique angle that explores its non-linear trajectory. The review of established literature contextualises this objective clearly.

2. LITERATURE REVIEW

2.1 Urbanisation: Driving the Informal Sector

Urbanisation moves people from the rural sector to the urban informal sector as it offers higher incomes and better job opportunities (Lipton 1982). The growth of informal activities is massive in the early stages of industrialisation, as the demand for workers in labour-intensive jobs increases. Alongside many other pull and push factors, workers are required to operate machines and provide personal services, including informal housework. This increases workers' future abilities to find jobs in the formal sector (Harris and Todaro 1970). Banerjee (1983) found that in the case of India, where the average earnings in both the rural and urban informal employment were the same, expectations of future formal employment still pushed people to migrate. Hence, in the early stages of urbanisation, there exists a greater growth in the informal sector compared to the formal (De Janvry 1981; Furtado 1970; Moser 1978).

The quantitative relationship between urbanisation and informal employment has attracted growing empirical attention in recent years. There is a recurring methodological shift towards panel fixed-effects specifications that can credibly absorb time-invariant and country-level heterogeneity, an advance that has substantially sharpened the precision of earlier cross-sectional estimates. The foundation for this line of inquiry was laid by Elgin and Oyvat (2013), who used a cross-country panel of 152 countries to establish the now widely replicated inverted-U relationship between urbanisation and informal sector size. It shows that at low levels of urban population share, the informal economy expands as rural migrants flood labour markets with skills mismatched to the formal economy, while at higher urbanisation levels, institutional deepening, capital accumulation, and productivity gains gradually pull workers into formal employment. Subsequent work using more flexible nonparametric techniques has confirmed this non-linearity both at global levels (Lv and Xu 2021) and provincial levels (Nguyen and Pham 2024).

Gangopadhyay and Shankar (2016) have identified insufficient income, hard working conditions, lack of guarantee of basic human rights, low productivity and poor emergency capability as characteristics of vulnerable employment found in the informal sector. There is a strong negative relationship between urbanisation and vulnerable employment for high-

income countries over 28 years using panel data and a fixed effects model (Chen et al., 2023). However, the research further establishes that for low-income countries, the relationship is not strong, and for some countries where the agricultural sector is big, and the transition to urbanisation is fast, with no significant employment structure changes, the relationship does not hold.

Extending the urbanisation-informality nexus to the African continent, Djeufack Dongmo et al. (2022) employ a panel vector autoregression (PVAR) approach using data from 45 African countries subdivided by sub-region over the period 1991–2019. Their findings reveal a bidirectional dynamic relationship between urbanisation and the informal economy in Africa, confirming that rapid urban growth in low-income African settings tends to expand rather than contract the informal sector, at least in the short run. This evidence is particularly pertinent to the study's focus on low-income contexts, where the structural conditions of Sub-Saharan Africa and South Asia are broadly comparable: a predominantly agrarian workforce, weak urban labour absorption capacity, and entrenched gender inequality in labour markets. In Sub-Saharan Africa, informal employment accounts for approximately 85–90% of total employment, with women disproportionately concentrated in the more precarious segments (Kiaga and Leung 2020). The parallels with South Asia, where informal employment accounts for over 70% of non-agricultural employment (Strachan and Adikaram 2023), are striking and lend contextual weight to the cross-national patterns.

2.2 Urbanisation and Feminisation of Informal Employment: Incomes and Informal Market Absorption

Informal workers in general are worse off than formal workers due to reduced social protections, bad working environments, harsh work conditions and lower earnings (Jütting and De Laiglesia 2009). In culturally stringent countries, women are forced to work near their homes due to familial pressures, forcing them to land jobs through informal contacts, thus increasing the supply of labour in non-specialised activities (Mitra 2005). Less educated, married and older people are more likely to work in the informal sector, while skilled workers shift to the formal sector in culturally stringent countries (Gillani et al., 2021). The authors use data on 1,503 households in Southern Punjab, Pakistan, and run a logit regression to explain why both males and females work in the informal sector and find reasons specifically for females working in the sector. The authors found that having a joint family and adults increased the probability of females working in the informal sector compared to males, who were not affected by either. There are also other factors, such as the size of the public and agricultural sectors, access to these sectors, openness and corruption, which are associated with the informal sector (Tanabe and Angel-Urdinola 2012). On the other hand, females prefer the formal sector once they attain greater education (Gunatilaka 2008).

Mitra and Tripathi (2024) use Granger causality tests and simultaneous equation modelling estimated by two-stage least squares to find that urbanisation negatively affects the ratio of female-to-male labour force participation. The findings affirm the theoretical framework where increased economic growth results in lower unemployment, without any sort of gender bias, as in Okun's law. However, the findings point towards greater informal employment of women, with women being more involved in domestic tasks due to relocation to urban areas. Elgin and Elveren (2021) used cross-country panel data from 125 countries for 55 years to run a fixed-effects regression to find a negative relationship between the size of the informal sector and income inequality for richer countries and a positive one for poorer countries. The authors further established that higher female labour force participation rates lower income inequality, but the effects are cancelled by the presence of large informal sectors.

