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Macroeconomic Instability and Gender Inequality in Labor Markets in the Developing Countries

ATANGANA ONDOA Henri

atanganaoondoa@yahoo.fr

University of Yaoundé II

NGACHILI NJIKAM Youssouf

ngachilinjikamyoussouf@gmail.com

University of Yaoundé II

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MACROECONOMIC VOLATILITY AND GENDER INEQUALITY IN LABOR MARKETS: EVIDENCE FROM DEVELOPING ECONOMIES

Abstract

This study examines the relationship between macroeconomic volatility and gender inequality in labor markets in developing countries. Although gender equality is widely recognized as a key driver of inclusive and sustainable economic development, women continue to face persistent disparities in employment opportunities, wages, and access to productive resources. These inequalities are often exacerbated by unstable macroeconomic environments characterized by fluctuations in economic growth, inflation, exchange rates, and fiscal imbalances. Using a panel dataset covering 148 developing countries over the period 2000–2023, this paper investigates how macroeconomic instability influences gender disparities in labor market participation and wage outcomes. The empirical analysis relies on a dynamic panel estimation using the Generalized Method of Moments (GMM) to address potential endogeneity issues and unobserved heterogeneity across countries. The results indicate that macroeconomic volatility significantly increases gender inequalities in economic participation, as women are disproportionately concentrated in vulnerable and informal sectors that are highly sensitive to economic shocks. Furthermore, the findings reveal a nonlinear relationship between macroeconomic instability and gender wage inequality, suggesting that economic shocks initially widen gender wage gaps before institutional responses and labor market adjustments partially mitigate these disparities. These results highlight the importance of implementing gender-sensitive macroeconomic policies, strengthening social protection systems, and promoting inclusive labor market institutions in order to reduce women's vulnerability to economic shocks and foster equitable and sustainable development in developing countries.

Keywords: *Macroeconomic volatility; Gender inequality; Labor market; Developing countries; Economic shocks; Inclusive development.*

JEL Classification : *E32 ; J16 ; J21 ; O11 ; O15*.

1. Context

Gender equality constitutes a fundamental pillar for social and economic transformation in developing countries. It is essential not only for ensuring individual well-being but also for promoting inclusive and sustainable economic growth (World Economic Forum, 2023 ; UN Women, 2022). Despite progress in access to education and health services, gender inequalities persist in critical areas such as labor market participation, access to productive resources, political representation, and leadership opportunities (Kabeer, 2005 ; Duflo, 2012 ; Buvinic et al., 2019). These inequalities reflect a combination of institutional constraints, social norms, and economic barriers that limit women's ability to fully contribute to the economic and social development of their countries (Elson, 1999 ; Seguino, 2010).

In the labor market context, women in developing countries are often overrepresented in the informal sector and precarious employment, which are characterized by low incomes, limited social protection, and high vulnerability to economic fluctuations (Anker, 1998 ; ILO, 2023 ; Maloney, 2004). Their participation in paid employment remains systematically lower than that of men, and they frequently face a double burden of work, combining paid employment with unpaid domestic responsibilities, thereby reinforcing structural inequalities (Elson, 1999 ; Seguino, 2000). This double burden restricts women's access to productive opportunities and hinders the accumulation of human capital, ultimately affecting overall economic growth (Amin et al., 2013).

Macroeconomic instabilities further exacerbate these inequalities. The volatility of macroeconomic indicators—such as gross domestic product (GDP), inflation, interest rates, exchange rates, and fiscal deficits—is particularly pronounced in developing economies due to their exposure to external shocks and the fragility of their financial institutions (Calderón et al., 2008 ; Bloom et al., 2012 ; IMF, 2024). These fluctuations affect not only investment and job creation but also have differentiated impacts on men and women, given women's often more precarious position in the labor market and their greater dependence on essential public services (Papadavid, 2025 ; Bhorat et al., 2021).

Moreover, economic crises have repeatedly demonstrated that women are particularly vulnerable to macroeconomic shocks. Fiscal adjustments and austerity policies, frequently adopted to stabilize economies, may reduce public spending in crucial sectors such as health, education, and childcare services, disproportionately affecting women (Eicher, 2025 ; IMF, 2024). Similarly, periods of recession or economic contraction tend to increase female unemployment, as women are more concentrated in vulnerable or informal sectors (Jaumotte et al., 2013 ; Bardasi & Galli, 2015).

Beyond employment, macroeconomic shocks have multidimensional effects on women's lives. Food crises and fluctuations in commodity prices can increase household vulnerability and reinforce discriminatory practices such as early and forced marriages, limiting access to education and economic opportunities for girls and young women (OECD, 2023 ; World Bank, 2021). Health crises and pandemics, such as the COVID-19 pandemic, have also intensified these inequalities by increasing unpaid care responsibilities and restricting women's participation in the formal labor market (UN Women, 2022 ; McKinsey Global Institute, 2021).

Structural and institutional barriers further aggravate these vulnerabilities. Patriarchal norms, domestic responsibilities, and unequal access to productive resources constrain women's labor market participation and economic autonomy (Duflo, 2012 ; Kabeer, 2016). The absence of adequate social protection systems and limited access to formal financial services reinforce women's economic precarity and dependence on family or informal support systems, making them particularly sensitive to macroeconomic fluctuations (Maloney, 2004 ; Fields, 2007). In this context, macroeconomic instabilities and recent crises—persistent inflation, shocks in food and energy prices, monetary and financial fluctuations, and pandemics—exacerbate gender inequalities, both in employment and in access to essential services and economic security (IMF, 2024 ; Papadavid, 2025 ; AfDB, 2022). These dynamics highlight the

urgent need to design gender-sensitive economic policies capable of protecting women and strengthening their participation in economic and social development.

Finally, the socio-economic context of developing countries demonstrates that gender inequalities are not merely an issue of social justice but also a key determinant of economic resilience and inclusive growth. Promoting gender equality and reducing women's vulnerability to macroeconomic shocks therefore constitute essential conditions for achieving sustainable social transformation and balanced economic growth (World Economic Forum, 2023 ; UN Women, 2022 ; Duflo, 2012 ; Kabeer, 2016 ; Papadavid, 2025).

2. Literature Review

To provide a structured analysis, this literature review is organized into two main parts. The first part presents the theoretical foundations explaining the mechanisms linking macroeconomic instability to gender inequalities, drawing on key approaches from development economics, feminist economics, and macroeconomics. The second part focuses on the empirical review, examining the results of quantitative and qualitative studies that have analyzed the impact of macroeconomic instability on various dimensions of gender inequality in developing countries.

2.1 Theoretical Analysis

The relationship between macroeconomic instability and gender inequality has received increasing attention in the literature on development economics, macroeconomics, and feminist economics. Macroeconomic fluctuations, such as growth volatility, inflation, or economic crises, can have differential effects on men and women due to structural inequalities in labor markets and access to economic resources (Dollar & Gatti, 1999 ; Klasen, 2002 ; Klasen & Lamanna, 2009). Several theoretical approaches explain the mechanisms through which macroeconomic instability can influence gender inequality dynamics.

Feminist economic analyses emphasize that women generally occupy more vulnerable positions within the economic structures of developing countries. They are often concentrated in the informal sector, precarious jobs, and low-productivity activities, making them particularly sensitive to economic fluctuations (Seguino, 2000 ; Benería, 2003 ; Braunstein, 2012). During periods of macroeconomic instability, contractions in economic activity and reductions in labor demand can disproportionately affect women, exacerbating gaps in labor market participation and income between the sexes (Seguino & Grown, 2006).

Moreover, the literature highlights the role of macroeconomic policies in shaping gender inequality dynamics. Economic stabilization policies implemented during crises—particularly fiscal austerity measures—may lead to reductions in public spending on social sectors such as education, health, and social protection (Elson & Cagatay, 2000 ; Stotsky, 2006). These public services are crucial for promoting gender equality, and reductions in such spending can increase women's unpaid domestic workload and limit their participation in formal economic activities (Elson, 1999).

In addition, human capital theory suggests that periods of macroeconomic instability can affect human capital accumulation, particularly through reductions in investment in education and health (Becker, 1964). In many developing countries, economic constraints may lead households to prioritize boys' education over girls', thereby reinforcing gender inequalities in educational attainment and future economic opportunities (Hill & King, 1995 ; Klasen & Lamanna, 2009).

Finally, contributions from development macroeconomics indicate that macroeconomic instability can slow structural transformation processes and limit job creation in high-productivity sectors (Rodrik, 2011). Since women are often underrepresented in these modern economic sectors, periods of instability may further marginalize them economically (Seguino, 2010 ; Braunstein, 2012). Therefore, theoretical approaches suggest that macroeconomic instability can influence gender inequality through multiple

channels, including labor markets, macroeconomic policies, and human capital accumulation. However, empirical analysis is required to validate these mechanisms, as discussed in the following section.

2.2 Empirical Analysis

The empirical literature on the relationship between macroeconomic instability and gender inequality has grown substantially in recent decades. Several studies have shown that macroeconomic fluctuations—such as financial crises, inflation, or growth volatility—have differential effects on men and women, particularly in developing countries with fragile economic and social structures. These effects pertain to labor market participation, income, access to education, and economic opportunities (Dollar & Gatti, 1999 ; Seguino, 2000 ; Klasen & Lamanna, 2009 ; Braunstein, 2012).

