# Monetary Policy and the Gendered Labor Market Dynamics: Evidence from Developing Economies

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## Abstract

Using a Taylor rule amended with official reserves movements, we derive country-specific monetary shocks and employ a local projections estimator for tracking gender-disaggregated labor market responses in 99 developing economies from 2009 to 2021. Results show that women experience more negative post-shock employment responses than men, contributing to a deepening of the gender gaps in the labor market. After the shock, women are more likely to leave the labor market compared to men, resulting in an apparently intact or even improved unemployment outcome for women. We find limited evidence of sector-specific reactions to interest rates. Additionally, we identify an intense worsening of women's position in the labor market in high-growth environments as well as under monetary policy tightening. Developing Asia and Latin America experience the most significant detrimental effects on women's employment, while Africa exhibits a slower manifestation of the monetary shocks' impact, and developing Europe shows the mildest effects.

**Keywords:** Monetary Policy, Gendered Labor Market Dynamics, Developing Economies

**JEL Classification:** E52, J16, J21

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## 1. Introduction

There is a growing interest in analyzing the various consequences of monetary policy driven by the need to not only better understand its impact on total employment but also to identify—and comprehend—the labor market channels underlying its distributional effects. As for this second and novel driver, the rising levels of income inequality in recent decades have made distributional issues a key concern for the general public as well as for economic policymakers. These include central bankers, who have argued if—and how—monetary policy affects the distribution of incomes and whether these distributional effects should be considered. In the words of Mersch (2014), "all economic policymakers have some distributional impact as a result of the measures they introduce—yet until relatively recently, such consequences have been largely ignored in the theory and practice of monetary policy". Draghi (2016) has also exhibited his worries about the distributional effects of monetary policy when he discussed in his past remarks why interest rates were so low at that time and what the implications of those low rates really were.

Undoubtedly, the distributional effects of monetary policy are complex and uncertain (Bernanke, 2015). Determining these effects is intricate because monetary policy affects individuals' incomes through a large number of channels, many of which are likely to have opposite effects on the distribution of their incomes. However, properly understanding the distributional effect of monetary policy is well worth the effort. Otherwise, policymakers will merely look like "innocent bystanders" along the different channels through which monetary policy shocks affect inequality (Coibion et al., 2017).

However, despite the prolonged prevalence of dual mandates as primary targets for central banks in advanced economies for over two decades, the impact of monetary policy shocks on labor market gender gaps has recently captured academic and central bankers' attention (Flamini et al., 2023). This interest is grounded in a double imperative: firstly, to comprehensively grasp how monetary policy affects overall employment as well as economic output, and secondly, to pinpoint specific channels within the labor market that contribute to the distributional effects of monetary policy.

An increasing number of studies have pushed the Sisyphean boulder and focused on how monetary policy affects different sectors of the labor market (see, for example, Singh et al., 2022), occupational groups or labor income (Gomes et al., 2023; Madeira and Salazar, 2023; Amberg et al., 2022; Dolado et al., 2021; Heathcote et al., 2020; or Zens et al., 2020), and the labor market gender gap. As for the latter, a monetary shock—often thought of as gender-neutral—tends to influence women and men differently because of their diverse paid and non-paid positions in the economy.

In fact, on the one hand, men and women are not equally represented across sectors and jobs. Men are more likely than women to work in construction and manufacturing industries, which according to Erceg and Levin (2006), are more sensitive to changes in interest rates than non-durable services, where more women are usually employed. Even within services, women tend to work in areas such as education and healthcare that are less sensitive to economic fluctuations following monetary policy changes. On the other hand, women are also more likely to be employed in jobs that are more susceptible to labor market adjustments due to monetary policy changes (part-time or temporary contracts

come at this point as examples). Entrepreneurial women also tend to be primary caregivers and are more likely to reduce their labor force participation in turbulent times (Takhtamanova and Sierminska, 2009). Due to vulnerable positions in the labor market, monetary policy may definitely not be gender-neutral. Still, scarce attention to these issues has been given by monetary policies, and as a consequence, these policies have seldom been conducive to the achievement of gender equality.

The aim of this study is to investigate if heterogeneous monetary policy shocks have a tendency to be 'gender-biased'. From this viewpoint, we depart from the focus on the policy shocks' effects over income and/or occupational groups in that we center on another unexplored aspect—gender gaps in the labor market, particularly analyzing how monetary policy shocks impact men's versus women's employment, in which sectors and through which adjusting process.

To our knowledge, the relationship between monetary policy shocks and gender employment gaps has rarely or never been examined as we do. Flamini et al. (2023) only study the relationship for a set of OECD countries. As a key contribution, we derive country-specific monetary shocks and employ a local projections estimator for tracking gender-disaggregated labor-market responses in 99 developing economies from 2009 to 2021, covering a historical window as several major global events occurred. During this period, the monetary shocks chosen to tackle the short-term impacts differed significantly from—and are blended with—those in normal times, and the likely outcome on the gender labor-market responses turns out to be a stimulating empirical question that we attempt to answer in the study. As another novelty, we further advance in the methodological approach by considering official reserves' changes in the monetary policy function, as a way to capture the characteristics of developing economies which more frequently run forms of rigid exchange rates and/or heavily intervene in the foreign exchange market to prevent large volatilities in prices and outputs. Hence, if the conduct of monetary policy through sterilized forex interventions is not captured in the model, it would be improperly identified as a monetary policy shock, while potentially being a daily monetary-policy management in countries with fixed exchange rates or currency boards. We consider this is the first paper to conduct such an analysis for a set of developing economies.

The rest of the paper is organized as follows. Section 2 provides a brief overview of the referent literature. Section 3 presents the underlying methodology and the data used, portraying all the relevant constraints one usually faces when working with developing economies. Section 4 presents the results. The last section concludes.

## 2. Overview of the related literature

Depending on various factors, gender as well as racial minorities are profoundly affected by contractionary monetary policy. While monetary policy influences the gender labor market gap, the direction of the effect remains unclear. Moreover, the scant empirical evidence suggesting that women's labor market outcomes may be more vulnerable to monetary policy shocks than men's has also not been conclusive, as Takhtamanova and

Sierminska (2009) find no significant impact of monetary policy changes on gender gaps in employment for OECD countries.[1]

Examining the divergent impacts of monetary policy on unemployment rates in the United States, Abell (1991) concluded that the labor market is ghettoized —a term coined by us— in a manner that tends to favor white men during periods of contractionary monetary policies. Similarly, Thorbecke (2001) found analogous results, indicating that disinflationary monetary policy increases unemployment among minorities approximately twice as much as it does among whites. Carpenter and Rodgers (2004) highlighted that monetary policy appears to disproportionately affect the unemployment rate of teenagers, particularly Afro-American ones, and demonstrate that a monetary policy accommodation reduces the gap between the unemployment rates of black and white households.

Braunstein and Heintz (2008) also consider the employment costs of inflation reduction in developing countries from a gender perspective and explore two broad empirical questions: (1) what is the impact of inflation reduction on employment, and is the impact different for women and men; and (2) how are monetary policy indicators (e.g., real interest rates) connected to deflationary episodes and gender-specific employment effects? Their study reveals that the gap between women's and men's employment increases when central banks tighten monetary policy to lower inflation in emerging markets and developing countries. Similarly, but for the United States, Seguino and Heintz (2012)'s results indicate that the costs of fighting inflation are unequally distributed among workers. For these authors, the effects vary according to the density of the black population in each US state and that the cost of policies to combat inflation is unevenly distributed among workers, negatively affecting more heavily on Black women and Black men, followed by white women and lastly white men.

Differences in unemployment rates across groups seem to be most pronounced during an economic downturn and disappear throughout an expansion. A sustained expansion excessively improves labor market outcomes for the most susceptible groups of workers in the United States (Duzak, 2021), for whom labor market sensitivities also vary across gender and racial groups. In this country, Black and Hispanic workers face the most adverse impact from economic slowdowns, especially men. Recall that gender and racial discrimination may be complements, such that white women, Black women, and Black men all face relatively similar disadvantages in job access during economic downturns (Seguino and Heintz, 2012).

In an interesting document, Bartscher et al. (2022) link monetary policy shocks not only to earnings but also to wealth differentials between black and white households. They find that while accommodative monetary policy tends to reduce racial unemployment and thus earnings differentials —and, by the way, it exacerbates racial wealth differentials— which implies an important tradeoff for policymakers.

Bergman et al. (2022) find that women tend to increase their employment more than men under expansionary monetary policy in tighter labor markets. They show that the

[1] For a theoretical model providing the various mechanisms and channels whereby macroeconomic policies have distinct employment outcomes for women and men see Akin (2020).

employment of populations with lower labor force attachment (blacks, women, and high school dropouts) is more responsive to expansionary monetary policy in tighter labor markets.

Among those who explore the impact of monetary policy on the gender gap, the majority of the works focus on advanced economies. As for developing ones, where variables such as gender and race become indispensable in the debate for a more strategic economic policy, the studies are sporadic. Beyond the study of Braunstein and Heintz (2008), who analyze 17 low- and middle-income countries, Couto and Brenck (2024) explore the effect of changes in the interest rate for female and black employment creation in Brazil. The authors conclude that social stratification, if not considered, can lead to misleading policies that perpetuate unequal socioeconomic outcomes. This is because the real interest rate has a positive effect on the relative unemployment of Black men to white men, no effect on the relative unemployment of Black women to white men, and a negative effect on the relative unemployment of white women to white men.

To our knowledge, the latest contribution attempting to shed some light on how monetary policy affects gender employment gaps in a panel of 22 advanced and emerging market economies is the work of Flamini op. cit. The authors analyze how exogenous monetary policy shocks impact women's employment versus men's in which sectors, through which adjustment process (labor force participation and unemployment rates), and how different labor market characteristics shape these effects. They also study the asymmetric effects of contractionary versus expansionary monetary policy shocks and across business cycles (recessions versus expansions). Their results show that men's employment falls more than women's after contractionary monetary policy shocks, narrowing the employment gender gap over time. The effects are larger in countries with more flexible labor market regulations, higher gender wage gaps, and lower informal women's employment compared to men's. Finally, the effects are also larger for contractionary monetary policy shocks and during expansions.

However, beyond the above-mentioned studies, the gender impact of unanticipated monetary policy shocks on labor markets in developing economies remains unexplored. Probably, this is due to several reasons. It is not the scope of this paper to specify a complete explanation of this circumstance, and we are not going into further details regarding this lack of studies. However, it may perhaps be noted without straying too far afield from our major focus that this exploration requires a proper definition of the monetary shock, which tends to be a difficult task in developing economies where financial instability has also been an important characteristic.

Regarding this point, it is true that most of these economies have been modernizing their monetary policy frameworks, often moving toward an inflation-targeting monetary policy. However, questions regarding the strength of monetary policy transmission from interest rates to inflation and output have been delayed. The growing concerns in recent years about financial stability raise the question of whether central banks could pursue such a goal, and if so, how. Not surprisingly, a large body of literature on central bank actions focuses on the inclusion of various kinds of stability measures in the Taylor rule. Formally speaking, one can augment the equation with a term related to some measure of financial stability with the accurate weight. However, what exactly this extension of the rule should

look like remains an open question. Or, in other words, although there are now numerous papers that present augmented Taylor rules, it is unclear which of those measures would be best to safeguard financial stability (Käfer, 2014), particularly in those economies with rather inflexible forms of exchange rates as the developing ones.

In fact, since the exchange rate determines the price of imported goods as well as inflation expectations and the competitiveness of domestic firms is persuaded by the exchange rate, an appreciation in the domestic currency makes foreign products cheaper and domestic products more expensive. Accordingly, the demand for domestic products should fall in this case. But these two impacts are only linked to the traditional arguments of the Taylor rule: inflation and output. By the way, in this connection, the literature shows that the sectoral composition of labor is also an important channel in which the exchange rate affects gender and race inequality. Indeed, a devaluation would boost exports and it may also affect inflation (Ha, Stocker, and Yilmazkuday, 2020, among many others), and Erten and Metzger (2019) also highlight the importance of the country's sectoral composition and stages of development where a currency undervaluation can have different effects, reducing women's labor force participation by allocating resources to male-dominated, technologically intensive industries.

Regarding financial instability, capital flows induced by the exchange rate can generate credit and asset price bubbles, and a collapse in the inflowing country. Besides, if the debt weight of firms and banks is to a large extent denominated in a foreign currency, an exchange rate depreciation may increase the burden of outstanding debt and eventually force the economy to a crash. Thus, one may conclude that these economies are most affected by such anxieties as they are usually heavily dependent on exchange rate movements (Ho and McCauley, 2003; Mohanty and Klau, 2005; Aizeman et al., 2011). Not surprisingly, the normative literature mostly suggests small reactions of the interest rate to the exchange rate. This finding seems to be supported by the positive literature, as this usually states significant, albeit rather small responses (Käffer, op. cit.). While as a first suggestion an exchange rate objective for the ECB would be inappropriate as the Eurozone as a whole is anything, it seems reasonable in a small and emerging and/or dollarized de facto economy. Then, the Taylor rule reactions to the exchange rate proceed (Ball, 1999; Svensson, 2000; Batini et al., 2003), it should be amended and the way in which we do so will be unveiled in the next section.

