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Prepared by Valentina Flamini,[*] Diego B. P. Gomes,[*] Bihong Huang,[*] Lisa Kolovich,[*] Aina Puig[†], and Aleksandra Zdzienicka[*]

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ABSTRACT: We study the effects of monetary policy shocks on employment gender gaps in a panel of 22 countries using quarterly data from 1990 to 2019. Our results show that men's employment falls more than women's after contractionary monetary policy shocks, narrowing the employment gender gap over time. Two factors contribute to explaining this heterogeneous effect. First, a larger impact of monetary policy shocks on employment in the industry sector that employs more men. Second, the larger response of the employment gap in the sector (services) that employs the largest share of men and women. In terms of labor market adjustment, the narrowing of the gender employment gap is initially driven by a reduction in the gender unemployment gaps that, over time, results in an adjustment in the gender labor force participation gap—with men's labor force participation dropping more than women's. 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.

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WORKING PAPERS

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I. Introduction

There is a growing interest among academics and policymakers in analyzing the heterogeneous effects of monetary policy on employment and other labor market outcomes. It is driven by the need to not only better understand the impact of monetary policy on total employment and economic output but to also identify the labor market channels underlying the distributional effects of the monetary policy.[2] It is therefore not surprising that an increasing number of empirical and theoretical studies have focused on how monetary policy affects different sectors of the labor market (e.g., Singh and others, 2022, and references therein), occupational groups, or labor income (e.g., Zens and others, 2020; Heathcote and others, 2020; Dolado and others, 2021; Amberg and others, 2022; Gomes and others, 2023).

Less attention has been paid to how monetary policy affects gender labor market outcomes. The sign of the effect is unclear *a priori*. On the one hand, men and women are not equally represented across sectors and jobs. Men are more likely than women to work in *durable* sectors, such as manufacturing and construction industries, which are more sensitive to changes in interest rates than *non-durable* services (Erceg and Levin, 2006), where more women are employed. Even within services, women tend to work in sectors such as education and healthcare that are less sensitive to economic fluctuations following monetary policy changes or other demand shocks (Duzak, 2021). On the other hand, women are also more likely to work in jobs (e.g., part-time or temporary contracts) that are more prone to labor market adjustments due to monetary policy changes (e.g., Takhtamanova and Sierminska, 2009, and references therein). Moreover, due to already lower rates of access to credit and financial services, women's productive or entrepreneurial activities—including self-employment—tend to be more sensitive to monetary policy changes.[3] Women also tend to be primary caregivers and are more likely to reduce their labor force participation in turbulent times.

Consistent with the mixed theoretical predictions, the limited empirical evidence suggesting that women's labor market outcomes may be more vulnerable to monetary policy shocks than men's has also not reached a consensus. Seguino and Heintz (2012) examine the intersection of gender, race, and monetary policy and show that higher interest rates lead to higher unemployment rates for Black female workers compared to Black and white male workers in the United States. Bergman and others (2022) find that women tend to increase their employment more than men under expansionary monetary policy in tighter labor markets. Braunstein and Heintz (2008) reveal 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. In contrast, Takhtamanova and Sierminska (2009) find no significant impact of monetary policy changes on gender gaps in employment for OECD countries.

In this paper, we aim to shed light on how monetary policy affects gender employment gaps in a panel of 22 advanced and emerging market economies from 1990Q1 to 2019Q4.[4] In particular, we analyze how

[2] The literature on the heterogeneous effects of monetary policy has looked primarily at income or wealth inequality in advanced economies (Coibion and others, 2017; Furceri and others, 2018; Blomhoff Holm and others, 2021). Some studies (e.g., Bartscher and others, 2022) investigate the relationship between monetary policy and racial inequality.

[3] See, for instance, Bernanke and Blinder 1988.

[4] Gender gaps are defined as the female indicator minus the male indicator. Hence, a narrowing (widening) of the gender gap is represented as a positive (negative) impulse response for the employment and labor force participation gender gap and a negative (positive) impulse response for the unemployment gender gap.

exogenous monetary policy shocks impact women's versus men's employment, in which sectors, through which adjustment process (labor force participation and unemployment rates), and how different labor market characteristics shape these effects. We also study the asymmetric effects of contractionary versus expansionary monetary policy shocks and across business cycles (recessions versus expansions).

Monetary policy shocks are identified separately for each country using the methodology proposed by Brandao-Marques and others (2020), who extend the Romer and Romer (2005) approach to a large panel of countries. The estimated shocks are then embedded in panel local projections *à la* Jordà (2005) to estimate impulse responses on various labor market outcomes.

We find that an unexpected increase of 100-basis point in the interest rate reduces women's employment less than men's, narrowing the total gender employment gap starting ten quarters after the shock, with a peak impact of about 0.3 percentage point (a quarter of its standard deviation in the sample). Two mechanisms contribute to explain this effect. First, employment in the industrial sector (where men's employment dominates) contracts more and faster than in services (where women are disproportionally represented) following a monetary policy shock. Second, in services, monetary policy shocks have an immediate and persistent impact, slightly narrowing the gender employment gap. In industry, the gender employment gap initially widens but over time, reverses and experiences a larger narrowing of the gap than in services.

When explaining changes in employment by adjustments in labor force participation and unemployment, we find that following contractionary monetary policy shocks, the unemployment gap declines in the short term. In the medium term, men more than women drop out of the labor market, contributing to a narrowing in the labor force participation gap up to about 0.2 percentage point (almost a quarter of the standard deviation) at the end of the projection period.

We also find that the effects are larger in countries with more flexible overall employment protection regulations, given lower firing costs and constraints, and with larger wage gaps, given women's lower earnings than men. The impact is also relatively larger when gender gaps in informal employment are lower, as informality generally dampens the impact of monetary policy transmission (Alberola and Urrutia, 2020, and references therein) and therefore mutes the impact on women's [formal] employment.

Finally, the effects of monetary policy on employment are asymmetric. A 100-basis point contractionary monetary policy shock narrows total gender employment gaps after six quarters, with a peak impact of 0.6 percentage points after 12 quarters, while the impact of expansionary monetary policy shocks is muted. The longer-term effect of monetary policy shocks is driven by their impact during expansions. The results are robust to various sensitivity tests.

The rest of the paper is organized as follows. Section II describes the methodology and data we use to identify the monetary policy shocks and estimate the impulse responses. Section III presents the results of the effect of monetary policy shocks on total gender employment gaps, across industry and service sectors, adjustments in labor force participation versus unemployment rate, and labor market characteristics. Section IV analyzes the asymmetric transmission of contractionary versus expansionary shocks and across the business cycle. Section V discusses robustness tests. Section VI concludes with policy recommendations.