Some empirical studies show that macroeconomic instability reduces women's labor market participation. For instance, Seguino (2000) and Seguino & Grown (2006) emphasize that economic crises disproportionately affect women, particularly in formal and industrial sectors where they are underrepresented. Similarly, Braunstein (2012) and Bhalotra & Umana-Aponte (2010) indicate that economic shocks often push women into informal, lower-paid, and more precarious employment. These findings confirm that women experience disproportionately higher losses in economic opportunities during periods of macroeconomic volatility.

Furthermore, several studies highlight the role of macroeconomic policies in exacerbating gender inequalities. Elson & Cagatay (2000) and Stotsky (2006) demonstrate that fiscal austerity and structural adjustment policies lead to reductions in public spending on social sectors—such as education, health, and social protection—which are essential for reducing gender inequality. Elson (1999) also notes that such reductions increase women's unpaid domestic workload and limit their participation in formal economic activities. These results are supported by the World Bank (2012) and Braunstein (2012), which show that social protection and public services are key to supporting women's economic resilience against macroeconomic shocks.

The impact of macroeconomic instability on human capital accumulation has also been documented. Hill & King (1995) show that economic crises often result in reduced investment in education, disproportionately affecting girls. Klasen (2002) and Klasen & Lamanna (2009) confirm that these educational inequalities have lasting effects on women's future economic opportunities and contribute to persistent gender disparities in the labor market.

Finally, several studies underline the crucial role of institutions and public policies in mitigating the effects of macroeconomic instability. Kabeer (2012) and Duflo (2012) show that women's access to credit, education, and productive resources enhances their resilience to economic shocks. Rodrik (2011) and Seguino (2010) stress that macroeconomic instability can hinder structural transformation, limiting the creation of productive jobs in modern sectors where women are already underrepresented. Overall, the empirical literature converges on the idea that macroeconomic instability influences gender inequality through multiple channels: labor markets, macroeconomic policies, human capital accumulation, and institutions. Nevertheless, results remain heterogeneous across countries, periods, and indicators, highlighting the need for further empirical analysis to clarify these mechanisms and assess their magnitude in developing countries.

3. Research Problem

In developing countries, gender equality in the labor market remains a major challenge despite progress in access to education, vocational training, and women's economic empowerment (World Economic Forum, 2023 ; UN Women, 2022). Women continue to be overrepresented in the informal sector, occupy precarious and low-paid jobs, and bear a disproportionate burden of unpaid work (Kabeer, 2005 ; Duflo, 2012). Economic literature shows that these inequalities not only hinder inclusive growth but also compromise the resilience of economies to crises (Seguino, 2000 ; Bardasi & Galli, 2015).

At the same time, women are particularly vulnerable to macroeconomic shocks. Fluctuations in GDP, inflation, currency depreciations, and fiscal deficits affect female employment more strongly and limit access to essential social services (Papadavid, 2025 ; IMF, 2024 ; Petreski et al., 2024). Recent crises, such as the COVID-19 pandemic and global food crises, have exacerbated these inequalities, leading to job losses, increased domestic responsibilities, and school interruptions for girls and women (UN Women, 2022; OECD, 2023; Hacibedel et al., 2023). These phenomena suggest that macroeconomic volatility does not affect all workers uniformly but generates gender-differentiated impacts, aggravating existing vulnerabilities.

The existing literature provides partial analyses: some studies examine the impact of economic crises on female employment (Jaumotte et al., 2013; Bhorat et al., 2021), while others focus on the effects of macroeconomic policies on gendered labor allocation (Papadavid, 2025; Seguino, 2010). However, few studies combine an analysis of macroeconomic volatility, female employment, and public policies across a large sample of developing countries, using robust econometric methods (e.g., 2SLS, GMM) to identify causal relationships (Bhorat et al., 2021; Petreski et al., 2024).

Thus, this study aims to fill this gap by examining the differential effects of macroeconomic volatility on gender inequalities in the labor market. The central research question can be formulated as follows**: How does macroeconomic volatility influence gender inequalities in the labor market in developing countries, and which economic policies can mitigate these effects to promote inclusive and sustainable female participation?**

4. Macroeconomic Instabilities and Gender Inequalities: Descriptive Analysis

Gender has become recognized as a central issue for structural transformation and inclusive development (Kabeer, 1999; World Bank, 2012). In developing countries, gender disparities persist across multiple dimensions—access to education, labor market participation, remuneration, access to productive resources, and reproductive health—thereby hindering the achievement of the Sustainable Development Goals (UN, 2023; UNDP, 2024). However, these inequalities are not solely socio-cultural in origin; they are also shaped by the macroeconomic context, particularly by the degree of economic stability or instability, which influences the distribution of opportunities between men and women (Seguino, 2000; Elson, 2009).

Empirical studies have demonstrated that macroeconomic instability tends to widen gender gaps in labor market outcomes and access to essential public services. Klasen & Lamanna (2009) and Cuberes & Teignier (2016) show that women's underrepresentation in formal employment reduces GDP growth by nearly 2% per year in low-income countries. Similarly, structural adjustment programs and fiscal austerity policies have often led to cuts in social spending (education, health, social protection), disproportionately affecting women and children (Seguino & Braunstein, 2019; UN Women, 2022).

Recent descriptive data reveal contrasting trends across regions. In Sub-Saharan Africa and South Asia, female employment rates remain below 45%, compared with over 55% in Latin America, while wage gaps often exceed 25% in the most economically unstable countries (ILO, 2023; World Bank, 2024). Successive economic crises have also intensified women's labor precariousness, particularly in informal sectors where they represent more than 80% of the workforce (UNDP, 2023; Charmes, 2019). Macroeconomic volatility further increases unpaid domestic work and limits women's economic and social mobility, thereby exacerbating intersectoral and intergenerational inequalities (Elborgh-Woytek et al., 2013; Seguino, 2022).

This section aims to provide an empirical approach to measuring the effect of macroeconomic instability on gender inequalities in the labor market, focusing on developing countries. The first subsection presents a descriptive analysis of the study's main variables and data sources. The second subsection is devoted to the presentation and interpretation of empirical results, highlighting the dynamics specific to the contexts studied.

4.1. Macroeconomic Instabilities and Gender Inequalities : Descriptive Analysis and Data Sources

In this subsection, we present sequentially the stylized effect, the data sources, and the description and justification of the variables used in the study.

4.1.1. *Data Sources and Variable Description*

This part focuses on presenting the different variables and their sources.

4.1.1.1. *Data Sources*

The data used in this study are drawn from several leading international institutions, namely the World Bank (World Development Indicators, 2023), the United Nations Development Programme (UNDP, 2023), the International Labour Organization (ILO, 2023), and the International Monetary Fund (IMF, 2023). These databases are widely recognized for their reliability, comparability, and regularity, providing a robust analytical framework for examining the relationship between macroeconomic instability and gender inequalities in developing countries.

The sample includes 148 developing countries observed over the period 2000–2023, covering 24 consecutive years. This period was chosen for both empirical and structural reasons : first, gender-related indicators (including the Gender Inequality Index, female labor force participation, access to education, and decision-making positions) are consistently available only from 2000 onwards ; second, this period corresponds to intense economic and social transformations in developing countries, marked by globalization, the diffusion of digital technologies, and institutional reforms promoting gender equality.

Combining these sources provides a coherent and integrated overview of the interactions between economic instability and gender disparities, linking economic, social, and institutional aspects. Moreover, the extended temporal coverage and geographic diversity of the data enhance the empirical robustness of the analysis and allow for the identification of structural differences across regions. Finally, the estimation method relies on Ordinary Least Squares (OLS) regression, which is well suited for the quantitative and continuous nature of the dependent variable, enabling a rigorous assessment of how macroeconomic instabilities influence gender inequalities in developing countries during the 2000–2023 period.

4.1.1.2. Variable Description and Justification

The variables used in this study are grouped into two categories: the dependent variable, representing gender inequality, and the explanatory variables, including macroeconomic instability and control variables.

A) Dependent Variable : Gender Inequality

Gender inequalities constitute the dependent variable of this study. They are defined as structural disparities between men and women in access to economic resources, education, employment, and political participation. In developing countries, these inequalities reflect not only social and cultural norms but also economic and institutional imbalances that limit women's empowerment. According to the World Economic Forum (2023), countries with high levels of gender inequality exhibit lower economic growth and weaker human development outcomes.

Empirical studies have highlighted the link between macroeconomic conditions and gender inequality. Addison et al. (2021) show that economic instability reduces women's access to formal employment and financial resources, exacerbating wage gaps. Similarly, UN Women (2023) emphasizes that macroeconomic volatility and financial crises disproportionately affect women due to their overrepresentation in informal and vulnerable sectors. More recently, Agyapong et al. (2024) find that macroeconomic stability is correlated with a significant reduction in labor market participation gaps between men and women in several African countries.

B) Explanatory Variables

The explanatory variables include the main variable, macroeconomic instability, and a set of socio-economic and institutional control variables likely to influence gender inequalities.

a) Macroeconomic Instability

Macroeconomic instability is defined as the volatility or unpredictability of key economic variables (growth rate, inflation, exchange rate, fiscal deficit), generating uncertain conditions for employment, investment, and resource distribution. According to Alesina and Perotti (1996), recurrent economic fluctuations weaken social protection systems and exacerbate existing inequalities. Fischer (1993) adds that volatility in macroeconomic aggregates reduces households' capacity, particularly women's, to access stable employment and productive resources.

