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AN INTERNATIONAL MAP OF GENDER GAPS

by Ines Buono* and Annalivia Polselli°

Abstract

This paper revisits stylized facts on female labour force participation, employment and unemployment, using a unified and up-to-date dataset with comparable information for high-income (HI) and middle-low income (MLI) countries. We find that: (i) global trends in labour supply in the last 30 years are mainly shaped by the increasing trend in female participation in HI countries that almost offset the contemporaneous decrease in male participation; (ii) gaps in unemployment between men and women widen during economic crises, with men usually affected more than women (with the notable exception of the Covid-19 crisis); (iii) the increase in female employment over the last 30 years has mostly been driven by the expansion of the service sector; and (iv) finally, the adoption of reforms to foster equal access to economic opportunities only helps to increase female labour supply when countries enter the last stage of economic development.

JEL Classification: E24, J16, J21, J71, J78.

Keywords: gender gaps, labour force participation, female employment, Covid-19.

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Contents

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1 Introduction[1]

The existence of gender gaps in many areas of economic opportunities is a worldwide fact, transversal to advanced and emerging countries, persistent through time and responsible of significant losses in terms of GDP and welfare. Systematic differences in women's decision to enter the labour force (supply side) and the lack of employment opportunities (demand side) may help to explain this large gap between genders. Evidence shows that women experience higher inactivity rates for levels of unemployment that are similar to men's. This outlines that countries may enhance female employment by first implementing gender-specific and supply-related policies (e.g., enhancing welfare system in support of working parents through childcare, mobility, etc.). In addition, among those women who work, they tend to be employed more in informal sectors, have lower wages, work less hours and cover less senior positions.

These disparities adversely affect women's contribution to measured economic activity and leave their productivity far below its potential thus compressing overall growth and economic development (Duflo, 2012; Jayachandran, 2015; Kochhar et al., 2017). Female labour force constitutes an untapped reserve of resources that is particularly valuable in an era of sluggish productivity and low potential output (as the world was witnessing, at least before the Covid-19 outbreak).

As concerns the quantification of the impact of female participation on overall growth and productivity, recent works highlighted that macro gains from rising female labour force participation are higher than the mechanical gains attributable to the mere increase of labour force participation *per se* (Elborgh-Woytek et al., 2013; Cuberes and Teignier, 2016; Hsieh et al., 2019). Ostry et al. (2018) for instance show that since women and men bring different skills to the workplace – a claim that is supported by microeconomic evidence and that can be related to different attitudes to ward risk and collaboration – they are complements instead of perfect substitutes in the workplace. Thus, the marginal effect of adding an additional woman to the labour force is higher than hiring an additional man in a context where of scarce female labour force participation (FLFP). In their calibration, the authors find that closing the gender gap in female participation in countries where the gap is wide could increase their GDP by an average of 35 percent, *ceteris paribus*. While the bulk of the effect could be attributable to a mechanic effect of labour force increase, a non-negligible part of it is caused by the diversity effect. In turn, the increase of global growth and productivity would result in an increase in overall wages, including those of people already participating in the job market.

[1]We are grateful for the valuable advice of our discussant Marco Bertoni at the "Bank of Italy Gender Economics Workshop". We thank for their feedback: Francesca Carta, Pietro Catte, Riccardo Cristadoro, Marta De Philippis, Emma Duchini, Marco Francesconi, Aseem Patel, Lucia Rizzica, Neslihan Sakarya, Massimo Sbracia, Fabrizio Venditti. We thank the participants to "Bank of Italy Gender Economics Workshop" and the participants to the Student Seminar at University of Essex for their active interaction and suggestions. The usual disclaimer applies.

Using a unified dataset we aim at describing the trends, the dynamics and the deeper determinants of female labour force participation, employment and unemployment comparing the evolution in high-income (HI) countries *vis-à-vis* middle-low income (MLI) ones. Our aim is to provide a comparable and up-to-date assessment of many aspects of gendered participation in the labour market by presenting the main stylized facts on gender gaps as well as unveiling new ones. In particular, we collect data from official international sources (World bank, ILO, IMF) to obtain a panel dataset that provides comparable information on 168 countries over the past 30 years. The background picture in our data is that the gender gap in labour force participation is much higher in middle-low income (MLI) countries than high-income (HI) countries. While male participation is either stable at 80% or declining below that figure in all countries over the last 30 years, female participation in HI countries has started to catch up (from 60% towards 70% in our data), although convergence is far from complete. On the contrary, female labor force in MLI has remained fairly stable (around 55% from our data), with strong differences among countries.

Our main results can be summarised in the four points below. First, a decrease in female participation has a drastic impact on the total labour supply. Our counterfactual exercise shows that the decline in global labour supply not only could have been attenuated had female labor supply remained constant at the levels in 1990, but also almost reverted if female participation in MLI countries would have grown by the same magnitude of the growth in HI countries in the period considered.

Second, while the gap in labour participation is still very pronounced, data shows that the gender gap in unemployment is almost absent in normal times. During global recessions, male and female unemployment behave in very different ways instead. By comparing gender differences in unemployment cyclicality, we confirm that male unemployment is more cyclical than female but only in HI countries; this seems to be relates to sectors where men are mostly employed (Doepke and Tertilt, 2016; Ellieroth et al., 2019; Alon et al., 2020). Conversely, in MLI countries the trend is more relevant than the cycle, and male and female unemployment are almost completely aligned.

Third, we examined how female employment evolved in the last three decades and by means of the shift-share decomposition, we found empirical confirmation of the hypothesis that attributes a key role in the raise of the relative demand for female work to the expansion of the service economy. That is, the increase in female employment over the last 30 years is indeed mainly driven by the expansion of the service sector, where female labor share is higher.

Last, we investigate the long-term determinants of female labour force participation by means of a regression analysis. We find strong evidence in support of the U-shape hypothesis for female labour force participation – stating that women's participation in the labour market decreases at early stages of the economic development until when the relationship is reversed (Goldin, 1994).

The institutional setting and policies – captured by the World Bank's "Women, Business and Law" (WBL) index, that provides women and men with equal legal ability on variuos dimensions, such as economic and financial independence, mobility, parenthood and marriage (Millennium Challenge Corporation, 2022) – contribute to foster women's participation in HI countries whereas the economic structure and the stage of development (sectoral value added & socio-demographic characteristics) are crucial in MLI economies. In other words, although the stage of development is a fundamental factor in explaining FLFP – as suggested by the U-shape hypothesis – the institutional setting and policies boost women's labour supply only once countries enter in the last stage of their development.

Finally, Covid-19 outbreak may have magnified existing regional disparities. The pandemic has undeniably affected men and women differently in terms of labor supply. In fact, a relatively high fraction of women were employed in "quarantined", "non-essential" sectors for which remote work was not possible (e.g., restaurants, hotels, shops, etc.). In addition, the amount of unpaid housework and childcare that women face has increased with the closing of schools. The Covid-19 crisis has brought about a strong and fast increase in unemployment, especially for women in HI countries, which has been equally fastly re-absorbed. In regards to labour participation, its severe and unprecedented decrease is still far from reverted if we consider the entire population older than 16. Those dynamics are pretty different than those observed during the 2008-2009 crisis that caused a strong increase in male unemployment (with respect to female's) and an overall decrease in male participation only. All in all, this evidence suggests that Covid-19 crisis could slow down or even revert the convergence in gender labour market that we have observed until 2019, at least in HI countries. As a consequence of schools closed and Governments' enforcement to work from home, the pandemic has restructured employment and induced a shift in gender-role attitudes within the household (Reichelt et al., 2020). Although fathers contributed at home more during the lockdown, the majority of the household chores was still carried out by mothers (Alon et al., 2020; Farré et al., 2020; Reichelt et al., 2020). For working mothers with young children, remote work did not always conciliate work with family duties during the lockdown; for example, evidence suggests a decline in female productivity in the academia (measured as the number of papers submitted to journals) during the pandemic (Cui et al., 2020). However, after the pandemic with schools and childcare facilities open, the childcare burden is overall reduced such that more flexible working arrangements (like telecommuting) may eventually stimulate women's participation into the labour force in the long run. Random experiments in Italy and China show that flexible working arrangements are economically desirable because they not only improve well-being and work-life of employees but also their productivity, with a stronger positive effect on women (Bloom et al., 2015; Angelici and Profeta, 2020). This calls for prompt and targeted intervention of the policy maker to enhance female participation in the years ahead.

The paper is structured as follows. Section 2 presents the unified dataset we compiled and presents the methodology used for the analysis in this study. Then, Section 3 examines long-term trends of Labour Force Participation (LFP). Section 4 we conduct three counterfactual exercises to quantify the impact of income-group specific dynamics of FLFP on the total labour supply. The cyclicality of unemployment is studied in Section 5 with the Hodrick-Prescott filter. Section 6 reports the shift-share decomposition of female employment. Section 7 investigates the long-term determinants of female labour force participation using a panel data regression analysis. Section 8 compared the dynamics of unemployment and LFP during the Great Financial Crisis agaist the recent Covid-19 crisis. Last section concludes.

2 Data and Methodology

Our dataset combines annual country-level data of socio-economic indicators from several data sources: (i) World Development Indicators (WDI) and Health Nutrition and Population Statistics (HNPS) from World Bank; (ii) the Woman Business and Law (WBL) dataset; (iii) GDP from Penn World Table. Data sources are reported in Table 1. Some in depth explanation on the data collection is provided for the main data provider of our combined dataset – i.e., the World Bank. Specifically, the World Bank compiles data from officially-recognised international sources (statistical systems of member countries) which are adjusted to be "consistent in definition, timing and methods" (The World Bank, 2022a).

The combined dataset is a macro-panel with information at the country-year level. Our main sample consists of 168 countries with series that spans from 1990 to 2019[2]. Data are collected annually for each time series. Countries are classified in two main groups: 42 as High Income (HI) countries, and 126 as Middle-Low Income (MLI) countries (the full list in Table 2). Our classification is based on the World Bank's income grouping (low, lower-middle, upper-middle, and high) made on the basis of a country's Gross National Income (GNI) per capita, in USD (for further details see The World Bank, 2022b). Changes in GNI may cause countries to switch from one group to the other over time and then alter the composition of the macro-group, although the original income grouping remain fixed for the entire fiscal year (i.e., until July 1 of the following year). To avoid that, we assigned each country to a given group on the basis of the modal income classification of the country over the total period of study. All in all, this dataset extends Hyland et al.'s (2020) dataset with the

[2]Data before 1990 was missing for most variables of interest such as the WBL index and main labour outcomes. Data on labour market outcomes and population from our main data source World Bank is not yet available for 2020.

inclusion of updated countries' series for 2019 and socio-demographic and economic variables.

