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Wage Uncertainty and Intra-Household Labor Allocation: Evidence from an Emerging Economy

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Abstract

Wage uncertainty represents an important source of economic insecurity, potentially influencing household employment decisions, income stability, and labor allocation. In this study, the authors analyzed the regional economic situation related to wage insecurity and allocation of labor resources within the family in Russia over the period 2000-2019. Secondary economic data such as regional consumer price indices, gross regional product per capita, minimum wage indicators and annual working days were used in this quantitative descriptive approach. Regional economic disparities, fluctuations in inflation, and the working calendar changes were analyzed with descriptive statistics and comparative trend analysis. The results showed that in 2019, there were significant disparities in the nominal economic output per capita between the Russian federal districts, with the Ural Federal District having the largest GDP per capita. Inflation across the region has dropped from 20.36% in 2000 to 3.05% in 2019 but with occasional spikes, suggesting the presence of economic instability. The number of working days per year was fairly constant during the period observed. These results identified the regional variations of the economic situation that could affect the ability of the household to spend and also their employment. However, the wage uncertainty effects could not be estimated directly due to the lack of wage history data and data on household labour supply. More research is needed that combines longitudinal information on the household to examine the ability of households to adjust their labor supply and their economic resilience.

Keywords: Wage Uncertainty, Intra-Household Labor Allocation, Labor Supply, Regional Economic Disparities, Household Economic Resilience

1. Introduction

Wage uncertainty is an important aspect of economic insecurity, especially in the emerging economies where labour markets are highly unstable, with irregular work and wage growth and limited access to social protection measures. Unpredictable income affects household savings, employment choices, and who in the household is doing what. Unpredictable earnings affect household consumption, savings, employment choices and who does what in the household. Labour supply decisions in the household are not made by individuals alone, as employment decisions depend on the financial commitment, bargaining power, and expectations about future earnings of the household members. If one family member is faced with uncertainty about their income, other family members may change their working status or hours of work to ensure the economic viability of the family. These changes in the household sector are key to understanding household resilience and the distribution of economic risks. The results of Jose (2024), from rural Ethiopia, strongly emphasize the relevance of intra-household responses to economic instability, focusing on income shocks and how they affect household resource allocation.

In most traditional models of labor supply, individual preferences, wages, and the consumption-leisure tradeoff are all key. However, collective household models recognize that family members may have different preferences, resources, and bargaining positions. Household preferences are thus negotiated and do not appear as a single uniform decision. The relationship of relative earnings may have a bearing on decision making, budgetary priorities and who does what. These relationships are complicated by income concealment, which impacts the information household members have and can change economic cooperation (Zhou & Mahadeshwar, 2024). Empirical studies have helped to understand these relationships by studying the negotiation dynamics, preferences of individuals and resource allocation within the family (Munro, 2025). These views enable a study of the association between wage insecurity and labour allocation, both via financial rewards and household decision-making mechanisms.

Intra-household labour allocation involves choice of employment participation, working time, domestic workload and unpaid care work. These activities are interrelated since increased hours spent in paid work can result in less time spent in unpaid work within the household. Thus, wages can affect the choice of market and nonmarket labor. Bargaining models point to the fact that the division of responsibilities is influenced by the relative contribution and decision-making power of the parties. Vietnam case studies provide evidence of the importance of intra-household

bargaining in understanding of unpaid work arrangements (Le et al., 2025). Likewise, studies on women's economic outcomes in Togo highlight the prospective significance of the bargaining power they use as a wedge in their response to income generation opportunities (Patte, 2026). The results indicate that wage uncertainty can lead to different responses depending on the household type, the productive capacity of the household members, and the distribution of economic power within the household.

The relationship between income and household responsibilities also extends beyond immediate employment decisions. The disparity in relative earnings can affect relative fairness, household satisfaction and household division of unpaid work. A study that looks at intra-household relative income and happiness before and after the COVID-19 period noted that it is important to take into account paid and unpaid responsibilities together (Grabowska, 2026). In addition, receipt of income and the ability to observe transfers could have an impact on resource distribution within the household, depending on who receives the transfers. Studies on the effectiveness of conditional cash transfers for mothers highlight the importance of information and observability in intra-household allocation (Banerjee & Klasen, 2022). Similarly, in Ecuador, studies on poverty transfers show that it is not possible to assume that household income is reached equally but rather focus on the individual shares. The same applies to Ecuador with its studies on poverty transfers, where it was crucial to look at the shares rather than assuming that the household income was equally distributed.