Conceptually, macroeconomic instability influences gender inequality through multiple channels. First, it limits women's access to the formal labor market, which is often more sensitive to economic shocks. Addison et al. (2021) note that income volatility and budgetary crises increase women's economic dependence on men. Empirically, macroeconomic instability is measured through a composite index, incorporating the volatility of real growth rate, inflation, real exchange rate, and public debt, following the approaches of Hnatkovska & Loayza (2020) and IMF (2024). This index allows quantifying the overall impact of economic instability on gender inequalities.

b) Control Variables

To isolate the specific effect of macroeconomic volatility on women's socio-economic conditions, several control variables are included: economic openness, GDP growth, urbanization, industrial value-added, current health expenditure, vulnerable female employment, female mortality, female industrial employment, and female human capital (education).

Economic openness directly affects women's labor market participation and integration into global value chains. Open economies provide more employment opportunities for women, particularly in export-oriented and manufacturing sectors, reducing gender inequalities (Asiedu, 2006 ; World Bank, 2023).

GDP growth is a key macroeconomic factor for resource redistribution and improving women's living standards. Sustained growth promotes investment in education, health, and female employment, reducing economic gender gaps (Barro, 1996 ; Bloom & Canning, 2000).

Urbanization facilitates women's access to social services, transport infrastructure, and industrial jobs but can increase vulnerability in informal settlements if poorly managed (Glaeser, 2011).

Industrial value-added measures productive transformation and industrialization, sectors offering skilled jobs to women and promoting wage equality and economic inclusion (Rodrik, 2018).

Current health expenditure improves women's access to care, reduces female mortality, and supports active labor market participation (Jamison et al., 2013).

Vulnerable female employment, measured as the proportion of women working in informal or precarious conditions, is critical for understanding inequalities, as macroeconomic shocks often exacerbate female precarity (Kabeer, 2012).

Female mortality reflects women's social and economic vulnerability and the effectiveness of public policies targeting gender equality.

Female industrial employment illustrates participation in high-value formal sectors, fostering economic empowerment (World Bank, 2023; UNIDO, 2023).

Female human capital, measured by enrollment or secondary education rates, is central to gender equality, improving access to skilled jobs, decision-making participation, and autonomy (Lucas, 1988; Romer, 1990; Klasen, 2018).

c) Instruments

For this chapter, instruments were used for macroeconomic instability indicators likely to affect women differently. GDP growth volatility measures women's exposure to economic shocks that can increase wage gaps and limit employment access (Seguino, 2000; Duflo, 2012). Inflation serves as a complementary instrument, as it affects household purchasing power and women's economic security (Barro, 1996). Finally, exogenous economic and financial crises act as instruments to causally identify the effect of macroeconomic instability on wage gaps and female labor market participation (Blundell & Bond, 1998). These instruments allow isolating the impact of macroeconomic instability on gender inequalities.

4.1.2. Descriptive Analysis

This part is divided into three sections: economic participation inequalities, wage inequalities, and their graphical analyses. The goal is to highlight various observations, including means, standard deviations, minimums, and maximums of the study variables.

4.1.2.1. *Economic Participation Inequalities*

Table1*: Descriptive Statistics of Study Variables*

Variables	***Observations***	***Means***	***Standard***	***Minimum***	***Maximum***
Gender Inequality / Economic Participation	*3,333*	*-.4516202*	*.4162943*	*-2.611851*	*.0605181*
Unemployment	*3,309*	*8.299045*	*6.459589*	*.1*	*37.32*
Inflation	*3,557*	*9.626311*	*50.69828*	*-28.76014*	*2630.123*
Growth Volatility	*3,403*	*-52.62046*	*2738.487*	*-104513.1*	*85308.89*
Public Expenditure	*2,820*	*2.315355*	*2.781091*	*0*	*52.61411*
Exchange Rate	*3,503*	*1920056*	*1.14e+08*	*.0444684*	*6.72e+09*
Interest Rate	*2,585*	*6.250205*	*10.63894*	*-81.13211*	*93.91508*
Political Stability / Absence of Violence	*3,432*	*-.3066351*	*.9535369*	*-3.312951*	*1.48308*
Trade Openness	*3,211*	*2.831545*	*.7466609*	*.6954001*	*4.969678*
GDP Growth	*3,019*	*1.391799*	*.8447999*	*-5.40279*	*4.463915*
Urbanization	*3,600*	*14.72744*	*2.297974*	*8.38754*	*20.62994*
Manuacturing Value Added	*3,024*	*21.35197*	*2.487064*	*13.94805*	*28.79496*
Current/Health Expenditure	*3,404*	*4.924452*	*1.327429*	*1.429303*	*9.068551*
Female Primary Education	*2,892*	*4.631189*	*.1613788*	*3.140038*	*7.005502*

Vulnerable Female Employment	*3,409*	*3.574253*	*1.165514*	*-3.782411*	*4.594474*
Female Mortality	*3,600*	*3.081024*	*.7994439*	*.5306283*	*5.421862*
Female Industrial Employment	*3,309*	*2.808227*	*.5212957*	*.8130062*	*4.087303*

Source** : **Author's calculation based on Stata data

The table above presents descriptive statistics of the variables used to examine the relationship between macroeconomic instabilities and gender gaps in economic participation in developing countries. It provides a comprehensive overview of the sample characteristics through means, standard deviations, as well as minimum and maximum values for the different variables. These statistics, calculated from Stata estimations, allow for a clear understanding of the structural, economic, and social disparities inherent in the countries studied.

The dependent variable, the Gender Inequality / Economic Participation index (IG / Economic Participation), based on 3,333 observations, has a mean of -0.4516202 and a standard deviation of 0.4162943, with values ranging from -2.611851 to 0.0605181. These results indicate a significant disparity between men and women in terms of labor market access and participation, with certain economies still exhibiting deep gender inequalities.

Unemployment, measured over 3,309 observations, shows a mean of 8.299045 and a standard deviation of 6.459589, with values ranging from 0.1 to 37.32. This highlights the high heterogeneity of the labor market and job insecurity, which disproportionately affects women.

Inflation, with a mean of 9.626311 and a standard deviation of 50.69828, presents values between -28.76014 and 2,630.123, reflecting significant monetary instability that constrains household purchasing power and exacerbates economic vulnerability, particularly for women.

Economic growth volatility, with a mean of -52.62046 and a standard deviation of 2,738.487, illustrates the macroeconomic fragility of developing countries, often facing cyclical fluctuations that can impede the creation of productive employment.

Similarly, public expenditure, with a mean of 2.315355 and a standard deviation of 2.781091, ranges between 0 and 52.61411, reflecting variability in fiscal policies and government efforts concerning social investment and equal opportunities.

The exchange rate, with a mean of 1,920,056 and a standard deviation of 1.14^{e}+08, exhibits high volatility (ranging from 0.0444684 to 6.72^{e}+09), which indicates structural monetary instability. Concurrently, the interest rate, with a mean of 6.250205 and a standard deviation of 10.63894, reveals fluctuating financial conditions, often unfavorable for private investment and inclusive job creation.

On the institutional side, political stability and absence of violence, with a mean of -0.3066351 and a standard deviation of 0.9535369, highlight persistent political fragility that may discourage investment and hinder the implementation of equitable economic policies. Trade openness, with a mean of 2.831545 and a standard deviation of 0.7466609, reflects moderate integration into global trade, while GDP growth, with a mean of 1.391799, shows modest but sometimes unstable economic expansion.

Urbanization, with a mean of 14.72744 and a standard deviation of 2.297974, reflects increasing population concentration in urban areas, which can create new employment opportunities for women but may also exacerbate certain inequalities depending on access to education and infrastructure.

On the productive and social dimensions, manufacturing value added, with a mean of 21.35197, reflects the gradual diversification of the productive base, although many countries remain weakly

industrialized. Current national health expenditure, with a mean of 4.924452, indicates variable levels of budgetary effort in health, reflecting unequal public priorities.

Female primary education, with a mean of 4.631189 and a standard deviation of 0.1613788, demonstrates notable progress in basic education access, yet remains insufficient to sustainably reduce labor market inequalities. Similarly, the variable representing vulnerable female employment, with a mean of 3.574253 and a standard deviation of 1.165514, highlights the high prevalence of precarious jobs in several countries. Female mortality, with a mean of 3.081024, underlines persistent health disparities.

Finally, female industrial employment, with a mean of 2.808227 and a standard deviation of 0.5212957, indicates low female integration into high-value-added sectors, despite the potential of inclusive industrialization to reduce gender gaps.

4.1.2.2 Wage Inequalities

Table 2: *Descriptive statistics of the study variables*

Variables	***Observations***	***Moyennes***	***Ecart-type***	***Minimum***	***Maximum***
GenderInequality / Wage	*3,333*	*-.2894692*	*.4709257*	*-2.119909*	*.5824546*
Unemployment	*3,309*	*8.299045*	*6.459589*	*.1*	*37.32*
Inflation	*3,557*	*9.626311*	*50.69828*	*-28.76014*	*2630.123*
Balance of Payments Deficit	*3,212*	*-3.52e+08*	*2.62e+10*	*-1.76e+11*	*4.24e+11*
Public Expenditure	*2,820*	*2.315355*	*2.781091*	*0*	*52.61411*
External Debt	*2,813*	*54.93948*	*48.61564*	*1.154216*	*610.4519*
Exchange Rate	*3,503*	*1920056*	*1.14e+08*	*.0444684*	*6.72e+09*
Interest Rate	*2,585*	*6.250205*	*10.63894*	*-81.13211*	*93.91508*
Economic Openness	*3,211*	*2.831545*	*.7466609*	*.6954001*	*4.969678*
GDP Growth	*3,019*	*1.391799*	*.8447999*	*-5.40279*	*4.463915*
Urbanization	*3,600*	*14.72744*	*2.297974*	*8.38754*	*20.62994*
Manufacturing Value Added	*3,024*	*21.35197*	*2.487064*	*13.94805*	*28.79496*
Public Health Expenditure	*3,404*	*4.924452*	*1.327429*	*1.429303*	*9.068551*
Female Primary Education	*2,892*	*4.631189*	*.1613788*	*3.140038*	*7.005502*
Vulnerable Female Employment	*3,409*	*3.574253*	*1.165514*	*-3.782411*	*4.594474*
Female Mortality	*3,600*	*3.081024*	*.7994439*	*.5306283*	*5.421862*
Industrial Employment	*3,309*	*2.808227*	*.5212957*	*.8130062*	*4.087303*

Source : Author's calculations based on Stata data

The table above presents the descriptive statistics of the variables used to examine the relationship between macroeconomic instabilities and gender wage inequalities in developing countries. These statistics, obtained from estimations conducted in Stata, describe central tendencies, dispersions, and ranges of the

different variables, thereby providing a comprehensive overview of the economic, social, and institutional characteristics of the countries under study.