II. Methodology and Data

Exogenous variations in policy variables are required for empirically assessing the impact of monetary policy on labor market outcomes. We identify monetary policy shocks following the methodology proposed by Brandao-Marques and others (2020), which extends the Romer and Romer (2005) approach to a large panel of countries. We index countries by k and quarter-years by t. Let $i_{k,t}$ denote the short-term (3-month) nominal interest rate, $g_{k,t}$ the quarterly GDP growth rate, and $\pi_{k,t}$ the quarterly inflation rate.[5] The superscript F indicates one-year-ahead market forecasts for the corresponding variables. With data on these variables, we use OLS to estimate the following regression for each country separately:

$$\left(i_{k,t} - i_{k,t-1}\right) = \alpha_{0,k} + \alpha_{1,k} g^F_{k,t+4} + \alpha_{2,k} \pi^F_{k,t+4} + \alpha_{3,k} g_{k,t} + \alpha_{4,k} \pi_{k,t} + \sum_{j=1}^{2} \alpha_{5,j,k} i_{k,t-j} + \varepsilon_{k,t}, \quad (1)$$

where $\varepsilon_{k,t}$ is the residual term. All coefficients are indexed by k, emphasizing that our estimates are country-specific at this stage. The monetary policy shock series is identified as the estimated residuals $\hat{\varepsilon}_{k,t}$.

With the estimated shock series in hand, we use local projections *à la* Jordà (2005) to estimate the responses of selected labor market outcomes to monetary policy shocks.[6] In our notation, we use the index n to indicate whether the outcome variable refers to the entire population, only women, only men, or the gender gap. The gender gaps are defined as the value for women minus the value for men for each variable. Also, we denote by h the horizon of the estimated responses, which ranges up to twenty quarters ($h = 0, \ldots, 19$) after the shock at $t-1$. Let $y_{n,k,t}$ be the labor market outcome of interest, $\lambda^n_{k,h}$ country fixed effects, and $\theta^n_{t,h}$ quarter-years fixed effects. For each horizon h, we estimate a separate fixed-effects panel regression as follows:

$$y_{n,k,t+h} = \sum_{j=1}^{4} \beta_{n,h,j} \hat{\varepsilon}_{k,t-j} + \sum_{j=1}^{4} \delta_{n,h,j} y_{n,k,t-j} + \lambda^n_{k,h} + \theta^n_{t,h} + \xi_{n,h,k,t}, \quad (2)$$

where $\xi_{n,h,k,t}$ is the residual term. Standard errors are robust and clustered at the country level. The estimated coefficients β quantify the percentage (point) change at horizon h in response to a monetary policy shock of 100 basis points or 1 percentage point. We graphically present the results by plotting the estimated coefficients with their confidence intervals on the vertical axis against their respective horizons on the horizontal axis.

To test whether the impact of the monetary policy shocks depends on the labor market characteristics, such as the overall employment protection regulation captured by firing and hiring costs and procedures, gender wage differentials, or level of informality among women versus men workers, we extend equation (2) as follows:

[5] The GDP growth rates are calculated as the difference of the logarithm of GDP in levels between two consecutive quarters. Similarly, the inflation rates are calculated as the difference of the logarithm of CPI between two consecutive quarters.

[6] The method of local projections estimates the response of outcome variables to properly identified policy shocks. Because it does not require the specification and estimation of the unknown true multivariate dynamic data-generating process, it is more robust to misspecification than vector autoregression (VAR) models, even if some efficiency is lost. Furthermore, unlike VARs, local projections are more amenable to highly nonlinear and flexible specifications.

$$y_{n,k,t+h} = \sum_{j=1}^{4} \beta^{-}_{n,h,j} \hat{\varepsilon}_{k,t-j} G(d_i) + \sum_{j=1}^{4} \beta^{+}_{n,h,j} \hat{\varepsilon}_{k,t-j} (1 - G(d_i)) + \sum_{j=1}^{4} \delta_{n,h,j} y_{n,k,t-j} + \lambda^{n}_{k,h} + \theta^{n}_{t,h} + \xi_{n,h,k,t}, \quad (3)$$

where $G(d_i) = \frac{\exp(-\gamma z_i)}{1+\exp(-\gamma z_i)}$, $\gamma > 0$. z is a normalized indicator of the mean state of the country to capture cross-counties variations defined as $z_i = \frac{x_i - \bar{x}}{\sigma_x}$, with x_i representing a country average, $\bar{x}$ a cross-country average, and σ_x a cross-country standard deviation, respectively. $G(d_i)$ is the corresponding smooth transition function between country regimes. The estimated coefficients β^{-} and β^{+} quantify the percentage (point) changes at horizon h in response to a monetary policy shock of 100 basis points in low versus high states regimes.[7]

We use a similar approach to test for the asymmetry of the monetary policy impact. In particular, we estimate equation (4) to assess whether the impact of monetary policy on gender gaps in our labor market variables vary following contractionary (positive) versus expansionary (negative) shocks.

$$y_{n,k,t+h} = \sum_{j=1}^{4} \beta^{-}_{n,h,j} \hat{\varepsilon}_{k,t-j} (D_{i,t}) + \sum_{j=1}^{4} \beta^{+}_{n,h,j} \hat{\varepsilon}_{k,t-j} (1 - D_{i,t}) + \sum_{j=1}^{4} \delta_{n,h,j} y_{n,k,t-j} + \lambda^{n}_{k,h} + \theta^{n}_{t,h} + \xi_{n,h,k,t}, \quad (4)$$

where $D_{i,t}$ is a dummy variable that takes a value of one for positive monetary policy shocks and zero otherwise. The estimated coefficients β^{-} and β^{+} quantify the percentage (point) changes at horizon h in response to a negative and positive monetary policy shock of 100 basis points, respectively.