## 3. Methodology and data

Our approach for identifying monetary policy shocks onto labor market outcomes for a set of developing economies consists of two parts. In the first one, we identify monetary policy shocks by estimating an adjusted Taylor rule, following Brandao-Marques et al. (2020). We index the countries by $k$ and years by $t$. Let $i_{k,t}$ represent the short-term central-bank nominal interest rate, $g_{k,t}$, the GDP growth rate, $\pi_{k,t}$, denote the inflation rate and $f_{k,t}$ the change in central-bank foreign exchange reserves. The superscript $F$ denotes one year ahead forecast for the GDP growth and inflation. The rest of the variables are taken with their first lags, inter alia to suppress any endogeneity concerns. We employ an OLS in estimating the Taylor-type regression for each country separately:

$$i_{k,t} - i_{k,t-1} = \alpha_{0,k} + \alpha_{1,k} g^{F}_{k,t+1} + \alpha_{2,k} \pi^{F}_{k,t+1} + \alpha_{3,k} g_{k,t-1} + \alpha_{4,k} \pi_{k,t-1} + \alpha_{5,k} f_{k,t-1} + \alpha_{6,k} i_{k,t-1} + \varepsilon_{k,t} \quad (1)$$

Differently from the original Taylor rule, and as a novelty, we incorporate the change in central bank reserves into our model. This addition is crucial for capturing the unique characteristics of many developing economies, which often operate as small, open economies with rigid exchange rate regimes or frequent interventions in foreign exchange markets to stabilize prices and output. This aspect is not adequately addressed in the traditional Taylor rule framework but is recognized in Brandao-Marques et al. (2020). By including the change in central bank reserves, we aim to improve our model's ability to account for these factors. However, it's important to note that the residual may still capture exogenous variation, even after purging it from any impact of lagged values in the included variables.

In examining developing countries, we specifically isolate reserves from fluctuations in foreign public debt. Foreign public debt is often considered exogenous, especially in countries engaged in programs with supranational institutions like the IMF or participating in initiatives such as the 'Road and Belt' project. Therefore, variations in foreign reserves can be attributed to current account dynamics, capital flows within private enterprises (including financial institutions), and anticipated interventions by the central bank. By disentangling changes in foreign exchange reserves from shifts in foreign public debt, central banks can more accurately assess the impact of their monetary policy decisions on reserves. We consider this approach a robustness check, acknowledging that our sample size may be slightly reduced due to data limitations concerning the foreign public debt variable.

All coefficients are country specific at this stage, while panel estimates of equation (1) are provided in **Table A 1** in Appendix 1 for intellectual curiosity. Monetary policy shocks in (1) are identified as the estimated residuals $\varepsilon_{k,t}$, i.e. through the deviations from the Taylor rule which aim to capture the unanticipated and non-systematic components of monetary policy actions. As the magnitude of shocks varies significantly across countries, we standardize the residuals on a country-by-country basis. Consequently, a unit monetary policy shock represents a one standard deviation shock within each specific country.

The inflation rates, GDP growth rates, and their forecasts are sourced from the International Monetary Fund's (IMF) World Economic Outlook (WEO). Forecasts are based on next-year projections published annually each October. For instance, the 2021 inflation forecast refers to the projection published in the October 2020 edition of the WEO. It's important to note that any revisions made by the IMF after this date are not taken into account.

The short-term interest rate data is obtained from the International Financial Statistics (IFS). To ensure a larger sample size, we use the lending interest rate rather than the policy interest rate. This choice is beneficial as the lending rate may better reflect the monetary policy stance in small and open economies with more rigid exchange rate regimes or in cases where other monetary policy instruments are used, such as reserve requirements or foreign exchange operations to manage domestic liquidity. Additionally, in economies that are dollarized or euroized, a traditional policy rate may not even exist.

While using the lending rate addresses some remaining exogenous variation in the residuals, it may introduce exogenous variation that is specific to the banking sector.

The reserve data is also sourced from the IFS and is reported in their current dollar value. All definitions and sources of the variables used are provided in **Table A 2**, while descriptive statistics in **Table A 3** in the Appendix 2.

For this first part of the analysis, we focus on all countries classified by the IMF as emerging markets and developing economies, totaling 160 nations. We examine the period following the Global Financial Crisis of 2007-08, from 2009 to 2022. However, due to various factors such as missing data, the utilization of lagged variables in our model specification, and the exclusion of countries with less than five years of data within the specified timeframe, the total number of observations is reduced from a maximum of 2,240 to 975. As a result, our analysis is narrowed down to 99 developing economies. These are specified in **Table A 4** in the Appendix 2.

As our sample encompasses a diverse range of countries observed during a specific historical timeframe marked by events such as the Global Financial Crisis and its aftermath, periods of low or negative interest rates, and the global pandemic, we provide additional insight into the frequency of episodes with negative monetary policy and inflation shocks in Appendix 3. This helps contextualize the uniqueness of the time period under consideration.

In the second part of our analysis, we estimate the responses of specific labor market outcomes to monetary policy shocks, following Jorda (2005)'s and Flamini et al. (2023)'s local projections approach for which we use the already estimated policy shock series (lagged) from equation (1), $\varepsilon_{k,t-1}$. In our empirical model, we disentangle the outcome variable, $y_{n,k,t+h}$, by gender, and then take is a gender gap. The following are used as outcome variables: employment rate of working-age population (15+) and of youth (15-24), share of employment in agriculture, industry and services, labor force participation rate and unemployment rate. The gender gap is quantified by subtracting the value for men from the value for women for each variable. Additionally, we introduce the notation 'h' to represent the horizon of the estimated responses, spanning up to five years (h = 0, ..., 5), following the shock at time t-1. Let $\lambda_{k.h}^{n}$ denote country fixed effects, and $\theta_{t,h}^{n}$ represent time fixed effects. For each horizon h, a distinct fixed-effects panel regression is estimated as follows:

$$y_{n,k,t+h} = \beta_{n,h}\varepsilon_{k,t-1} + \alpha_{n,h}y_{n,k,t-1} + \lambda_{k.h}^{n} + \theta_{t,h}^{n} + \nu_{n,h,k,t} \qquad (2)$$

The estimated coefficient $\beta_{n,h}$ provides a measure of the percentage (point) change at horizon h, reflecting the response to a monetary policy shock of one standard deviation. To visually depict these findings, we construct graphical representations by plotting the estimated coefficients along with their confidence intervals on the vertical axis, aligning them against their corresponding horizons on the horizontal axis.

We conduct a few subsequent steps to observe heterogenous results and/or to provide some robustness analysis. First, to test whether the impact of the monetary policy shocks depends on the economic conditions as defined through the real GDP growth, to the explanatory variables in (2), we add the lag of the real GDP growth as follows:

$$y_{n,k,t+h} = \beta_{n,h}\varepsilon_{k,t-1} + \alpha_{n,h}y_{n,k,t-1} + \rho_{n,h}g_{n,k,t-1} + \lambda^{n}_{k.h} + \theta^{n}_{t,h} + \nu_{n,h,k,t} \quad (3)$$

Then, we take an alternative specification of our Taylor rule (equation 3). Namely, we calculate the residuals of short-term interest rate forecast errors after controlling for GDP and CPI forecast errors instead of their forecasts.

Second, in equation (3), we add labor conditions, represented through three variables: collective bargaining coverage rate, gender pay gap and the informal employment share, introduced through the vector $X'_{n,k,j,t-1}$:

$$y_{n,k,t+h} = \beta_{n,h}\varepsilon_{k,t-1} + \alpha_{n,h}y_{n,k,t-1} + \rho_{n,h}g_{n,k,t-1} + \sum \gamma_{n,h,j}X'_{n,k,j,t-1} + \lambda^{n}_{k.h} + \theta^{n}_{t,h} + \nu_{n,h,k,t} \quad (4)$$

in order to observe if some labor-market adjustment could help in explaining differential effects for men and women of a monetary policy shock.

Third, to test asymmetric impacts of monetary policy shocks onto gender gaps in the labor market, we run the following adjusted model:

$$y_{n,k,t+h} = \beta^{-}_{n,h}\varepsilon_{k,t-1}G(d_i) + \beta^{+}_{n,h}\varepsilon_{k,t-1}(1 - G(d_i)) + \alpha_{n,h}y_{n,k,t-1} + \rho_{n,h}g_{n,k,t-1} + \lambda^{n}_{k.h} + \theta^{n}_{t,h} + \nu_{n,h,k,t} \quad (5)$$

whereby $G(d_i) = \frac{\exp(-\eta z_i)}{1+\exp(-\eta z_i)}, \eta > 0$. $z_i$ is a normalized indicator of the mean state of the country to capture cross-country variation defined as $z_i = \frac{x_i - \bar{x}}{\sigma_x}$, whereby $x_i$ stands for the country average while $\bar{x}$ and $\sigma_x$ the cross-country average and standard deviation, respectively. We use $\eta = 1.5$ (following Auerbach and Gorodnichenko, 2013) to estimate coefficients $\beta$s as the percentage (point) changes at horizon $h$ in response to a monetary policy shock of one standard deviation in low versus high real GDP growth regimes. In the second, $G(d_i)$ is reduced to a dummy variable that takes a value of one for positive monetary policy shocks and zero otherwise, to quantify the gendered labor-market outcomes during positive and negative monetary policy shocks.

Finally, we run equation (3) for different geographical subset of countries as follows: Emerging and Developing Asia (EDA), Emerging and Developing Europe (EDE), Latin America and the Caribbean (LAC), Sub-Saharan Africa (SSA). The belonging of each country is given in **Table A 4** in Appendix 2. Note that the Middle East countries are included under Emerging and Developing Asia, due to the fairly small sample to obtain results separately.

Labor market data used for our outcome variable, as well as the three variables capturing labor conditions—collective bargaining rate, gender pay gap, and the informal employment share—are sourced from the International Labor Organization (ILO). While the dataset on outcome variables provides broader coverage in terms of countries and periods compared to the dataset used in our first analysis, which included data for 157 countries, our analysis is limited to the 924 observations introduced earlier due to the smaller set of countries/periods for which monetary policy shocks are identified. However, data on collective bargaining rates, gender pay gaps, and the informal employment share are significantly scarcer and are available for only about a third of our final dataset. Consequently, equation (5) does not incorporate them, despite efforts to include them in the analysis.

## 4. Results and discussion

This section presents the results and offers a discussion in the following order: baseline results, robustness check with alternative specification of monetary policy shocks, results with using labor-market adjustment variables, results with asymmetries, and geographically-differentiated results.

### 4.1. Baseline results

A monetary policy shock of one standard deviation works differently for men and women in the developing economies (**Figure 1**). Note that the figure is structured so that each row has one labor-market outcome variable, while each column represents, respectively, men, women, and the gender gap (calculated as 'women' minus 'men'). Interestingly, the response of men's employment outcome to a monetary policy shock is slightly positive in all the employment variables used, though clearly not very different from zero. On the other hand, women's employment reacts to a monetary policy shock in a mixed manner, with a frequent and significantly negative reaction.

A monetary policy shock of one standard deviation results in a decline in female employment (15+) of about 0.07 percentage points in the third and fourth year after the shock (row 1). Still, if men's employment reaction could be interpreted as significant and positive, it may indicate that a monetary policy shock prompts men—who are usually the main breadwinners in most developing-country societies—to more actively seek employment, given that women are more frequently losing their jobs (and incomes) in such circumstances. This determines that the gender employment gap declines over the entire horizon, but starts negligibly and deepens around the third and fourth year by nearly 0.1 percentage point, after which the shock's effect on the gap vanishes. This primary result is of similar absolute magnitude, yet smaller and with the opposite sign, than that of Flamini et al. (cited), who find a response of +0.5 percentage points (despite not using standardized monetary policy shocks, which may impose important differences).