The dependent variable, the wage inequality index (IG/Wage), based on 3,333 observations, has a mean of -0.2894692 and a standard deviation of 0.4709257, with values ranging from -2.119909 to 0.5824546. These figures reflect persistent wage disparities between men and women, illustrating labor market segmentation and the low valuation of female labor in several developing countries.

Unemployment, measured across 3,309 observations, has a mean of 8.299045 and a standard deviation of 6.459589, with values ranging from 0.1 to 37.32, indicating significant labor market variability, often characterized by high structural unemployment. Inflation, with a mean of 9.626311 and a standard deviation of 50.69828, exhibits extreme values between -28.76014 and 2630.123, highlighting strong monetary instability that undermines purchasing power and exacerbates wage inequalities.

Furthermore, the balance of payments deficit, with a mean of $-3.52^{e}+08$ and a standard deviation of $2.62^{e}+10$, reveals significant external imbalances in many sample countries. This reflects structural dependence on imports and the weakness of high-value-added exports. Public expenditure, with a mean of 2.315355 and a standard deviation of 2.781091, ranges from 0 to 52.61411, illustrating the diversity of budgetary policies and government efforts in redistribution and social services. External debt, with a mean of 54.93948 and a standard deviation of 48.61564, demonstrates strong heterogeneity in indebtedness, as some countries rely heavily on external financing, potentially limiting the fiscal space necessary to reduce wage inequalities.

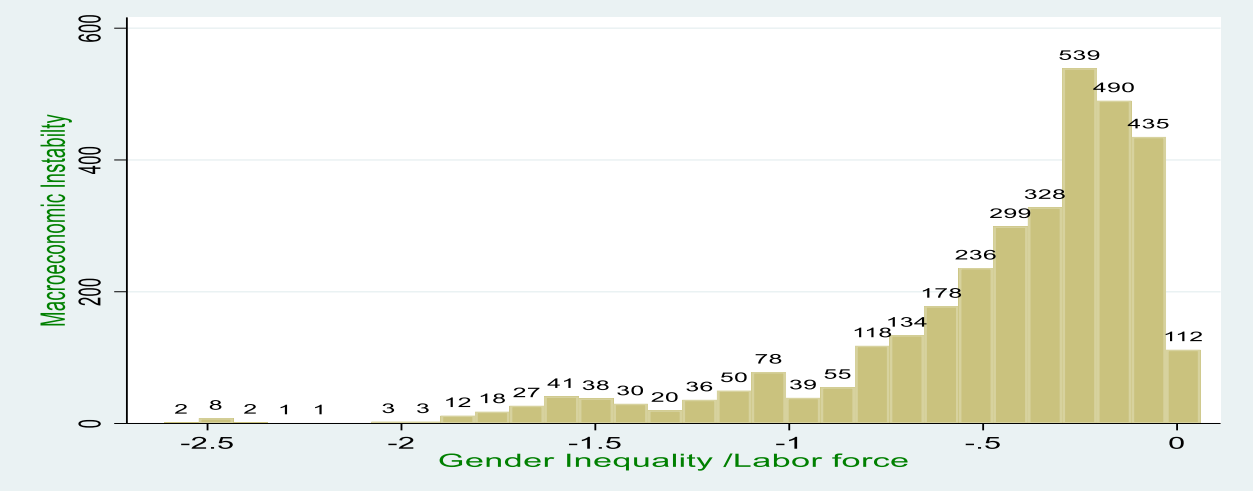
The exchange rate, averaging 1,920,056 with a standard deviation of $1.14^{e}+08$ and values ranging from 0.0444684 to $6.72^{e}+09$, reflects structural monetary instability that may affect labor costs and productive investments. Interest rates, with a mean of 6.250205 and a standard deviation of 10.63894, reveal highly volatile financial conditions, unfavorable to formal job creation and the reduction of wage gaps.

At the institutional level, economic openness, measured over 3,211 observations, has a mean of 2.831545 and a standard deviation of 0.7466609, reflecting moderate integration into international trade. GDP growth, with a mean of 1.391799, remains relatively low and uneven across countries, while urbanization, with a mean of 14.72744, indicates a growing concentration of economic activity in urban areas, without necessarily ensuring an automatic reduction in gender wage gaps.

In terms of productive and social dimensions, manufacturing value added, with a mean of 21.35197 and a standard deviation of 2.487064, highlights variable industrial development, often insufficient to absorb female labor into formal sectors. Public health expenditure, averaging 4.924452, reflects a moderate fiscal effort that can indirectly improve long-term productivity and working conditions. Female primary education, with a mean of 4.631189 and a standard deviation of 0.1613788, shows significant progress in basic education, although disparities in access to higher education remain a barrier to wage equality. Similarly, vulnerable female employment, with a mean of 3.574253 and a standard deviation of 1.165514, reveals high job precariousness among women, contributing to widening wage gaps. Female mortality, with a mean of 3.081024, underscores persistent health disparities, while industrial employment, with a mean of 2.808227 and a standard deviation of 0.5212957, shows limited female integration into high-value-added productive sectors.

4.1.2.3: *Graphical Analysis*

Graph 1: *Macroeconomic Instabilities and Gender Inequalities in Economic Participation*



Source : ***Author's calculations based on Stata data***

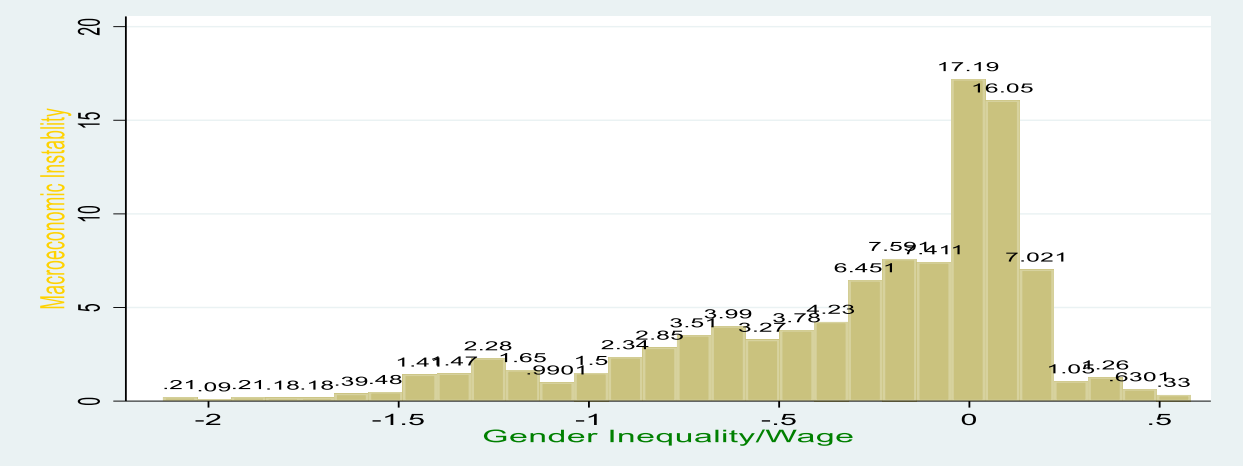
This graph highlights a positive relationship between macroeconomic instability and gender inequalities in economic participation. In other words, as the macroeconomic environment becomes more unstable, the gap in labor market participation between men and women tends to widen.

From an economic perspective, this dynamic can be explained by the fact that women are generally more exposed to the most vulnerable segments of the labor market, particularly informal employment, subsistence activities, and low-productivity services. In developing countries, these sectors are highly sensitive to macroeconomic fluctuations, financial crises, and inflationary shocks. Consequently, when macroeconomic instability rises, economic adjustments often result in job losses or reduced economic opportunities that disproportionately affect women. This observation aligns with the findings of Kabeer (2016) and Seguino (2020), who demonstrate that economic crises tend to reinforce labor market segmentation and diminish women's economic autonomy.

Moreover, periods of macroeconomic instability often lead to fiscal adjustment policies or contractions in public spending, particularly in social sectors such as education, healthcare, and childcare services. These services play a crucial role in facilitating female economic participation. Their reduction increases domestic burdens on women and limits their access to the formal labor market. In this regard, Buvinic et al. (2014) and UN Women (2022) emphasize that economic crises exacerbate gender inequalities by weakening institutional mechanisms that support women's economic empowerment.