In the context of South Asia and Pakistan specifically, recent work has drawn attention to determinants of women's informal employment. The determinants range from the structure of society to the prevalent culture in society. Dogar et al. (2022) have used qualitative evidence from Khyber Pakhtunkhwa, a province in Pakistan, to document compounding vulnerabilities faced by female domestic workers in the informal sector. The authors have found these women to be exposed to economic insecurity, restricted mobility and exposure to domestic violence. These findings echo the broader issues across the country that quantitative studies have also documented. Maqsood et al. (2024), using econometric methods, found persistent barriers to women's formalisation. Women's low formal-sector participation in Pakistan was found to be structurally entrenched, with patriarchal household arrangements and limited access to education and skills.

Female informality has negative consequences for the health and human-capital accumulation of women, which is now a major focus of a growing literature. Horn (2010) found that the feminisation of this sector forces women into roles with lower economic value and limited social protection. This has been historically documented in the case of Pakistan. Mohiuddin (1982) found that female domestic workers in Karachi, the business capital of Pakistan, were put at the extreme end of the poverty scale through feminisation of the informal sector. Khan and Khan (2009) studied how enhancing human capital in the sector for women is not enough. The authors provide findings that even with increased asset ownership to contribute to household survival, women are burdened by income inequalities and uneven debt shares. This results in a fundamental decrease in their real human and physical capital accumulation.

Aronsson et al. (2023) provide more evidence on the aforementioned effects on health. The authors found significant physical and mental health risks for the female workers and their children associated with the informal sector. The evidence was particularly relevant to Sub-Saharan Africa and South Asian settings where female informal employment rates are highest and social protection and income security are lowest. Moreover, women are exposed to hazardous working conditions without social protection systems in place. Elgin

and Elveren (2021) provide the groundwork for the health issues identified by Aronsson et al. (2023). Their findings are suggestive of a greater social welfare problem with the feminisation of informal employment and not merely an economic phenomenon. Women in these sectors face constant risks of sexual exploitation and gender-based violence (Rogan and Alfers 2019). These risks have been confirmed previously in South Asian settings by Kar and Somani (2015). The authors found that in urban settings with low social protection such as Delhi, India, feminisation of informality was linked to higher rates of domestic abuse, severe mental health challenges and restricted social mobility. These findings strengthen the case for policy interventions that go beyond income support to address the structural and institutional determinants of female informality, as advocated in the policy recommendations of the present study.

The current study builds upon this research by making a novel contribution to the literature: estimating a non-monotonic curve illustrating the effects of urbanisation on the feminisation of informal employment across different levels of GDP per capita as representative of economic development.

3. METHODOLOGY

3.1 Data and Sample

The analysis employs a panel dataset comprising country-year observations to investigate the hypothesis. The dependent variable, informal employment as a percentage of total female employment, measures the incidence of informal employment among women (the feminisation of informal employment) and is sourced from the International Labour Organization's (ILOSTAT) database. The primary independent variable, urbanisation, is measured by the urban population as a percentage of the total national population, as available in the World Bank's World Development Indicators (WDI). The nature of the study positions the log of GDP per capita (Purchasing Power Parity (PPP) adjusted) as the moderating variable to account for the level of binary economic development, sourced from WDI. To mitigate omitted variable bias, a vector of control variables is incorporated in the model. The control variables sourced from the World Bank's WDI serve in controlling for multiple parameters: the percentage of women employed in agriculture controls for structural economic composition in the country, the age dependency ratio controls for demographic pressures (Gillani et al., 2021), the total fertility rate is included to account for female care burdens and social structures, and the personal remittances received as a percentage of GDP are used to control for potential negative effects of remittances on female labour force participation, as documented by Yoda (2025). The cross-national sample consists of 126 countries, including developed, developing, and underdeveloped countries. The sample of countries is defined by a range of GDP per capita (PPP) from a minimum of USD 991.039 to a maximum of USD 136,771.92. The model must consider the observations for countries without complete data across the chosen study period of 15 years (from 2010 to 2024) and must necessarily exclude them. The resulting dataset is an

unbalanced panel due to the inherent limitations in the annual reporting of informal economic statistics across all countries and years; hence, this structure is accounted for in the chosen econometric models.