Since MLI countries may be very heterogeneous with respect to normative and cultural aspects that may shape their labour market and the female participation, we defined a sub-sample from our full dataset leaving out countries: with low female labour participation due to cultural norms and gender stereotypes (i.e., Arabic countries); those in an early phase of development (i.e., LI countries); and among the MLI group, India and China that mainly drive the aggregate statistics being the most populated and economically influential countries. In addition, Indian data present statistical inconsistency between 2005 and 2010 compared to other years, partly due to changes in measurement methodology between surveys[3]. Therefore, the sub-sample allows us to validate our empirical findings with a smaller and more homogeneous group of MLI countries.

With the aim to present descriptive statistics by income region, country-level data are aggregated at the income region level. For this purpose, weighting the data is hence necessary not to over-represent small countries (either in terms of population density or GDP). Country data may be weighted using population (Fotini et al., 2013; ReStore, 2022) or a measure of economic size – such as GDP. The two weighting schemes have indeed two different interpretations. Specifically, population weights account for the demographic potential of a country in providing workers in the labour force whereas GDP weights express the economic potential of a country when an additional worker is employed. In our descriptive exercises, we opt to weight country data using their economic size (specifically we used the average 2000-2005 GDP) for the following reasons: (i) We want to account for the economic potential of an additional worker in the economy; (ii) There is a strong positive correlation between population size and GDP (0.99 for HI countries and 0.90 for MLI countries); (iii) To prevent any bias that statistic changes in Indian data – i.e., the largest MLI country in terms of population – may create in the analysis. For the sake of completeness, we replicate part of the descriptive analysis using the average 2000-2005 population as weights. We obtain similar results for HI countries but, as expected, different results for MLI from 2005 because of the change in Indian statistics (see Figure 1 as an example).

A final methodological note consists in aknowledging that the descriptive analysis on total female employment conducted in the paper (e.g., the shift-share analysis) may over-report the actual effect because women tend to have more part-time jobs and, hence, work less hours than men but our data do not take this into account as we do not have this information.

[3]According to Kapsos et al. (2014), the decrease in female labour force participation (FLFP) in India between 2005 and 2010 can be attributable to changes in measurement methodology between survey rounds (for the 40%), but also to economic reasons like higher female educational attainment and higher levels of household consumption (around 18%) and the general lack of employment opportunities for women and other factors (circa 40%).

3 A "map" of international gender gaps in LFP

Labour force participation, employment and unemployment rates are linked by the identity that expresses employment as the fraction of working-age population (aged between 15 and 64 years old) that is not unemployed (Hobijn and Şahin, 2021). In formulae,

$$EPOP_t^g = (1 - u_t^g) \times LFP_t^g \quad \text{for all } g = \{male, female, total\} \text{ at time } t \tag{1}$$

where $EPOP_t^g$ is the employment rate derived as the ratio of the number of employed people over the working-age population at time t and in group g; u_t^g is the unemployment rate calculated as the number of unemployed people over the labour force (that includes employed and unemployed) at time t and in group g; and LFP_t^g is the labour force participation rate calculated as the ratio of population in the labour force over population[4].

In this section we examine the long-term trends of labour force participation (LFP) in HI and MLI countries. The LFP rate is calculated as the number of employed and unemployed individuals (labour force) divided by the working-age population, $LFP_t^g = (E_t^g + U_t^g)/Pop_t^g$. We use population aged 15-64 instead of population aged 15+ (as in Hyland et al., 2020) because the consequences of population aging – predominantly happening in HI countries – will otherwise be overlooked. Although this is unlikely to change the global picture as the majority of the population is in MLI countries, population ageing is quite relevant for HI Countries.

Figure 1 shows long-term trends of LFP for HI and MLI countries with country data aggregated by using the average 2000-2005 GDP (top panel) and average 2000-2005 population (bottom panel) as weights. From a joint look at Table 3 and Figure 1, LFP dynamics differ across genders. Overall, LFP is always higher in both HI and MLI for men with respect to women in each year, averaging around 80% for men and 65% for women in HI countries and around 78% for men and 52% ffor women in MLI countries. Specifically, in HI countries FLFP has increased by over 10 percentage points (p.p.) against a moderate drop of MLFP by around 4 p.p., instead in MLI countries both MLFP and FLFP decreased, the former within a range of 5 p.p. while the latter more gradually. Overall, with both weighting schemes (population size and GDP) FLFP follows an upward trend in HI countries – rapidly growing from 59% in 1990 up to 69% in 2019. Conversely, it is stable at around 55% in MLI countries until 2000, then declines until early 2010s (the decline is much more severe when population is used as weights) finally reaching a pleateau thereafter. Looking at male figures, participation remains persistently high at around 80% in HI countries, despite a gentle decline over the period,

[4] This formulation does not account for the presence of inactive population in the economy, namely that part of working-age population who decides not to enter the labour force (the complement to 1 of the LFP).

whereas figures in MLI countries rapidly drop after the mid-90s, reaching their minimum at 75% in 2019. Although main trends remain unchanged with both weighting schemes, the long-term trend of FLFP for MLI countries shows a sharp decline when population weights are used. This can be explained by the drastic decrease of female labour force in India between 2005 and 2010, attributable to changes in measurement methodology (as extensively explained in Section 2). Using the average 2000-2005 GDP as weights helps to obtain more precise statistics for MLI countries while it does not significantly affect HI countries. Hence, the rest of the descriptive analysis is conducted using GDP weighting scheme.

Figure 2 shows global labour force participation over the last 30 years. Aggregate female LFP is always lower than its male counterpart. FLFP reached a plateau at around 55% from 1990 until 2014, before starting to slightly increase thereafter. In stark contrast, MLFP displays a clear downward trend since 1990 with a drop by about 4% in 2019 with respect to 1990. Since the composition of male and female population is very similar over time, the aggregate LFP rate is an average of the male and female participation which progressively decreased from 68% to 66%, displaying an accelerated downward trend after the beginning of the 21st century. However, those aggregate figures mask great heterogeneity between income groups as highlighted above.

Figure 3 shows FLFP for selected countries in the two income groups. While female labour supply in HI countries is not as dispersed as in MLI, we can distinguish different trends and dynamics within each group. Focusing on HI countries, there are countries - like Germany and Spain – where female labour supply grows faster than the rest of the countries (Spain displays a rapid acceleration after 1990 reaching a plateau at around 68% after 2010); there are countries with a moderate growth – like France, United Kingdom and Italy – whose FLFP increased in a range between 4 and 10 p.p. in the sample; countries where FLFP remained stable for some years (Sweden and Japan) and increased in the last part of the sample (Japan, starting from 2012 following the Abenomics policies). Among HI countries Italy still lags behind, despite the gradual increase of FLFP over time. Finally, in the United States the FLFP slightly increased after 1991 but then started to decrease much before the 2007 financial crisis. In MLI countries, differences among countries - both in the levels and in the dynamics - are even more remarkable. First, we can observe high dispersion in starting point of the series, with FLFP ranging from around 18% in Saudi Arabia and around 80% in China. Second, as for HI countries, we observe divergent paths: first, decreasing trends in China, India, and Russia during the 90s[5]; second, slightly increasing trends in South-American countries (Brazil, Mexico and Argentina); and, third, steep upward-trends over the last ten years for countries - like Turkey and

[5]Even if not shown in Figures 3, we observe this general behaviour in may African countries and in some Eastern European countries - such as, Albania, Slovak Republic, Ukraine, Poland and Bulgaria.

Saudi Arabia.

The higher dispersion of FLFP for MLI countries with respect to HI ones is con- firmed once we consider the entire sample of countries. That is, Figure 4 shows the distribution within each group of male and female LFP by income group over the period spanning from 1990 until 2019. The graph shows that the distribution of female participation in MLI countries is highly dispersed with thick tails. Among this group, there are countries with female participation below 20% and others above 80%. On the contrary, the distribution of FLFP in HI countries is left-skewed with long thin left-tail and higher density around 65%. The scenario is indeed different for men as both distributions are less dispersed around the means of roughly 80%, with thinner tails for HI countries and with a thicker left-tail for MLI countries. The comparison confirms that: i) In both groups of countries male participation is in general higher and less dispersed than female participation; ii) The distance between the distributions of MLFP and FLFP in HI countries is smaller compared to the distance in MLI, suggesting that the development process leads to more similar, although, far from coincident gender labour participation.

Overall, with an extensive and updated dataset, descriptive evidence suggests that: i) male participation is declining in all countries over the last 30 years whereas female participation started from lower levels and has overall increased; ii) when distinguishing between HI and MLI countries, we find that while convergence is far from complete in each country group, its lack is much more accentuated in MLI economies, where FLFP increased only slightly in the last 30 years. Observed dissimilar patterns in labour supply both between genders and groups of countries motivate our analysis. It is crucial to understand how to keep boosting female LFP in HI countries and inducing the convergence process in MLI countries to sustain labour participation and, hence, growth in coming years.

A caveat applies to data on MLI countries. In those countries the majority of the population is engaged in informal jobs. Their employment engagement is – in law or in practice – not subject to national labour legislation, income taxation, social protection or entitlement to certain employment benefits (paid annual or sick leave, pension, health insurance). Moreover these jobs are characterized by lower wages and unsafe conditions. Data for labour force participation used in this paper comes from combined data from labor force surveys, censuses, and establishment censuses and surveys at the country level. These sources do not include informal work, by definition. However, ILO compiles a dataset on informal workers which we use to show some statistics on its dimension in different countries (Elgin et al., 2021). According to ILO's report (Lee et al., 2018), there is a positive correlation between the level of socio-economic development and formality of employment with informal employment in HI countries being one third smaller than the level it has in MLI ones. Regions with countries experiencing higher levels of socio-economic development – such as the Americas, Asia and the Pacific, and Europe and Central Asia – have lower shares of informal employment. Overall, it is observed that in MLI countries a higher proportion of women are in informal employment than men (Lee et al., 2018, footnote 21, p.20). Downloadable data from ILO are only available for MLI countries while for HI the statistics are reported in ILO's report (Lee et al., 2018).

Figure 5 compares the distributions of informal employment as a share of potential total employment (sum of informal and formal employment) in MLI countries across genders. Figures 6 and 7 display the share of female informal employment in the richest (above the 75th percentile) and poorest (below the 25th percentile) MLI countries, respectively. The main observed facts are as follows. First, informal work is a widespread phenomenon in MLI countries among both men and women (as both distributions are left-skewed) but more common for women (the average share of female informal employment is higher than male's – i.e., 0.45 against 0.40). Second, in the MLI group richest countries register lower levels of informal employment compared to the poorest from the same group where the share of female informal work reached 40% on average. Last, it is extremely likely that our descriptive figures under-report the actual labour force in MLI countries, especially in the poorest, especially for women. Finally, although our results may under-estimate employement in MLI countries, our restricted sample – without poorest coutries where informality shares are the highest – does not suffer from this understatement.