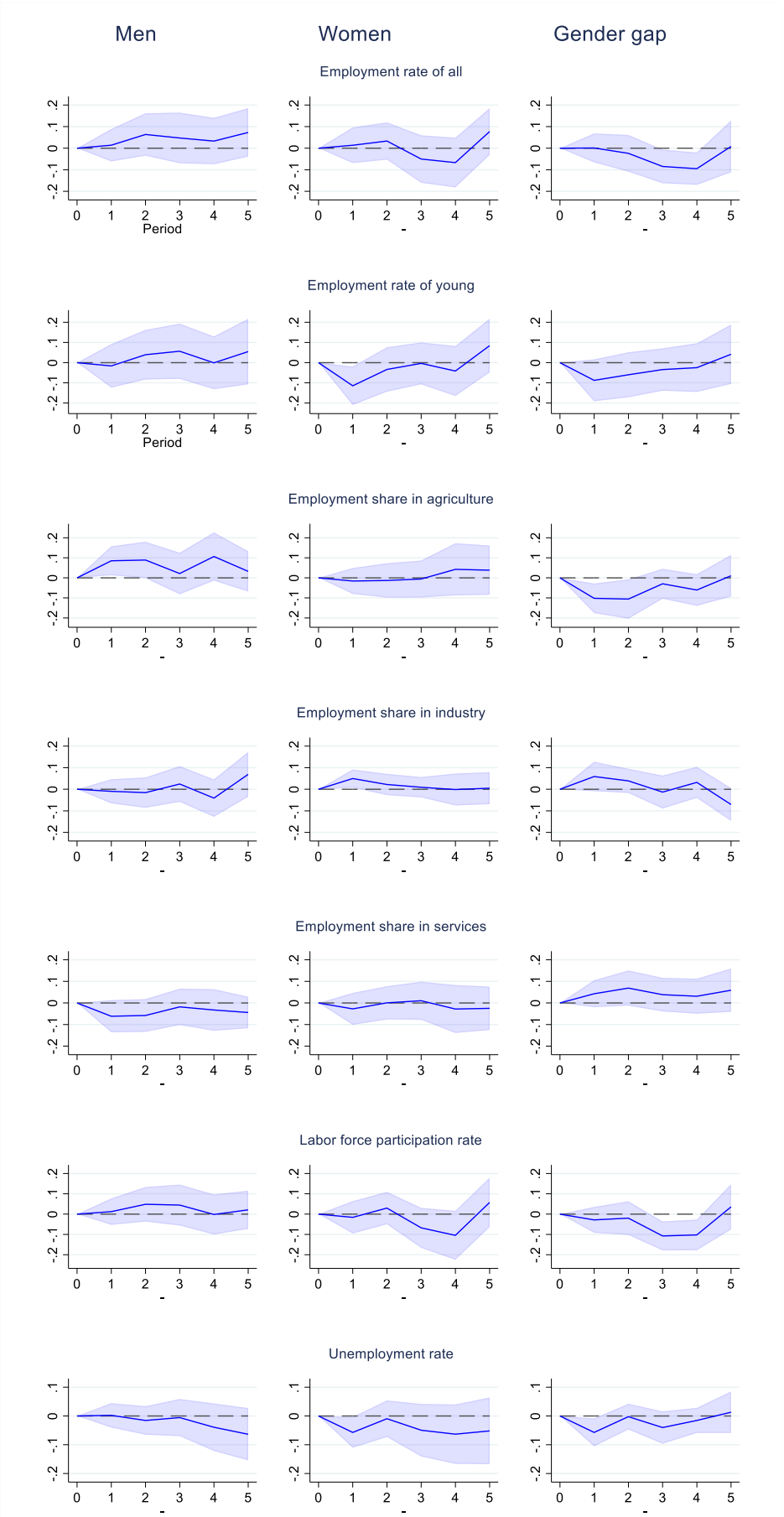
Similar general conclusions could be drawn by observing the rest of the employment variables. For example, the pattern of reaction in the case of youth (15-24) is similar (row 2), yet the negative effect of the monetary policy shocks comes sooner, i.e., already after a year of the shock, imposing a worsening of the gender employment gap. However, women's sectoral employment shares remain somewhat intact (rows 3-5), suggesting that a monetary policy shock does not impose sectoral relocation of female employment, i.e., that the reduction in employment for women tends to be sector-neutral. However, men in agriculture increase their share mainly at the expense of those in services, suggesting that when a monetary policy shock hits, jobs for men are lost in services (this may be associated with service branches such as transport and hospitality), but then they find shelter in agriculture. On the other hand, women's share remains intact, dominating in service branches such as trade and public administration, as well as in agriculture, where they more frequently appear as unpaid family members. This implies that women worsen their relative presence in agriculture and improve it in services.

Labor force participation rate reacts in a similar fashion as employment (row 6). Men increase their participation rate following a monetary policy shock, likely reflecting the

notion that new employment is also driven by labor-market activation. Women clearly become more passive, with the strongest effect arriving at about the fourth year following the shock, resulting in a worsening of the gender participation gap of about 0.1 percentage points at its peak in years three and four. On the other hand, the unemployment rate of men does not react until years four and five (row 7), when it starts declining, consistent with their activation and employment attitude following a monetary policy shock. Meanwhile, that of women declines more persistently throughout the entire period, with a magnitude of about 0.05 percent, implying a reduction of the gender unemployment gap (favorable for women in the case of this variable). Given that we found women to be more frequently than men exiting the labor market (or becoming passive), the declining unemployment rate implies that women have a higher propensity to become passive after losing their job than men.

Results are almost replicated when (i) the identification of the monetary policy shock follows the augmented Taylor rule with the reserves purged from the variation in the foreign public debt, as per the consideration of its exogenous variation (**Figure 2**), and (ii) when the real GDP growth rate is added as independent variable in the equation (**Figure 3**). The idea is that these results serve as robustness check, which they do. In portraying the reaction of the labor-market outcomes of men and women to monetary policy shocks, the overall stance of the economy may matter, which here is captured through the lagged value of the real GDP growth. The results remain stable.

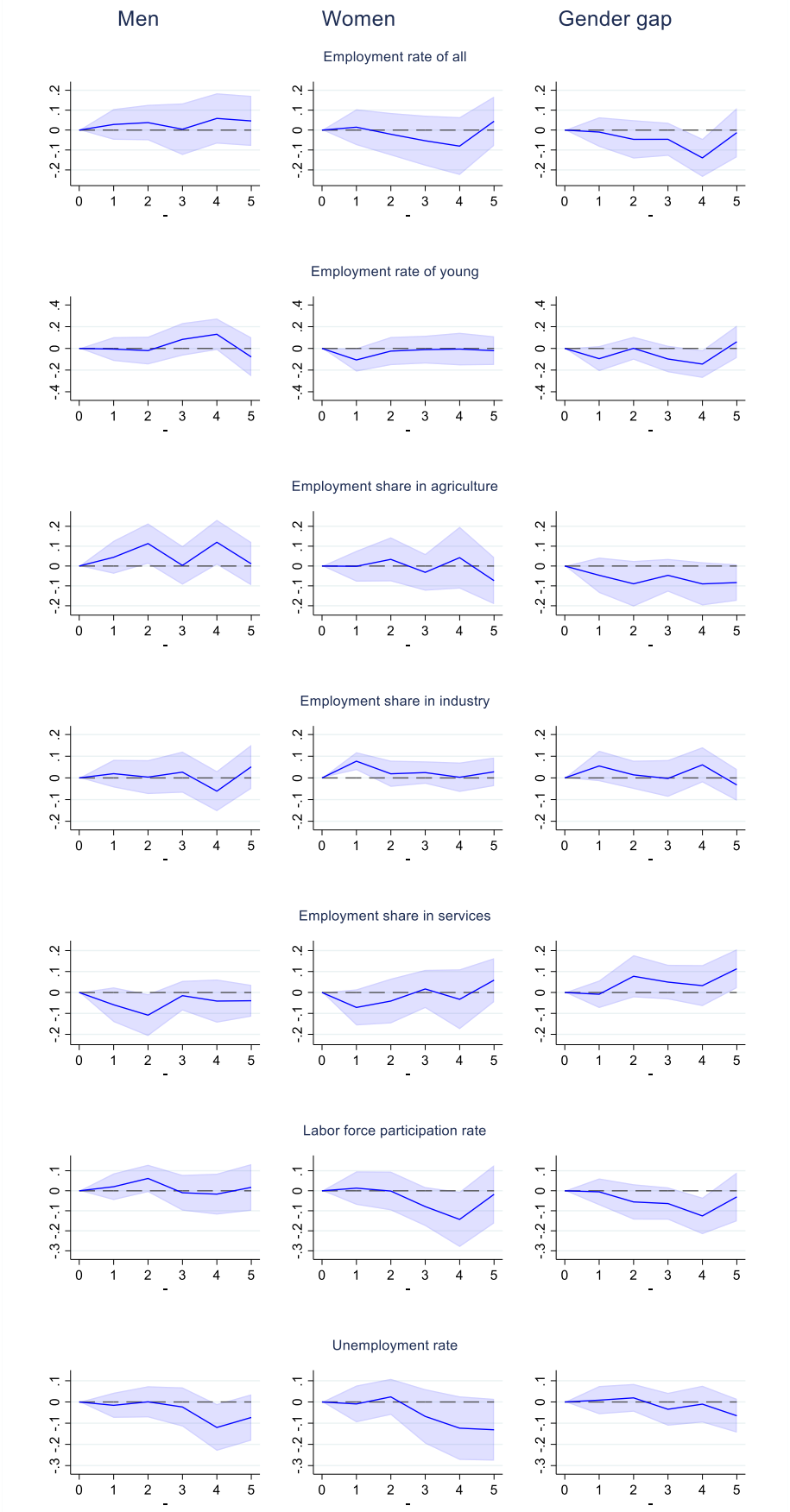
## Figure 1– Gendered labor market response to a monetary policy shock




*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock, separately for men (column 1), women (column 2) and for the gender gap (column 3). Hence, the vertical axis of columns 1 and 2 represent percentages, while of column 3 percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap.*

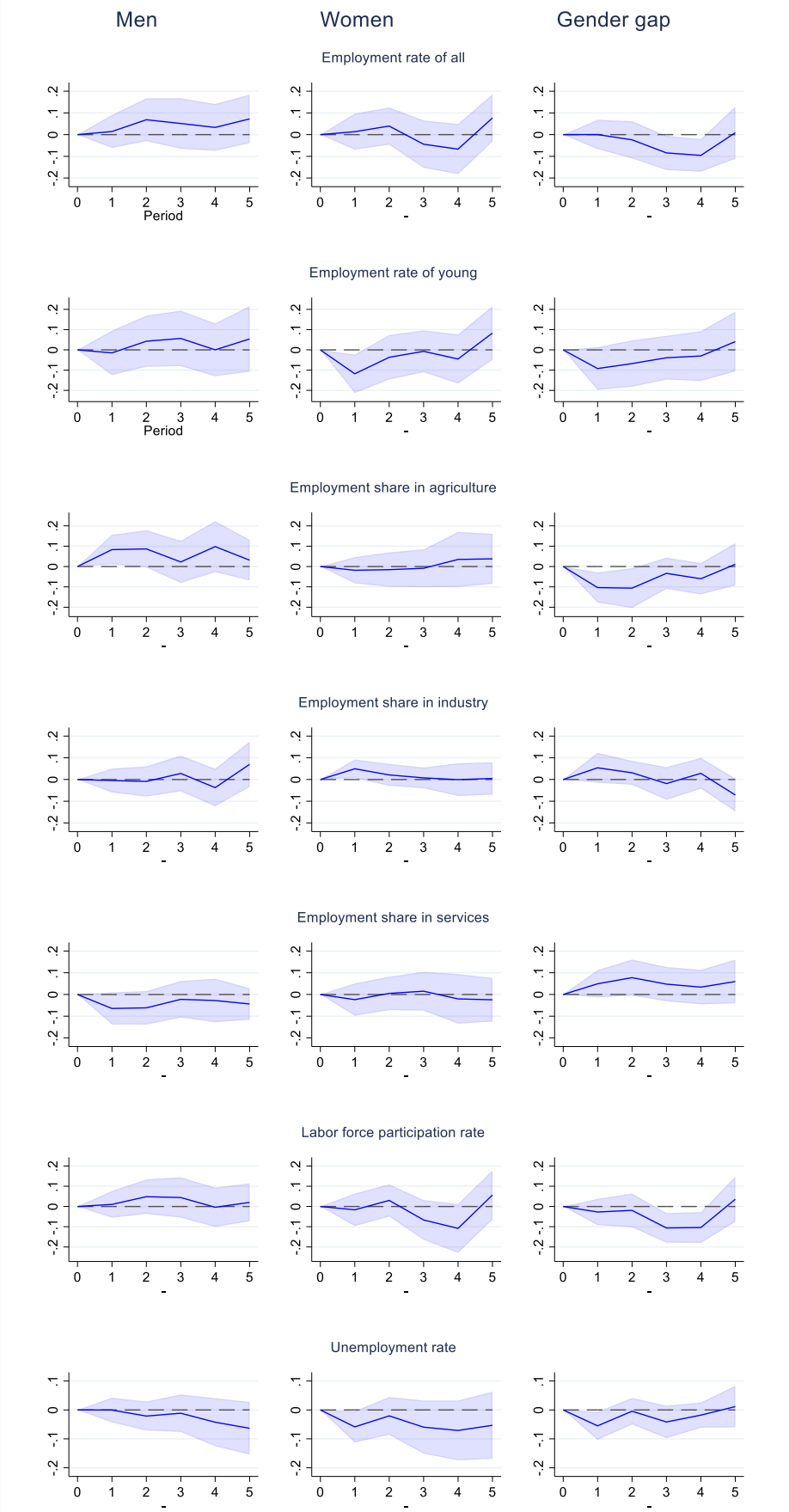
**Figure 2 – Gendered labor market response to a monetary policy shock, with reserves purged**