Furthermore, macroeconomic instability can intensify constraints on access to productive resources, including credit, training, and professional networks. Women, already facing structural barriers in these areas, experience amplified disadvantages during periods of economic turbulence, contributing to a widening gap in economic participation between genders. This dynamic confirms the existence of a structural link between macroeconomic instability and women's economic marginalization, representing a significant obstacle to inclusive structural transformation in developing countries

Graph 2*: Macroeconomic Instabilities and Gender Wage Inequalities*



Source : ***Author's calculations based on Stata data***

The second graph highlights a non-linear relationship between macroeconomic instability and gender wage inequalities. More specifically, the graphical analysis suggests the existence of two distinct phases in the relationship between these variables.

In the first interval (−2 to 0), an increase in macroeconomic instability is accompanied by a rise in gender wage inequalities. This trend can be interpreted as reflecting an amplifying effect of economic shocks on pre-existing labor market disparities. Indeed, when the economy becomes more unstable, firms tend to prioritize the protection of jobs and wages in strategic sectors or high-productivity positions, which are typically occupied predominantly by men. In this context, women, who are often concentrated in precarious or low-paid jobs, are more affected by wage adjustments or reductions in professional opportunities. Empirical analyses by Elborgh-Woytek et al. (2013) and Seguino (2020) confirm that macroeconomic shocks tend to exacerbate gender wage gaps, particularly in economies with highly segmented labor markets.

However, in the second interval (0 to 5), the graph shows that once macroeconomic instability surpasses a certain threshold, wage inequalities begin to gradually decrease. This reversal can be explained by several mechanisms. First, severe economic crises may lead to greater job losses in certain male-dominated industrial or extractive sectors, which mechanically reduces the average wage gap between men and women. Second, major crises often trigger institutional or policy responses, such as programs supporting female employment, social protection policies, or initiatives aimed at reducing wage discrimination. Recent studies indicate that these interventions can mitigate gender wage disparities during economic crises (Seguino & Heintz, 2019; UN Women, 2022).

This non-linear relationship suggests that the impact of macroeconomic instability on wage inequalities depends on the level of instability reached, which justifies the use of econometric specifications incorporating threshold effects or quadratic terms in the empirical analysis. Such an approach better captures the complexity of interactions between macroeconomic shocks and labor market dynamics in developing countries.

4.2 Macroeconomic Instabilities and Gender Inequalities in the Labor Market: Empirical Analyses

In developing countries, macroeconomic instabilities are a recurrent phenomenon, characterized by price volatility, budgetary imbalances, exchange rate fluctuations, and irregular economic growth. Far from producing purely economic effects, these instabilities deeply influence social dynamics, particularly gender inequalities in the labor market. Several studies have shown that periods of macroeconomic crisis tend to

disproportionately affect women due to their overrepresentation in informal, vulnerable, and low-paid sectors (Baden & Reeves, 2000; Elson, 2010). When inflation accelerates or public budgets contract, social sectors such as health, education, and community services are often the first to experience funding reductions, thereby increasing the precariousness of female employment (Seguino, 2020).

Moreover, economic volatility reinforces labor market segmentation, where women are often confined to informal or unprotected employment with lower wages and reduced social security (Kabeer, 2016). Rising macroeconomic pressures push households to adjust labor market participation, and in most cases, women absorb the shocks by increasing unpaid domestic work, limiting their professional mobility and career opportunities (Folbre, 2021). Furthermore, unequal access to human capital, productive resources, and financial institutions heightens their vulnerability to macroeconomic disturbances (World Bank, 2023).

Based on this, our empirical analysis first presents the methodology, including model specification, data sources, and variable definitions. It then presents the estimation results, followed by their interpretation, compared to existing theoretical and empirical findings, in order to better understand how macroeconomic instabilities, influence gender inequality dynamics in the labor market and to derive policy implications.

4.2.1: ***Analysis Method***

This subsection addresses two key points: the estimation principle and the choice of econometric model.

4.2.1.1: *Estimation Principle*

The empirical analysis in Chapter 4 relies on the Generalized Method of Moments (GMM) to evaluate the impact of macroeconomic instabilities on gender inequalities in the labor market of developing countries. This methodological choice responds to the need to correct for endogeneity of explanatory variables, account for temporal dependencies of labor market indicators, and address potential heteroskedasticity and autocorrelation in panel data. Dynamic GMM is particularly suitable for these situations and provides robust and efficient estimators (Arellano & Bond, 1991 ; Blundell & Bond, 1998 ; Roodman, 2009). Dynamic panel GMM uses internal instruments, typically based on lags of explanatory and dependent variables, to simultaneously address endogeneity and dynamic effects. This approach is robust to heteroskedasticity and serial correlation in error terms, ensuring consistent and asymptotically unbiased estimators even in panels of developing countries with a limited number of periods (Blundell & Bond, 1998 ; Roodman, 2009).

Recent literature on gender inequalities and economic development confirms the relevance of this approach. For instance, Seguino (2010) and Duflo (2012) emphasize the importance of correcting for endogeneity in macroeconomic and institutional variables when studying the impact of economic shocks on gender equality in employment and income. More recent studies, such as Baharumshah et al. (2019) and Nistor et al. (2021), show that dynamic GMM is effective for analyzing the effects of macroeconomic instabilities on social indicators, including gender inequalities, while accounting for temporal dependencies and structural differences between countries.

Thus, the use of dynamic GMM provides a robust and rigorous methodological framework to isolate the effect of macroeconomic instabilities on gender inequalities in the labor market, while ensuring statistical validity and reliability of empirical results. This approach allows for credible causal estimates in accordance with the methodological standards of recent literature on economic development and gender equality.

4.2.1.2: *Choice of Econometric Model*

In the context of the econometric analysis on the relationship between macroeconomic instabilities and gender inequalities in the labor market, the choice of model must be rigorously justified, particularly

due to the complexity of panel data and potential endogeneity issues. To address this, we adopt the Generalized Method of Moments (GMM) estimation technique, developed by Arellano and Bond (1991), as it provides a robust solution for dynamic models by correcting biases arising from potential endogeneity of explanatory variables. This method is particularly suitable for panel data that include unobserved fixed effects as well as temporal dependencies.

The equation of our model can be expressed as follows:

$$GI_{\text{it}} = \beta_0 + \beta_1 Instab_{it} + \beta_2 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \qquad [1]$$

$$\left\{ \begin{array}{l} GIPE_{\text{it}} = \beta_0 + \beta_1 Instab_{it} + \beta_2 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \\ GIWage_{\text{it}} = \beta_0 + \beta_1 Instab_{it} + \beta_2 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \end{array} \right\} \qquad [2]$$

$GIPE$: gender inequality for economic participation and $GIWage$: gender inequality for wage

Where GI_{it} represents the dependent variable measuring gender inequalities in the labor market for country (i) at period (t), $Instab_{it}$ is the variable of interest, X_{it} is a set of control variables, X_{it} denotes country-specific effects, λ_t captures time effects, and ε_{it} is the error term, β_0 : that accounts for other factors not included in the model. This simple model, although relevant, is subject to endogeneity since macroeconomic instability may itself be influenced by gender inequalities, which can generate a correlation between $Instab_{it}$ et ε_{it} .

To address this issue, we apply the first-difference transformation, as proposed by Arellano and Bond (1991), to eliminate the fixed effects μ_i, resulting in the following equation:

$$\Delta GI_{\text{it}} = \beta_1 \Delta Instab_{it} + \beta_2 \Delta X_{it} + \Delta \varepsilon_{it} \qquad [3]$$

$$\left\{ \begin{array}{l} GIEP_{\text{it}} = \beta_1 \Delta Instab_{it} + \beta_2 \Delta X_{it} + \Delta \varepsilon_{it} \\ \Delta GIWage_{\text{it}} = \beta_1 \Delta Instab_{it} + \beta_2 \Delta X_{it} + \Delta \varepsilon_{it} \end{array} \right\} \qquad [4]$$

However, this transformation does not fully resolve the endogeneity problem, as ΔGI_{it} may still be correlated with $\Delta \varepsilon_{it}$. Therefore, we employ internal instruments, specifically lagged values of $Instab_{it}$ and X_{it} , following Hansen (1982) moment conditions:

$$E(Instab_{i,t-\kappa}.\Delta \varepsilon_{it}) = 0 \qquad \text{for t=3,4,....T et } \kappa \geq 2 \qquad [5]$$

Using these internal instruments allows us to correct for endogeneity bias and produce consistent estimates. Furthermore, to improve estimation efficiency, we also implement system GMM, proposed by Blundell and Bond (1998), which combines the equations in differences with equations in levels. This approach better exploits the information in the data while maintaining valid instruments. The levels equation is expressed as :

$$\left(\begin{array}{l} IGEP_{it} = \beta_0 + \beta_1 Instab_{it} + \beta_2 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \\ IGWage_{it} = \beta_0 + \beta_1 Instab_{it} + \beta_2 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \end{array} \right) \qquad [6]$$

In summary, the choice of the GMM method is based on its ability to simultaneously address fixed effects and endogeneity.

4.2.1.3: *Main Robustness Tests*

To test the robustness of our model, we perform two tests. The first is the Sargan/Hansen over-identification test, which examines the validity of lagged variables as instruments. The test is considered satisfactory if the null hypothesis cannot be rejected at the 10% significance level. We prefer the Hansen test over the Sargan test, as it is robust to heteroskedasticity in the residuals. The second test is the Arellano-Bond second-order autocorrelation test, which is considered satisfactory if the null hypothesis of no second-order autocorrelation of first-differenced errors cannot be rejected at the 10% significance level.

4.2.2 *Results and Interpretation*

This subsection is organized around two main points. First, we present the key results from our estimations. Second, we provide an economic interpretation of these findings.