4 Counterfactual Exercise

We are interested now in quantifying the impact of income-group specific dynamics of FLFP on total labour supply. For this purpose, we conduct three counterfactual exercises. In the first counterfactual exercise, the FLFP is fixed to the 1990 level for both HI and MLI countries; in the second counterfactual exercise, only FLFP of MLI countries is kept constant at its 1990 level; in the third counterfactual exercise, FLFP in MLI countries varies at the same rate at which FLFP changed for HI countries between 1990 and 2019. Table 4 presents the actual and synthetic values of total LFP at the start and end of the period in analysis only, and Figure 8 displays the evolution of the observed and synthetic global LFP between 1990 and 2019.

In the first exercise, we evaluate how the dynamics of total LFP would have evolved over the last 30 years if the 1990 level of FLFP was held constant in all groups. The distance between the actual line and the counterfactual informs on how female LFP dynamics accounts for total LFP dynamic. Using data reported in Table 4 for years 1990 and 2019, we find that while the actual decline in global LFP has been of 1 point (= 67.9% – 66.9%), in the absence of actual movements in the female component, the decrease could have doubled in magnitude. Therefore, the dynamics in female labour participation in both income regions prevented a much larger global decline, especially in the last five years of the sample, when global LFP inverted its overall declining trend thanks to the increase in female LFP.

The second exercise examines what the evolution of total LFP would have been if female participation in MLI countries had remained constant at its level at the beginning of the sample period (i.e., around 55%). The distance between each point in the actual line and the long-dashed line is interpreted as the contribution of FLFP dynamics in MLI to global LFP. As mentioned in the previous section, aggregate FLFP was almost constant in MLI over the last thirty years and, therefore, the two lines (the long-dashed and the solid one) are almost overlapping throughout the full sample period. There is a small gap between the two lines during the years following the financial crisis because in the absence of a slight decrease in female LFP in MLI countries, global participation would have been higher.

In the third and last counterfactual exercise, we analyse how the global LFP would have evolved if FLFP in MLI and HI countries had changed in the same manner as in HI countries. The distance between each point in the solid and short-dashed lines is interpreted as the potential contribution of female participation to global LFP participation if MLI countries had experienced similar conditions of HI countries. This thus means that MLI countries would have started converging to higher levels of female participation. Values in Table 4 and the short-dashed line in Figure 8 show that under this hypothesis global LFP would have experienced an increase by 2.3 points in 2019, thus completely counteracting the decreasing trend in male participation. This last analysis unveils the clear potential that boosting female participation could have on global labour supply. Implementing reforms and ensure conditions that can help MLI countries to support analogous trend in FLFP than those observed in HI countries is essential to counterbalance male trends.

As previously discussed, the variability in female LFP trends within the sample is quite high, mainly because two largest MLI countries (China and India) experienced a decline in female labour force as observed in Figure 3. We thus repeat the counterfactual exercise considering the restricted sample. The upper panel of Figure 9 shows the aggregate trends in labour supply for HI and MLI countries for a restricted sample of countries. While figures for HI countries remain almost unchanged, there is an increase in the overall female participation in MLI countries which counterbalance the decrease in male's. The lower panel of the Figure plots the outcome of the counterfactual analysis. Here, we find that female supply dynamics have contributed considerably to the increase in global labour force; in the absence of movements in female supply, global labor force would have been almost 4 p.p. lower than the actual level, actually it would have declined (by 1.5 p.p.) instead of increasing (by 2.4 p.p.). The growth of female supply in HI countries contributed almost by 70% to the overall trend given by the ratio (71.1-68.5)/(72.4-68.5)[6]. Finally if the increasing trend in female labour supply in MLI had been more pronounced (as much as in HI countries), then the total labour supply could have been 0.5 p.p. higher than what actually observed.

Overall, we can conclude that: i) The dynamics of FLFP is quantitatively important to understand global trends in labour supply; ii) The increasing trend in FLFP in HI countries had a major contribution in modelling the dynamics of global labour supply, considering that the trend in MLI was either constant or slightly increasing in our restricted sample; iii) finally, the global reduction in labour supply could have been reverted had FLFP in MLI income countries grown by the same magnitude as in HI countries. Understanding the determinants of FLFP in both groups of countries is important to unfold this source of labour supply that can almost entirely offset the effects of the decreasing trend in male labour supply.

5 Cyclicality and Trend

While labor supply differs enormously between males and females, the unemployment rate between the two groups is fairly similar. Figure 10 shows a scatter plot of female unemployment rate versus its male counterpart for the initial and the final year of the dataset. With the exception of few MLI countries for which female unemployment exceeds its male counterpart, the majority of observations lie on the 45-degree line. When looking at the dynamics of the change in unemployment the rates, we observe in Table 5 that they decreased in HI countries (more for men than women) whereas increased in MLI countries (more for men than for women)

Albanesi and Şahin (2018) show that in the US the gender unemployment gap – defined as the difference between female and male unemployment rates – was positive until the first years of 80's but disappeared afterwards. During recessions, however, men's and women's unemployment rates behave differently with the former typically exceeding the latter. Macroeconomic theory has extensively examined employment fluctuations claiming that they differ over the business cycle for male and female workers. An explanation can be found in the fact that male dominated sectors – e.g., construction or manufacturing – tend to be mainly hit during regular economic downturns, unlike female dominated sectors (Hoynes et al., 2012; Doepke and Tertilt, 2016)[7]. As a response, women self-select into less-cyclical jobs as an insurance against the higher unemployment risk faced by their

[6]Because the second exercise uses the synthetic LF from the first exercise for MLI countries and the actual LF for HI, the distance between the first and second counterfactual lines inform on the contribution of female LFP dynamic in HI countries on global LFP variation

[7]Hobijn and Şahin (2021) have recently highlighted with flow micro-data that labour force participation has also a strong cyclical component that is large for all groups and amplifies the unevenness of the unemployment cycle.

spouses (Albanesi, 2019; Ellieroth et al., 2019).

In this section, we uncover the dynamics (cycle and trend) of unemployment and labour force participation by gender while next section focuses on employment. In our analysis, we make use of the Hodrick-Prescott (HP) filter to separate the trend and cyclical components of the female and male unemployment and labour force rates in HI and MLI countries. The HP filter is the most popular technique[8] used to separate cyclical behaviour from the long-run path of a series, i.e., the trend.

In Figure 11, the trend components are displayed in dotted lines while cyclical components are in solid lines. At the start of each global economic downturn (in 1991, 2001, and 2008), the cyclical component of male unemployment rate in HI countries responds immediately and with higher magnitude to fluctuations in the economy than female unemployment rate. The opposite occurs during recoveries when male unemployment decreases earlier and faster than female one. For MLI countries, instead, we do not observe this cyclicality. This is even more striking from Figure 12 which shows the gap in the male-female unemployment cyclical component. For each country in a given year, we calculate the difference of the absolute value of the male cycle and the absolute value of the female cycle and then we aggregated results for MLI and HI group of countries. This indicator assumes positive values when male cycle is more distant from zero than female cycle – i.e., when male unemployment is more cyclical than female one. Overall, the graphs show that: i) male unemployment is more cyclical than female one in HI countries; ii) this gap is particularly noticeable during crises – such as the 1990-1991 crisis, a period after the 2001 dot-com crisis, and the GFC; iii) interestingly, the gap started broadening before the Covid-19 crisis during a period of mild growth, in which the cycle component of male unemployment was decreasing much faster than the relative female component; iv) in MLI countries, female unemployment is slightly more cyclical than male's (negative gap), with the exception of the GFC where male unemployment is more cyclical.

The observed fact that unemployment appears to be less cyclical in MLI countries with respect to HI countries may seem counterintuitive, being the former more exposed to volatile growth. Koren and Tenreyro (2007) suggest that MLI countries growth volatility is high because they tend to specialize in more volatile sectors and because they suffer more frequent and severe aggregate shocks. Results are nonetheless robust applying the decomposition to our restricted sample, which exclude among others also China, a country whose GDP is far less volatile than in other MLI countries (see Figures 13 and 14). For MLI countries our results suggest that men tend to have more stable works,

[8]Although the econometric literature warns against its use in estimating econometric relationships due to omitted variable problem and spurious autocorrelation problem (Hamilton, 2018), there is a general agreement in using the HP filter for descriptive analysis (i.e., "stylised facts"). The analysis itself hence reflects the main features of the chosen de-trending technique (Ahumada and Garegnani, 1999). The choice of the smoothing parameter follows Ravn and Uhlig (2002) that suggests $\lambda = 6.25$ for annual data.

while women tend to lose their jobs more often based on the economic cycle.

The lower cyclicality of female unemployment is consistent with the "added worker effect" theory (first studied by Lundberg, 1985) according to which labour supply of married women acts as a household insurance devise, especially when husbands become unemployed. (Albanesi, 2019) argues that the lower cyclicality of female hours combined with the growing share of female workers have contributed to the reduction in the volatility of business cycle fluctuations in advanced countries in the last 20 years, the so-called great moderation. This regularity does not to apply to the Covid-19 crisis – as we show in the last section of the paper – because the two crises hit different sectors (i.e., industry and constructions during the 2008-2009 crisis and female-intensive service sectors during the Covid-19 pandemic).

Understanding the cyclical/procyclical behaviour of male/female unemployment may help policy makers to implement targeted policies to contrast adverse effects of crises based on their nature (i.e., affecting cyclical/procyclical sectors). For example, from what we observe in Section 8 we can claim that an immediate policy intervention in HI countries was necessary to contrast the increasing female unemployment whereas a long-term policy seems to be more appropriate to reduce male unemployment rates in response to GFC.

6 Within or Between Sectors? Shift-share Decomposition

Recent findings in the literature highlight that one structural reason for the increase in female participation is the expansion of service sectors in most economies after the Second World War since women tend to be employed in services rather than in manufacture, the expansion of service sectors raise of the relative demand for female labour (Olivetti and Petrongolo, 2014, 2016; Ngai and Petrongolo, 2017).