*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock, separately for men (column 1), women (column 2) and for the gender gap (column 3). Hence, the vertical axis of columns 1 and 2 represent percentages, while of column 3 percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap.*

**Figure 3 – Gendered labor market response to a monetary policy shock, with lagged GDP as a control**



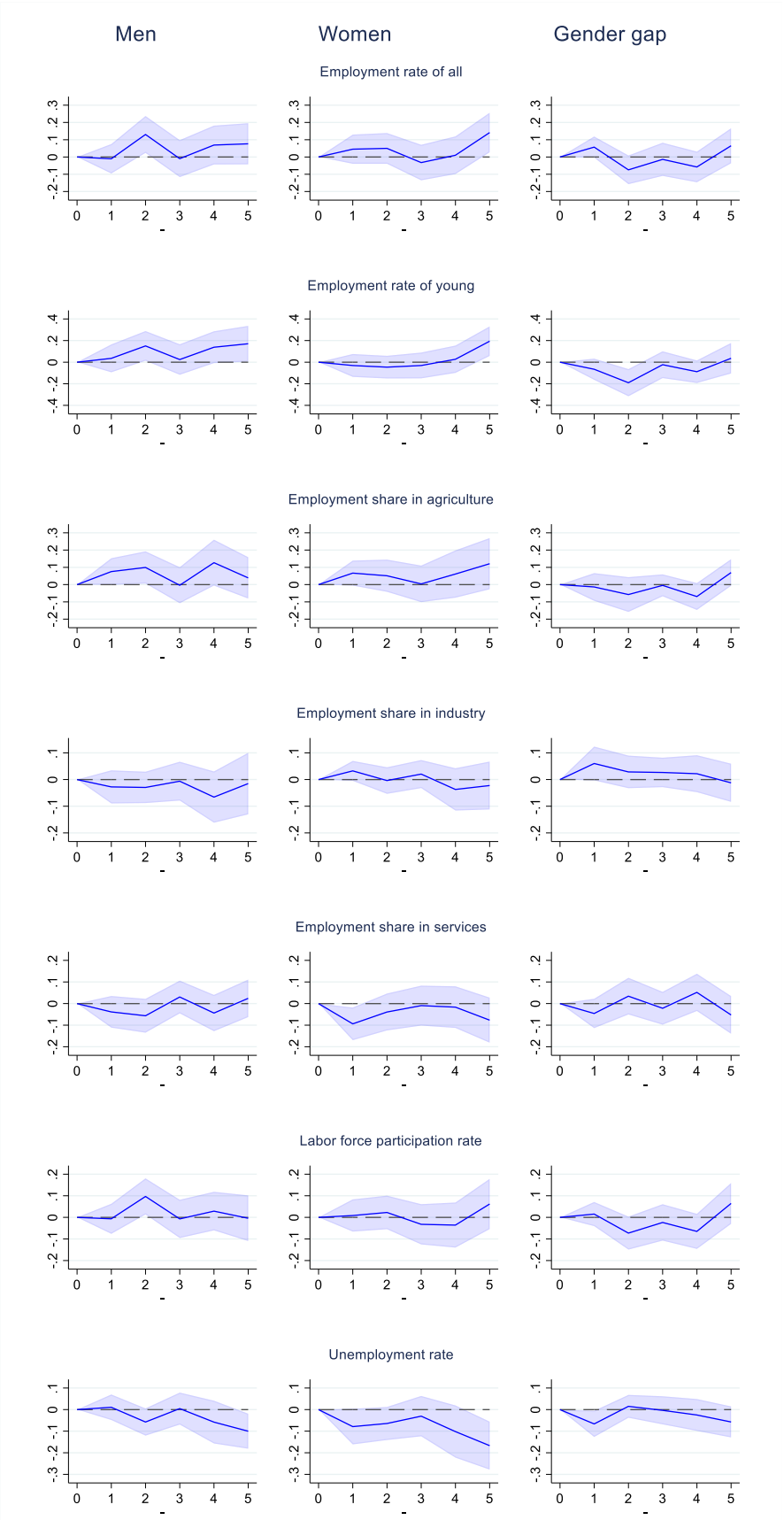

*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock, separately for men (column 1), women (column 2) and for the gender gap (column 3). Hence, the vertical axis of columns 1 and 2 represent percentages, while of column 3 percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap.*

### 4.2. Robustness to alternative specification of monetary policy shocks

To test the robustness of our results, we take an alternative specification of our Taylor rule (precisely of equation 5). Namely, we estimate the residuals of short-term interest rate forecast errors after controlling for GDP and CPI forecast errors instead of their forecasts. **Figure 4** presents results comparable to those of our baseline model in **Figure 3**. The response of men's and women's employment rates is similar, albeit slightly more intensive on the positive side for men, which implies that the gender gap's reaction is weaker but still in the same direction of its worsening. The same holds true for the youth employment variables. Sectoral employment reactions are very similar. In the case of the labor force participation rate, the positive reaction of the men's indicator is slightly stronger, while that of women is slightly weaker around the fourth year, resulting in a narrower reaction of the gender gap. Regarding unemployment, women's rate reacts in the same fashion but more intensely over the longer horizon, implying that over the same time period, the gap worsens (to the advantage of women in this indicator) rather than remaining intact in the baseline scenario.

**Figure 4 – Gendered labor market response to a monetary policy shock, alternative specification of the monetary policy shocks**




*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock, separately for men (column 1), women (column 2) and for the gender gap (column 3). Hence, the vertical axis of columns 1 and 2 represent percentages, while of column 3 percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap.*

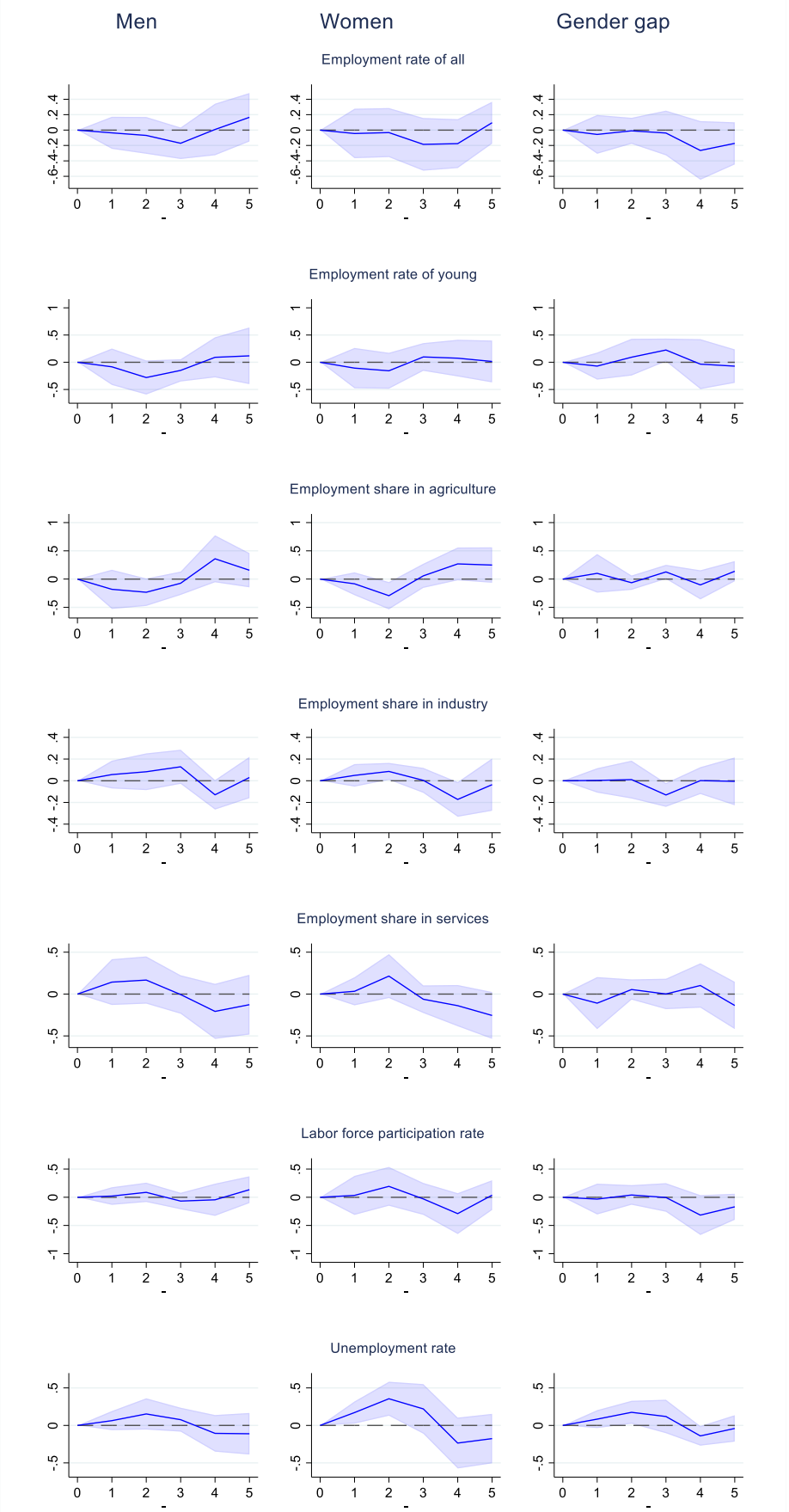
### 4.3. Results using labor-market adjustment mechanism

The adjustments in the labor market following policy changes are expected to vary based on both the sector's responsiveness to interest rates and the structural characteristics of the labor market. We next control for the labor market adjustment variables in our specification (**Figure 5**). There are more pronounced differences compared to our baseline results, particularly in the case of men's labor market outcomes, driven by the fact that these conditions were not available for about two-thirds of our sample. However, we consider it an advantage that, despite such a severe cut of the sample, the results remain fairly robust.

The same pattern of reaction of the gender employment gap (15+) is observed, yet significantly stronger: at the deepest point in year four, the gender employment gap worsens by 0.25 percentage points, about 2.5 times deeper than in the original specification. However, the confidence interval is likewise wider, as expected, probably reflecting the smaller sample. Then, the reaction of the young gender employment gap changes from negative to slightly positive, reflecting the negative response of young men's employment. Likewise, in the case of the sectoral distribution of employment, the reaction in agriculture is negative, while it is positive in industry and services. This may be related to the dissimilar adjustment mechanisms in the sector; for example, the fact that the collective bargaining coverage rate is significantly smaller in agriculture, or that informal employment there is more prevalent, or that the gender pay gap is theoretically infinite due to the prevalence of unpaid family workers among women. This fact attenuates our earlier consideration that women, despite being less affected sectorally, improve their position in services and worsen it in agriculture. It is safer to say that, given labor sectoral conditions, the gender gaps there remain almost intact following a monetary shock.

The reactions of the labor force participation and the unemployment rate are more robust, despite women initially increasing their unemployment rate and then reducing it following a monetary policy shock. This is opposite to the baseline scenario when the reaction was mostly on the decline side. As a result, the gender unemployment gap initially increases (which is detrimental for women), but then its augmentation is neutralized.