To test if the impact of monetary policy varies across the business cycle, we estimate equation (5).

$$\begin{aligned} y_{n,k,t+h} = &\sum_{j=1}^{4} \beta^{-}_{n,h,j} \hat{\varepsilon}_{k,t-j} G(d_{i,t}) + \sum_{j=1}^{4} \beta^{+}_{n,h,j} \hat{\varepsilon}_{k,t-j} (1 - G(d_{i,t})) + \sum_{j=1}^{4} \delta_{n,h,j} y_{n,k,t-j} \\ &+ \sum_{j=1}^{4} \rho_{n,h,j} \Delta gdp_{n,k,t-j} + \lambda^{n}_{k,h} + \theta^{n}_{t,h} + \xi_{n,h,k,t}, \end{aligned} \quad (5)$$

where $G(d_{i,t}) = \frac{\exp(-\gamma z_{i,t})}{1+\exp(-\gamma z_{i,t})}$, $\gamma = 1.5$ (following Auerbach and Gorodnichenko, 2013). $z_{i,t}$ is a normalized indicator of the state of the country to capture within-countries variations defined as $z_{i,t} = \frac{x_{i,t} - \bar{x}_i}{\sigma_{x_i}}$, with $x_{i,t}$ representing a country's GDP growth, $\bar{x}_i$ a country's average GDP growth, and σ_{x_i} a country's GDP growth standard deviation, respectively. $G(d_{i,t})$ is the corresponding smooth transition function between country growth regimes within countries. The estimated coefficients β^{-} and β^{+} quantify the percentage (point) changes at horizon h in response to a monetary policy shock of 100 basis points in low versus high growth period.[8]

Equations (2) to (5) are estimated using quarterly data for a panel of 22 countries from 1990Q1 to 2019Q4. Annex I lists the countries included in our analysis and the periods available for each of the three labor market

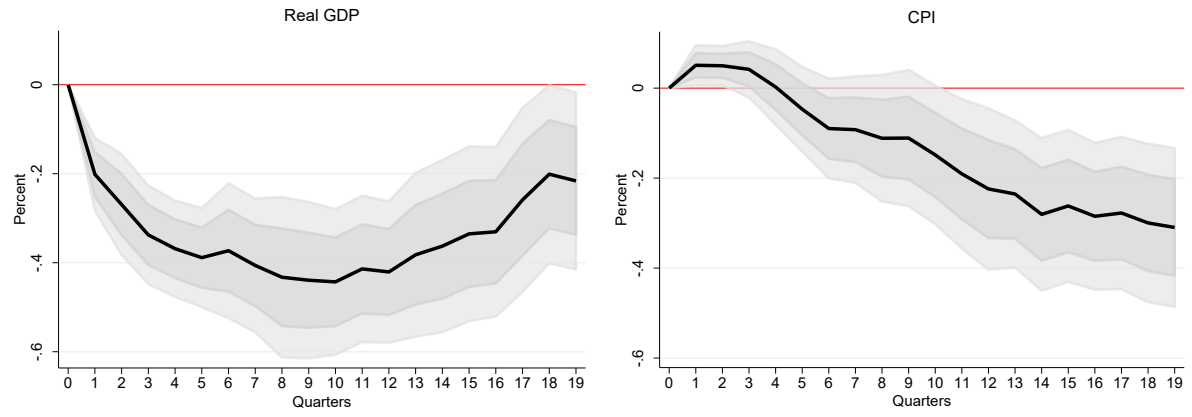
[7] The results reported in the paper correspond to $\gamma = 1.5$ and are available upon request for alternative values of γ.

[8] We control for each country's GDP growth as $z_{i,t}$ indicator captures only within-countries effects.

variables of interest. Labor market data ($y_{n,k,t}$) are collected from the International Labour Organization (ILO), including total and sectoral employment, unemployment rates, and labor force participation rates.[9] Short-term interest rates ($i_{k,t}$) and three-month money market rates are taken from the OECD. Actual real GDP growth rates ($g_{k,t}$) and inflation rates ($\pi_{k,t}$) come from the IMF's World Economic Outlook (WEO). Market forecasts for GDP growth rates ($g^F_{k,t+4}$) and inflation rates ($\pi^F_{k,t+4}$) are collected from Consensus Economics. These data are reported as 12-month-ahead forecasts. We aggregate them quarterly by averaging forecasts across months within the same quarter, following Brandao-Marques and others (2020). The inclusion of countries in our sample is driven by the availability of Consensus Economics data. Annual data on employment protection legislation (the cost and procedures of individual and group dismissal on regular contracts and hiring workers on temporary contracts) and the wage gap (relative difference between median men and women earnings) come from the OECD. Annual data (with gaps) on the share of informal women and men workers in total workers are taken principally from the ILO.[10] Table 2 in Annex I provides selected summary statistics.

Before analyzing the impact of estimated monetary policy shocks on gender-differentiated labor market outcomes, we examine their impact on the logarithm of real GDP and CPI using equation (2). Figure 1 shows textbook responses to a 100 basis points monetary tightening: economic activity contracts and price levels decline, albeit with a lag, resulting in negative inflation rates. In particular, GDP responds to the tightening by falling gradually by about 0.4 percent (a third of the sample standard deviation) at the peak of 8-10 quarters and remains at 0.3 percent below its initial value. The level of CPI starts falling after 6-10 quarters, with prices declining by 0.3 percent over the horizon (40 percent of its standard deviation).

Figure 1. Impulse Responses for Macroeconomic Variables



Notes: The solid lines represent the response to a 100-baisis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively.

[9] We limit the sectoral analysis to employment due to a lack of sectoral data on unemployment and labor force participation.