Figure 15 gives a preview of this finding for few selected countries in our database. In particular it shows the correlation between the service share in total economy and the female share in total employment for different time intervals. Clearly as service sector expands, female employment share increases. However, although the overall dynamic moves towards similar convergence levels for European countries, some of these countries are notably falling behind. For instance, in the period 2011-2019 Italy and Germany have a similar share of jobs in the service sector but the share in female employment in Italy is slightly smaller than the corresponding German figure. In HI countries outside the Euro area, Japan displays a faster catch up with a sustained increase of female share in the last years of the sample while figures in 2019 correspond to the situation US and UK were experiencing in 1991-2000. The US presents a rather interesting dynamics. That is, female employment share gradually increased with the expansion of the service sector with the exception of the period following the recovery from the financial crisis (until 2008-2010). Finally, for selected MLI countries the graph shows a very diverse picture which seems to be not compatible with a convergence dynamic. With the exception of Brazil, in the other economies the expansion of the share in service sector does not correspond to a gradual increase in female employment share, which either remains stable (China and Russia) or sharply decreases (India).

The previous graph provides a preliminary evidence of the role of the service sector in explaining the raise in female employment. In what follows, we use a shift-share analysis to quantify such phenomenon. In particular we follow Olivetti and Petrongolo (2016) to decompose the growth in female employment to population share in two components[9]: the first captures the change in the *employment share* of each sector (i.e., agriculture, industry, services) of the economy, and the second reflects changes in the *gender composition* within each sector. In formulae, the shift-share decomposition is

$$\Delta e^f_{it} = \underbrace{\sum_{j=1}^{J} \alpha^f_{ijt} \Delta e_{ijt}}_{\text{Between-industry}} + \underbrace{\sum_{j=1}^{J} \alpha_{ijt} \Delta e^f_{ijt}}_{\text{Within-industry}} \quad \text{for all } i = 1, \ldots, I \tag{2}$$

where $\Delta e^f_{it} = E^f_{it_1}/E_{it_1} - E^f_{it_0}/E_{it_0}$ is the difference in the share of female employment between t_0 and t_1; $\Delta e_{jit} = E_{ijt_1}/E_{it_1} - E_{ijt_0}/E_{it_0}$ is the difference in the share of total employment in sector j between t_0 and t_1; $\Delta e^f_{ijt} = E^f_{ijt_1}/E_{ijt_1} - E^f_{ijt_0}/E_{ijt_0}$ is the difference in the share of female employment in sector j; $\alpha^f_{ijt} = (e^f_{ijt_0} + e^f_{ijt_1})/2$ and $\alpha_{ijt} = (e_{ijt_0} + e_{ijt_1})/2$ are decomposition weights – respectively, the average share of female employment in sector j of economy i and the average share of sector j in economy i; the subscript i stands for country and j for sector; t_0 is the base year while t_1 is the comparison year. The first component of Equation (2) captures the change in female employment share due to changes in the industry structure of the economy (*between-industry component*) while the second reflects changes in female composition within sectors (*within-industry component*).

Table 6 summarises the main figures of the shift-share decomposition for the entire sample of countries (labelled as World) and two income regions (HI and MLI), where 1991 is treated as base year[10] and 2007 and 2019 as comparison years[11]. The first three columns display total female employment shares (total number of females employed over total number of individuals employed in the economy) in the base and comparison years and their change; the following two columns report

[9]Notice that Olivetti and Petrongolo (2016) use growth rate of female working hours instead of female employment.

[10]We could not use year 1990 as base year because data on sectoral employment by gender is not available before 1991.

[11]We choose those two years to contrast the trends in the year before the global financial crisis (year 2007) with the final year in the sample (year 2019) to exclude any possible long-run effects coming from the crisis.

the values of the *between* and *within* components for all sectors; the last columns split the aggregate *between* and *within* components from the previous two columns into each of the three macro-sectors (i.e., agriculture, industry, and services). Interesting patterns are outlined. Global female employment shares increased in the two comparison periods (by about 2 p.p. in 2007 and 3 p.p. in 2019). The increase is much larger for HI countries (about 3 p.p. in 2007 and 5 p.p. in 2019) than in MLI countries (about 1 p.p. in 2007 and 2 p.p. in 2019). The change in female employment share is mostly explained by the increase in the *between* component (large *between* components). For instance, before the GFC almost two-thirds of this change is explained by the total expansion in the exmployment of each sector in both HI and MLI countries. Whilst this pattern is still observed in HI countries in 2019, the negative *within* component in MLI countries attenuates the positive contribution of the *between* component. From the figures of the single sector components, the expansion of the service sector is able to counterbalance the contraction in the agricultural sector in MLI countries while being dominant in HI countries. Moreover, the increase in the proportion of women employed in service sector (*within* component) is large enough to counterbalance the reduction of their involvement in agriculture and industry with the exception of MLI countries in 2019. This behaviour is likely to be explained by Goldin's (1994) U-shape hypothesis proposing that female workforce is mainly employed either in the agricultural sector or home production in early stages of the country's development but, as the country's economic activity switches to industry, women increase their educational attainment reducting their labour supply (more details in Section 7.1).

Figure 16 displays the evolution of the change of female/male employment (respectively, solid black and red lines) and two sectoral components (services and "other") in the current year with respect to reference year (1991) by income region[12]. In the graph, components for agriculture and manufacture are grouped as "other" and identifiable with a cross while services are shown separately with circles. The graph outlines what component mainly drives the overall change in female employment over time and, especially, during economic downturns. The change in female and male employment shares follows opposite directions (with same magnitudes, by construction). This change sharply increases over time with respect to the base year (1990) in HI countries where male employment has been experiencing a much faster decline than the respective increase in female employment. In particular, the GFC did not arrest female employment as much as male employment with respect to the base year. In MLI countries, the change in male and female employment starts diverging from 1993 but the figures remain within the ± 0.20 range. As expected from the literature (Olivetti and Petrongolo, 2016), the increasing trend in the change of female employment is mainly driven by the expansion of the service sector (*between* component in services) with respect to the

[12]Data points for 2007 and 2019 hence coincide with those from Table 6.

base year, where women are mostly employed (*within* component in services). The decline in female workforce composition in agriculture and manufacture in MLI countries that has not been accompanied by a reallocation of female workers in the service sector for the reasons highlighted above. During the GFC, female employment shares in HI countries continued to increase due to the change in the service sector against a progressive contraction of the other two sectors as well as the female composition in all sectors. In stark contrast, the GFC had no impact in MLI countries on the female employment and composition in the service sector, unlike the other two sectors that experienced a sharp decline.

Overall, the shift-share analysis at the income-region level highlighted some interesting patterns. For instance, the *between* components are larger in magnitudes with respect to the *within* components, especially in MLI countries. When looking at the decomposition by sectors, we observe that the increase in the change of female employment is mainly driven by the expansion of the service sector, where women are mostly employed. However, it is worth to mention that our results may tend to overestimate women employment because we use the total number of female workers instead of working hours and women tend to have more part-time jobs and, thus, to work less hours than men.

7 Long-run Determinants of FLFP

In this section we discuss the long-term determinants of female participation in labour supply. Robustness checks are provided in the Appendix, where also the gender participation gap and MLFP are used as dependent variables.

7.1 The U-shape Hypothesis

One of the most discussed hypothesis in the gender literature is the U-shaped hypothesis, which is explored in a large number of studies but is still far from accepted. According to this hypothesis, there is a U-shaped relationship between economic development and women's participation in the labour market. The main reason, as explained in Goldin (1994), is that in the first stage of development women work for necessity, mainly in the agricultural sector or in home-based production. As development proceeds and economic activity switches from agriculture to industry, men – whose work is more suited for industrial production – tend to work more and women less. With increasing levels of educational attainment, fertility rates fall and social stigmas weaken so that women tend to re-enter the labour market leaving the inactive population, and looking for occupations mainly in the service sector. With more family-friendly policies and accessible economic opportunities, female participation further increases.

A visual representation of the U-shape hypotehsis is displayed in Figure 17, which depicts the quadratic relationship between FLFP and real GDP per capita. The left graph displays the quadratic relationship using average values between 2000-2005 (before the GFC) while the right graph uses average values between 2010-2015 (after the GFC and before the Covid-19 pandemic). Both figures provide a visual inspection of the U-shape relationship. As expected, the main cloud of points of MLI countries (in orange) lies in the descending part of the U-shape curve between 2000-2005 and shifts to the right of the support between 2010-2015 with a conspicuous group of countries laying on the beginning of the ascendant part of the curve. This suggests that most of MLI countries have been activelly experiencing a transition into a new phase of their economies where women invest in their education and enter the labour market later. On the contrary, HI countries (in black) mainly lie on the ascending part of the U-shape curve. The slope of the curve is steeper between 2010-2015, suggesting that a marginal increase in a country's wealth increases female labour supply at rapid pace compared to the period 2000-2005.

This different representation is explained by the key role played by female educatioanl attainment. Elementary educational attainment is usually very low at early stages of economic development, especially for women. Along the descending portion of the U-curve, FLFP decreases as primary educational attainment of young unmarried women increases because they delay their entry into the labour force despite the increase. Incomes then rise but women's relative productivity might not for some time (Goldin, 1994). In the ascending portion of the curve, women gain education at the secondary school level and can aim at positions in the service sector (or white-collar sector, according to Goldin, 1994) increasing their labor force participation rates. The visual inspection of the U-shape hypothesis clearly explains these socio-economic differences in both groups of countries. The slopes of the curve in HI countries countries are not as steep as in MLI counties. This implies that a marginal increase in GDP per capita may drop or boost FLFP in that economy, depending on its stage of development (whether it lays on the left or right side of the U-curve, respectively).

7.2 The WBL Index

The WBL dataset collects information based on a country's legislation aimed at measuring equality of economic opportunities for men and women. World Bank's legal experts, working with local experts of 190 countries, identified and aggregated legislative issues on eight areas impacting women's economic participation – mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pensions. To each of this area, through an articulated methodology (see Hyland et al., 2020), is assigned an indicator; the unweighted average of all the indicators is then the overall WBL index. All in all, the WBL index is a synthetic index available for 190 countries in the last 50 years, which ranges from 0 to 100 points; the higher the score, the more rights are accorded to women. For example, the global average WBL index in 2019 was 75.2 points indicating that women are accorded, on average, about three quarters the number of rights as men in the areas covered by the index. Figure 18 shows the distribution of WBL index in our sample over its support (upper panel) and the evolution of the index over the past thirty years (lower panel) by income region. The distribution of the WBL index in MLI countries seems to follow a normal distribution centered around the mean of 65 and with thick tails whereas it is skewed to the right in HI countries, displaying two modes at around 85 and 95 and with a long left tail which ends with a dense groups of data points with values ranging between 20 and 35 points. Therefore, the polarisation in HI countries between "virtuous" countries that actively promote laws in favour of economic empowerment (whose WBL score range above 70) and "non-virtuous" countries (with WBL score below 40) is quite visible. The support of WBL from 20 until 100 points in both groups. When we look at the evolution of WBL index over time, we observe that the two series both show an upward trend and are parallel (with HI countries displaying higher average scores than MLI countries). However, the vertical gap between HI and MLI countries seems to remain constant suggesting that for MLI countries it will take more time to close the gap in adopting laws that provide equal economic opportunities to men and women.