3.2 Regression Models

To test the hypothesis using the optimal framework, the study conducts a series of specification selection tests. An F-test strongly rejects the pooled OLS null hypothesis ($F(21, 125) = 4.41$, $p < 0.01$), and a Hausman specification test rejects the null hypothesis that a random effects model is preferred over a fixed effects model ($\chi^2(20) = 175.58$, $p < 0.01$). The modified Wald test for groupwise heteroskedasticity similarly rejects the null hypothesis ($\chi^2(126) = 31480.07$, $p < 0.01$), necessitating the use of clustered standard errors at the country-level. Guided by these diagnostics, the study applies a stepwise estimation strategy to carefully dissect the non-linear dynamics within the panel. The study first estimates the unconditional average effect of urbanisation on the dependent variable through a baseline model without polynomial interactions using high-dimensional fixed effects, as expressed in Eq. (1).

$$IE_{(it)} = \alpha + \beta_1 UP_{(it)} + X'_{(it)}\gamma + \mu_i + \lambda_t + u_{(it)} \quad (1)$$

Here, the coefficient estimate β measures the magnitude and the direction of the effect urbanisation has on the feminisation of informal employment, denoted by IE, and μ_i and λ_t represent country and year fixed effects, respectively. The use of the fixed-effects model assists in addressing potential autocorrelation challenges. To address potential endogeneity and structurally mitigate reverse causality, the study lags the primary explanatory variables, urban population and GDP per capita. Then, the quadratic interaction framework is introduced based upon the core interaction terms, $\beta_4\, ln(GDP)_{(i,t-1)}$ and $\beta_5\big(ln(GDP)_{(i,t-1)}\big)^2$ as shown in Eq. (2). The structural stability of this framework is tested across three progressively restrictive specifications. The temporal shocks to the dataset are isolated using a time-fixed effects model, and then unobserved spatial heterogeneity is controlled for through a country-fixed effects model. Finally, these dimensions are combined in the main Two-Way Fixed Effects model (TWFE) to ensure the robustness of the exploration of the hypothesised non-linear trajectory under demanding empirical conditions. To study the marginal effect of urbanisation across different income levels, the log GDP per capita is squared, and its joint interaction with urban population is assessed to investigate a non-monotonic transformation. This transformation is isolated by taking the first partial derivative of the main model equation, Eq. (2), which can be demonstrated as Eq. (3).

$$IE_{(it)} = \beta_1 UP_{(i,t-1)} + \beta_2\, ln(GDP)_{(i,t-1)} + \beta_3\big(ln(GDP)_{(i,t-1)}\big)^2 + \beta_4\big(UP_{(i,t-1)} \times ln(GDP)_{(i,t-1)}\big) + \beta_5\left(UP_{(i,t-1)} \times \big(ln(GDP)_{(i,t-1)}\big)^2\right) + X'_{(it)}\gamma + \mu_i + \lambda_t + u_{(it)} \quad (2)$$

$$\big(\partial IE_{(it)}\big)/\big(\partial UP_{(i,t-1)}\big) = \beta_1 + \beta_4\, ln(GDP)_{(i,t-1)} + \beta_5\big(ln(GDP)_{(i,t-1)}\big)^2 \quad (3)$$

4. RESULTS

4.1 Descriptive Statistics

The dataset exhibits substantial variation across informal female employment and urbanisation. The displayed variation provides a suitable basis for examining how urbanisation interacts with the feminisation of informal employment at different levels of GDP.

Table 1: Summary Statistics of the Dataset

	Obs	Mean	Std. dev.	Min	Max
Informal Female Employment (%)	1055	38.84	33.66	0.5	99.8
Urban Population (%)	2085	56.06	21.60	10.98	100
ln GDP per Capita, PPP	2047	9.38	1.14	6.90	11.82
Remittances Received (%)	2011	5.23	7.13	0.0001	49.89
Female Employment in Agriculture (%)	1833	25.80	25.24	0.21	95.03
Age Dependency Ratio (% of Population)	2085	61.50	16.85	31.98	107.78
Fertility Rate, total (births per woman)	1946	2.83	1.45	0.72	7.64

Note: * This data is collected across different years.

4.2 High-Dimensional Fixed Effects Regressions

Estimating the dataset using the four aforementioned models yields the following results, as illustrated below in Table 2.

Table 2: Results of High-Dimensional Fixed Effects Regression under Different Effects

Dependent Variable: Informal Female Employment (%)				
	Baseline Linear Model	**Time Fixed Effects**	**Country Fixed Effects**	**Two-Way Fixed Effects (Main Model)**
Specification	Linear TWFE	Non-Linear	Non-Linear	Non-Linear TWFE
Urban Population	-0.214 (0.219)	18.800*** (3.641)	13.196*** (4.054)	13.082*** (4.350)
ln GDP per Capita, PPP	-2.553 (3.362)	278.237*** (59.101)	76.774 (50.815)	73.054 (55.800)
ln GDP × Urban Population		-3.924*** (0.754)	-2.627*** (0.831)	-2.591*** (0.895)

(ln GDP)²		-16.022***	-3.939	-3.665
		(3.374)	(2.730)	(3.006)
(ln GDP)² × Urban Population		0.206***	0.127***	0.125***
		(0.040)	(0.043)	(0.046)
Female Employment in Agriculture	0.265**	0.316***	0.233*	0.244*
	(0.124)	(0.097)	(0.125)	(0.046)
Fertility Rate	-1.049	12.826***	1.650	0.424
	(2.084)	(3.684)	(2.096)	(2.177)
Age Dependency Ratio	-0.162	-0.615**	-0.215	-0.164
	(0.130)	(0.241)	(0.130)	(0.129)
Remittances	-0.120	-0.438	-0.120	-0.088
	(0.121)	(0.313)	(0.132)	(0.134)
Within R-squared	0.058	0.842	0.167	0.085
Observations	877	902	877	877

*All regressions include a constant term. Robust standard errors are clustered at the country level and reported in parentheses. * 10%, ** 5% and *** 1% significance levels*

Source: Authors' own calculations.