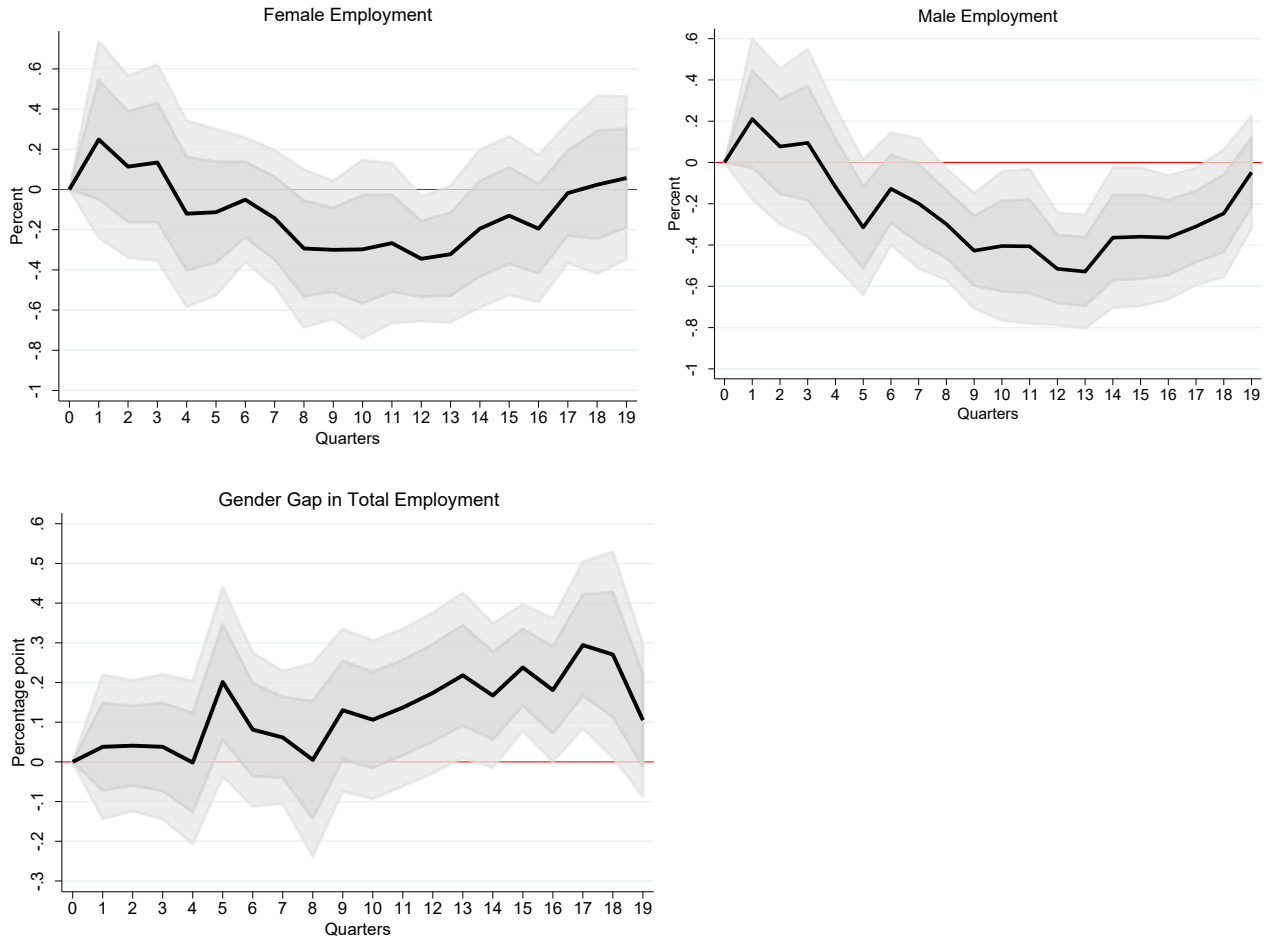
[10] Informal employment is "all remunerative work (i.e., both self-employment and wage employment) that is not registered, regulated or protected by existing legal or regulatory frameworks, as well as non-remunerative work undertaken in an income-producing enterprise" (ILO).

III. Overall Results

A. Total Employment

A monetary policy shock of 100 basis points decreases (the logarithm of) employment for both men and women. However, men's employment decreases more sharply and takes longer to recover than women's (Figure 2, top charts). For example, in our sample, the female employment reduction bottoms out at about 0.3 percent (20 percent of its standard deviation) 8 to 12 quarters after the shock and recovers 17 quarters after the shocks. For men, the employment cut happens faster and recovery takes longer, bottoming out at about 0.5 percent (40 percent of its standard deviation) 12 quarters after the shock. As a result (Figure 2, bottom chart, and Table III in Annex II), the gender gap in employment starts to narrow around ten quarters after the shock, up to 0.3 percentage point (a quarter of its standard deviation) at the peak.

Figure 2. Impulse Responses for Women and Men Employment, and Gender Total Employment Gap



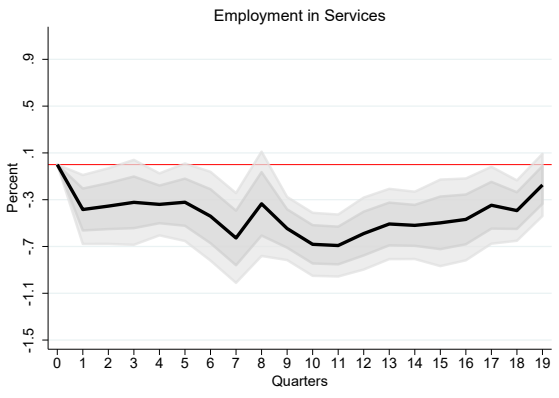
Notes: The solid lines represent the response to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap.

B. Sectoral Employment

Two sectoral mechanisms can explain the impact of the monetary policy shocks on the gender gap in total employment. First, monetary policy shocks have larger effects in those sectors that employ more men than women. Second, the response of the gender gap in employment is positive and larger in the sectors with the largest share of total employment. To examine these channels, we focus on how monetary policy shocks affect total employment and the gender employment gap in the industry and service sectors.[11]

Our results indicate that both mechanisms contribute to the effects of monetary policy shocks on the gender gap in employment. Figure 3 shows that monetary policy shocks have an immediate negative impact on employment in the industry sector, which employs more men than women.[12] In particular, employment in industry contracts by about 0.8 percent two quarters after the shock (a quarter of its standard deviation) and converges to its initial value 12 quarters later. Employment in the services sector (which employs more women than men) takes longer to respond—around six to seven quarters—and contracts by less—about 0.6 percent (a quarter of its standard deviation)—but also recovers later. This larger and faster reaction of industries compared to services aligns with the literature that finds that investment and output of durable goods in industries and manufacturing are more interest-sensitive compared to non-durable goods in services (Zens and others, 2020). As men outnumber women in the industry sector and monetary policy shocks have a lower impact in the services sector, we see that men overall are more affected by employment losses immediately following monetary policy shocks.

Figure 3. Impulse Responses for Total Employment by Sectors



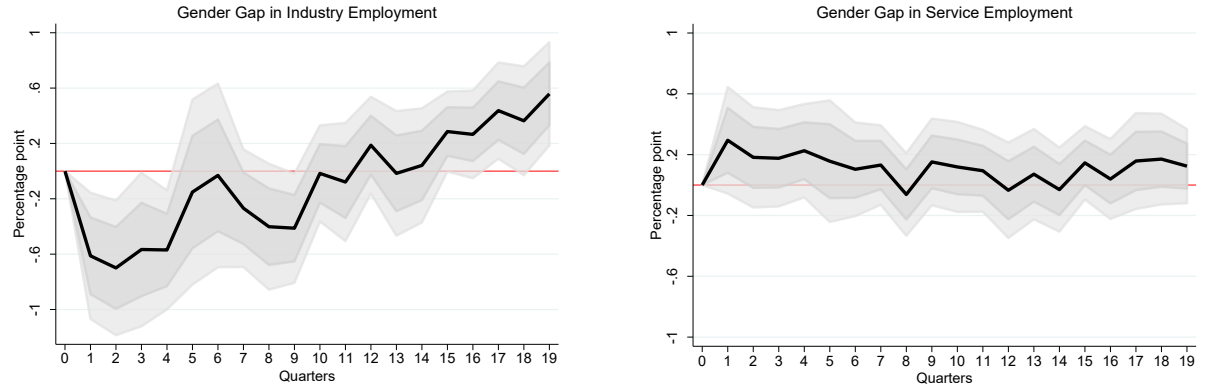
Notes: The solid lines represent the response of (logarithm of) employment in the industry and service sectors to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap

[11] On average, services employ 69.5 percent of the workforce and industry 25.2 percent. We exclude the agriculture sector, given its negligible share of total employment (4.9 percent on average) in our sample.