**Figure 5 – Gendered labor market response to a monetary policy shock, with labor conditions as controls**




*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock, separately for men (column 1), women (column 2) and for the gender gap (column 3). Hence, the vertical axis of columns 1 and 2 represent percentages, while of column 3 percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap.*

### 4.4. Results with asymmetries

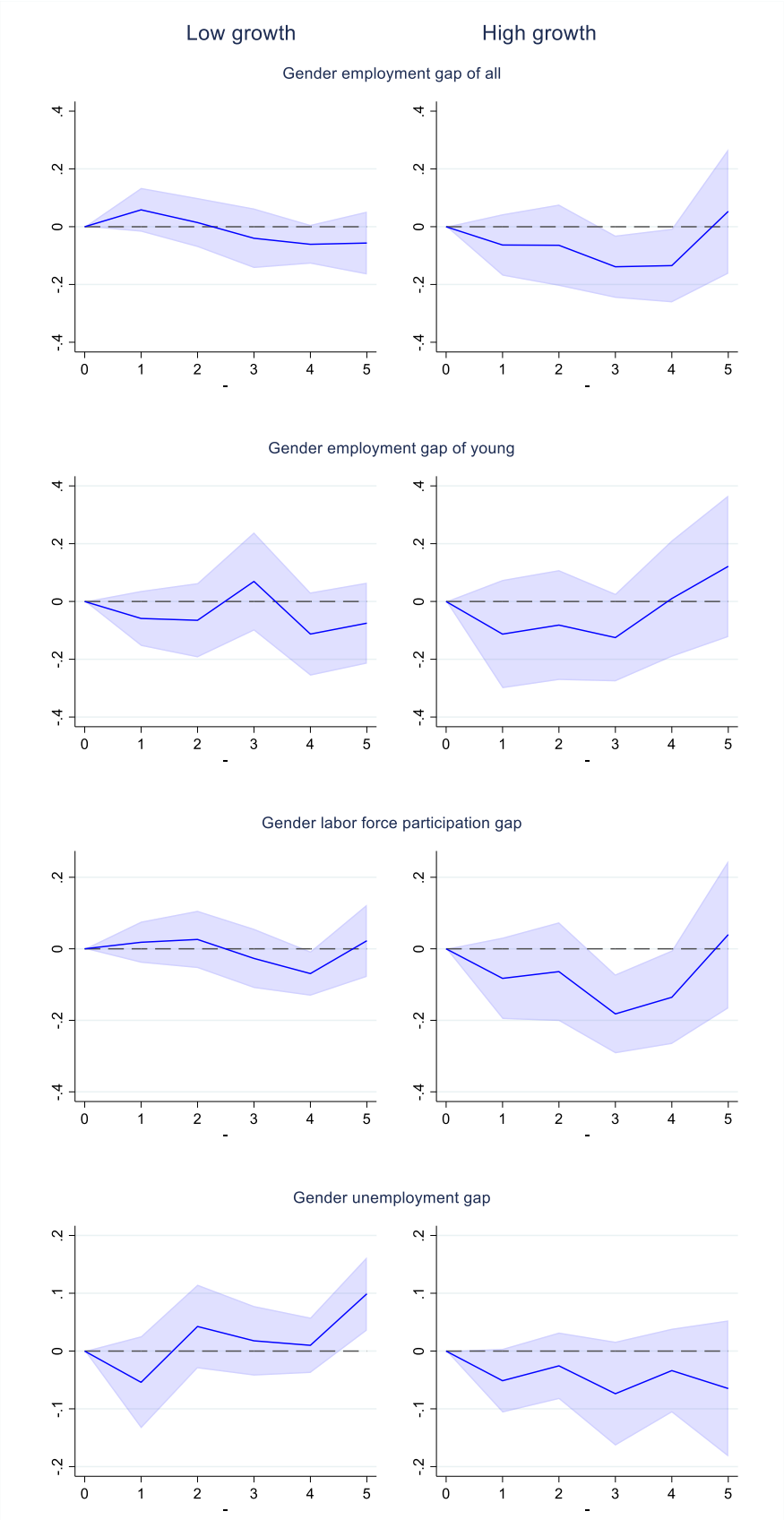
Given the likely importance of labor market adjustment for the sectoral distribution of employment, and considering the constraints imposed by a severely reduced sample size due to data limitations related to labor conditions variables, we will focus our analysis solely on the employment rates of individuals aged 15 and above, youth employment, labor force participation rate, and unemployment rate.

**Figure 6** divides the countries based on whether their average GDP growth rate over the observed period has been low or high compared to the cross-country average. The gender employment gap shows almost no reaction to a monetary policy shock in a low-growth environment, while it significantly worsens, especially in years three and four, in a high-growth environment. A similar pattern is observed for the gender employment gap of youth, as well as for the labor force participation gap. In a high-growth environment, these gaps worsen following a monetary policy shock, and then significantly rebound. On the other hand, the gender unemployment gap mainly reacts positively, though over the longer term. This implies that women experience a faster-growing or slower-declining unemployment rate in a low-growth environment. Conversely, the opposite is true in a high-growth environment: women's unemployment rate declines faster or rises slower than men's, which is perplexed by their more intense passivation in the labor market.

**Figure 7** divides the within-country periods into monetary policy easing (negative monetary policy shock) and tightening (positive shock). Unexpected easing of monetary policy does not affect the gender employment gap, while the earlier observed worsening of the gap likely occurs mainly when interest rates have been unexpectedly raised. The same conclusion holds when considering only youth, but the worsening of the gap occurs sooner and then rebounds by the end of the period. However, even under monetary policy easing, women experience some worsening of their employment position around year two, suggesting that even if employment conditions improve under monetary-policy easing, they do so more for men than for women. The labor force participation gap worsens under both easing and tightening, but the worsening under tightening persists until year four. Finally, the gender unemployment gap worsens (to the advantage of women) under both easing and tightening, but the result under easing is not stable, while under tightening it is relatively small.

Overall, monetary policy shocks affect women in developing economies more strongly than men. This impact is felt more intensely when the economy is growing faster than the global average, suggesting that a monetary shock in a faster-growing economy exacerbates gender inequality more than in a slower-growing economy. Similarly, unexpected monetary policy tightening affects women more severely than easing does. In fact, the role of easing for employment is negligible, if it exists at all.

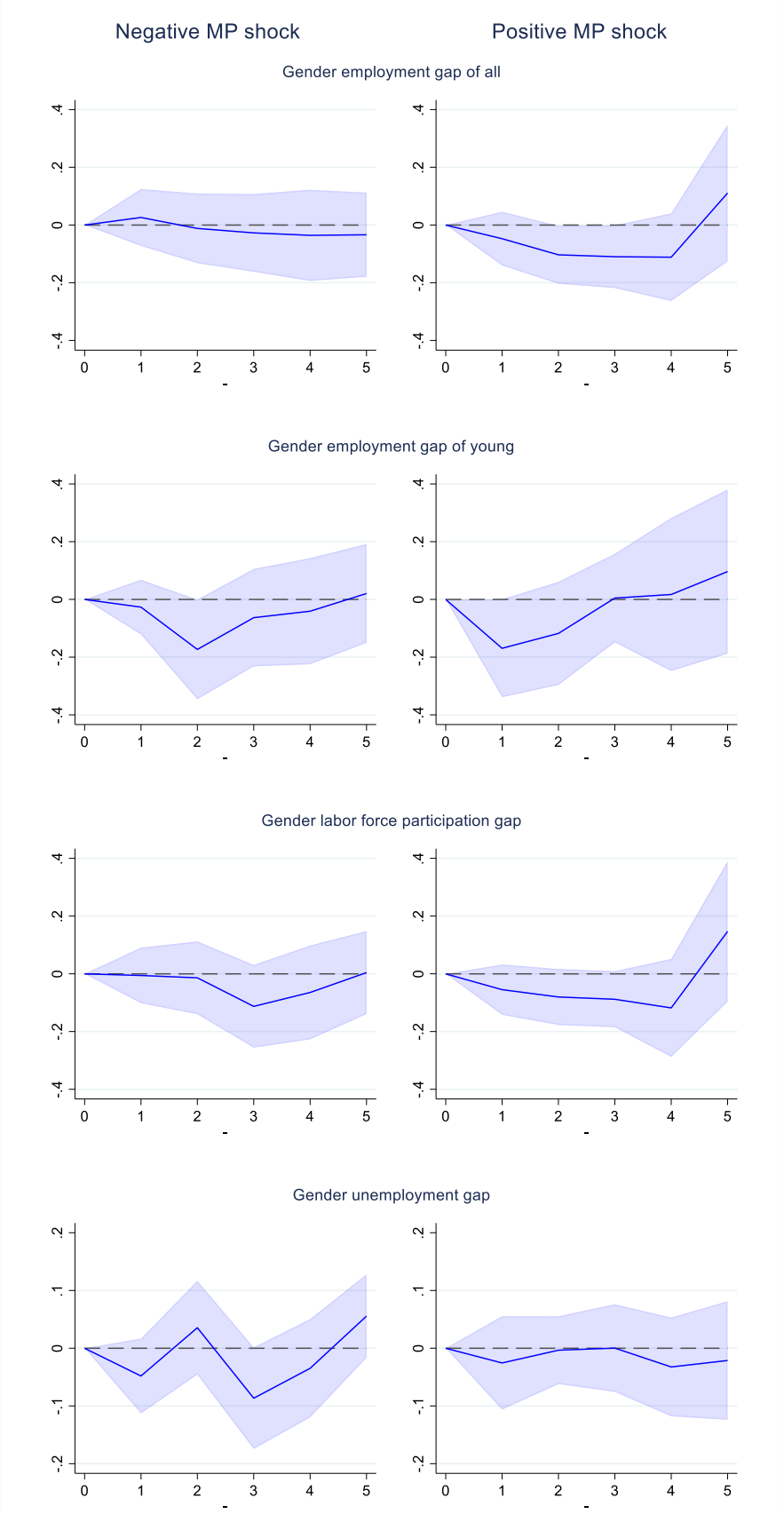
**Figure 6 – Gendered labor market response to a monetary policy shock, low- versus high-growth countries**




*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock, separately for low growth countries (column 1), and high-growth countries (column 2). Hence, the vertical axis represents percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap.*

**Figure 7 – Gendered labor market response to a monetary policy shock, negative versus positive monetary shocks**




*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock, separately for negative monetary policy shock (easing) (column 1), and positive monetary policy shock (tightening) (column 2). Hence, the vertical axis represents percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap.*

### 4.5. Results with geographical and income heterogeneity

In the last analytical section, we disentangle the results by geographic regions and income levels. We divide the developing world into four major regions: Emerging and Developing Asia (EDA), Emerging and Developing Europe (EDE), Latin America and the Caribbean (LAC), and Sub-Saharan Africa (SSA). The results are presented in **Figure 8**. A monetary policy shock of one standard deviation is more detrimental for women's employment than for men's, thereby worsening the gender employment gap in at least two developing regions: Asia and Latin America. In these regions, the lowest point is reached around years three or four following the shock, although in Asia, the decline is recovered by year five. In Europe, the shock leaves the gender employment gap largely unchanged, as well as in Africa, at least until year five.

The gender employment gap of youth also worsens in three of the four regions, excluding Latin America, within the first or second year following the shock, consistent with the general trend. In Latin America, the worsening occurs later, in year four, with no subsequent recovery. Conversely, the decline in the other three regions is reversed by the end of the horizon. Overall, in terms of employment outcomes, Latin America and Africa appear to lack any recovery of the worsening of women's position compared to men's.

A similar pattern is observed when examining the gender labor participation gap. Women experience more intense withdrawal from the labor market compared to men following a monetary policy shock, with the strongest effect occurring around year three to five. It takes longest in Africa for the shock to materialize in a worsened gender labor participation gap. However, the reaction in Europe is the mildest among the regions, indicating the weakest passivation of women following the shock.