7.3 The Regression Analysis

Based on the gender inequality literature that has identified several socio-economic factors that may contribute to explain lower levels of female labour force participation, we distinguish four key dimensions that include all possible determinants: (i) level of economic development; (ii) sectoral structure of the economy; (iii) socio-demographic factors; and (iv) institutional setting and policies. In regards to the level of development, the real GDP per capita is used to test the U-shaped hypothesis. To account for the sectoral structure of the economy, sectoral value added (as percentage of GDP) is included. Socio-demographic factors include school enrolment rates in primary and secondary education, the average number of births per women, and the percentage of rural population. To control for institutional setting and policies, the number of days of maternity leave[13] (in logarithm) and the WBL index are included.

The estimating regression equation is

$$y_{it} = \beta_0 + \beta_1 \ln\text{GDP}_{it} + \beta_2 \ln\text{GDP}_{it}^2 + \beta_3 \text{WBL}_{it} \times \text{MLI}_i + \beta_4 \text{WBL}_{it} \times \text{HI}_i + \mathbf{x}_{it}'\gamma + u_{it} \tag{3}$$

[13]The variable refers to the days of leave taken by the mother of the child just before, during and immediately after childbirth.

where y_{it} is FLFP (in %); lnGDP is the logarithm of real GDP per capita; WBL is the WBL index as the main proxy of institutional setting and policies; the binary indicators[14] HI_i and MLI_i are equal to one if country i is, respectively, a high income or middle-low income country, and zero otherwise; $\mathbf{x}_{it}$ is a vector of controls for the economic develpment and structure (sectorial added value of agriculture, industry and services with manufacture as base category), for socio-demographic factors (education, female fertility, percentage of rural population), for the institutional setting (number of maternity days) which is interacted with both HI_i and MLI_i. The unit of observation i is the country observed in period t.

Equation (3) is estimated using random-effects model for panel data[15]. The interacted estimated coefficients for HI (MLI) countries are interpretaed for HI (MLI) countries; there is no base category because we omit the estimation of the overall effect. Standard errors are robust and clustered at the country level. Regression analysis does not require any weighting scheme because we are estimating correlations without generalising to populations[16].

Table 7 reports the estimated results of Equation (3). FLFP is the dependent variables. Each column adds an additional dimension to the analysis. Column 1 tests the U-shape hypothesis in the female sample; Column 2 inserts variables that control for the institutional setting; Column 3 includes socio-demographic factors that may explain gender norms and stereotypes; Column 4 includes the economic structure; and Column 5 excludes from Specification 4 the number of maternity days because there are countries with missing values.

A robust result from Tables 7 is that Goldin's (1994) U-shape hypothesis for FLFP is strongly verified in all specifications. In fact, we find that the coefficient of log GDP per capita is negative and the coefficient of its square is positive. The WBL index is relevant in HI countries but significant in MLI countries only before controlling for socio-demographic factors, suggesting that the institutional setting and reforms in support of working women do matter in facilitating female participation in the labour market mainly in HI countries. Our findings are aligned with Hyland et al.'s (2020) fifth stylised fact that a higher score in the WBL index is associated with better labour makert outcomes. However, we claim that this is not generally the case in all countries but only in the group of HI countries due to the different economic structure of the countries. Sectoral value added are significant in HI countries but positive and significant in MLI countries, especially agriculture that

[14]As previously explained, the indicators are time-invariant because country i has been classified to belong to one of the two groups according to its mode over the full time period.

[15]The main regression specifications are not estimated using the within-group (fixed-effects) model because it would capture the long-run trends within each countries while the main interest is to capture variation across countries.

[16]Weighting the observations by the GDP/population would indeed induce results for small countries to have no relevance in the analysis while our ultimate aim is to find a common pattern described by the data. Any weighting scheme is technically a correction for heteroskedasticity due to computing averages over countries with different (economic or demographic) sizes. This aspect can be easily accounted by using cluster-robust standard errors at the country level.

mainly contributes to the transition of MLI countries into higher participation levels. Interestingly, value added of services is insignificant in both groups (where the base category is manufacture). As expencted, female labour supply is always negatively correlated with fertility but it is signficant in MLI countries when controlling for the economic structure whereas in HI countries when not controlling for it. Regarding education, schooling is fairly significant in MLI countries only; primary and seondary education are weakly significant and have opposite sign (respectively, negative and positive signs). These findings are in line with the U-shape hypothesis (Goldin, 1994). In MLI countries, we expected to find a decreasing female labour supply as women gain more primary education but an increasing participation as they gain secondary education.

In conclusion, regression results suggest that the stage of development (measured by the GDP per capita) is a fundamental factor in explaining FLFP, according to Goldin's (1994) U-shape hypothesis. In addition, the institutional setting and policies (captured by the WBL index) contribute to foster women's participation only once countries are in the last stage of their economic development whereas the economic structure and development (sectoral value added & socio-demographic characteristics) are crucial in MLI economies. These results may be rationalized considering that at the early phase of the economic development, when an economy moves in the descending phase of the U-shaped curve, socio-economic factors have a greater impact in stimulating female participation in paid activities. However, once as the economy grows and starts to move along the ascendant part of the curve, breaking gender stereotypes and promoting laws that facilitate women's decision to enter or remain in the labour market (e.g., reforms in support of the family, or equality laws) are necessary in stimulating female participation and, ultimately, growth. General results hold under different hypothesis (individual and time fixed effects), with different samples (without China and India, without countries with extreme values in FLFP, without rich countries), and consistent when using LFP gap as alternative dependent variable. Robustness checks can be found in Table 8 in Appendix.

8 Trends during Covid-19 Outbreak

Region-specific facts may have been offset or magnified by the Covid-19 outbreak. The pandemic has undeniably affected men and women differently in terms of unemployment, labour supply, working hours and wages. The root causes of the diverse impact on men and women lies in the gendered-specific structure of the labour market and in social norms. In fact, a higher proportion of women is employed in the service sector (e.g., in retail, tourism, food industry, and other services) that is usually less affected by conventional recessions (Doepke and Tertilt, 2016; Ellieroth et al., 2019; Alon et al., 2020; Fuchs-Schündeln et al., 2020; Richardson and Denniss, 2020).

Unlike standard recessions (e.g., GFC), Covid-19 pandemic has heavily hit female-dominated in-person services. As a consequence of a series of localised or centralised measures to contrast the spread of the virus, a relatively high fraction of women employed in "quarantined" and "non-essential" sectors for which remote work was not possible (e.g., restaurants, hotels, shops, etc.) lost their jobs or were put on furlough. In addition, the closing of schools and day-care facilities reduced working mothers' employment opportunities and participation in the labour market in favour of home production, despite a slight increase in fathers' contribution at home during the lockdown (Gelbach, 2002; Graves, 2013; Alon et al., 2020; Farré et al., 2020; Fuchs-Schündeln et al., 2020; Reichelt et al., 2020).

In light of this evidence, we conduct an exercise to compare the different impact of the GFC (from second quarter 2007 until fourth quarter 2009) and Covid-19 pandemic (from first quarter 2020 until fourth quarter 2021) on female and male unemployment and LFP. With this exercise, we can compare the speed of adjustment of unemployment and LFP during the two crises. To do so, we make use of data from national short-term labour force statistics collected by ILO[17] which is available for a fairly limited number of countries (marked with a Q in Table 2) and have a higher time frequency (quarterly rather than annual[18]). Data refers to working population aged 15-64.

Figures 19 and 20 display respectively the dynamics of unemployment and LFP in the full sample of HI and MLI countries. To make the two crises comparable, we normalised our variables at 100 in the quarter before the outbreak of each crisis and we then follow their dynamics in the following quarters (reported on the x-axes). The most visible difference between the two crises consists in the time frame when the main effects occurr. Specifically, major effects of the GFC on unemployment rates happen in the medium-term (until the 10th quarter after the shock) while unemployment rates reacted to Covid-19 shock immediately (the spike is within the first quarter after the shock). As expected from the literature and from previous analysis, for HI countries the GFC had a greater impact on men's unemployment than women's and the effects last in the medium-term whereas Covid-19 hit female unemployment more harshly than male's with persistent effects over time. Moreover the peak of unemployment has been stronger during the Covid-19 crisis with respect to GFC, although it reverted at a very fast rate, with male unemployment reaching lower level than those prevailing before the Covid-19 after less than two years. Conversely, in MLI countries both crises affected men unemployment rate more harshly than female's but the Covid-19 had more drastic consequences on

[17]Because data for 2020-2022 are still not available from the data sources we use, we had to rely on ILO quarterly dataset.

[18]For this type of exercise, quarterly data are much more appropriate than annual data that would not be able to separate the short from the medium-term effects. This feature of the data is important to compare the evolution of unemployment and labour supply in the quarters after the GFC and Covid-19 outbreak. However, ILO quarterly data are not as comparable as annual data because they are not standardised by ILO.)

unemployment with respect to the GFC crisis, and recovery is still lagging behind for both genders.

The situation is much different when we look at the LFP. The GFC had no negative impact on female LFP, which continued to increase after the crisis, following its long-run trend and also to make up for the loss of male employment (added worker effect). Male labour supply instead decreased in HI incomes after some quarters. In regards to the Covid-19 crisis, the male and female LFP immediately decreased with a stronger negative effect on women in both HI and MLI countries. The dynamics leads to a convergence towards the starting point few quarters after the shock. This finding seems in contrast with recent discussion on the fact that participation did not recoup its *pre* Covid-19 level in some HI countries. We find that this fact is confirmed with data for population aged 15+ (see Figure 21)[19] while it is not supported when looking at data on working-age (15-64) population (see Figure 20). These findings are aligned with some early evidence of excess retirement in some countries after Covid-19 , like in US (Domash and Summers, 2022).

In conclusion, the proposed exercise suggests that at the aggregate level, labour market in HI countries reacted faster to the Covid-19 crisis with unemployment decreasing to level below pre-crisis. In MLI countries recovery in labour market is instead lagging behind with quite high unemployment rates for both women and men. This exercise has policy implications because it provides policy-makers with the empirical evidence is support of targeted policies to contrast short-run adverse effects of Covid-19 crisis and recovery policies designed to sustain long-run economic growth as discussed in Section 5.

9 Conclusion

Gender inequality is a widely complex phenomenon that is addressed in many areas of the Economic literature. Motivated by the fact that only half of working-age women actually enter the labour force in contrast to the 80% of their male counterparts, we look at different strands of this vast literature to deeply understand well-established facts of this phenomenon. We indeed followed the evolution of gender gaps in the labour market using a unified panel dataset, which includes a large number of countries over the last thirty years. Our contribution consisted in bringing an up-to-date assessment of many aspects of gender-based differences in labour supply by means of various techniques in a comparative perspective between HI and MLI countries.