[12] Men and women account for 77.6 and 22.4 percent of total employment in the industry sector, respectively. In the service sector, women account for 53.1 percent of total employment and men for 46.9 percent on average.

We also find that in the industry sector, which accounts for a smaller share of total employment, monetary policy shocks initially widen the gender gap in employment (Figure 4), lowering women's employment more than men's. However, the effect reverses over time, leading to a narrowing of the gender gap in employment by about 0.4 percentage point (15 percent of the standard deviation) at the end of the projection period. The impact of monetary policy on narrowing the gender gap in services employment is immediate and persistent, about 0.1 percentage point (10 percent of the standard deviation) over the projection period. Two factors can explain this differentiated reaction. Within services, monetary policy has less influence on activities such as education and healthcare, where women's employment dominates.[13] Men also tend to occupy jobs in industries that are more sensitive to interest rate changes, which causes their larger employment losses over the medium term. A more detailed sectoral analysis is needed to explain a higher sensitivity of women versus men employment to monetary policy shocks in the industry in the short time.

Figure 4. Impulse Responses got the Gender Employment Gap by Sectors



Notes: The solid lines represent the response to a 100-baisic point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap.

C. Unemployment and Labor Force Participation

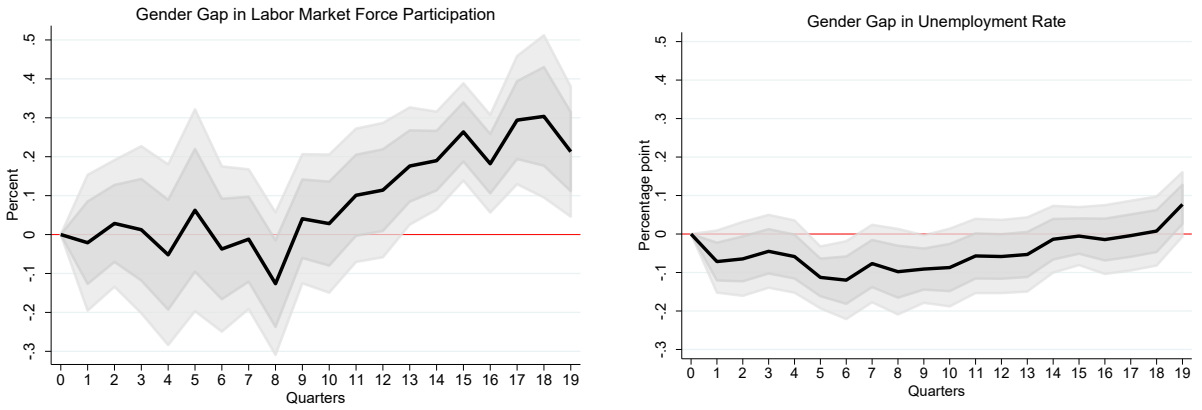
Changes in employment can also be explained by the variation in unemployment and labor force participation.[14] Therefore, we decompose the (logarithm of) total employment gender gap into the total unemployment rate gender gap and (logarithm of) labor force participation gender gap to see which one explains the impact of monetary policy shocks. Our results show that the employment dynamics following monetary policy shocks are driven mainly by a decline (narrowing) in the unemployment gap in the short term, followed by an increase (narrowing) in the labor force participation gap in the medium term. In particular, a 100-basis point exogenous increase in the policy rate reduces the unemployment gap by 0.1 percentage point (about 20 percent of its standard deviation) through 8 quarters following the shock but narrows the gender gap

[13] It is worth noting that women account for about 50 percent of the workforce in services such accommodation and food services that tend to be more precarious and, thus, more sensitive to output changes jobs (ILO 2021). For instance, In the US, women account for 53 percent of the workforce in total employment in accommodation and food services (EEOP, 2022).

[14] $\ln(E) \approx \ln(L) - u$. See, for example, Blanchard and Katz (1992).

in labor force participation by about 0.2 percentage point (about 20 percent of its standard deviation) by the end of the projection period.

Figure 5. Impulse Responses for the Gender Gap in Labor Force Participation and Unemployment Rate



Notes: The solid lines represent the response to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the labor force participation gender gap and a widening (narrowing) of the unemployment rate gender gap.

D. Role of Labor Market Characteristics

The literature often attributes differentiated impacts of monetary policy across sectors or occupations to (i) the rigidity of the labor market, such as wage rigidities (Zanetti, 2007) that result in a temporary decrease in employment; (ii) high firing/hiring costs (Ball and others, 2013) that limit employment losses; or (iii) capital-skill complementarities that result in job losses for low-skill workers (Dolado and others, 2020). Some authors also point out that in countries/sectors with high informality, labor markets react less to variations in demand, which may impact the transmission of monetary policy shocks (Alberola and Urrutia 2020).[15]

We further investigate the influence of these factors by re-estimating equation 3 and find that monetary policy has a limited impact on gender employment gaps in countries with more rigid employment protection legislation. This is because, with higher firing and hiring costs and more stringent firing procedures, employment is less responsive to demand fluctuations in these countries compared to countries with more flexible job protection frameworks (Figure 6).

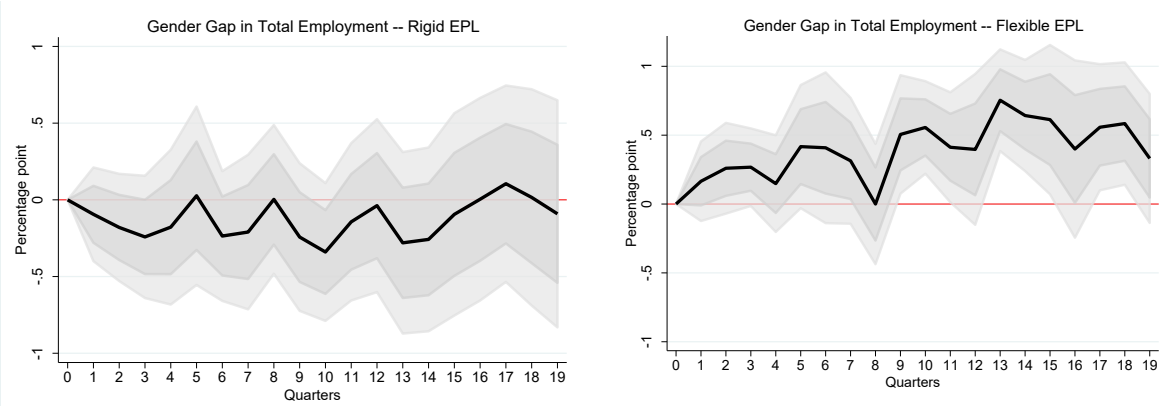
In countries with bigger gender wage gaps,[16] monetary policy shocks tend to play a more significant and persistent role in narrowing the gender employment gaps (Figure 7). This is consistent with the findings that

[15] In economies with an informal sector, a rapid decline in informal employment and a lower decline in real wages absorb a fall in labor demand following output contraction after monetary policy shocks, making disinflation harder to achieve (making the Phillips curve flatter).