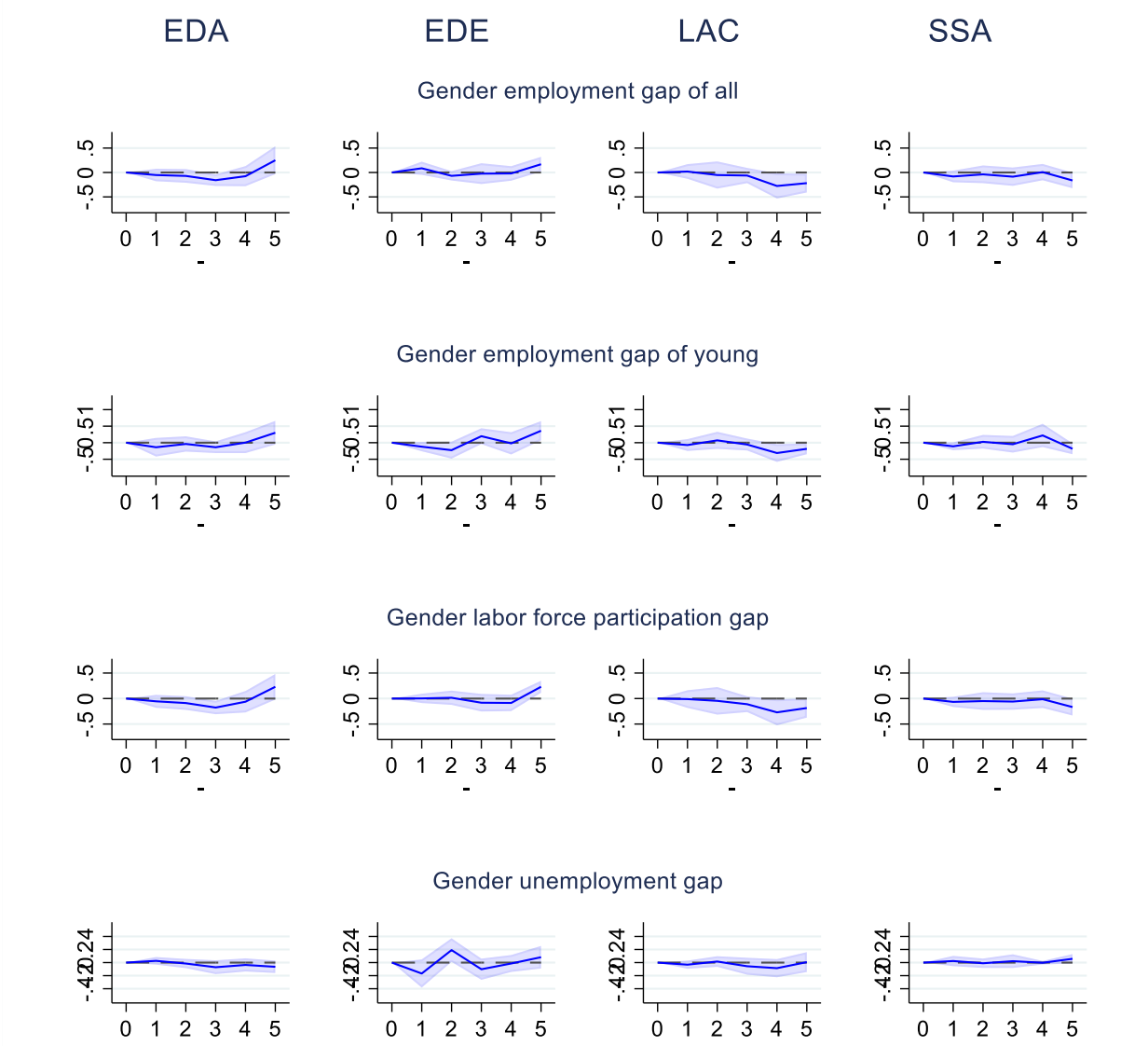
The gender unemployment gap becomes more negative, which is beneficial for women, at least in Asia, Latin America, and Africa, consistent with the baseline results. The deepening of the gender unemployment gap is of similar magnitude as in the overall result; however, the scale is larger due to the graph of Europe, which shows a very strong negative in year one and then a very strong positive reaction in year two. Overall, in Europe, the gender unemployment gap remains intact on average, corroborating the weak passivation effect of women there. In Africa, the gap likewise remains intact in the first four years after the shock, reflecting the notion that the shock neither affected labor force participation nor unemployment dynamics by year five. However, by this year, the unemployment situation for women becomes more dire compared to men's. Across regions, the gender labor participation and unemployment gaps follow similar patterns, with Europe exhibiting the mildest effects on women's labor force dynamics.

We divide the developing world on four income groups: low, lower-middle, upper-middle and high income. The results are presented in **Figure 9**. A monetary policy shock of one standard deviation worsens the gender employment gap in all income groups except the lower-middle. Interestingly, this worsening is most pronounced in low-income countries, while relatively mild in upper-middle and high-income countries. The gender employment gap of youth worsens in low-income countries but then improves after period three. A

positive reaction is observed for the lower-middle income economies and, to some extent, in the high-income economies.

Women suffer more than men in terms of their labor market participation when a monetary policy shock hits, but only in low-income countries. In the rest of the income groupings, the result is either mildly negative or positive in the high-income group. On the other hand, in the low-income group, the gender unemployment gap becomes more negative, which is beneficial for women. Meanwhile, in the high-income group, the opposite is observed, at least during some of the years over the forecasting horizon.

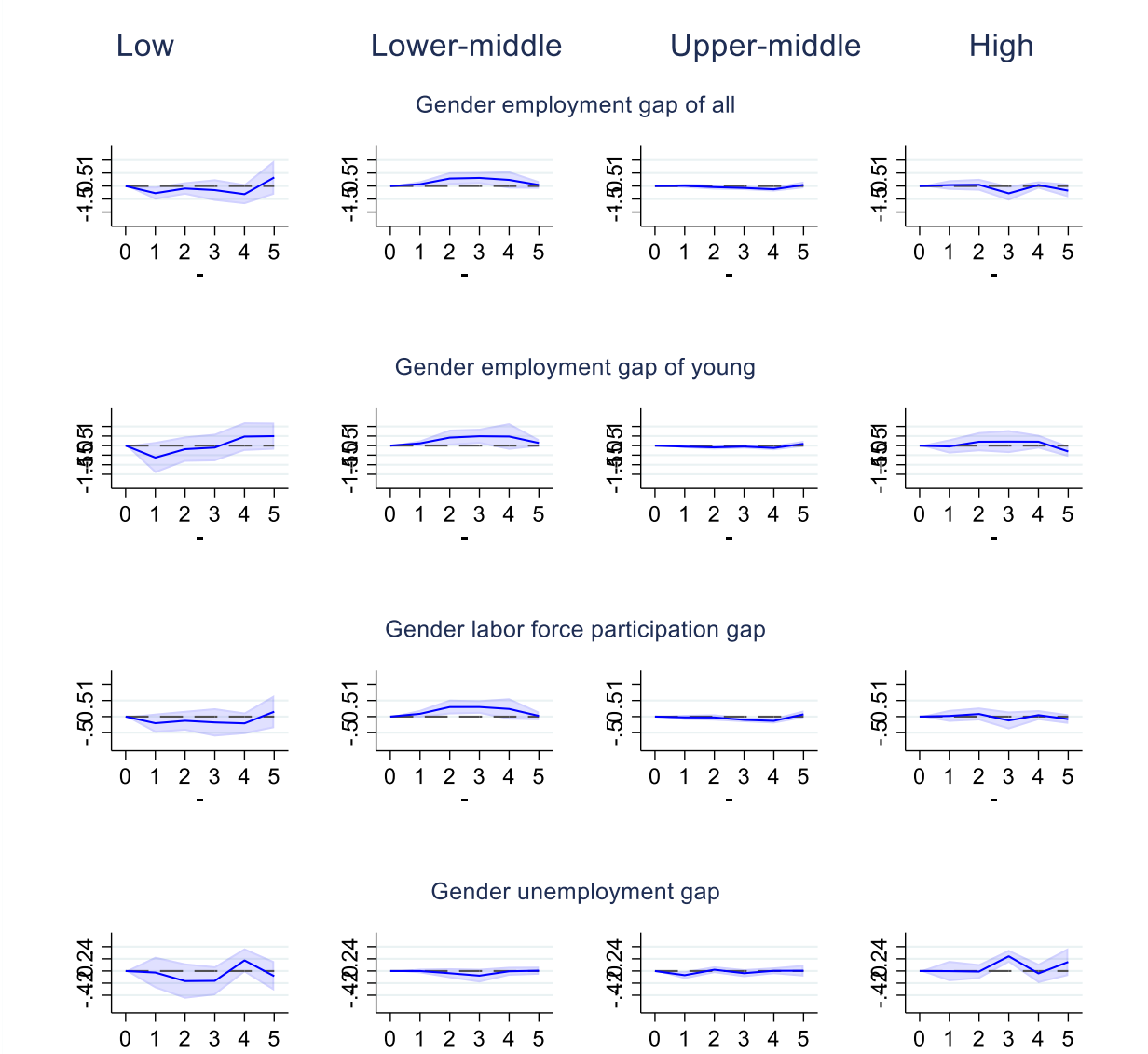
**Figure 8 – Gendered labor market response to a monetary policy shock, by region**




*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock. Hence, the vertical axis represents percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap. Abbreviations stand for the world regions as follows: Emerging and Developing Asia (EDA), Emerging and Developing Europe (EDE), Latin America and the Caribbean (LAC), Sub-Saharan Africa (SSA).*

**Figure 9 – Gendered labor market response to a monetary policy shock, by income level**




*Source: Authors' estimates.*

*Notes: Each graph presents the response of the titled labor market indicator to a one standard deviation monetary policy shock. Hence, the vertical axis represents percentage points. The horizontal axis presents the time horizon expressed in years. 90% confidence interval is presented in shading. A positive (negative) impulse response represents a narrowing (widening) of the gender gap. Classification of the countries based on income levels is conducted based on World Bank's classification available here: https://blogs.worldbank.org/en/opendata/new-world-bank-group-country-classifications-income-level-fy24*

## 5. Conclusions

The aim of this paper is to reveal if unanticipated monetary policy shocks may have implications for men's and women's labor-market outcomes in developing economies by examining the specific impacts on gender gaps in the labor market in a set of 99 developing economies over the period 2009-2021.

To capture the rather inflexible forms in the exchange rate regimes of our sample, we firstly obtain the monetary policy shocks from a Taylor rule augmented with countries' official reserves movements. This tends to catch a common monetary policy reaction of the monetary authorities to usually avoid the instability of the foreign exchange market. Secondly, these country-specific shocks are plugged into a local projections estimator to understand how the gender-disaggregated labor-market outcomes react to a monetary policy shock of one standard deviation.

The baseline results reveal nuanced patterns. After a monetary policy shock, men generally experience a slightly positive response in employment outcomes, while women's employment reacts more negatively, particularly in the third and fourth years after the shock. This asymmetry contributes, in turn, to a gradual deepening of the gender employment gap, which peaks around the third or fourth year and diminishes thereafter. This outcome is complemented with deterioration of the gender participation gap, as women more intensively passivize following a shock than men. Under such an adjusting mechanism, the observed gender unemployment gap either remains unchanged or improves for women.

Including controls such as lagged GDP growth provides robustness to our findings. The results remain consistent, highlighting the persistent impact of monetary policy shocks on gender employment dynamics. Additionally, exploring alternative specifications of monetary policy shocks further corroborates the gendered outcomes, emphasizing the higher sensitivity of women's employment to unexpected policy changes.

The labor market adjustments post-policy changes exhibit sector-specific responsiveness to interest rates and are influenced by the structural characteristics of the labor market. Despite pronounced differences, particularly in men's outcomes, arising from labor market adjustment heterogeneity and data availability limitations, the results remain robust. Notably, sectoral reactions following a monetary policy shock vary: agriculture declines and industry and services improve. This nuances the initial assumption of sectoral impacts on women, suggesting that gender gaps persist despite sector-specific adjustments. The labor force participation and unemployment rate responses are more consistent, with women initially experiencing increased unemployment, subsequently stabilizing the gender unemployment gap.

The gender employment gap worsens more significantly in high-growth environments, suggesting that the intersection of monetary shocks and rapid economic expansion exacerbates gender inequalities. Moreover, the adverse effects are more pronounced under monetary policy tightening than easing, indicating that unexpected hikes in interest rates disproportionately affect women's employment. This may imply, for example, that in common cases for many smaller development economies which expose

their fixed currency to speculation, may ultimately lead to harm women on the labor market more significantly than men.

Geographical heterogeneity analysis reveals distinct regional patterns. Developing Asia and Latin America experience the most significant detrimental effects on women's employment, with a recovery observed in Asia by the fifth year. Europe shows the mildest impact, aligning with the high activity rates of women in the labor market. Africa exhibits a slower manifestation of the shock's impact on the gender employment gap, with the situation for women worsening by the fifth year.

Income level heterogeneity analysis, likewise, reveals distinct patterns. It is primarily the low-income group where a monetary policy shock of a standard deviation results in a fairly severe worsening of the position of women in the labor market, mainly manifested through their passivation once the job is lost. To a milder extent, opposite results are observed in the lower-middle- and high-income groups, while the results in the upper-middle-income group are mainly neutral.

The comprehensive analysis underscores the need for targeted policy interventions to mitigate the gendered consequences of monetary policy shocks in developing economies, which extend beyond monetary and structural (labor-market) policies to fiscal and redistribution policies. Policymakers should be attentive to the differential impacts on men and women, crafting measures that promote gender equality and resilience in the face of economic shocks. Particularly, if central banks start to gradually include understanding of the differentiated impact of the policy move by gender in their analytical approaches, this may help to the calibration of other policies – e.g., the active labor market policies, vocational training, fostering part-time work and other flexible arrangements, unemployment benefits – in a way that best suits affected groups, particularly women. Our research not only advances the understanding of the intricate relationship between monetary policy shocks and gender employment gaps but also underscores the urgency of adopting inclusive policy frameworks to ensure equitable outcomes in diverse economic contexts.

This study is one of the largest possible panels of developing and emerging economies, given data limitations. This, as in every other panel study, assumes aggregation of the results. Hence, tailoring policies to the specific circumstances of each country is essential. Consequently, additional research is needed to enhance the dynamics and determinants of the gendered impacts arising from monetary policy on the local labor markets, considering factors like the level of economic and social development, the very specifics of monetary policy design and execution, and the structures of the labor market.

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## Appendix 1 – Estimates for the Taylor rule

The Appendix provides estimates of the Taylor rule (equation (1) in the main text of this paper). While what we need is the country-specific estimates, here we provide panel-based estimates to observe the Taylor rule in developing economies as a group. We provide results of a simple FE estimator (columns 1 and 2), IV estimates (columns 3 and 4) and Arellano-Bond estimates (columns 5 and 6), all in **Table A 1**. The idea with the latter two groups of estimates is to allow for capturing any remaining endogeneity in the model, despite intentionally taking the first lags of the non-forecast variables. However, some endogeneity may still be present, for example, through undertaking some investment decisions given expectations about the future interest rates, especially when financing sources have a pronounced component of the interest rate tied to the central bank reference rate.