Our main findings can be summarised in the four points as follows. First, the dynamics of FLFP is quantitatively important to understand global trends in labour supply which was mainly

[19] In the graph for HI countries, the LFP dynamics drop below 98 for both men and women in teh preiod right after the shock, slowly rasing over the next quarters but still remaining below 100.

shaped by the increasing trend in female participation in HI countries. We found that the global reduction in labour supply could have been reverted had FLFP in MLI income countries grown by the same magnitude of that in HI countries.

Second, as concerns unemployment, we find that while in normal times there is no gap between female and male unemployment, in line with the macroeconomic theory (Hoynes et al., 2012; Doepke and Tertilt, 2016), male unemployment is more cyclical than female's, but this holds for HI countries only because trend matters in MLI countries.

Third, the increase in female employment over the last 30 years is exclusively driven by the expansion of the service sector, where women are mostly employed, as argued by (Olivetti and Petrongolo, 2014, 2016; Ngai and Petrongolo, 2017).

Last, while the economic structure and the stage of development are a fundamental factors in explaining FLFP – as suggested by Goldin's (1994) U-shape hypothesis – the institutional setting and policies (proxied by WBL index) boost women's labour supply only once countries enter in the last stage of their development. This means that development and economic forces themselves are not sufficient to ultimate the convergence and reduce gender gap; the active intervention of policy maker is thus needed to bring the economies to a more appropriate and welfare-enhancing equilibrium.

As the Covid-19 crisis has affected female unemployment and participation more than its male counterpart, especially in high-income countries where convergence was on the way, it is important that the policy maker act to avoid that virtuous trend could be reverted as worldwide recovery takes strength.

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10 Tables

Table 1. *Data Sources*

Variables	Details	Data Sources (with links)
WBL index	series starting from 1970 until 2020	Women, Business and Law Data
WDI indicators	series starting from 1960 until 2020	World Bank
Wage gap	series starting from 1981 until 2019	ILOStat
Wage gap for OECD countries	series starting from 1970 until 2019	OECD
Real GDP (`rgdpna`)	series starting from 1950 until 2019	Penn World Table

Note: Relevant WDI Indicators are (un)employment, LFP, population, population in the labour force. For WBL index, we dowloaded the latest version of "Women, Business and the Law Data for 1971-2021".

Table 2. *Countries by income region*

HI countries	MLI countries	MLI countries	MLI countries
Aruba	Albania	Guinea-Bissau[LI]	Sao Tome and Principe[LI]
Australia[Q]	Algeria[A]	Guyana	Senegal[LI]
Austria[Q]	Angola	Haiti[LI]	Serbia[Q]
Bahamas, The	Antigua and Barbuda	Honduras	Seychelles
Bahrain[A]	Argentina[Q]	Hungary[Q]	Sierra Leone[LI]
Barbados	Armenia	India[LI,*]	South Africa[Q]
Belgium[Q]	Azerbaijan	Indonesia[Q]	Sri Lanka
Bermuda	Bangladesh[LI]	Iran, Islamic Rep.[Q]	St. Kitts and Nevis
British Virgin Islands	Belarus	Iraq[A]	St. Lucia
Brunei Darussalam	Belize	Jamaica[Q]	St. Vincent and the Grenadines
Canada[Q]	Benin[LI]	Jordan[A]	Sudan[LI]
Cayman Islands	Bhutan[LI]	Kazakhstan	Suriname
Curacao	Bolivia	Kenya[LI]	Syrian Arab Republic[A]
Cyprus[Q]	Bosnia and Herzegovina	Kyrgyz Republic[LI]	Tajikistan[LI]
Czech Republic[Q]	Botswana	Lao PDR[LI]	Tanzania[LI]
Denmark[Q]	Brazil	Latvia[Q]	Thailand
Estonia[Q]	Bulgaria[Q]	Lebanon[A]	Togo[LI]
Finland[Q]	Burkina Faso[LI]	Lesotho	Trinidad and Tobago
France[Q]	Burundi[LI]	Liberia	Tunisia[A]
Germany[Q]	Cabo Verde	Lithuania[Q]	Turkey[Q]
Greece[Q]	Cambodia[LI]	Madagascar[LI]	Turkmenistan
Hong Kong SAR, China	Cameroon	Malawi[LI]	Uganda[LI]
Iceland[Q]	Central African Republic[LI]	Malaysia	Ukraine
Ireland[Q]	Chad[LI]	Maldives	Uruguay[Q]
Israel	Chile	Mali[LI]	Uzbekistan
Italy[Q]	China[*]	Mauritania[A,LI]	Venezuela, RB
Japan[Q]	Colombia[Q]	Mauritius[Q]	Vietnam[LI]
Korea, Rep.	Comoros[A,LI]	Mexico[Q]	West Bank and Gaza[A]
Kuwait[A]	Congo, Dem. Rep.[LI]	Moldova	Yemen, Rep.[A,LI]
Luxembourg[Q]	Congo, Rep.	Mongolia	Zambia[LI]
Macao SAR, China[Q]	Costa Rica	Montenegro	Zimbabwe[LI]
Malta[Q]	Cote d'Ivoire	Morocco[A]	
Netherlands[Q]	Croatia[Q]	Mozambique[LI]	
New Zealand [Q]	Djibouti[A]	Myanmar[LI]	
Norway[Q]	Dominica	Namibia	
Portugal	Dominican Republic[Q]	Nepal[LI]	
Qatar[A]	Ecuador[Q]	Nicaragua	
Saudi Arabia[A]	Egypt, Arab Rep.[A,Q]	Niger[LI]	
Singapore	El Salvador	Nigeria[LI]	
Sint Maarten (Dutch part)	Equatorial Guinea[LI]	North Macedonia[Q]	
Slovak Republic[Q]	Eswatini	Oman[A]	
Slovenia[Q]	Ethiopia[LI]	Pakistan[LI]	
Spain[Q]	Fiji	Panama	
Sweden[Q]	Gabon	Paraguay	
Switzerland[Q]	Gambia, The[LI]	Peru[Q]	
Taiwan, China	Georgia	Philippines[Q]	
Turks and Caicos Islands	Ghana[LI]	Poland[Q]	
United Arab Emirates[A]	Grenada	Romania[Q]	
United Kingdom[Q]	Guatemala	Russian Federation	
United States[Q]	Guinea[LI]	Rwanda[LI]	

Note: The total number of HI countries is 42; the total number of MLI countries is 126. A *stands for "Arabic" countried accoring to World Bank definition;* LI *stands for "Low Income" countries;* Q *identifies countries in quarterly ILO dataset; the asterisk identifies China and India.*

Table 3. *Summary statistics: Labour Force Participation*

	Weights Average 2000-2005 Population		Weights Average 2000-2005 GDP				
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Min	Max	N
	High Income Countries						
ΔGap LFP	-11.4	5.329	-11.142	5.204	-31.91	1.34	42
ΔFLFP	9.790	7.771	9.047	7.903	-3.49	31.97	42
ΔMLFP	-1.61	3.823	-2.096	3.848	-7.26	9.17	42
	Low&Middle Income Countries						
ΔGap LFP	-1.852	8.300	-3.88	9.423	-30.15	8.32	126
ΔFLFP	-2.836	9.202	-0.079	9.920	-19.1	28.96	126
ΔMLFP	-4.688	3.561	-3.959	3.586	-21.24	12.88	126

Table 4. *Values from Counterfactual Exercise, Full Sample*

		Full sample		Restricted Sample	
Case	Hypothesis	Total LFP_{1990}	Total LFP_{2019}	Total LFP_{1990}	Total LFP_{2019}
Observed LFP	Actual level of FLFP	67.9	66.9	70	72.4
Exercise 1	Both HI & MLI FLFP fixed at 1990 level	67.9	65.9	70	68.5
Exercise 2	Only MLI FLFP fixed at 1990 level	67.9	66.9	70	71.1
Exercise 3	MLI FLFP varies as HI LFP between 1990 and 2019	67.9	70.2	70	72.9

Note: For the first counterfactual exercise (Conterfactual LFP_{1990}), the FLFP IS fixed to the level of 1990 for both HI and MLI countries; in the second counterfactual exercise (Counterfactual MLI_{1990}), only FLFP of MLI countries is kept constant at its level of 1990; in the third counterfactual exercise (Counterfactual $MLI_{2019-1990}$), we let FLFP in MLI countries increase at the same rate at which FLFP increased for HI countries between 2019-1990. Restricted sample excludes low income countries, Arabic countries, China and India. Weighting using average GDP in 2000-2005.

Table 5. *Summary statistics: Unemployment*

	Weights Average 2000-2005 GDP				
Variable	Mean	Std. Dev.	Min	Max	N
	High Income Countries				
Δu_{ML}	-1.668	2.796	-10.22	9.210	42
Δu_{FML}	-2.144	4.105	-15.83	18.01	42
	Low&Middle Income Countries				
Δu_{ML}	0.92	3.142	-16.39	16.5	126
Δu_{FML}	1.114	4.56	-21.32	33.27	126

Table 6. *Shift-share Decomposition, 1991-2007 and 1991-2019*

				Decomposition							
	Fml employment share			All sectors		Single sector					
Area	1991	t	Change	BTW	WTN	BTW_{AGR}	BTW_{IND}	BTW_{SRV}	WTN_{AGR}	WTN_{IND}	WTN_{SRV}
Comparison year: 2007											
HI	41.9%	44.5%	2.6%	1.7%	0.9%	-0.6%	-1.2%	3.6%	-0.1%	-0.9%	1.9%
MLI	37.7%	38.8%	1.1%	0.8%	0.3%	-4.0%	0.5%	4.3%	0.2%	-0.9%	1.1%
World	40.1%	42.1%	1.9%	1.3%	0.6%	-2.1%	-0.5%	3.9%	0.0%	-0.9%	1.5%
Comparison year: 2019											
HI	41.9%	46.1%	4.2%	2.7%	1.5%	-0.8%	-2.0%	5.5%	-0.2%	-0.9%	2.6%
MLI	37.7%	39.0%	1.3%	1.5%	-0.2%	-7.1%	0.7%	7.8%	-0.6%	-1.6%	1.9%
World	40.1%	43.1%	2.9%	2.2%	0.8%	-3.5%	-0.8%	6.5%	-0.3%	-1.2%	2.3%