4.2.2.1 *Econometric Results (Gender Inequality in Labor Force Participation)*

Table 3 : Results 1

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
VARIABLES	GI/laborforce	GI/laborforce	GI/laborforce	GI/laborforce	GI/laborforce	GI/laborforce	GI/laborforce	GI/laborforc
Interest rate	0.00312***							
	(0.000175)							
Exchange rate		0.00459***						
		(0.000935)						
unemployment			-0.00648***					
			(0.00158)					
External debt				0.0132***				
				(0.000927)				
Government expenditure					0.00457***			
					(0.000535)			
Inflation						-0.000344***		
						(5.32e-05)		
Growth volatility							4.27e-06***	
							(8.33e-07)	
Political instability								0.0224***
								(0.00727)
Lagged IG/labor force Participation	0.792***	0.805***	0.829***	0.802***	0.796***	0.812***	0.809***	0.916***
	(0.00762)	(0.0144)	(0.0113)	(0.0120)	(0.0170)	(0.0149)	(0.0207)	(0.0431)
Trade openness	-0.00990***	0.0170***	0.0174***	0.00564***	0.00757***	0.0128***	0.0114***	-0.0265***
	(0.00105)	(0.00257)	(0.00218)	(0.00152)	(0.00142)	(0.00293)	(0.00335)	(0.00752)
GDP growth	0.00176***	0.00392***	0.00368***	0.00466***	0.00423***	0.00441***	0.00447***	0.00476***
	(0.000159)	(0.000342)	(0.000301)	(0.000217)	(0.000223)	(0.000322)	(0.000361)	(0.00119)

Urbanization	0.00755***	0.0259***	0.0374***	0.0422***	0.0448***	0.0481***	0.0272***	0.0535***
	(0.00283)	(0.00340)	(0.00371)	(0.00343)	(0.00367)	(0.00432)	(0.00480)	(0.0161)
Manufacturing value added	-0.00881***	-0.0173***	-0.0256***	-0.0330***	-0.0379***	-0.0448***	-0.0249***	-0.0458***
	(0.00288)	(0.00361)	(0.00388)	(0.00449)	(0.00484)	(0.00428)	(0.00558)	(0.0152)
Current/health expenditure (%of GDP)	0.00433***	0.00527***	0.00170	0.0147***	0.0117***	0.0127***	0.00898***	-0.00231
	(0.00127)	(0.00189)	(0.00169)	(0.00102)	(0.00140)	(0.00262)	(0.00266)	(0.00682)
Female education	0.125***	0.0732***	0.0666***	0.0971***	0.0886***	0.0553**	0.0848***	0.0713*
	(0.0106)	(0.0157)	(0.0151)	(0.0164)	(0.0125)	(0.0234)	(0.0176)	(0.0420)
Vulnerable female employment	0.0225***	0.00965***	0.00662	-0.00363	-0.00522	-0.000171	0.00659*	0.00885
	(0.00304)	(0.00366)	(0.00414)	(0.00442)	(0.00431)	(0.00415)	(0.00389)	(0.00938)
Female mortality	-0.00598***	0.00457	0.000139	0.0236***	0.0167***	0.0178***	0.0101*	-0.0238*
	(0.00194)	(0.00494)	(0.00449)	(0.00322)	(0.00292)	(0.00650)	(0.00605)	(0.0133)
Industrial employment	0.0528***	0.0484***	0.0427***	0.0586***	0.0647***	0.0813***	0.0608***	0.0917***
	(0.00358)	(0.00750)	(0.00760)	(0.00929)	(0.00870)	(0.00872)	(0.00906)	(0.0228)
Constant	-0.792***	-0.709***	-0.572***	-0.825***	-0.656***	-0.474***	-0.649***	-0.312
	(0.0680)	(0.0947)	(0.0702)	(0.0971)	(0.0829)	(0.107)	(0.111)	(0.254)
Time dummy variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,007	1,548	1,531	1,323	1,322	1,487	1,543	1,496
Number of ID	91	107	106	92	92	105	107	107
Fisher (p-value)	0	0	0	0	0	0	0	0
Hansen Test (p-value)	0.647	0.468	0.531	0.512	0.490	0.619	0.385	0.595
AR (1) (p-value)	0.009	0.005	0.005	0.010	0.010	0.007	0.006	0.004
AR (2) (p-value)	0.126	0.930	0.950	0.920	0.945	0.926	0.912	0.894

Source : ***Author's calculations based on World Bank data***

Notes : *Values in parentheses represent heteroskedasticity-robust standard errors. *** p<0.01 indicates significance at 1%, ** p<0.05 indicates significance at 5%, * p<0.1 indicates significance at 10%.*

4.2.2.2: *Econometric Results (Gender Wage Inequality)*

Table 4 : Results 2

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
VARIABLES	GI/wage	GI/wage	GI/wage	GI/wage	GI/wage	GI/wage	GI/wage	GI/wage
Government expenditure	-0.00500***							

	(0.000224)							
unemployment	-0.00610***							
		(0.00116)						
Inflation		-0.00119***						
			(0.000250)					
Exchange rate				0.00742***				
				(0.00142)				
Exchange rate					-0.000755***			
					(0.000127)			
External debt						-0.00512***		
						(0.000868)		
Growth volatility							-0.00142***	
							(5.15e-05)	
Political instability								-0.0230***
								(0.00144)
Lagged IG wage	0.962***	0.986***	0.956***	0.986***	0.904***	0.970***	0.948***	0.968***
	(0.00414)	(0.00661)	(0.00606)	(0.00656)	(0.00639)	(0.00676)	(0.00309)	(0.00258)
Trade openness	-0.00746***	-0.00902***	-0.00636***	-0.0102***	0.00924***	-0.0124***	0.00400***	0.0124***
	(0.00110)	(0.00268)	(0.00205)	(0.00233)	(0.00104)	(0.000804)	(0.000804)	(0.00158)
GDP growth	-0.00552***	-0.00622***	-0.00698***	-0.00551***	-0.00788***	-0.00614***	-0.00527***	-0.00579**
	(0.000243)	(0.000429)	(0.000338)	(0.000445)	(0.000411)	(0.000324)	(0.000251)	(0.000396)
Urbanization	-0.0181***	0.00500	0.00324	-0.0123***	-0.0356***	-0.0103**	-0.0123***	-0.0186***
	(0.00316)	(0.00419)	(0.00369)	(0.00404)	(0.00234)	(0.00460)	(0.00272)	(0.00315)
Manufacturing value added	0.0115***	-0.00738**	-0.00414	0.00870**	0.0242***	0.00391	0.0113***	0.0116***
	(0.00322)	(0.00372)	(0.00321)	(0.00367)	(0.00280)	(0.00420)	(0.00256)	(0.00245)
Current/health expenditure (%of GDP)	-0.00136	0.00887***	0.00914***	0.0104***	0.0115***	0.000570	-0.00695***	0.00209*
	(0.00120)	(0.00159)	(0.00128)	(0.00167)	(0.00163)	(0.000986)	(0.000950)	(0.00108)
Female education	0.0384***	0.0237***	0.0176***	0.0237***	0.0515***	0.0343***	0.0749***	0.0201***
	(0.00594)	(0.00387)	(0.00223)	(0.00552)	(0.00765)	(0.00393)	(0.00945)	(0.00366)

Vulnerable female employment	-0.00120	-0.0106***	-0.00554	-0.0111***	-0.0263***	-0.00208*	-0.00323*	2.65e-05
	(0.00175)	(0.00272)	(0.00372)	(0.00272)	(0.00304)	(0.00113)	(0.00195)	(0.00111)
Female mortality	0.00258	0.0283***	0.0316***	0.0289***	0.0519***	0.00787***	0.0135***	0.00972***
	(0.00288)	(0.00485)	(0.00342)	(0.00403)	(0.00523)	(0.00234)	(0.00144)	(0.00273)
Industrial employment	0.00933***	0.00952	0.0205***	0.000902	0.0240***	0.0110***	0.0271***	0.00740
	(0.00355)	(0.00619)	(0.00491)	(0.00622)	(0.00447)	(0.00333)	(0.00246)	(0.00469)
Constant	-0.150***	-0.0990**	-0.197***	-0.206***	-0.448***	-0.0787***	-0.488***	-0.164***
	(0.0400)	(0.0412)	(0.0357)	(0.0391)	(0.0396)	(0.0290)	(0.0530)	(0.0289)
Time dummy variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,357	1,583	1,424	1,566	1,037	1,358	668	1,53
Number of ID	96	111	106	110	95	96	107	111
Fisher (p-value)	0	0	0	0	0	0	0	0
Hansen Test (p-value)	0.847	0.682	0.610	0.880	0.650	0.752	0.840	0.509
AR (1) (pvalue)	0.006	0.005	0.008	0.005	0.028	0.005	0.167	0.005
AR (2) (pvalue)	0.764	0.740	0.690	0.723	0.518	0.749	0.995	0.775

Source: ***Author's calculations based on Stata data***

Notes: *Values in parentheses represent heteroskedasticity-robust standard errors. *** p<0.01 indicates significance at 1%, ** p<0.05 indicates significance at 5%, * p<0.1 indicates significance at 10%.*

4.2.2.3: ***Interpretation of Results***

a*) Interpretation of the Effects of Macroeconomic Instabilities on Gender Wage Inequality*

The econometric analysis presented in this table examines the impact of macroeconomic instabilities on gender wage inequality in developing countries, using a dynamic panel approach estimated via the Generalized Method of Moments (GMM). This methodology allows for the simultaneous correction of potential endogeneity, heteroskedasticity, and autocorrelation.