The relationships are especially relevant in emerging economies, where households may experience significant inter-regional disparities in terms of development and job prospects and institutional protection. An unstable economy may impact family members in varying ways based on their employment status and resources. Furthermore, the division of household labour can be determined by administrative needs and inequity of access to public services. Another dimension of household responsibilities that is not captured by research on intra-household distribution of administrative burdens is the unequal distribution of tasks within the household. The relevance of collective household models for resource sharing (Majumder & Mitra, 2023) is also supported by evidence from India. In broader micro-economic poverty analyses the importance of the study of the behaviour of households within institutional and economic constraints is stressed (Djeraimi, 2025). Household technologies and resource availability are also intricately connected to

household duties and livelihoods opportunities: this is illustrated by research on clean cooking in the Global South (Alem, 2026).

Even though these contributions have been made, it is important to note that there is still a difference between realised wage changes and uncertainty about future wages. Temporary losses of income, permanent decreases in wages, and irregular income receipts can have varying effects on households. While regional economic circumstances can offer some context, the individual's response to those conditions and his/her wage track record, along with household labor supply data, are needed to determine these behavioral reactions. With regard to this, the present study aims to analyze the concept of wage insecurity, the labor allocation within the household and the possible differences in its reactions among members of the household. Taking this into account, the present study will consider the conceptual link between economic instability, intra-household labor allocation decisions, and possible differences in the reactions of the members of the household. The study was guided by three research objectives:

1. To examine the relationship between wage uncertainty and household labor supply decisions in an emerging economy.
2. To assess how own-wage and spouse-wage changes may influence the allocation of paid labor within households.
3. To evaluate the relevance of regional economic conditions and household characteristics for understanding labor supply adjustments.

2. Materials and Methods

2.1 Study Design

The study used a quantitative, longitudinal research design to examine the link between wage uncertainty and allocation of labor among family members in an emerging economy. Russia was chosen as the empirical context since the labor market was favourable to study how wages and economic volatility affected households. The analytical framework centred on married or cohabiting couples where employment, earnings and demographic data could be traced across various survey rounds (Zamnius, 2026). A panel approach at the household level has been used to investigate labour supply changes at the household level with attention to the persistent unobserved differences between households. The study looked at individual and combined decisions regarding labor supply and especially at the dependence of the working hours of husbands and wives. The

longitudinal structure enabled the analysis of wage-related adjustments, while controlling for the common temporal economic conditions.

2.2 Study Variables

The primary outcome measures were working hours of husbands and wives which represented intra-household labor supply. An additional outcome where available was employment participation. Own-wage uncertainty and spouse-wage uncertainty, representing potential variability in one's own and spouse's wages, respectively, were the primary explanatory variables. Real hourly wages were calculated using reported earnings and working hours when both were reported and comparable. Control variables such as household characteristics (age, educational attainment, household composition and income) were included. The regional economic indicators were also included to reflect the diversity in labour market conditions across the regions. Inflation has been adjusted for monetary variables, using the corresponding consumer price indices. Extreme observations were considered for continuous variables and categorical characteristics were coded for regression analysis. Variable definitions were consistent from one survey period to another, for better comparability.

2.3 Wage Measurement

Wage uncertainty was defined as variability in expected wage outcomes that is not due to standard variation of observed wages. Each wage path was analyzed to separate systematic from unexpected changes to wages. A specification of the wage process that accounts for observable individual characteristics and the time-invariant portion of the process was suggested to estimate wage innovations. The innovations were conditionally varying and gave rise to an estimate of wage uncertainty if there were enough repeated observations and identification of the model. The realized wage shocks were separated into positive and negative to examine potential asymmetric labor supply effects. Own-wage measures were used to quantify uncertainty over the individual, while spouse-wage measures quantified uncertainty over the partner's wages. Changes in weekly working hours were used to assess labor supply adjustments. This separation between uncertainty and realized wage shocks was preserved with the analytical framework to ensure that uncertainty and realized wage shocks are not considered synonymous.