Table 7. *Regression Results, FLFP*

	Dep. var.: FLFP				
	(1)	(2)	(3)	(4)	(5)
Log GDP per capita	-7.659***	-7.010***	-9.154***	-7.562**	-7.488**
	(2.123)	(2.024)	(2.723)	(3.290)	(3.276)
Log GDP per capita squared	2.170***	1.390***	1.667***	1.654***	1.668***
	(0.461)	(0.437)	(0.496)	(0.603)	(0.600)
WBL index					
HI		0.334***	0.283***	0.156***	0.157***
		(0.052)	(0.046)	(0.056)	(0.057)
MLI		0.113***	0.024	0.035	0.030
		(0.028)	(0.032)	(0.039)	(0.038)
Log maternity days					
HI		0.356	0.342***	0.346***	
		(0.320)	(0.120)	(0.111)	
MLI		-0.239	-0.603**	-0.444*	
		(0.319)	(0.245)	(0.251)	
Births per woman					
HI			-4.585***	-2.189	-2.170
			(0.945)	(2.159)	(2.190)
MLI			-0.687	-1.541***	-1.507**
			(0.457)	(0.589)	(0.587)
Female primary enrollment rate					
HI			-0.093**	0.055	0.071
			(0.043)	(0.052)	(0.053)
MLI			-0.038*	-0.048**	-0.050**
			(0.022)	(0.023)	(0.022)
Female secondary enrollment rate					
HI			0.034	0.020	0.020
			(0.033)	(0.037)	(0.038)
MLI			0.062**	0.062**	0.062**
			(0.027)	(0.027)	(0.027)
Rural population (%)					
HI				-0.402**	-0.382**
				(0.160)	(0.159)
MLI				0.047	0.056
				(0.160)	(0.159)
Agriculture value added (% of GDP)					
HI				-0.134	-0.150
				(0.599)	(0.597)
MLI				0.236***	0.234***
				(0.065)	(0.066)
Industry value added (% of GDP)					
HI				-0.138	-0.136
				(0.112)	(0.112)
MLI				0.118*	0.110*
				(0.064)	(0.064)
Services value added (% of GDP)					
HI				0.068	0.073
				(0.094)	(0.094)
MLI				0.071	0.064
				(0.058)	(0.057)
Observations	5,040	4,980	3,052	2,736	2,736
R^2	0.02	0.13	0.16	0.13	0.14

Note: The coefficients of logarithmic variables are interpreted as follows: "A 1% change in the independent variable leads to an expected change in the dependent variable by $(\beta/100)$ *percentage points". The estimated coefficients for HI (MLI) countries are reported in the line with HI (MLI). Significance levels: *** p<0.01; ** p<0.05; * p<0.10.*

Table 8. *Robustness Check*

Dep. var.:	FLFP									LFP Gap
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log GDP per capita	-7.488**	-6.853**	-7.050**	-6.402**	-9.831**	-14.067*	-8.001**	-8.102**		-6.634**
	(3.276)	(3.242)	(3.214)	(2.986)	(4.557)	(7.862)	(3.703)	(3.503)		(2.876)
Log GDP per capita squared	1.668***	1.646***	1.291**	1.546***	2.141***	2.737**	2.002***	1.893***		1.544***
	(0.600)	(0.587)	(0.598)	(0.559)	(0.823)	(1.217)	(0.777)	(0.659)		(0.533)
Detrended Log GDP per capita									-1.363	
									(1.643)	
Detrended Log GDP per capita squared									0.269	
									(4.424)	
WBL index										
HI	0.157***	0.126**	0.109*	0.155***	0.118**	0.148***	-0.067	0.047	0.199***	0.145***
	(0.057)	(0.056)	(0.059)	(0.057)	(0.057)	(0.056)	(0.052)	(0.073)	(0.054)	(0.051)
MLI	0.030	0.015	0.000	0.020	0.010	0.062	0.015	0.028	0.043	0.021
	(0.038)	(0.039)	(0.039)	(0.038)	(0.047)	(0.044)	(0.038)	(0.038)	(0.045)	(0.032)
Births per woman										
HI	-2.170	-2.556	-1.482	-2.180	-2.402	-2.644	-3.969*	3.820	-1.023	-2.211
	(2.190)	(2.174)	(2.007)	(2.187)	(2.929)	(2.227)	(2.145)	(3.095)	(1.987)	(1.870)
MLI	-1.507**	-1.551**	-0.862	-1.350**	-1.478**	-2.139***	-1.727***	-1.558***	-1.024*	-1.425***
	(0.587)	(0.602)	(0.637)	(0.559)	(0.752)	(0.657)	(0.603)	(0.590)	(0.603)	(0.522)
Female primary enrollment rate										
HI	0.071	0.046	0.072	0.071	0.108*	0.071	0.124	0.064	0.072	0.029
	(0.053)	(0.050)	(0.052)	(0.053)	(0.064)	(0.055)	(0.077)	(0.065)	(0.051)	(0.045)
MLI	-0.050**	-0.052**	-0.057**	-0.053**	-0.042	-0.035*	-0.049**	-0.047**	-0.072***	-0.058***
	(0.022)	(0.022)	(0.023)	(0.022)	(0.027)	(0.020)	(0.022)	(0.022)	(0.022)	(0.020)
Female secondary enrollment rate										
HI	0.020	0.008	0.014	0.020	0.049	0.020	0.025	0.026	0.022	0.039
	(0.038)	(0.038)	(0.035)	(0.038)	(0.052)	(0.038)	(0.044)	(0.057)	(0.037)	(0.032)
MLI	0.062**	0.062**	0.050*	0.068**	0.072**	0.049*	0.061**	0.062**	0.075***	0.080***
	(0.027)	(0.027)	(0.029)	(0.027)	(0.030)	(0.028)	(0.029)	(0.027)	(0.028)	(0.023)
Rural population (%)										
HI	-0.382**	-0.481***	-0.289*	-0.383**	-0.305*	-0.361**	0.728***	-0.112	-0.410**	-0.414***
	(0.159)	(0.157)	(0.168)	(0.159)	(0.167)	(0.161)	(0.172)	(0.153)	(0.164)	(0.144)
MLI	0.056	0.036	0.077	0.025	-0.048	-0.103	0.094	0.072	0.063	0.071
	(0.094)	(0.110)	(0.097)	(0.089)	(0.089)	(0.090)	(0.100)	(0.095)	(0.097)	(0.089)
Agriculture value added (% of GDP)										
HI	-0.150	-0.540	0.010	-0.153	-0.575	0.023	-1.278***	-0.781	-0.629	-0.041
	(0.597)	(0.569)	(0.577)	(0.597)	(0.650)	(0.596)	(0.351)	(0.662)	(0.569)	(0.490)
MLI	0.234***	0.255***	0.249***	0.240***	0.233***	0.317***	0.241***	0.249***	0.230***	0.202***
	(0.066)	(0.067)	(0.068)	(0.066)	(0.073)	(0.092)	(0.068)	(0.067)	(0.068)	(0.055)
Industry value added (% of GDP)										
HI	-0.136	-0.452**	-0.087	-0.146	-0.313*	-0.128	-0.236**	-0.334**	-0.098	-0.140
	(0.112)	(0.188)	(0.100)	(0.112)	(0.160)	(0.115)	(0.118)	(0.164)	(0.105)	(0.101)
MLI	0.110*	0.139**	0.118*	0.116*	0.106	0.136*	0.117*	0.123*	0.106	0.086*
	(0.064)	(0.066)	(0.062)	(0.063)	(0.076)	(0.073)	(0.068)	(0.064)	(0.068)	(0.052)
Services value added (% of GDP)										
HI	0.073	-0.260	0.105	0.062	0.001	0.084	-0.171*	0.123	0.101	0.109
	(0.094)	(0.179)	(0.091)	(0.093)	(0.116)	(0.096)	(0.103)	(0.130)	(0.091)	(0.081)
MLI	0.064	0.093	0.051	0.080	0.064	0.080	0.064	0.073	0.084	0.056
	(0.057)	(0.060)	(0.057)	(0.056)	(0.064)	(0.064)	(0.061)	(0.058)	(0.057)	(0.048)
Country FE	No	Yes	No	No	No	No	No	No	No	No
Time FE	No	No	Yes	No	No	No	No	No	No	No
Sample w/t CHN and IND	No	No	No	Yes	No	No	No	No	No	No
Sample w/t High&Low FLFP	No	No	No	No	Yes	No	No	No	No	No
Sample w/t Poorest Countries	No	No	No	No	No	Yes	No	No	No	No
Sample w/t Rich Countries	No	No	No	No	No	No	Yes	No	No	No
Sample w/t Richest Countries	No	No	No	No	No	No	No	Yes	No	No
Observations	2,736	2,736	2,736	2,697	2,042	2,158	2,007	2,381	2,736	2,736
R^2	0.14	0.34	0.20	0.09	0.10	0.31	0.09	0.12	0.10	0.10

*Note: Colum (1) is Column (5) in Table 7. The coefficients of logarithmic variables are interpreted as follows: "A 1% change in the independent variable leads to an expected change in the dependent variable by $(\beta/100)$ percentage points". The estimated coefficients for HI (MLI) countries are reported in the line with HI (MLI). Significance levels: pvalue<0.01 ***, pvalue<0.05 **, pvalue<0.1 *.*

11 Figures

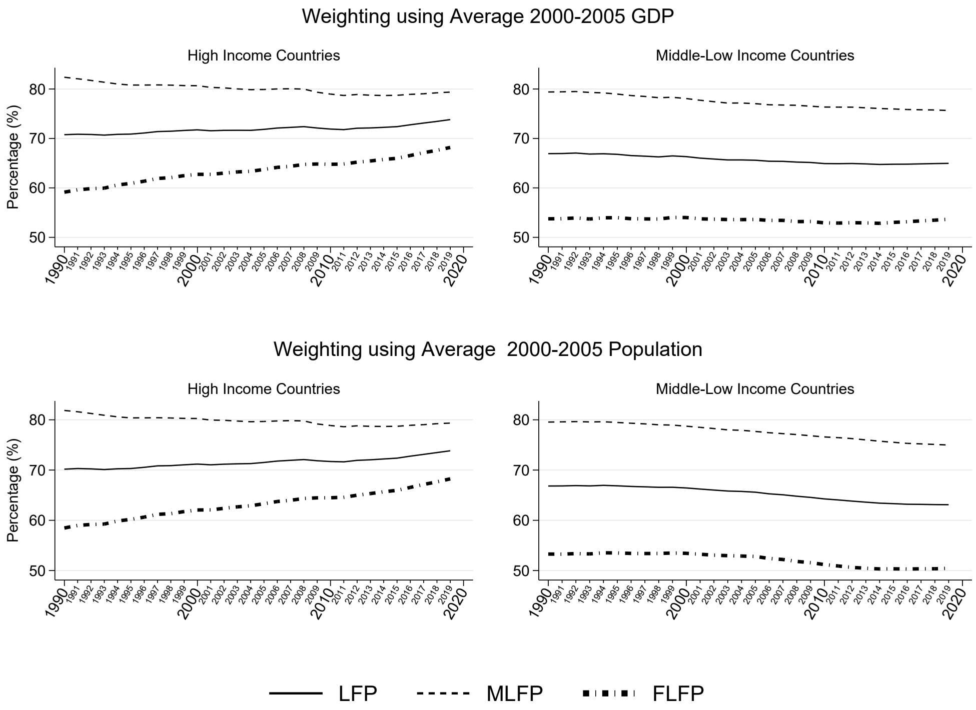


Figure 1. *Labour Force Participation Rate, by Income Region*

Note: Full sample. Two types of weights used: average 2000-2005 GDP in top panel; average 2000-2005 Population in top panel.