[16] The larger difference between median men's and women's earnings, the bigger the gender wage gap is.

during periods of low demand, as those following output contractions after monetary policy shocks, firms have incentives to reduce the more expensive workers (Firpo and others, 2020).

Figure 6. Impulse Responses for the Gender Gap in Total Employment by Labor Market Regulation (EPL)



Notes: The solid lines represent the response to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender labor market gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap. Rigid (flexible) EPL is defined using the smooth transition function between country regimes (equation 3).

Figure 7. Impulse Responses for the Gender Gap in Total Employment Depending on Gender Wage Gap

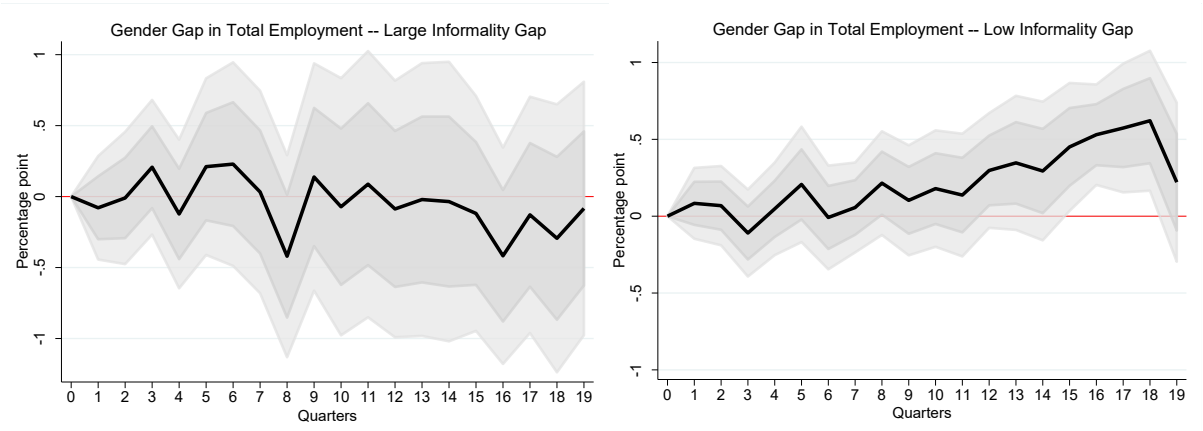
Notes: The solid lines represent the response to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender labor market gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap. Large (low) wage gap is defined using the smooth transition function between country regimes (equation 3).

Our results also indicate that in countries with a higher informality gap[17], monetary policy shocks have no impact on the gender gap in employment (Figure 8 left panel). In particular, with a larger share of informal female workers than informal male workers, there is no statistically significant difference between the impact of

[17] The higher share of informal female workers than informal men workers, the higher the informality gap.

monetary policy on women's employment versus men's. In contrast, the effect is larger in countries with a lower informality gap, with the gender employment gap narrowing by about 0.5 percentage point at the peak (Figure 8, right panel). These results are consistent with the literature that finds that with higher informality, the adjustment in informal employment absorbs the impact of monetary policy shocks on formal employment (Alberola and Urrutia 2020).

Figure 8. Impulse Responses for the Gender Employment Gap Depending on Job Informality Gap



Notes: The solid lines represent the response to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender labor market gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap. Large (low) informality gap is defined using the smooth transition function between country regimes (equation 3).

IV. Asymmetric Effects

A. Contractionary versus Expansionary Monetary Policy Shocks

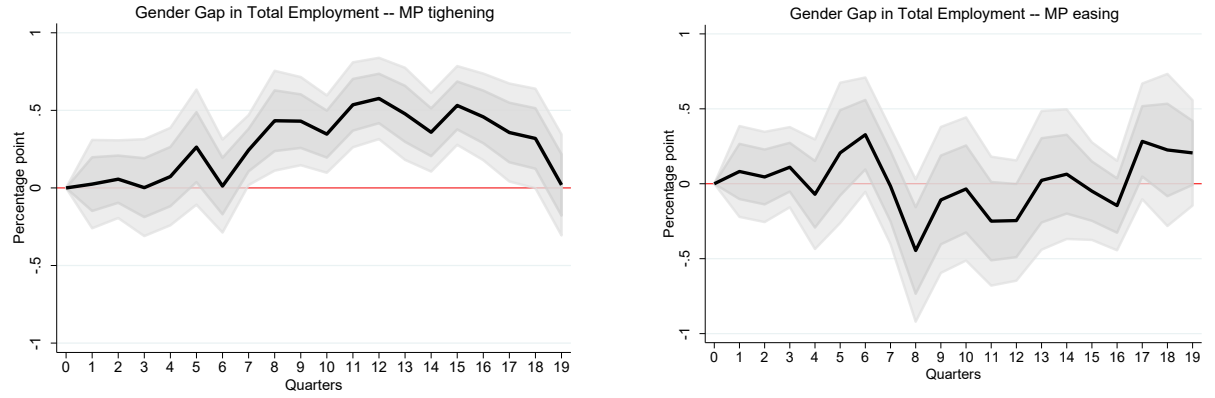
A growing body of research has shown that contractionary (positive) monetary policy shocks have a larger impact on economic outcomes than expansionary (negative) shocks (Furceri and others, 2018; Debortoli and others, 2020). Asymmetry can reflect credit market imperfections when more financially constrained firms cannot access external financing and cut activities and demand for credit (Bernanke and Blinder, 1988) or a situation where less liquid banks face funding shocks and cuts in the availability of credit (Kashyap and Stein, 2002). Similarly, this asymmetric impact of monetary policy can affect labor market outcomes. For instance, Angrist and others (2018) show that monetary policy tightening in the US has a larger effect on employment and industrial output with a more muted effect on inflation.[18]