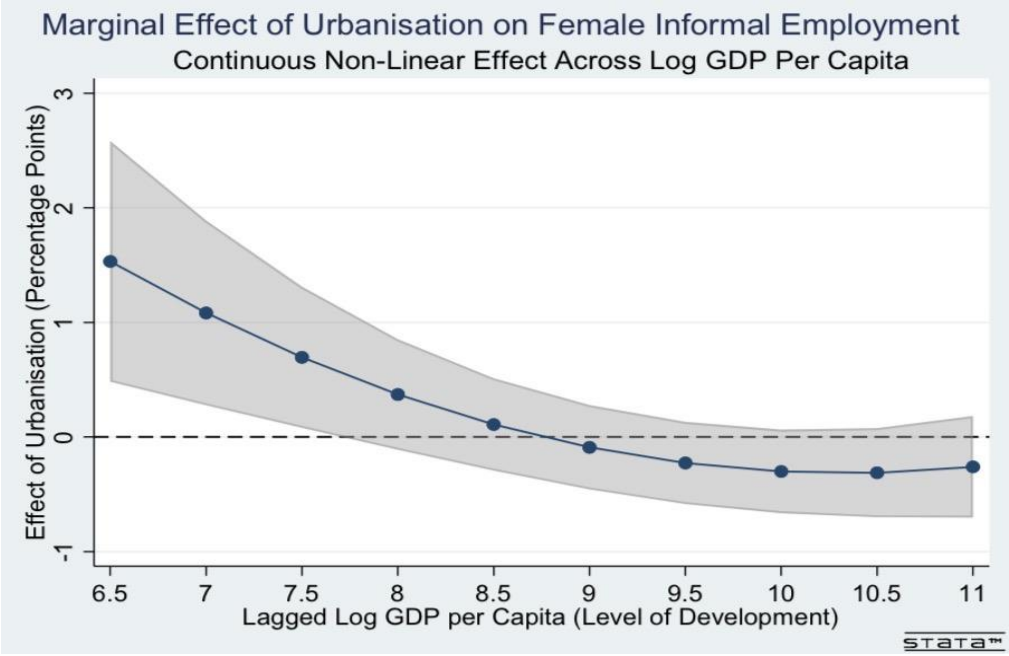
As reported in Column 1 of Table 2, a linear two-way fixed effects model has a statistically insignificant coefficient for urban population (-0.214). The main model's findings in Column 4 indicate that urbanisation's adverse effect on informal female employment is dependent on the country's level of development. The parameters reveal a non-monotonic trajectory, following standard interaction term mechanics. The baseline urbanisation coefficient indicates a positive shock (13.082, $p < 0.01$), given the interaction model. However, the negative coefficient of the primary interaction term (-2.591, $p < 0.01$) shows that economic growth creates a cushioning effect. As log GDP per capita increases, the effect of urbanisation on female informal employment gradually reduces. By contrast, the positive coefficient of the quadratic interaction term (0.125, $p < 0.01$) pulls up the downward marginal effect at higher income levels. In tandem, these parameters construct a U-shaped function of economic development. The results indicate a highly positive and statistically significant net marginal effect of urbanisation at lower stages of economic development (ln GDP = 7). This relationship seems to dilute as the GDP per capita increases, until finally reaching a turning point at the parabolic vertex of the curve, around when the value of ln GDP is 10.36, after which the effect of urbanisation on female informal employment is no longer significant. Additionally, the control variables introduced to the study's model behave similarly to the conclusions drawn in prominent literature, such as the relationship seen between higher female employment in agriculture and the dependent variable (0.265, $p < 0.05$).

The results show that progressing from a model with only time-fixed effects (Column 2 in Table 2) to the main model (Column 4 in Table 2) causes a steep decline in the within R2

statistic, from 0.842 to 0.085. The polynomial interaction terms retain their magnitude, as well as their 1% statistical significance, corroborating the strength of the non-linear hypothesis. Additionally, the study re-estimates the main model using the Driscoll and Kraay (1998) estimator (see Table 3), to guard against cross-sectional dependence. The primary interaction coefficients withstand this test, confirming the non-linear trajectory of the study's data set.

Furthermore, for a visual interpretation of the interaction coefficients in the main model, the study plots the conditional marginal effects of urbanisation across the observed distribution of log GDP per capita, as illustrated in Figure 1. The shape of the curve corroborates the notion that the adverse effect of urbanisation on female informal employment is prominent at low-income levels, but gradually neutralises as macroeconomic capacity shifts outward.