Results for the Taylor rule have the expected signs, except for the forecasted GDP growth rate. Lagged GDP growth is positively related to the interest rate, reflecting the usually observed relationship. However, higher expected growth is predicted to result in a lower interest rate, which is counter-intuitive. Still, both results on the GDP-interest rate relationship are not stable across specifications. This is not the case for the inflation rate: both lagged and forecasted ones robustly lead to increasing interest rates. While a decline in reserves results in an increase in the nominal interest rate, reflecting an attempt to curb inflationary pressures or stabilize the currency. Finally, a negative lagged interest rate, while strange at first, reflects the notion that higher previous levels of the interest rate led to smaller subsequent changes in the nominal interest rate.

**Table A 1 – Panel estimates of the Taylor-type of rule**

| *Dependent variable: Changes in the nominal interest rate* | | | | | | |
|---|---|---|---|---|---|---|
| | **FE estimates** | | **IV estimates** | | **Arellano-Bond estimates** | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Lagged GDP growth** | 0.0253** | 0.00552 | 0.186 | 0.211 | 0.0321** | 0.00408 |
| | (0.011) | (0.017) | (0.144) | (0.266) | (0.015) | (0.022) |
| **Forecasted GDP growth** | -0.0344*** | -0.0261** | -0.326 | -0.439 | -0.037 | -0.0231** |
| | (0.012) | (0.012) | (0.283) | (0.494) | (0.036) | (0.012) |
| **Lagged inflation rate** | 0.0204*** | 0.0205** | 0.0662** | 0.0594 | 0.0152** | 0.0133*** |
| | (0.007) | (0.008) | (0.032) | (0.038) | (0.006) | (0.005) |
| **Forecasted inflation rate** | 0.125** | 0.127** | 0.424*** | 0.394*** | 0.0495* | 0.0396** |
| | (0.062) | (0.064) | (0.130) | (0.144) | (0.027) | (0.020) |
| **Lagged changes in reserves** | -0.00730*** | -0.00556* | -0.0361 | -0.077 | -0.00668** | -0.0042 |
| | (0.002) | (0.003) | (0.082) | (0.105) | (0.003) | (0.003) |
| **Lagged nominal interest rate** | -0.185* | -0.203* | -0.645*** | -0.602*** | -0.185*** | -0.274*** |
| | (0.095) | (0.117) | (0.123) | (0.158) | (0.072) | (0.072) |
| **Constant** | 1.352 | 1.516 | | | | |
| | (1.354) | (1.930) | | | | |
| **Time dummies** | No | Yes | No | Yes | No | Yes |
| **Observations** | 975 | 975 | 743 | 743 | 856 | 856 |
| **Nb. of countries** | 99 | 99 | 96 | 96 | 99 | 99 |
| **Hansen test** | | | 0.926 | 0.957 | 0.156 | 0.0923 |

*Source: Authors' calculations. *, ** and *** denote a statistical significance at the 10%, 5% and 1% level, respectively. Standard errors are robust to heteroskedasticity, are clustered, and provided in parentheses.*

## Appendix 2 – Data and variables

### Table A 2 – Variables and their sources

| Variable | Description | Source |
|---|---|---|
| Interest rate | The bank rate that usually meets the short- and medium-term financing needs of the private sector. It is used both in its level (lagged value) and change compared to the previous period. | International Financial Statistics |
| GDP growth | GDP growth rate in real terms. It is used in its lagged value | World Economic Outlook |
| GDP growth forecast | One-year ahead forecast of the GDP growth rate in real terms | World Economic Outlook |
| Inflation rate | Average inflation rate. It is used in its lagged value | World Economic Outlook |
| Inflation forecast | One-year ahead forecast of the average inflation rate | World Economic Outlook |
| Change in reserves | Annual change in holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. It is used in its lagged value | International Financial Statistics |
| Change in reserves purged from changes in the foreign public debt | Reserves as per the definition in the preceding row, reduced for the public and publicly guaranteed debt service (principal repayments and interest actually paid in currency, goods, or services on long-term obligations of public debtors and long-term private obligations guaranteed by a public entity). | International Financial Statistics |
| Employment rate | Employment to population ratio, 15+, male (%)<br>Employment to population ratio, 15+, female (%)<br>Employment to population ratio, ages 15-24, male (%)<br>Employment to population ratio, ages 15-24, female (%) | International Labor Organization |
| Share of employment in agriculture | Employment in agriculture, female (% of female employment)<br>Employment in agriculture, male (% of male employment) | International Labor Organization |
| Share of employment in industry | Employment in industry, female (% of female employment)<br>Employment in industry, male (% of male employment) | International Labor Organization |
| Share of employment in services | Employment in services, female (% of female employment)<br>Employment in services, male (% of male employment) | International Labor Organization |

| | | |
|---|---|---|
| Labor force participation rate | Labor force participation rate, male (% of male population ages 15+)<br>Labor force participation rate, female (% of female population ages 15+) | International Labor Organization |
| Unemployment rate | Unemployment, male (% of male labor force)<br>Unemployment, female (% of female labor force) | International Labor Organization |
| Collective bargaining | Collective bargaining coverage rate (%) | International Labor Organization |
| Gender pay gap | Average hourly earnings of employees of women (Local currency) minus average hourly earnings of employees of men (Local currency), divided by the former | International Labor Organization |
| Share of informal employment | Proportion of informal employment in total employment | International Labor Organization |

Table A 3 – Descriptive statistics of the included variables

| Variable | Obs. | Mean | St.dev. | Min. | Max. |
|---|---|---|---|---|---|
| Interest rate | 983 | 12.19 | 7.33 | 1.47 | 67.25 |
| Inflation rate | 983 | 5.67 | 14.91 | (3.09) | 379.85 |
| Forecast of the inflation rate | 983 | 5.32 | 6.41 | (1.00) | 110.69 |
| Real GDP growth rate | 983 | 3.03 | 5.04 | (33.50) | 43.48 |
| Forecast of the real GDP growth rate | 983 | 4.42 | 4.21 | (6.07) | 85.62 |
| Change in the interest rate | 983 | (0.32) | 1.92 | (12.69) | 21.94 |
| Change in reserves | 983 | 7.36 | 21.17 | (70.35) | 180.82 |
| Change in reserves reduced for the foreign public debt changes | 812 | 9.32 | 45.32 | (79.92) | 192.86 |
| Monetary policy shocks | 875 | 0.00 | 0.72 | (5.70) | 5.92 |
| Standardizes monetary policy shocks | 864 | (0.00) | 0.95 | (2.81) | 2.63 |
| Employment rate of men (15+) | 924 | 67.43 | 10.74 | 40.58 | 96.28 |
| Employment rate of women (15+) | 924 | 46.18 | 13.31 | 9.71 | 82.29 |
| Employment share in agriculture, women | 922 | 25.49 | 22.98 | 0.03 | 86.70 |
| Employment share in agriculture, men | 922 | 28.23 | 16.66 | 1.35 | 76.28 |
| Employment share in industry, women | 922 | 12.17 | 6.96 | 0.95 | 42.32 |
| Employment share in industry, men | 922 | 25.56 | 9.07 | 6.21 | 63.14 |
| Employment share in services, women | 922 | 62.34 | 21.89 | 11.64 | 96.11 |
| Employment share in services, men | 922 | 46.21 | 11.28 | 14.81 | 76.64 |
| Employment rate of men (15-24) | 924 | 41.35 | 14.20 | 12.51 | 82.12 |
| Employment rate of women (15-24) | 924 | 28.03 | 13.08 | 3.97 | 71.25 |
| Labor force participation of men | 924 | 72.48 | 8.90 | 43.57 | 96.38 |
| Labor force participation of women | 924 | 50.44 | 13.26 | 12.27 | 83.90 |
| Unemployment rate of men | 924 | 7.27 | 5.69 | 0.05 | 32.85 |
| Unemployment rate of women | 924 | 8.93 | 6.47 | 0.24 | 33.57 |
| Share of informal employment | 380 | 56.32 | 23.00 | 3.84 | 97.07 |
| Collective bargaining coverage rate | 223 | 23.51 | 23.29 | 0.40 | 98.50 |
| Gender pay gap | 334 | (4.97) | 15.74 | (49.65) | 147.38 |

Table A 4 – Countries included

| Country | Years observed | Region (geo) |
|---|---|---|
| Albania | 8 | EDE |
| Algeria | 12 | SSA |
| Angola | 10 | SSA |
| Antigua and Barbuda | 12 | LAC |
| Argentina | 6 | LAC |
| Armenia | 12 | EDE |
| Azerbaijan | 12 | EDE |
| Bahrain | 6 | EDA |
| Bangladesh | 11 | EDA |
| Barbados | 12 | LAC |
| Belarus | 12 | EDE |
| Belize | 12 | LAC |
| Bhutan | 6 | EDA |
| Bolivia | 10 | LAC |
| Bosnia and Herzegovina | 12 | EDE |
| Botswana | 9 | SSA |
| Brazil | 12 | LAC |
| Brunei Darussalam | 12 | EDA |
| Bulgaria | 12 | EDE |
| Cabo Verde | 9 | SSA |
| Chile | 9 | LAC |
| China | 12 | EDA |
| Colombia | 10 | LAC |
| Comoros | 10 | SSA |
| Costa Rica | 12 | LAC |
| Croatia | 5 | EDE |
| Democratic Republic of Congo | 5 | SSA |
| Dominica | 9 | LAC |
| Dominican Republic | 12 | LAC |
| Egypt | 12 | SSA |
| Fiji | 10 | EDA |
| Georgia | 12 | EDE |
| Grenada | 9 | LAC |
| Guatemala | 12 | LAC |
| Guyana | 10 | LAC |
| Haiti | 12 | LAC |
| Honduras | 12 | LAC |
| Hungary | 12 | EDE |
| India | 13 | EDA |
| Indonesia | 12 | EDA |
| Jamaica | 12 | LAC |
| Jordan | 7 | SSA |
| Kenya | 12 | SSA |
| Kosovo | 7 | EDE |
| Kuwait | 11 | EDA |
| Kyrgyz Republic | 12 | EDE |
| Lesotho | 8 | SSA |
| Liberia | 5 | SSA |
| Madagascar | 6 | SSA |
| Malaysia | 12 | EDA |
| Maldives | 8 | EDA |
| Mauritius | 12 | EDA |

| | | |
|---|---|---|
| Mexico | 12 | LAC |
| Moldova | 12 | EDE |
| Mongolia | 10 | EDA |
| Montenegro | 10 | EDE |
| Mozambique | 12 | SSA |
| Myanmar | 11 | EDA |
| Namibia | 8 | SSA |
| Nicaragua | 12 | LAC |
| Nigeria | 12 | SSA |
| North Macedonia | 12 | EDE |
| Oman | 9 | SSA |
| Pakistan | 12 | EDA |
| Panama | 12 | LAC |
| Papua New Guinea | 5 | EDA |
| Paraguay | 12 | LAC |
| Peru | 11 | LAC |
| Philippines | 10 | EDA |
| Qatar | 12 | SSA |
| Romania | 12 | EDE |
| Rwanda | 12 | SSA |
| Samoa | 12 | SSA |
| Seychelles | 10 | SSA |
| Sierra Leone | 10 | SSA |
| Solomon Islands | 9 | SSA |
| South Africa | 10 | SSA |
| South Sudan | 5 | SSA |
| Sri Lanka | 10 | SSA |
| St. Kitts and Nevis | 12 | LAC |
| St. Lucia | 12 | LAC |
| St. Vincent and the Grenadines | 12 | LAC |
| Suriname | 8 | LAC |
| Tajikistan | 10 | SSA |
| Tanzania | 6 | SSA |
| Thailand | 12 | EDA |
| The Gambia | 7 | SSA |
| Timor-Leste | 8 | EDA |
| Tonga | 7 | SSA |
| Trinidad and Tobago | 9 | LAC |
| Uganda | 9 | SSA |
| Ukraine | 12 | EDE |
| Uruguay | 10 | LAC |
| Uzbekistan | 8 | EDA |
| Vanuatu | 5 | SSA |
| Vietnam | 12 | EDA |
| Zambia | 11 | SSA |

Note: Abbreviations stand for as follows: Emerging and Developing Asia (EDA), Emerging and Developing Europe (EDE), Latin America and the Caribbean (LAC), Sub-Saharan Africa (SSA).