We therefore test whether monetary policy shocks have an asymmetric transmission to labor market gender gaps depending on whether they are contractionary or expansionary. We do so by estimating the local projections in equation (4) for positive and negative monetary policy shocks. The response of the gender employment gap to monetary policy varies by the sign of the shocks (Figure 9). Contractionary monetary policy

[18] See Karras (2013) for additional evidence for both the sign and size of asymmetric effects of monetary policy in the US.

stances are driving the effects documented in Section III. In particular, the gender employment gap narrows more after contractionary (positive) monetary policy shocks, by over 0.4 percentage point eight quarters after the shock and peaks at 0.6 percentage point after 11 quarters. On the other hand, expansionary (negative) shocks yield no significant effects on the gender gap in employment.[19]

Figure 9. Impulse Responses for the Gender Employment Gap Depending on the Type of Monetary Policy Shock



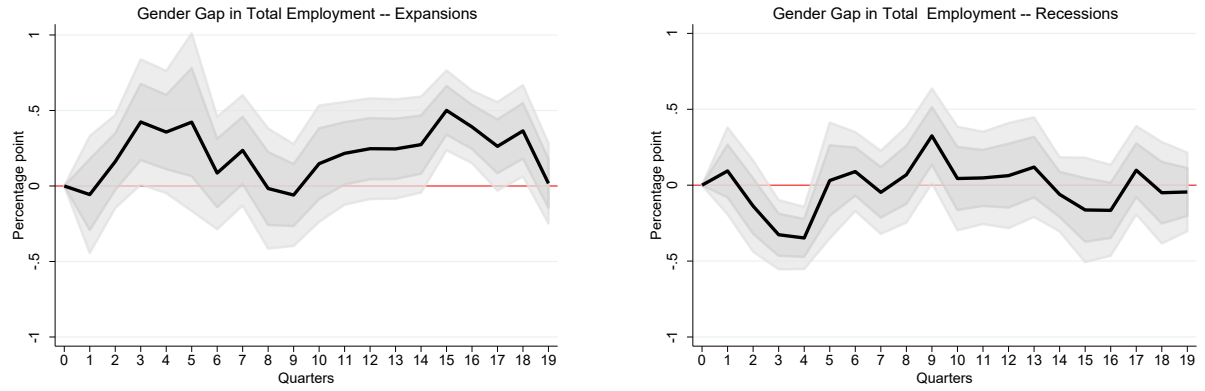
Notes: The solid lines represent the response to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender labor market gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap. Monetary policy (MP) tightening (easing) is defined as positive (negative) monetary policy shocks and the impact is estimated using equation 4.

B. Recessions versus Expansions

Some work also looks at the impact of monetary policy on economic outcomes (e.g., Barnichon and Mattes, 2015) and income distribution (Furceri and others, 2018) depending on phases on the business cycles and finds that monetary policy shocks have larger effects during expansions than recessions. We perform a similar analysis, identifying low and high growth regimes for each country using a smooth transition function (Auerbach and Gorodnichenko, 2013) and estimating equation (5). Our results confirm that monetary policy shocks tend to have larger effects on gender gaps in employment during higher growth periods than lower ones. Figure 10 shows that, indeed, the medium-term impact of monetary policy shocks is larger in expansions, when monetary policy tightening narrows the total gender employment gap by up to 0.5 percentage point at the peak.

[19] The results (available upon request) are qualitatively similar for sectoral employment, labor force participation, and unemployment.

Figure 10. Impulse Responses for the Gender Employment Gap in Expansions and Recessions

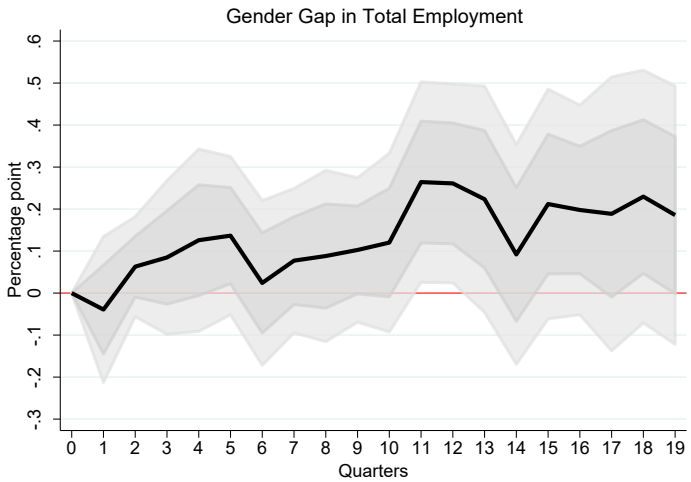


Notes: The solid lines represent the response to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender labor market gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap. Expansions (recessions) are defined using the smooth transition function within country growth regimes/periods (equation 5).

V. Robustness Checks

We examine the robustness of our findings by applying a different method to identify monetary policy shocks. Here we consider the residuals of short-term interest rate forecast errors after controlling for GDP and CPI forecast errors and obtain results comparable to our baseline. The response of the gender gap in total employment shown in Figure 11 is similar to the main results shown in Figure 2.

Figure 11. Impulse Responses for the Gender Gap in the Unemployment Rate by Alternative Shock Method



Notes: The solid lines represent the response to a 100-basis point monetary policy shock. The light and dark shaded areas represent 90 percent and one standard deviation confidence intervals, respectively. Gender gaps are defined as the female indicator minus the male indicator. A positive (negative) impulse response represents a narrowing (widening) of the employment gender gap.

The results (available upon request) also remain robust to including additional controls (e.g., fiscal policy shocks), excluding extreme values of labor market outcomes and monetary policy shocks to limit the impact of the outliers, or changing the number of countries.

VI. Conclusion

Our results highlight that monetary policy shocks can have different effects on employment and other labor market outcomes for men and women, depending on the monetary policy stance and business cycle phases. These findings have important implications for monetary, fiscal, and structural (labor market) policies and redistribution objectives. Therefore, understanding this differential impact and its drivers could help central banks improve their forecasts and policy outcomes, and governments identify and protect the most affected groups. Policymakers can take the following actions:

- Incorporating gender-disaggregated sectoral data into central banks' forecasts can help improve growth and inflation projections and, thus, better calibrate monetary policy actions and their impact.[20] Subsequently, clear communication of documented gender differentiated impact of monetary policy can also improve general understanding of central banks' actions and, thus, enhance their effectiveness.[21]
- By analyzing gender-disaggregated data, policymakers can monitor the differentiated impact of monetary policy shocks in the labor market and take targeted interventions to mitigate adverse effects such as long-term unemployment and labor-force exit for men in industry and women in specific services. These interventions include active labor market programs (training, upskilling) and increasing part-time opportunities with targeted subsidies or tax incentives to support employment and income of the most affected groups. Short-term distributional effects of monetary policy associated with temporary job losses in some sectors can be mitigated by extending coverage of unemployment benefits to all vulnerable groups.