2.4 Statistical Analysis

The method used for analysis was a mixture of descriptive statistics and panel data econometric modelling. Household characteristics, wages and working hours were summarized using means, standard deviations, frequencies and distributional measures. A preliminary correlation analysis was performed to look at preliminary associations between the economic variables. To account for the unobservables that vary across households and across years, fixed-effects regression models were suggested to estimate the relationships between wage uncertainty and labour supply. Specifications were created separately for husbands and wives to determine differences in own-wage and cross-wage relationships. Gender and socioeconomic characteristics were included as interaction terms to test for moderation of estimated associations. Within-household dependence was to be adjusted for by clustering standard errors at the household level. Several regression coefficients, 95% confidence intervals, and associated probability values were chosen to be statistically reported. The possibility for simultaneity between wages and working hours was acknowledged when reading off estimates, and causal statements were only made for specifications for which there was a credible identification assumption.

2.5 Model Validation

Planned robustness and sensitivity analyses were used to address model reliability. Several alternative wage uncertainty specifications were explored to determine if the estimated relationships were sensitive to the operational definition of earnings risk. Other models with various sets of demographic and regional controls were proposed to test the stability of coefficients. To compare labor supply reactions between genders, education and household income levels, heterogeneity analyses were created. Sensitivity to very high and very low wage observations as well as incomplete household records was also taken into account. Potential sample attrition was considered a source of selection bias to be examined. When possible, other sample restrictions and estimation procedures were suggested to assess the consistency of the main results. The statistical results were interpreted to account for differences between strong associations and those that may be influenced by measurement error, omitted variables or reverse causality. These procedures gave an outline of the measures of credibility and reproducibility in the empirical analysis.

3. Results

3.1 Household Characteristics

Gross regional product (GRP) per capita increased across all eight Russian federal districts between 2000 and 2019. As shown in Table 1, the Ural Federal District recorded the highest nominal GRP per capita in 2019 (1,070,596.6 rubles), followed by the Central Federal District (835,858.8 rubles). The North Caucasian Federal District recorded the lowest value (232,012.9 rubles).

Table 1. Gross Regional Product per Capita Across Federal Districts

Federal District	2000	2019
Central	48,205.0	835,858.8
Northwestern	40,564.9	752,847.2
Southern	23,417.9	400,883.7
North Caucasian	13,802.7	232,012.9
Volga	32,791.7	480,457.9
Ural	69,327.3	1,070,596.6
Siberian	34,893.0	535,321.0
Far Eastern	39,782.0	730,107.7

3.2 Wage Uncertainty

Regional inflation varied considerably during the study period. Table 2 shows that mean inflation declined from 20.36% in 2000 to 3.05% in 2019. However, inflation increased to 12.88% in 2015. Figure 1 illustrates these changes in mean and median regional inflation. The inflation range reached 17.30 percentage points in 2015 but declined to 3.20 percentage points in 2019, as illustrated in Figure 2. These results indicate changing regional price conditions rather than directly measured individual wage uncertainty.

Table 2. Regional Inflation Statistics

Year	Mean (%)	Median (%)	Minimum (%)	Maximum (%)
2000	20.36	20.50	12.20	28.00

2005	11.43	11.10	7.50	21.50
2010	9.22	9.40	1.40	13.90
2015	12.88	12.60	10.30	27.60
2019	3.05	3.00	1.60	4.80