Firstly, several macroeconomic variables reflecting economic instability exert significant effects on gender wage gaps. Public expenditure, for instance, is positively and significantly associated with wage inequality, with a coefficient of 0.00500 significant at the 1% level. This suggests that increases in public spending, when not directed toward inclusive and gender-sensitive policies, may reinforce wage disparities between men and women. This finding aligns with the works of Seguino (2010) and Elson (2012), which highlight that the structure and sectoral allocation of public expenditure are more important than the overall level in reducing gender inequality.

Similarly, unemployment exhibits a positive and highly significant effect (coefficient = 0.00610, significant at 1%), indicating that labor market deterioration increases wage disparities, with women being more exposed to precarious and informal employment, as emphasized by Kabeer (2016) and the World Bank (2023). Conversely, inflation has a negative and significant impact on gender wage inequality (−0.00119, significant at 1%), which can be explained by the erosion of real wages in formal, predominantly

male-dominated sectors, temporarily reducing relative wage gaps, as noted by Braunstein and Heintz (2008) and Ball et al. (2022).

Additionally, the exchange rate shows a positive and significant effect (0.00742, 1% significance), suggesting that currency depreciations, by increasing import costs and disrupting production structures, disproportionately affect women, who are often concentrated in low-productivity sectors, consistent with Razavi et al. (2018). On the other hand, interest rates are negatively and significantly associated with wage inequality (−0.000755, 1% significance), which may reflect a contraction of credit and private investment impacting male-dominated, capital-intensive sectors more strongly, as indicated by Agénor and Montiel (2015). External debt also has a significant negative effect (−0.00512, 1% significance), reflecting those budgetary constraints related to debt service can reduce certain wage rents, although the literature notes that these adjustments often come at the expense of social spending favorable to women in the long term (Benería et al., 2019).

Economic growth volatility significantly increases wage inequality (−0.00142, 1% significance), confirming that macroeconomic instability disproportionately affects women's vulnerability in the labor market, as shown by Loayza and Raddatz (2010) and UNDP (2022). Political instability exerts a strong negative and significant effect (−0.0230, 1% significance), reflecting severe labor market disruptions and deterioration of wage-setting mechanisms that disproportionately impact women, consistent with Justino and Shemyakina (2012).

Regarding control variables, the lagged dependent variable—gender wage inequality—presents coefficients ranging from 0.904 to 0.986, significant at the 1% level across all models, revealing a strong temporal persistence of gender wage gaps. This aligns with Blau and Kahn (2017) and OECD (2023), who emphasize the structural and inertial nature of wage disparities. Trade openness shows a positive and significant effect across models, with coefficients between 0.00746 and 0.0124, indicating that, without accompanying policies, trade integration can exacerbate wage inequalities, particularly through specialization in low-wage, female-dominated sectors, as shown by Berik et al. (2016) and UNCTAD (2021).

GDP growth exerts a positive and significant effect, suggesting that economic growth does not automatically reduce gender wage disparities, consistent with Seguino (2011) and Duflo (2012). Urbanization has a negative and significant effect, indicating that increased access to urban markets and employment opportunities can help reduce wage gaps, in line with Glaeser and Xiong (2017). Manufacturing value-added shows a positive and significant effect, suggesting that industrialization, when based on low-skilled, weakly unionized segments, can reproduce or even exacerbate gender inequalities, as noted by Tejani and Milberg (2016). Finally, current health expenditure and female education both exhibit positive and significant effects, highlighting the central role of female human capital in reducing wage gaps, in accordance with Schultz (2002), Klasen (2018), and the World Bank (2024).

b) Interpretation of Results: Macroeconomic Instabilities and Gender Inequality in Labor Force Participation

The econometric analysis presented in this table examines the impact of macroeconomic instabilities on gender inequality in labor force participation in developing countries, using a dynamic panel model estimated via the Generalized Method of Moments (GMM). This approach simultaneously accounts for the temporal persistence of labor market participation, potential endogeneity of macroeconomic variables, and unobserved country-specific effects.

The results first highlight the significant role of several macroeconomic instability indicators. Interest rates have a positive and significant effect on gender inequality in labor force participation, with a coefficient of 0.00312 significant at the 1% level. This suggests that tighter financial conditions tend to exclude women more from the formal labor market, as they are more dependent on credit for self-

employment and income-generating activities, in line with the findings of Agénor and Montiel (2015) and UNWTO (2022). Similarly, the exchange rate shows a positive and significant coefficient of 0.00459, indicating that currency depreciations, by increasing macroeconomic uncertainty and import input costs, negatively affect female employment, which is often concentrated in sectors vulnerable to external shocks (Razavi et al., 2018).

Unemployment also emerges as a key factor aggravating gender inequality in labor force participation, with a coefficient of −0.00648 significant at 1%, reflecting that labor market contractions disproportionately affect women, who are typically the first to be excluded during economic slowdowns, consistent with Kabeer (2016) and the World Bank (2023).

External debt exhibits a positive and significant effect (0.0132), suggesting that the burden of external borrowing constrains fiscal and social policies, limiting governments' capacity to support female employment, consistent with Benería et al. (2019). Public expenditure is also positive and significant (0.00457), indicating that increases in public spending do not automatically translate into improved female labor market inclusion when not directed toward active, gender-sensitive employment policies. Conversely, inflation shows a negative and significant effect (−0.000344), suggesting that the erosion of household purchasing power may prompt more women to enter the labor market to compensate for lost income, as documented by Braunstein and Heintz (2008).

The volatility of growth exhibits a positive and significant effect, confirming that economic instability exacerbates structural labor market imbalances and reinforces gender disparities in participation. Overall macroeconomic instability also shows a positive and significant effect (0.0224), reflecting the high sensitivity of female employment to macroeconomic and institutional shocks.

Regarding control variables, the lagged dependent variable of gender inequality in labor force participation has coefficients between 0.706 and 0.916, significant at the 1% level across all models, highlighting the strong inertia of gender participation gaps. This underlines the structural and persistent nature of gender disparities in labor market participation, consistent with Blau and Kahn (2017) and OECD (2023). Trade openness presents a negative and significant effect in early models, indicating that trade integration can support female employment in certain export sectors, but this effect tends to diminish or reverse when openness is accompanied by a sectoral specialization unfavorable to women (Berik et al., 2016).

GDP growth has a positive and significant effect on female participation, suggesting that economic expansion creates employment opportunities capable of reducing gender gaps, although this effect depends on the sectoral structure of growth (Duflo, 2012). Urbanization shows a positive and significant effect, reflecting the role of urban areas in improving women's access to the labor market through greater diversification of economic opportunities and better infrastructure access (Glaeser & Xiong, 2017). Manufacturing value-added has a negative and significant effect, suggesting that industrialization in developing countries remains largely male-dominated and non-inclusive, consistent with Tejani and Milberg (2016).

Current health expenditures positively and significantly affect female participation, confirming that improvements in health capital enhance women's labor market engagement. Female education shows a strongly positive and significant effect, highlighting the central role of female human capital in labor market access and retention (Schultz, 2002 ; Klasen, 2018 ; World Bank, 2024). Vulnerable female employment significantly increases participation inequality, reflecting the structural precariousness of women's jobs, while female mortality and industrial employment show significant effects confirming the importance of living conditions, health, and sectoral structure in determining participation gaps.

The negative and significant constant across most models, ranging from −0.31 to −0.85, reflects the presence of unobserved structural factors limiting women's labor market participation independently of

observed macroeconomic variables, as documented by Akerlof and Kranton (2000), Fortin (2021), and UNWTO (2023).

Diagnostic tests confirm the robustness of the estimates: Fisher tests indicate overall model significance, Hansen tests show p-values above critical thresholds, confirming the validity of instruments, while significant AR (1) and non-significant AR (2) tests confirm the absence of second-order autocorrelation, in accordance with GMM model validity criteria established by Arellano and Bond (1991) and Roodman (2009). Overall, these results highlight those macroeconomic instabilities are a major and persistent determinant of gender inequality in labor force participation in developing countries, interacting closely with structural, institutional, and social dynamics.

4.2.3: Robustness Analysis

The robustness analysis in this chapter aims to assess the stability of the empirical results regarding the impact of macroeconomic instabilities on gender inequalities in the labor market in developing countries, measured by gender wage gaps and economic participation gaps. The main model, estimated via GMM, is complemented by an alternative estimation method to test the sensitivity of the results. Specifically, Two-Stage Least Squares (2SLS) with instrumental variables is employed as an alternative identification strategy.

The use of GMM in the primary estimations is justified by the likely endogeneity between macroeconomic instabilities and gender inequalities in the labor market. Macroeconomic shocks can differentially affect women's labor market access, wage levels, and economic participation, while persistent gender inequalities may, in turn, influence overall macroeconomic performance through productivity and labor supply. GMM corrects for these biases while accounting for unobserved heterogeneity and potential dynamics of the studied variables.

Estimates obtained via 2SLS, used as a robustness check, largely confirm the results from the GMM model. In particular, macroeconomic instability indicators maintain significant effects on both gender wage inequalities and labor force participation gaps, in terms of both sign and statistical significance. This convergence indicates that macroeconomic instability tends to exacerbate women's disadvantages in the labor market, reinforcing wage gaps and limiting their integration into formal economic activity. While some differences in coefficient magnitudes are observed between GMM and 2SLS estimates, they are moderate and do not alter the direction of effects or their economic interpretation. These differences can be explained by method-specific characteristics, including the explicit handling of temporal dynamics in GMM and the static identification strategy in 2SLS.