## Appendix 3 – Identification of various episodes in the sample

The Appendix identifies the number and share of various episodes in our sample, i.e.: episodes with negative growth rates, with easing of monetary policy as per declining lending interest rate, and as per a negative monetary policy shock, and episodes with inflation exceeding one standard deviation of the country average during the observed period. The notion behind the appendix is that the period 2009 – 2022 is specific as several major global events occurred, from the Global Financial Crisis, via years of very low or negative interest rates to the global economic slowdown during the pandemic. Results are presented in **Table A 5**. The (tetrachoric) correlation between the episodes of easing monetary policy observed through the declining interest rate and the negative monetary policy shocks, as per our identification, is clearly positive though moderate (37.7%), though very significant (p=0.0000), signifying a clear relationship between the two. The correlation between the negative monetary policy shocks (easing of monetary policy) and inflationary shocks is expectedly negative though small (-10.5%), albeit significant at the 10% level. However, these observations provide grounds for treating the heterogeneous sample of developing economies over the particular time window in the way we do in this analysis.

**Table A 5 – Various episodes in our sample**

| | Negative growth episodes | Share of negative growth episodes (%) | Episodes with easing monetary policy | Share of episodes with easing monetary policy (%) | Negative monetary policy shocks | Share of negative monetary policy shocks (%) | Inflationary shocks | Share of inflationary shocks (%) |
|---|---|---|---|---|---|---|---|---|
| **Albania** | 1 | 12.5 | 6 | 75.0 | 3 | 42.9 | 1 | 12.5 |
| **Algeria** | 1 | 8.3 | 0 | - | 0 | - | 2 | 16.7 |
| **Angola** | 3 | 30.0 | 5 | 50.0 | 6 | 66.7 | 2 | 20.0 |
| **Antigua and Barbuda** | 3 | 25.0 | 10 | 83.3 | 8 | 66.7 | 3 | 25.0 |
| **Argentina** | 2 | 33.3 | 2 | 33.3 | 1 | 33.3 | 1 | 16.7 |
| **Armenia** | 1 | 8.3 | 8 | 66.7 | 5 | 41.7 | 3 | 25.0 |
| **Azerbaijan** | 2 | 16.7 | 9 | 75.0 | 8 | 66.7 | 2 | 16.7 |
| **Bahrain** | 0 | - | 6 | 100.0 | 1 | 25.0 | 0 | - |
| **Bangladesh** | 0 | - | 8 | 72.7 | 4 | 40.0 | 1 | 9.1 |
| **Barbados** | 5 | 41.7 | 4 | 33.3 | 7 | 58.3 | 1 | 8.3 |
| **Belarus** | 3 | 25.0 | 7 | 58.3 | 6 | 50.0 | 2 | 16.7 |
| **Belize** | 2 | 16.7 | 12 | 100.0 | 6 | 50.0 | 1 | 8.3 |
| **Bhutan** | 2 | 33.3 | 2 | 33.3 | 2 | 33.3 | 2 | 33.3 |
| **Bolivia** | 1 | 10.0 | 6 | 60.0 | 5 | 55.6 | 1 | 10.0 |
| **Bosnia and Herzegovina** | 2 | 16.7 | 11 | 91.7 | 5 | 41.7 | 1 | 8.3 |
| **Botswana** | 1 | 11.1 | 8 | 88.9 | 2 | 40.0 | 3 | 33.3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Brazil** | 3 | 25.0 | 7 | 58.3 | 5 | 41.7 | 3 | 25.0 |
| **Brunei Darussalam** | 5 | 41.7 | 0 | - | 0 | - | 3 | 25.0 |
| **Bulgaria** | 1 | 8.3 | 12 | 100.0 | 6 | 50.0 | 1 | 8.3 |
| **Cabo Verde** | 1 | 11.1 | 6 | 66.7 | 4 | 50.0 | 1 | 11.1 |
| **Chile** | 0 | - | 6 | 66.7 | 5 | 55.6 | 2 | 22.2 |
| **China** | 0 | - | 3 | 25.0 | 8 | 66.7 | 1 | 8.3 |
| **Colombia** | 1 | 10.0 | 7 | 70.0 | 6 | 66.7 | 1 | 10.0 |
| **Comoros** | 0 | - | 1 | 10.0 | 0 | - | 2 | 20.0 |
| **Costa Rica** | 1 | 8.3 | 11 | 91.7 | 5 | 41.7 | 3 | 25.0 |
| **Croatia** | 5 | 100.0 | 5 | 100.0 | 1 | 50.0 | 1 | 20.0 |
| **Democratic Republic of Congo** | 0 | - | 2 | 40.0 | 0 | - | 1 | 20.0 |
| **Dominica** | 3 | 33.3 | 7 | 77.8 | 0 | - | 1 | 11.1 |
| **Dominican Republic** | 1 | 8.3 | 8 | 66.7 | 6 | 50.0 | 2 | 16.7 |
| **Egypt** | 0 | - | 6 | 50.0 | 5 | 41.7 | 2 | 16.7 |
| **Fiji** | 3 | 30.0 | 6 | 60.0 | 4 | 44.4 | 1 | 10.0 |
| **Georgia** | 1 | 8.3 | 8 | 66.7 | 5 | 41.7 | 2 | 16.7 |
| **Grenada** | 3 | 33.3 | 9 | 100.0 | 4 | 50.0 | 2 | 22.2 |
| **Guatemala** | 1 | 8.3 | 8 | 66.7 | 6 | 50.0 | 1 | 8.3 |
| **Guyana** | 0 | - | 6 | 60.0 | 6 | 66.7 | 2 | 20.0 |
| **Haiti** | 4 | 33.3 | 5 | 41.7 | 6 | 50.0 | 2 | 16.7 |
| **Honduras** | 1 | 8.3 | 9 | 75.0 | 7 | 58.3 | 2 | 16.7 |
| **Hungary** | 2 | 16.7 | 7 | 58.3 | 7 | 58.3 | 3 | 25.0 |
| **India** | 1 | 7.7 | 10 | 76.9 | 7 | 53.8 | 3 | 23.1 |
| **Indonesia** | 1 | 8.3 | 10 | 83.3 | 6 | 50.0 | 3 | 25.0 |
| **Jamaica** | 3 | 25.0 | 10 | 83.3 | 7 | 58.3 | 2 | 16.7 |
| **Jordan** | 0 | - | 5 | 71.4 | 0 | - | 0 | - |
| **Kenya** | 1 | 8.3 | 8 | 66.7 | 5 | 41.7 | 1 | 8.3 |
| **Kosovo** | 0 | - | 7 | 100.0 | 2 | 50.0 | 1 | 14.3 |
| **Kuwait** | 3 | 27.3 | 7 | 63.6 | 6 | 54.5 | 1 | 9.1 |
| **Kyrgyz Republic** | 3 | 25.0 | 9 | 75.0 | 5 | 41.7 | 2 | 16.7 |
| **Lesotho** | 1 | 12.5 | 4 | 50.0 | 4 | 50.0 | 2 | 25.0 |
| **Liberia** | 1 | 20.0 | 3 | 60.0 | 3 | 60.0 | 1 | 20.0 |
| **Madagascar** | 0 | - | 2 | 33.3 | 2 | 66.7 | 1 | 16.7 |
| **Malaysia** | 1 | 8.3 | 10 | 83.3 | 7 | 58.3 | 1 | 8.3 |
| **Maldives** | 1 | 12.5 | 4 | 50.0 | 6 | 75.0 | 1 | 12.5 |
| **Mauritius** | 1 | 8.3 | 6 | 50.0 | 5 | 41.7 | 1 | 8.3 |
| **Mexico** | 2 | 16.7 | 8 | 66.7 | 5 | 41.7 | 2 | 16.7 |
| **Moldova** | 3 | 25.0 | 10 | 83.3 | 7 | 58.3 | 2 | 16.7 |
| **Mongolia** | 1 | 10.0 | 5 | 50.0 | 6 | 66.7 | 2 | 20.0 |
| **Montenegro** | 1 | 10.0 | 8 | 80.0 | 4 | 44.4 | 1 | 10.0 |
| **Mozambique** | 1 | 8.3 | 6 | 50.0 | 6 | 50.0 | 2 | 16.7 |
| **Myanmar** | 0 | - | 3 | 27.3 | 4 | 36.4 | 2 | 18.2 |
| **Namibia** | 3 | 37.5 | 4 | 50.0 | 3 | 42.9 | 2 | 25.0 |
| **Nicaragua** | 3 | 25.0 | 8 | 66.7 | 7 | 58.3 | 3 | 25.0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nigeria | 2 | 16.7 | 8 | 66.7 | 8 | 66.7 | 3 | 25.0 |
| North Macedonia | 2 | 16.7 | 12 | 100.0 | 5 | 41.7 | 3 | 25.0 |
| Oman | 2 | 22.2 | 3 | 33.3 | 3 | 37.5 | 1 | 11.1 |
| Pakistan | 1 | 8.3 | 9 | 75.0 | 6 | 50.0 | 1 | 8.3 |
| Panama | 1 | 8.3 | 6 | 50.0 | 5 | 41.7 | 2 | 16.7 |
| Papua New Guinea | 0 | - | 2 | 40.0 | 0 | - | 1 | 20.0 |
| Paraguay | 3 | 25.0 | 10 | 83.3 | 6 | 50.0 | 1 | 8.3 |
| Peru | 1 | 9.1 | 7 | 63.6 | 5 | 45.5 | 2 | 18.2 |
| Philippines | 0 | - | 5 | 50.0 | 5 | 50.0 | 2 | 20.0 |
| Qatar | 1 | 8.3 | 8 | 66.7 | 7 | 58.3 | 2 | 16.7 |
| Romania | 2 | 16.7 | 10 | 83.3 | 6 | 50.0 | 2 | 16.7 |
| Russia | 3 | 25.0 | 7 | 58.3 | 6 | 50.0 | 1 | 8.3 |
| Rwanda | 1 | 8.3 | 8 | 66.7 | 7 | 58.3 | 2 | 16.7 |
| Samoa | 4 | 33.3 | 10 | 83.3 | 6 | 50.0 | 1 | 8.3 |
| Seychelles | 0 | - | 6 | 60.0 | 4 | 44.4 | 2 | 20.0 |
| Sierra Leone | 2 | 20.0 | 8 | 80.0 | 3 | 33.3 | 3 | 30.0 |
| Solomon Islands | 1 | 11.1 | 5 | 55.6 | 5 | 55.6 | 3 | 33.3 |
| South Africa | 1 | 10.0 | 6 | 60.0 | 4 | 44.4 | 2 | 20.0 |
| South Sudan | 4 | 80.0 | 3 | 60.0 | 2 | 66.7 | 1 | 20.0 |
| Sri Lanka | 0 | - | 7 | 70.0 | 7 | 70.0 | 1 | 10.0 |
| St. Kitts and Nevis | 5 | 41.7 | 8 | 66.7 | 5 | 41.7 | 1 | 8.3 |
| St. Lucia | 3 | 25.0 | 11 | 91.7 | 6 | 50.0 | 2 | 16.7 |
| St. Vincent and the Grenadines | 2 | 16.7 | 9 | 75.0 | 5 | 41.7 | 2 | 16.7 |
| Suriname | 4 | 50.0 | 2 | 25.0 | 3 | 37.5 | 2 | 25.0 |
| Tajikistan | 0 | - | 5 | 50.0 | 6 | 60.0 | 1 | 10.0 |
| Tanzania | 0 | - | 3 | 50.0 | 0 | - | 1 | 16.7 |
| Thailand | 1 | 8.3 | 10 | 83.3 | 5 | 41.7 | 3 | 25.0 |
| The Bahamas | 4 | 33.3 | 3 | 25.0 | 5 | 41.7 | 2 | 16.7 |
| The Gambia | 1 | 14.3 | 2 | 28.6 | 2 | 66.7 | 2 | 28.6 |
| Timor-Leste | 3 | 37.5 | 3 | 37.5 | 0 | - | 1 | 12.5 |
| Tonga | 1 | 14.3 | 5 | 71.4 | 4 | 66.7 | 2 | 28.6 |
| Trinidad and Tobago | 8 | 88.9 | 4 | 44.4 | 4 | 44.4 | 2 | 22.2 |
| Uganda | 0 | - | 5 | 55.6 | 6 | 66.7 | 2 | 22.2 |
| Ukraine | 4 | 33.3 | 6 | 50.0 | 7 | 58.3 | 1 | 8.3 |
| Uruguay | 1 | 10.0 | 6 | 60.0 | 3 | 33.3 | 2 | 20.0 |
| Uzbekistan | 0 | - | 5 | 62.5 | 3 | 60.0 | 1 | 12.5 |
| Vanuatu | 0 | - | 4 | 80.0 | 3 | 60.0 | 1 | 20.0 |
| Vietnam | 0 | - | 6 | 50.0 | 7 | 58.3 | 1 | 8.3 |
| Zambia | 1 | 9.1 | 7 | 63.6 | 6 | 54.5 | 2 | 18.2 |