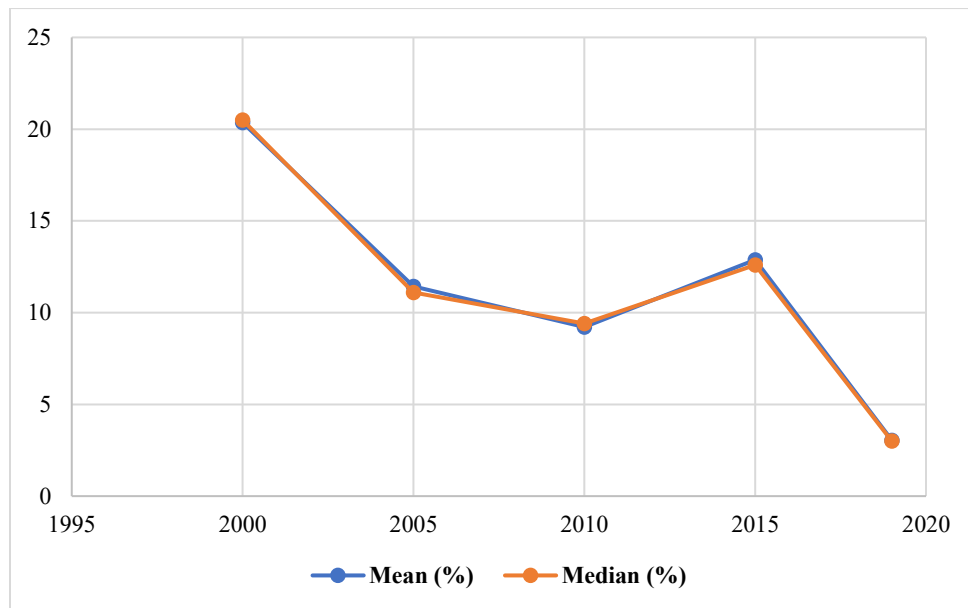


Figure 1. Mean and Median Regional Inflation Trends

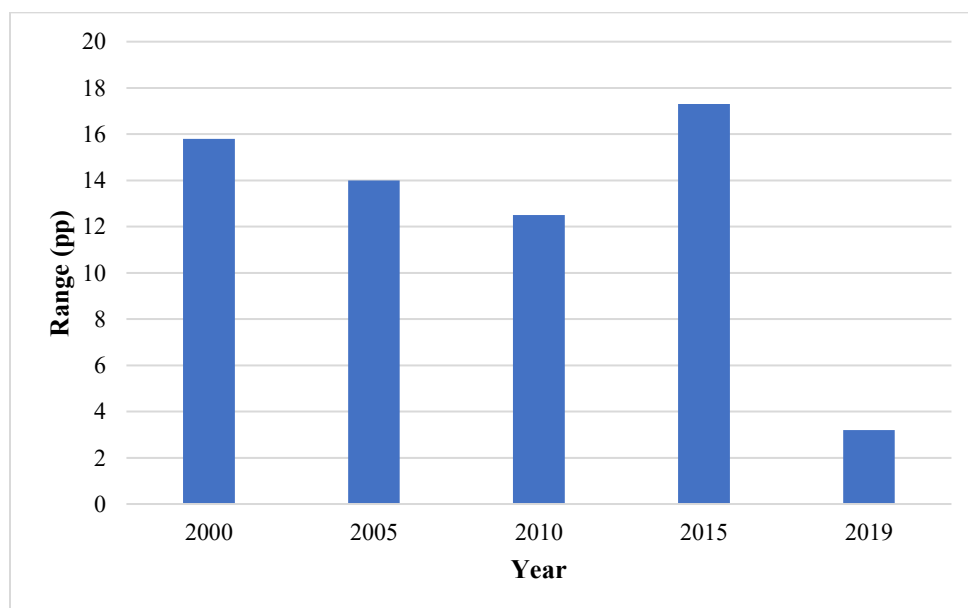


Figure 2. Regional Inflation Dispersion Across Selected Years

3.3 Wage Effects

National inflation decreased from 20.2% in 2000 to 3.0% in 2019, although it increased to 12.9% in 2015. Table 3 presents the corresponding price adjustment factors, which increased from 0.832 in 2000 to 0.971 in 2019. Figure 3 illustrates the variation in these factors across selected years. These findings describe purchasing-power conditions but do not establish the effects of individual wages or spousal wages on household labor supply.

Table 3. Inflation and Price Adjustment Factors

Year	Inflation (%)	Price Adjustment Factor
2000	20.2	0.832
2005	10.9	0.902
2010	8.8	0.919
2015	12.9	0.886
2019	3.0	0.971