Figure 1: Marginal Effect of Urbanisation on Female Informal Employment at varying GDP Per Capita Levels



Source: Authors' own calculations based on data from the WDI and ILOSTAT.

4.3 Robustness Checks

The Two-Way Fixed Effects model applied to this study uses cluster-robust standard errors. To ensure that the acquired results are not primarily driven by unobserved cross-sectional dependence or heteroskedasticity, as commonly observed in macroeconomic panels, the study re-estimates the model using Driscoll and Kraay (1998) standard errors (see Table 3). The findings reveal high significance and a consistent direction of the primary

interaction terms, robust at the 1% level. Thus, the U-shaped non-linear relationship observed between urbanisation and the feminisation of informal employment across differing GDP levels is confirmed.

Table 3: Robustness Check using Driscoll-Kraay Standard Errors

Variable	**Coefficient**	**Std. Error (DK)**	**t-statistic**
Urban Population	8.528***	0.758	11.26
ln GDP per Capita, PPP	3.267*	1.528	2.14
ln GDP × Urban Population	-1.605***	0.124	-12.92
$(\ln GDP)^2 \times$ Urban Population	0.072***	0.005	14.54
Female Employment in Agriculture	0.237***	0.074	3.18
Fertility Rate	1.204	1.078	1.12
Age Dependency Ratio	-0.221**	0.089	-2.49
Remittances	-0.141**	0.064	-2.20
Constant	28.915	17.607	1.64

Note: Number of observations = 902; Number of groups = 126; $F(8, 12) = 107.25$ ($p < 0.01$).
* 10%, ** 5% and *** 1% significance levels

Source: Authors' own calculations.

5. DISCUSSION

This study observes a critical pattern when the models applied progressively tighten their empirical specifications: the importance of relaxing linear assumptions when addressing macroeconomic labour transitions. The results from the baseline specification imply a lack of a structural relationship between urbanisation and female informal employment. This implication may not be caused by a lack of a relationship, as evidenced by the broader literature, but may instead be the result of non-random missing data within the study's sample. Notably, the study's results address a prevalent specification bias by introducing non-linear interaction terms into the model. The linear model imposes a constant marginal effect across all income levels, which effectively masks the contrasting influence of urbanisation at the opposite ends of the economic development spectrum. Conversely, the quadratic interactions peel away this masking effect and reveal the true structural dynamics with high statistical significance ($p < 0.01$).

These non-linear dynamics create an arc, illustrated in Figure 1 through marginal effects, which aligns with the non-linear trajectory identified by Nguyen and Pham (2024) in their province-level fixed effects analysis of Vietnam, and further corroborated by the functional-coefficient estimates of Lv and Xu (2021) across 127 countries, both of which find that the marginal impact of urbanisation on informality is strongly positive at low development levels and progressively diminishes as economic capacity deepens.

As evidenced by the study's results and supported by the literature, as urbanisation increases, there are greater movements of labour from unskilled rural agricultural sectors towards urban services sectors in the expectation of greater wages. However, the skill gap between both sectors forces unskilled agricultural labour to occupy the informal sector (Lewis 1954). Women are often restricted in their movements outside of zones near their homes by their families, resulting in the feminisation of informal employment. As women in lower-income countries are the primary caregivers, they occupy jobs in the informal sector in hopes of providing that care. Such feminisation opens women to exploitation in terms of lower wages, gender-based violence and sexual exploitation. This points toward a double burden faced by women at the intersection of low income and gender, shaping labour market composition.

This finding is supported by Ohnsorge and Yu (2022) and Chen et al. (2023), who show that higher-income economies possess the capacity to absorb a high supply of labour into formal jobs, given their advanced institutional infrastructure and improved service-sector depth. Piedrahita et al. (2024) document that women in agriculture globally are disproportionately concentrated in informal, seasonal, and unpaid family work, with the share reaching 92% in Sub-Saharan Africa. As female agricultural employment rises, women's labour market options remain structurally tied to the informal sector, driving up the feminisation of informal employment, as this study's positive coefficient confirms.

Although the study's global panel dataset provides a rigorous testing ground, the reliance on an unbalanced dataset due to missing observations in the dependent variable, as is common in macro-labour data, warrants explicit discussion. Missing data on informal employment cannot be strictly random, as lower-income economies with large informal sectors are often limited in their statistical reporting capacity (Ohnsorge and Yu 2022). This leads to a risk of selection bias if the sample disproportionately represents middle-income or higher-income economies. However, the missing data does not fundamentally compromise the reliability of the findings for two reasons. Firstly, the application of country-fixed effects absorbs time-invariant differences in national reporting infrastructure, absorbing the structural lack of data. Secondly, the surviving sample maintains substantial empirical variation across levels of economic development, enabling the mapping of a non-linear transformation curve. Future studies could benefit from using a balanced dataset to employ precise techniques, such as the Hansen (1999) threshold regression model, to test for endogenous breakpoints in the identified non-linear relationship.