Furthermore, instrument validity tests associated with 2SLS estimates, notably Sargan/Hansen overidentification tests, do not reject the null hypothesis of instrument exogeneity, confirming the appropriateness of the chosen instrumental strategy. Global significance tests also support the statistical robustness of alternative models, while control variables maintain signs consistent with theoretical predictions and the broader empirical literature on gender and the labor market. The 2SLS estimates are presented in the **Appendix**.

Conclusion

This study aimed to examine the relationship between macroeconomic instability and gender inequalities in developing countries, adopting both theoretical and empirical approaches. The analysis highlights those macroeconomic fluctuations constitute a significant determinant of the persistence and exacerbation of disparities between men and women. Episodes of macroeconomic instability—characterized by substantial variations in economic growth, inflation, or fiscal imbalances—tend to weaken economic and social structures, disproportionately affecting women in developing economies.

From a theoretical perspective, the results corroborate the literature emphasizing that gender inequalities are closely linked to the economic, institutional, and social structures of societies (Kabeer, 1999;

Seguino, 2000; Klasen & Lamanna, 2009). In this context, macroeconomic instability acts as an amplifier of existing vulnerabilities by limiting women's access to economic opportunities, productive resources, and social services. As also highlighted by Elson and Cagatay (2000), macroeconomic policies are not gender-neutral and may produce differentiated effects across social groups, particularly in economies with highly segmented labor markets.

Empirically, the findings suggest that macroeconomic instability significantly contributes to widening gender gaps across several development dimensions, including labor force participation, access to formal employment, and economic opportunities. This situation largely stems from the fact that women are disproportionately concentrated in informal and precarious employment, rendering them particularly vulnerable to economic shocks (Benería, 2003; Braunstein, 2012). Moreover, periods of economic instability are often accompanied by reductions in public spending on social sectors such as education, health, and social protection, which play a crucial role in promoting gender equality and women's empowerment (Duflo, 2012; World Bank, 2012).

This study provides three main contributions to the literature. First, it highlights the pivotal role of macroeconomic stability in promoting gender equality and inclusive development in developing countries. Second, it addresses a significant gap in the literature by explicitly linking macroeconomic fluctuations to gender inequality dynamics. Third, it provides empirical evidence to better understand the mechanisms through which macroeconomic shocks influence social and economic development trajectories.

The results also have important policy implications. Promoting gender equality in developing countries requires not only targeted social policies but also macroeconomic policies that support economic stability and enhance resilience to external shocks. As Sen (1999) emphasizes, development should be understood as a process of expanding freedoms and opportunities for all individuals, which entails particular attention to structural gender inequalities. From this perspective, integrating gender considerations into the design of macroeconomic policies appears as an essential lever to foster inclusive and sustainable growth (Stotsky, 2006; IMF, 2018).

Finally, while this study contributes valuable insights into the link between macroeconomic instability and gender inequality, certain limitations remain, offering avenues for future research. Further studies could deepen the analysis of transmission channels through which macroeconomic shocks affect gender dynamics, including labor markets, social policies, and economic institutions. A better understanding of these mechanisms would enable the design of more effective development strategies that reconcile macroeconomic stability, structural transformation, and sustainable reduction of gender inequalities in developing countries.

Data Availability Statement

The data used in this study are publicly available from the World Bank World Development Indicators (WDI) database. These data can be accessed at: https://databank.worldbank.org/source/world-development-indicators. The dataset constructed for the empirical analysis and the codes used for the econometric estimations are available from the corresponding author upon reasonable request.

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The author declares that there is no conflict of interest regarding the publication of this paper.

Author Contributions

The author contributed to all stages of the research process, including conceptualization, data collection, methodology design, econometric analysis, interpretation of results, and manuscript writing.

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Appendix 1

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
VARIABLES	GI/laborforce	GI/laborforce	GI/laborforce	GI/laborforce	GI/laborforce	GI/laborforce
Exchange rate	-0.0298***					
	(0.0109)					
Interest rate		0.0292***				
		(0.00851)				
Growth volatility		-1.10e-05***				
			(2.85e-06)			
Political instability				-0.0613**		
				(0.0288)		
Inflation (GDP)					0.0341*	
					(0.0176)	
Government expenditure						-0.00987**
						(0.00422)

Market size	-0.492***	-0.407***	-0.513***	-0.464***	-0.548***	-0.593***
	(0.0730)	(0.104)	(0.0815)	(0.0864)	(0.0829)	(0.226)
GDP per capital	0.146***	0.148***	0.188***	0.187***	0.162***	0.251**
	(0.0282)	(0.0394)	(0.0342)	(0.0342)	(0.0308)	(0.108)
Female education	0.130	0.244*	0.0881	0.243**	0.143	0.171
	(0.0913)	(0.129)	(0.104)	(0.115)	(0.107)	(0.189)
Vulnerable female employment	0.0608**	0.0541*	0.0447*	0.0614**	0.0387	-0.0206
	(0.0236)	(0.0311)	(0.0242)	(0.0248)	(0.0263)	(0.0544)
Female mortality	0.00630	0.00744	0.0309	0.00888	0.0172	-0.00950
	(0.0181)	(0.0252)	(0.0212)	(0.0239)	(0.0237)	(0.0332)
Industrial employment	0.00867	-0.0218	0.0100	-0.0200	0.0482	-0.111**
	(0.0343)	(0.0424)	(0.0411)	(0.0409)	(0.0423)	(0.0550)
Rural Population	0.0256***	0.0161**	0.0195***	0.00498	0.0150**	0.0171
	(0.00596)	(0.00785)	(0.00568)	(0.00802)	(0.00595)	(0.0115)
Natural resources rents	-0.0505***	-0.0519***	-0.0620***	-0.0624***	-0.0550***	-0.0985***
	(0.0104)	(0.0141)	(0.0140)	(0.0129)	(0.0140)	(0.0317)
Constant	-2.375***	-2.855***	-2.549***	-3.012***	-2.573***	-2.639**
	(0.439)	(0.645)	(0.466)	(0.474)	(0.509)	(1.184)
Time dummy variables	Oui	Oui	Oui	Oui	Oui	Oui
Observations	141	99	146	141	126	79
R-squared	0.721	0.713	0.685	0.699	0.696	0.619
Fisher (p-value)	0	0	0	0	0	0
Test Sargan/Hansen	0.1181	0.4407	0.6983	0.4533	0.1558	0.5464

Appendix2

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)
VARIABLES	GI/wage	GI/wage	GI/wage	GI/wage	GI/wage	GI/wage	GI/wage
unemployment	0.0649***						
	(0.0109)						
Interest rate		-0.0752***					
		(0.0165)					
Balance of payments deficit		4.37e-13 ***					
			(2.26e-12)				
Political instability			4.55e-06***				
				(1.68e-06)			
Growth volatility					0.0797***		
					(0.0263)		
Government expenditure						0.0677**	
						(0.0267)	
Inflation						0.000870**	
							(0.000417)
GDP per capital	0.106**	-0.124***	0.324***	0.294***	0.0513	0.183*	0.349***
	(0.0492)	(0.0208)	(0.0700)	(0.0728)	(0.0952)	(0.104)	(0.0863)
Trade openness	-0.0888***	-0.124***	-0.0253*	-0.0199	-0.0190	-0.0566	-0.0346**
	(0.0184)	(0.0398)	(0.0148)	(0.0143)	(0.0124)	(0.0945)	(0.0148)
GDP growth	-0.0106	-0.00715	0.0168	0.00741	0.00164	-0.00606	0.00860
	(0.0155)	(0.0130)	(0.0108)	(0.0106)	(0.00988)	(0.0299)	(0.0115)
Urbanization	-0.0930**	-0.252***	-0.00548	0.00565	-0.0966**	-0.149***	0.0595
	(0.0428)	(0.0322)	(0.0330)	(0.0390)	(0.0461)	(0.0407)	(0.0517)
Manufacturing value added	0.0839*	0.218***	-0.0236	-0.0272	0.0811*	0.132***	-0.0755
	(0.0429)	(0.0277)	(0.0339)	(0.0385)	(0.0469)	(0.0414)	(0.0497)
Secondary education	0.626***	-0.343**	0.136	0.161**	0.370***	0.476***	0.156*

	(0.0537)	(0.148)	(0.0845)	(0.0796)	(0.0915)	(0.0843)	(0.0935)
Vulnerable female employement	s-0.0601***	-0.114***	-0.0294***	-0.0407***	-0.0319***	-0.0714***	-0.0411***
	(0.0135)	(0.0239)	(0.00769)	(0.00754)	(0.00676)	(0.0201)	(0.00791)
Female mortality	0.139***	-0.0319	0.00941	0.0238	-0.0118	0.0615	0.0233
	(0.0264)	(0.0278)	(0.0157)	(0.0169)	(0.0179)	(0.0410)	(0.0181)
Constant	-4.392***	2.653***	-3.049***	-2.968***	-2.341***	-4.393***	-3.184***
	(0.356)	(0.424)	(0.163)	(0.193)	(0.260)	(0.368)	(0.223)
Time dummy variables	Oui	Oui	Oui	Oui	Oui	Oui	Oui
Observations	99	18	1,367	1,376	1,417	47	1,282
R-squared	0.878	0.925	0.532	0.517	0.582	0.885	0.501
Fisher (p-value)	0	0	0	0	0	0	0
Test Sargan/Hansen	0.3053	0.1512	0.1955	0.1056	0.5744	0.3942	0.1216