Policies should, of course, be tailored to country-specific circumstances. Therefore, further research is needed to deepen the understanding of the dynamics and drivers of the gendered effects of monetary policy on the labor market. Future research could study regional, country, or sector-specific cases, considering key local features such as the degree of economic and social development, monetary and fiscal policy design, macroeconomic conditions, and labor market structures, among other factors.

[20] For example, using data from the United States Consumer Expenditure Survey, Puig (2022) documents how increases in interest rates lead to differences in spending between male- and female- and black- and white-headed households.

[21] See Chalwadi and others (2023), Corduas (2022), D'Acunto and others (2021), and Bryan and Venkatu (2001).

Annex I. Data Details

Table 1. Countries and data availability, 1990-2019

Country	First year & quarter to Last year & quarter		
	Unemployment rate	Labor Force Participation rate	Employment
Australia	1991q1-2019q4	1991q1-2019q4	1991q1-2019q4
Canada	1990q1-2019q4	1990q1-2019q4	1990q1-2019q4
Chile	2010q1-2019q3	2001q1-2019q3	2010q1-2019q3
Colombia	2016q2-2019q4	2016q2-2019q4	2016q2-2019q4
Czech Republic	1998q3-2019q4	1998q3-2019q4	1998q3-2019q4
France	1998q1-2019q4	2003q1-2019q4	1998q1-2019q4
Germany	1998q2-2019q4	2005q1-2019q4	1998q2-2019q4
Hungary	1999q1-2019q4	1999q1-2019q4	1999q1-2019q4
Italy	1990q1-2019q4	1998q1-2019q4	1998q1-2019q4
Japan	2002q2-2019q4	2002q2-2019q4	2002q2-2019q4
Mexico	2001q2-2019q4	2005q1-2019q4	2002q1-2019q4
Netherlands	1998q2-2019q4	2000q1-2019q4	1998q2-2019q4
New Zealand	1990q1-2019q4	1990q1-2019q4	2003q1-2019q4
Norway	1999q2-2019q4	2000q1-2019q4	1999q2-2019q4
Poland	1999q1-2019q4	2000q1-2019q4	2000q1-2019q4
Slovak Republic	1998q3-2019q4	1999q1-2019q4	1998q3-2019q4
South Korea	1995q1-2019q4	1999q3-2019q4	1995q1-2019q4
Spain	1992q2-2019q4	1999q1-2019q4	1998q1-2019q4
Sweden	1998q2-2019q4	2001q1-2019q4	1998q2-2019q4
Switzerland	2010q1-2019q4	2010q1-2019q4	2010q1-2019q4
United Kingdom	1992q2-2019q4	1990q1-2019q4	1998q2-2019q4
United States	1990q1-2019q4	1990q1-2019q4	2003q1-2019q4

Table 2. Selected summary statistics, 1990-2019

Variables (change over the period)	Mean	Standard deviation
Total Employment	0.29	1.28
Total Women Employment	0.39	1.46
Total Men Employment	0.17	1.16
Total Gender Employment Gap	0.18	1.16
Total Industry Employment	0.00	3.17
Women Industry Employment	-0.01	3.07
Men Industry Employment	0.07	2.38
Gender Industry Employment Gap	-0.08	2.69
Total Service Employment	0.47	2.14
Women Service Employment	0.48	1.26
Men Service Employment	0.36	1.28
Gender Service Employment Gap	0.12	1.23
Labor Market Force Participation	0.26	1.00
Women Labor Force Participation	0.33	1.24
Men Labor Force Participation	0.19	0.99
Gender Labor Market Force Participation Gap	0.14	0.87
Total Unemployment Rate	-0.03	0.59
Women Unemployment Rate	-0.04	0.65
Men Unemployment Rate	-0.28	0.67
Gender Unemployment Rate Gap	-0.12	0.58
Employment Protection Legislation	0.00	0.05
Wage Gap	-0.06	0.76
Informality Gap	-0.05	4.75
Real GDP	0.61	1.18
CPI	0.63	0.81

Table 2 reports the sample mean and standard deviation over the estimation period (Table 1). Gender labor market gaps are defined as the female indicator minus the male indicator. Employment protection legislation captures the cost and procedures of individual and group dismissal on regular contracts and hiring workers on temporary contracts. The wage gap is the relative difference between median men and women earnings. The informality gap is the share of informal women and men workers in total workers.

Annex II. Selected Estimation Details

Table 3. Effect of monetary policy on the gender gap in total employment, 1990-2019

	q=4	q=8	q=12	q=16	q=19
Monetary policy shock $(t-1)$	0.201	0.130	0.218*	0.294**	0.058
	(0.145)	*(0.124)*	*(0.126)*	*(0.128)*	*(0.072)*
Monetary policy shock $(t-2)$	-0.116	0.052	0.084	0.130	0.029
	(0.227)	*(0.116)*	*(0.097)*	*(0.119)*	*(0.089)*
Monetary policy shock $(t-3)$	0.024	0.010	0.162	-0.014	0.001
	(0.093)	*(0.125)*	*(0.121)*	*(0.121)*	*(0.103)*
Monetary policy shock $(t-4)$	-0.167	0.032	-0.035	-0.128	-0.157
	(0.137)	*(0.136)*	*(0.125)*	*(0.092)*	*(0.106)*
Dependent variable $(t-1)$	0.415***	0.373***	0.284***	0.195**	0.273***
	(0.425)	*(0.060)*	*(0.081)*	*(0.085)*	*(0.072)*
Dependent variable $(t-2)$	-0.174***	-0.027***	-0.312***	-0.361***	0.112***
	(0.510)	*(0.046)*	*(0.043)*	*(0.038)*	*(0.072)*
Dependent variable $(t-3)$	0.121***	0.086*	0.021	-0.092*	-0.348***
	(0.028)	*(0.048)*	*(0.064)*	*(0.053)*	*(0.042)*
Dependent variable $(t-4)$	0.312***	0.199***	0.118**	0.0547	-0.195***
	(0.052)	*(0.060)*	*(0.051)*	*(0.048)*	*(0.061)*
N	1379	1297	1219	1143	1079
R2	0.39	0.16	0.06	0.08	0.17

Table 3 shows the impact of monetary policy shocks measured by a lagged β -coefficients after 4, 8, 12, 16, and 19 quarters (q) using equation (2). T-statistics based on robust clustered standard errors in parentheses. ***/**/* denote significance at 1, 5, 10 percent, respectively.

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