The drop in the R^2 towards the main model is expected given the sticky nature of macro-demographic variables such as urbanisation and structural employment as they gradually shift over time. The inclusion of country-fixed effects absorbs the vast majority of such cross-sectional variation. Thus, while urbanisation and economic development offer some insight into the behaviour of the informal sector, the inherent, systemic make-up of the socioeconomic and institutional landscape of a country largely determines the operation of informal employment.

6. CONCLUSION

The fixed effects reveal that the effect of urbanisation on the feminisation of informal employment is not standard across GDP per capita levels, a relationship that is not completely captured using linear assumptions. Coefficients of the interaction terms and the marginal effects show that an increase in the GDP per capita of an economy cushions the adverse effect of urbanisation on female informal employment, before gradually neutralising when the income level crosses a certain threshold.

The evidence leads to the conclusion that effective policies must move beyond uniform prescriptions and instead focus on context-specific and tailored interventions that address the structural and intersectional barriers faced by women in low-income markets at varying income levels, supporting the transition to and the maintenance of formal and highly productive work in the long run.

7. RECOMMENDATIONS

The nonlinear trajectory identified in this study has direct consequences for how policy should be designed and for whom. Since the marginal effect of urbanisation on female informal employment is high in low-income economies, blanket formalisation drives across all development levels may be ineffective. Policy must be calibrated to where a country sits on the development curve. For low-GDP countries like much of Sub-Saharan Africa and South Asia, including Pakistan, where urbanisation pulls women into the informal sector, the priority must be addressing structural constraints that make informality the only option. These constraints are spatial, institutional, and cultural. Urban planning should be gender-responsive, with affordable public transport connecting informal settlements to formal employment zones, upgrading those settlements to support home-based businesses, and safe public infrastructure that removes sanitation-related violence risks (Kayser et al., 2019). Medellín's Metrocable system (Bocarejo et al., 2014) provides a replicable precedent for this kind of low-income urban intervention.

For middle income countries, where the marginal effect of urbanisation on informal female employment begins to flatten, the policy challenge becomes less about structural transformation and more about managing the transition itself. Infrastructure for institutional formalisation, such as social security registration and labour inspections, is taking shape but remains uneven. The most effective lever here would be targeted upskilling that reaches workers already in the informal sector. State-funded training programmes that accommodate women's care burdens through flexible scheduling, subsidised childcare, and recognition of informally acquired skills can quicken the movement into formal employment (Rawat 2025). Inclusion of informally employed women in minimum wage coverage and social protection also reduces the cost advantage that informal employers extract from gender wage gaps.

In high-income countries, the marginal effect of urbanisation on female informality is neutral, so the concern shifts to prevention of regression. Even in these settings, Ohnsorge and Yu (2022) document that female informality exists in the form of domestic labour, platform gig labour, and seasonal agriculture. Recognition of care work in pension systems, extension of social protection and labour rights to domestic workers, and active re-entry programmes for women who have stepped out of formal employment are meaningful interventions. Across all three groups, the informal sector does not respond to uniform pressure, so effective policy must read the development curve rather than fight against it in the form of one size fits all solutions.

8. REFERENCES

Aronsson, A.E., Vidaurre-Teixidó, P., Jensen, M.R., Solhaug, S. and McNamara, C. 2023, 'The Health Consequences of Informal Employment Among Female Workers and Their Children: A Systematic Review', *Global Health*, vol. 19, e59, <https://doi.org/10.1186/s12992-023-00958-1>.

Banerjee, B. 1983, 'The Role of the Informal Sector in the Migration Process: A Test of Probabilistic Migration Models and Labour Market Segmentation for India', *Oxford Economic Papers*, vol. 35, no. 3, pp. 399–422, <https://doi.org/10.1093/oxfordjournals.oep.a041604>.

Bocarejo, J.P., Portilla, I.J., Velásquez, J.M., Cruz, M.N., Peña, A. and Oviedo, D.R. 2014, 'An Innovative Transit System and Its Impact on Low Income Users: The Case of the Metrocable in Medellín', *Journal of Transport Geography*, vol. 39, pp. 49–61, <https://doi.org/10.1016/j.jtrangeo.2014.06.018>.

Bussolo, M. and Rexer, J. 2025, 'Urbanisation Vs. Tradition: The Paradox of Female Labour Force Participation in South Asia', *OECD Development Matters*, 23 February, <https://oecd-development-matters.org/2025/02/23/urbanisation-vs-tradition-the-paradox-of-female-labour-force-participation-in-south-asia/>.

Chen, M., Huang, X., Cheng, J., Tang, Z. and Huang, G. 2023, 'Urbanization and Vulnerable Employment: Empirical Evidence from 163 Countries in 1991–2019', *Cities*, vol. 135, e104208, <https://doi.org/10.1016/j.cities.2023.104208>.

De Janvry, A. 1981, *The Agrarian Question and Reformism in Latin America*, Johns Hopkins University Press, Baltimore.