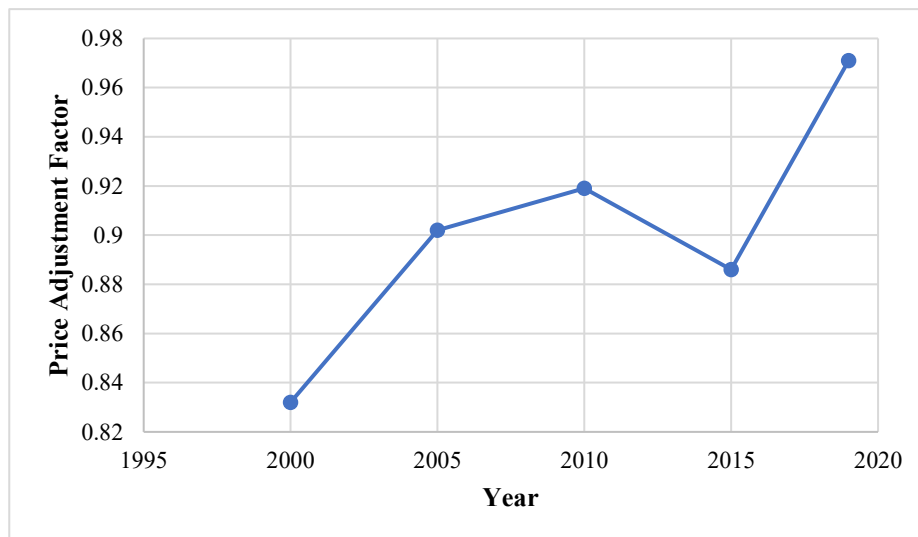


Figure 3. Changes in Price Adjustment Factors

3.4 Robustness Analysis

Annual working-day observations showed limited variation between 2000 and 2019. As presented in Table 4, working days ranged from 247 to 250 across the selected years, while the full-period range was 247–251 days, with an average of 248.55 days. Figure 4 illustrates the variation in

annual working days. Although these indicators support calendar adjustments in labor supply analysis, econometric robustness testing was not possible without individual wage and employment observations.

Table 4. Annual Working-Day Indicators

Year	Calendar Days	Working Days	Nonworking Days
2000	366	250	116
2005	365	248	117
2010	365	249	116
2015	365	247	118
2019	365	247	118

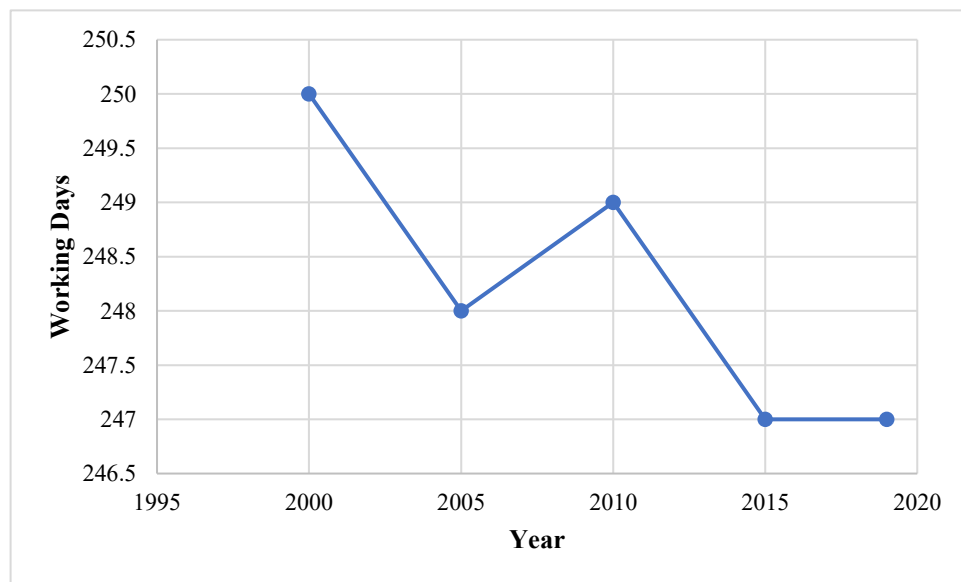


Figure 4. Annual Working-Day Variation, 2000–2019

4. Discussion

The present study analyzed the economic conditions for wage uncertainty and intra-household labor allocation in Russia in 2000-2019. The results of the descriptive analysis showed that there were considerable differences between the regions in terms of gross regional product per capita, significant volatility in the inflation rates and comparatively low variation in the number of working days per year. These patterns brought the subject of the evolving economy into which

households were making decisions about employment and finance. The indicators available offer some insight into regional economic uncertainty, but were not directly used to determine the impact on working hours and employment participation of the uncertainty of wages. Thus, the results should be viewed as contextual rather than estimates of household labor supply responses. This difference is crucial in assessing the effects of economic shocks on intra-household labour reallocation.

One of the significant results of the analysis was the regional economic differences. In 2019, the nominal economic output per capita was significantly higher in the Ural and Central Federal Districts than in the North Caucasian Federal District. These disparities could be due to industrialization, job availability, productivity, and economic differences between areas. But increased production in a region does not necessarily translate into increased income security for households or more equitable allocation of labor. Both the supply and the demand for household labor could be subject to economic development. Research that looks at agricultural mechanization and intra-household labour supply can offer a relevant perspective on the impact of changes in agricultural conditions on the division of labour among family members (Brudevold-Newman et al., 2025). Therefore, the regional differences in economies should be taken into account when examining the reactions of households to income uncertainty.