Djeufack Dongmo, A., Mbengono Coralie, P., Chetue Komguep, M. and Kembeng Tchinda, U. 2023, 'Urbanization, Informal Economy, Economic Growth and CO2 Emissions in African Countries: A Panel Vector Autoregression (PVAR) Model Approach', *Journal of Bioeconomics*, vol. 25, pp. 35–63, <https://doi.org/10.1007/s10818-022-09331-5>.

Dogar, A.A., Shah, I., Mahmood, T., Elahi, N., Alam, A. and Jadoon, U.G. 2022, 'Impact of Covid-19 on Informal Employment: A Case Study of Women Domestic Workers in Khyber Pakhtunkhwa, Pakistan', *PLOS ONE*, vol. 17, e0278710, <https://doi.org/10.1371/journal.pone.0278710>.

Driscoll, J.C. and Kraay, A.C. 1998, 'Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data', *The Review of Economics and Statistics*, vol. 80, no. 4, pp. 549–560, <https://doi.org/10.1162/003465398557825>.

Elgin, C. and Elveren, A.Y. 2021, 'Informality, Inequality, and Feminization of Labor', *Women's Studies International Forum*, vol. 88, e102505, <https://doi.org/10.1016/j.wsif.2021.102505>.

Elgin, C. and Oyvat, C. 2013, 'Lurking in the Cities: Urbanization and the Informal Economy', *Structural Change and Economic Dynamics*, vol. 27, pp. 36–47, <https://doi.org/10.1016/j.strueco.2013.06.003>.

Furtado, C. 1970, *Economic Development of Latin America: Historical Background and Contemporary Problems*, 2nd edn, Cambridge University Press, Cambridge.

Gangopadhyay, P. and Shankar, S. 2016, 'Labour (Im)mobility and Monopsonistic Exploitation of Workers in the Urban Informal Sector: Lessons from a Field Study', *Urban Studies*, vol. 53, no. 5, pp. 1042–1060, <https://doi.org/10.1177/0042098015571056>.

Gillani, D.Q., Shah, H.S. and Bashir, H.N. 2021, 'Gender and Urban Informal Sector Employment: An Analysis from Southern Punjab, Pakistan', *Journal of Economic Impact*, vol. 3, no. 3, pp. 152–157, <https://doi.org/10.52223/jei3032104>.

Gunatilaka, R. 2008, *Informal Employment in Sri Lanka: Nature, Probability of Employment, and Determinants of Wages*, International Labour Organization, Geneva, <https://www.ilo.org/publications/informal-employment-sri-lanka-nature-probability-employment-and>.

Hansen, B.E. 1999, 'Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference', *Journal of Econometrics*, vol. 93, no. 2, pp. 345–368, <https://doi.org/10.1016/S0304-4076(99)00025-1>.

Harris, J.R. and Todaro, M.P. 1970, 'Migration, Unemployment and Development: A Two-Sector Analysis', *The American Economic Review*, vol. 60, no. 1, pp. 126–142, <https://www.jstor.org/stable/1807860>.

Horn, Z.E. 2010, 'The Effects of the Global Economic Crisis on Women in the Informal Economy: Research Findings from WIEGO and the Inclusive Cities Partners', *Gender & Development*, vol. 18, no. 2, pp. 263–276, <https://doi.org/10.1080/13552074.2010.491339>.

ILOSTAT 2025, 'Informal Employment Rate', International Labour Organization, viewed 17 September 2026, <https://ilostat.ilo.org/data/snapshots/informal-employment-rate/>.

Jütting, J.P. and De Laiglesia, J.R. 2009, 'Employment, Poverty Reduction and Development: What's New', in Jütting, J.P. and De Laiglesia, J.R. (eds) *Is Informal Normal?*, OECD Publishing, Paris, pp. 17–26.

Kar, S.K. and Somani, A. 2015, 'Impact of Rapid Urbanization on Women's Mental Health: A Review of Literature', *Delhi Psychiatry Journal*, vol. 18, no. 1, pp. 171–176.

Kayser, G.L., Rao, N., Jose, R. and Raj, A. 2019, 'Water, Sanitation and Hygiene: Measuring Gender Equality and Empowerment', *Bulletin of the World Health Organization*, vol. 97, pp. 438–440, <https://doi.org/10.2471/BLT.18.223305>.

Khan, T. and Khan, R.E.A. 2009, 'Urban Informal Sector: How Much Women Are Struggling for Family Survival', *The Pakistan Development Review*, vol. 48, no. 1, pp. 67–95, <https://doi.org/10.30541/v48i1pp.67-95>.

Kiaga, A. and Leung, V. 2020, 'The Transition from the Informal to the Formal Economy in Africa', Global Employment Policy Review, Chapter 5, International Labour Organization, viewed 17 March 2026, <https://www.ilo.org/publications/transition-informal-formal-economy-africa-0>.

Lewis, W.A. 1954, 'Economic Development with Unlimited Supplies of Labour', *The Manchester School*, vol. 22, no. 2, pp. 139–191, <https://doi.org/10.1111/j.1467-9957.1954.tb00021.x>.

Lipton, M. 1982, 'Why Poor People Stay Poor', in Rural Development, 1st edn, Routledge, p. 16, <https://doi.org/10.4324/9781003431763>.

Lv, Z. and Xu, T. 2021, 'Urbanization and the Informal Economy: New Evidence from Partially Linear Functional-Coefficient Models', *Cities*, vol. 119, e103383, <https://doi.org/10.1016/j.cities.2021.103383>.

Maqsood, H., Che Sulaiman, N.F., Muhamad, S. and Akmal Binti Rohaizad, N.A. 2024, 'Women's Economic Underdevelopment in Pakistan: The Intersection of Gender and Female Labour Force Participation', *Human Systems Management*, vol. 43, no. 6, pp. 872–884, <https://doi.org/10.3233/HSM-240002>.

Mitra, A. 2005, 'Women in the Urban Informal Sector: Perpetuation of Meagre Earnings', *Development and Change*, vol. 36, no. 2, pp. 291–316, <https://doi.org/10.1111/j.0012-155X.2005.00412.x>.

Mitra, A. and Tripathi, S. 2024, 'Do More Women Find Employment as the Urban Population Grows?', *Theoretical and Empirical Researches in Urban Management*, vol. 19, no. 2, pp. 88–117.

Mohiuddin, Y. 1982, 'Female Handicraft Workers: The Invisible Hands', *Pakistan and Gulf Economist*, pp. 20–26.

Moser, C.O.N. 1978, 'Informal Sector or Petty Commodity Production: Dualism or Dependence in Urban Development?', *World Development*, vol. 6, nos. 9–10, pp. 1041–1064, <https://doi.org/10.1016/0305-750X(78)90062-1>.

Nguyen, T.T.H. and Pham, T. 2024, 'The Impact of Urbanization on Informal Employment: Evidence from Vietnam', *Tạp chí Kinh tế và Phát triển*, <https://doi.org/10.33301/JED-05-2024-0035>.

Ohnsorge, F. and Yu, S. (eds) 2022, *The Long Shadow of Informality: Challenges and Policies*, World Bank, Washington, DC, <https://doi.org/10.1596/978-1-4648-1753-3>.

Ortiz-Ospina, E., Samborska, V., Ritchie, H. and Roser, M. 2026, 'Urbanization', *Our World in Data*, originally published September 2018, substantially updated May 2026, <https://ourworldindata.org/urbanization>.

Piedrahita, N., Costa, V. and Mane, E. 2024, 'Gender Gap in Agricultural Labour Productivity: A Cross-Country Comparison: Background Paper for The Status of Women in Agrifood Systems', FAO, Rome, <https://doi.org/10.4060/cc9118en>.

Rawat, V. 2025, 'Women Workers in the Informal Sector, Challenges and Opportunities: A Systematic Review and Suggested Ways Forward', *International Journal for Multidisciplinary Research*, vol. 7, no. 5, September–October, <https://doi.org/10.36948/ijfmr.2025.v07i05.55984>.

Rogan, M. and Alfers, L. 2019, 'Gendered Inequalities in the South African Informal Economy', *Agenda*, vol. 33, no. 4, pp. 91–102, <https://doi.org/10.1080/10130950.2019.1676163>.

Strachan, G. and Adikaram, A.S. 2023, 'Women's Work in South Asia: Reflections on the Past Decade', *South Asian Journal of Human Resources Management*, vol. 10, no. 2, pp. 244–255, <https://doi.org/10.1177/23220937231198381>.

Tanabe, K. and Angel-Urdinola, D.F. 2012, 'Micro-Determinants of Informal Employment in the Middle East and North Africa Region', Social Protection Discussion Paper, no. 1201, World Bank, <https://doi.org/10.1596/26828>.

Thompson, K. 2017, 'Modernization Theory', *ReviseSociology*, 19 September, last updated 29 June 2025, <https://revisesociology.com/2017/09/19/modernization-theory/>.

Tomoiagă, E. and Pop Silaghi, M.I. 2023, 'Internal Migration in Romania: Revisiting the Harris-Todaro Model of Migration', *European Journal of Interdisciplinary Studies*, vol. 15, no. 2, pp. 176–185, <https://doi.org/10.24818/ejis.2023.23>.

United Nations Department of Public Information 2000, *The Feminization of Poverty*, Beijing+5: Fact Sheet No. 1, DPI/2035/A, United Nations, New York, May, viewed 25 September 2026, <https://www.un.org/womenwatch/daw/followup/session/presskit/fs1.htm>.

United Nations, Department of Economic and Social Affairs, Population Division 2025, *World Urbanization Prospects 2025*, <https://www.un.org/development/desa/pd/world-urbanization-prospects-2025>.

Yoda, A.H. 2025, 'Do Remittances Reduce Labor Force Participation in Sub-Saharan African Countries? Empirical Evidence of Heterogeneous Effects and Economic Opportunity Channels', *Cogent Economics & Finance*, vol. 13, no. 1, e2528445, <https://doi.org/10.1080/23322039.2025.2528445>.