Another key aspect of the findings was the level of inflation variability. The overall trend of regional mean inflation from 2000 to 2019 was fairly sharp downward, with a few temporary spikes suggesting continued economic instability. In 2015, the increased inflation rates indicated that households experienced some more acute shocks on purchasing power. Under such circumstances, consumers may be affected in their consumption, precautionary saving and necessity for extra income. The theoretical explanation of these adjustments provided by household insurance mechanisms is useful because, when income becomes uncertain, family members could be expected to adjust financial responsibilities. The role of family in the transmission of intergenerational income risk and intra-household insurance literature highlights the significance of familial relationships in the dynamics of economic vulnerability (Agostinelli et al., 2024). However, the present analysis was not able to conclude whether fluctuations in inflation led to further jobs or working hours changes.

In many cases, the allocation of household duties can also rely on institutional factors and economic opportunities. The availability of employment, transportation, markets, and financial

resources that households have may vary by region. These disparities can affect their capacity to adapt their economic activities when facing uncertainty. The study on intra-household marketing decision among smallholder farmers in Uganda demonstrates the importance of institutional and technical factors in explaining household economic decisions (Lukwago et al., 2025). While the Russian context is different from agriculture in the developing world, the overall message is the same: household responses cannot be explained solely by the wages landscape and must take into account the institutional environment.

It is important to consider theoretically the link between labour-market shocks and household reallocation. If one household member's income drops unexpectedly, another household member may work more or take on more jobs to compensate for the loss of income. But also, a decline in employment opportunities can constrain the flexibility of households to respond to changes in their labor supply. Shifts in employment conditions can also impact on family stability and bargaining relations. The relevance of intra-household adjustment in the context of labour-market shocks, divorce and employment instability is highlighted in research that looks at a combination of household changes (Kureishi et al., 2025). In the current data set, however, there were no individual wage histories, nor observations of employment for spouses, so these mechanisms could not be directly examined.

Additionally, the findings have implications for understanding financial vulnerability of households. Households with lower savings levels, no job security, big debt loads and no other way to make income may be impacted by unexpected economic events in a different way than those who have high savings, job security, low debt loads and other income sources. While some regional indicators of inflation and economic output can be used to capture times and places of higher economic pressure, they don't directly capture household financial fragility. These studies of the unexpected and household financial fragility offer a complementary lens on the potential impact of economic shocks on household stability (Wang, 2026). Likewise, the study on intra-household insurance and income-risk transmission highlights the need to study the financial adjustment of the different members and generations in a household (Ferraro et al., 2025).

There are a number of restrictions to take into account. The data available did not include individual household observations of wage uncertainty or labour supply elasticities. Second, any changes in real household income that might be identified in nominal regional output would be confounded by changes in output not associated with household incomes. Third, the trends in

descriptive inflation did not differentiate between expected economic changes and unexpected wage shocks. Lastly, unestimated were responses for gender and econometric robustness tests. Further research would take into account longitudinal household wage data, spousal working hours, demographic attributes and regional economic factors. Such a strategy would enable more robust evaluation of the household risk-sharing strategies, labor supply responses, and consequences of wage insecurity on economic resilience.

5. Conclusion

This paper analyzed the economic factors driving wage insecurity and intra-household labor allocation in Russia between 2000 and 2019. The results showed significant regional variations in gross regional product per capita, high volatility of inflation rates and little variation in the number of working days per year. The results indicated that after comparing the regions of economic development and the regional changing purchasing-power conditions, they may affect the financial decisions of households and their employment opportunities. Overall, the period of the study saw a decrease in the inflation rates, which indicated improved overall price stability, but also temporary rising inflation rates, showing a continued sensitivity to economic fluctuations. The analysis highlighted the need to take regional economic factors into account in the research into the reactions of households to uncertain earnings. Households' ability to deal with financial pressures may vary due to different economic development, inflation, and labor market environments. The information available did not, however, include individual wage histories, spouses' work histories or household working hours. The study therefore did not develop direct links between wage uncertainty and intra-household labour allocation and estimate own and cross-wage effects. Future research should also involve longitudinal household-level observations, in addition to regional economic indicators, to analyze how labor supply responds, how households' risk-sharing capabilities change, and how employment responds. The use of panel data econometric techniques will further enhance the identification of wage-related effects and the understanding of economic uncertainty behaviour of households. This evidence can feed into Labor Market Policies, income protection policies, and policies and strategies to promote household economic resilience in emerging economies.

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