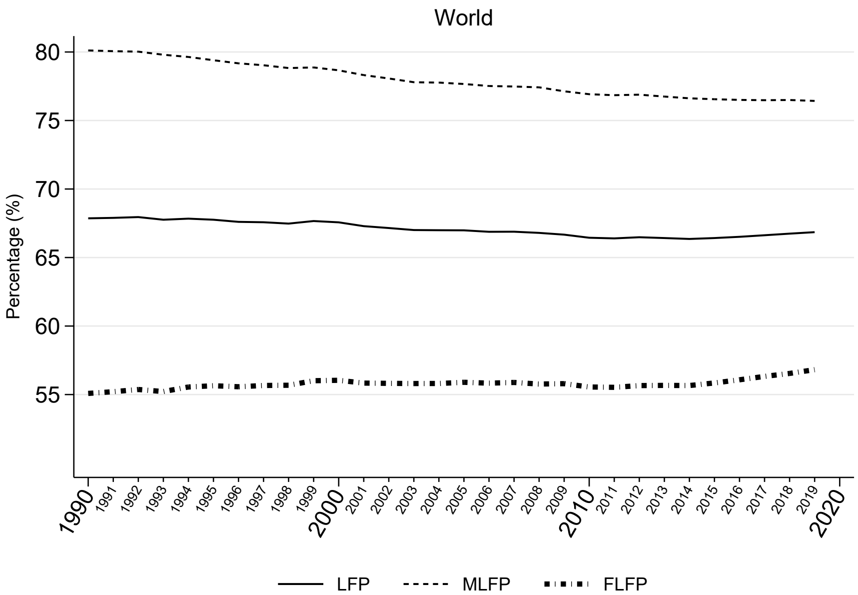


Figure 2. *Labour Force Participation Rate: World*

Note: Full sample. Weighting using average GDP in 2000-2005.

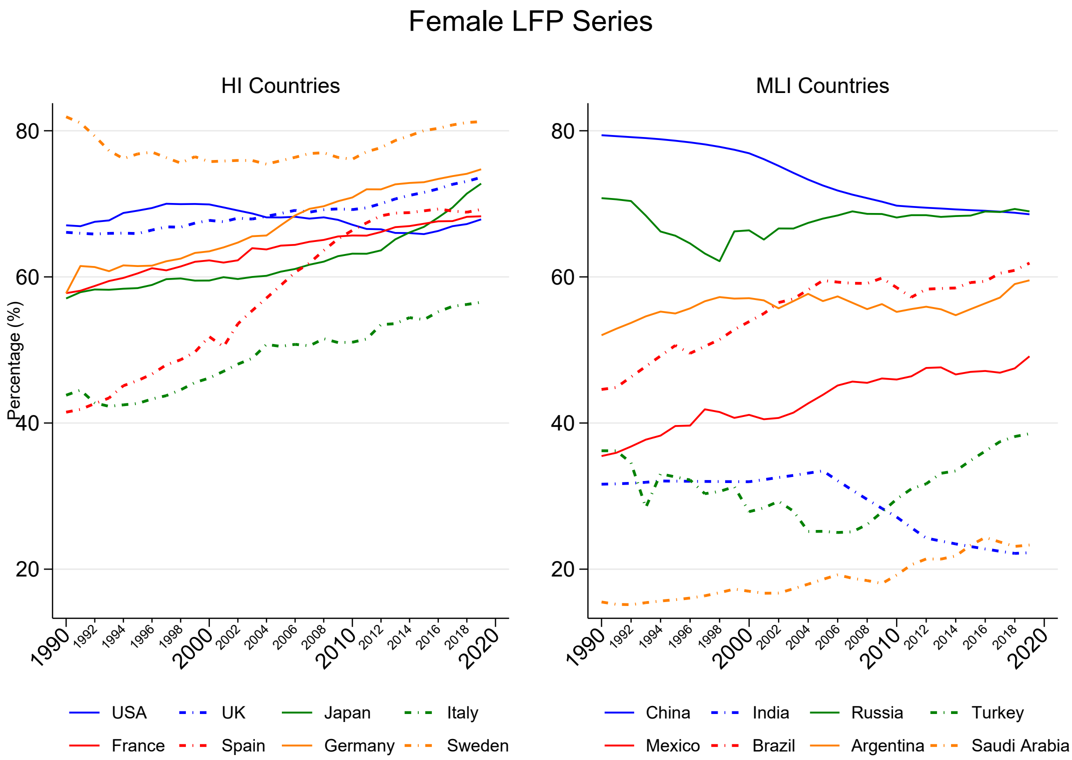


Figure 3. *Female Labour Force Participation Rate: Selected Countries*

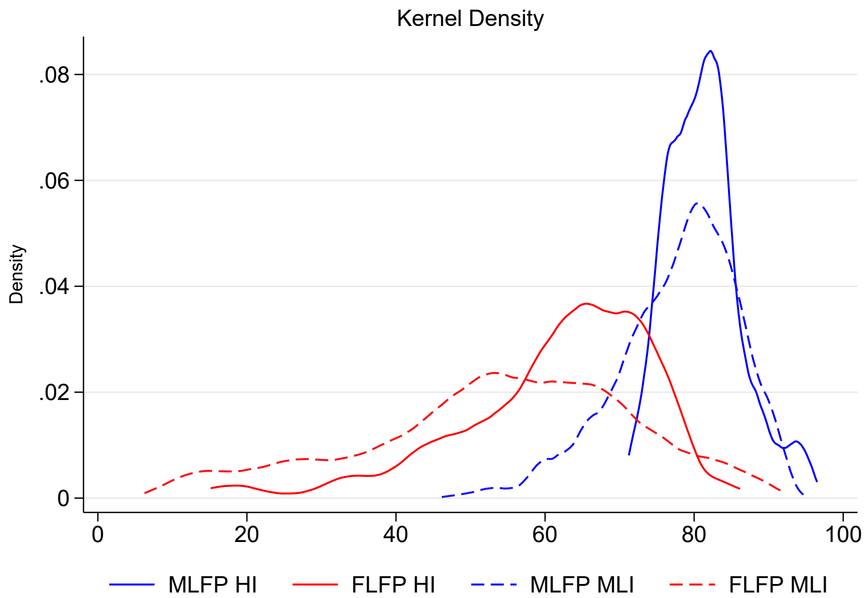


Figure 4. *Kernel density male and female LFP, HI and MLI Countries*

Note: Full sample. Unweighted.

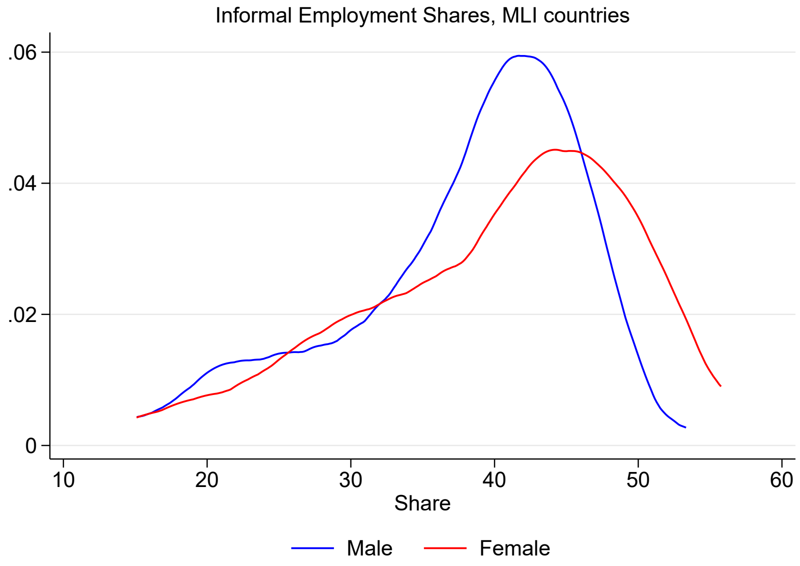


Figure 5. *Distribution of Informal Employment Shares, by Gender*

Note: Sample of available MLI countries (91 MLI countries). The densities for HI countries are not displayed because the ILO dataset on informal work has only three HI countries. Unweighted.

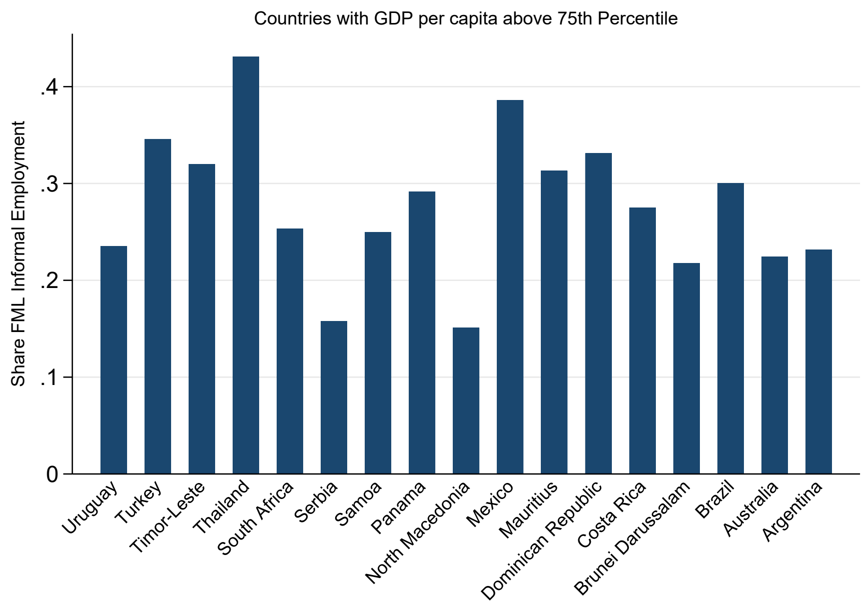


Figure 6. *Shares of Female Informal Employment, Richest MLI Countries*

Note: Restricted MLI sample. Unweighted.

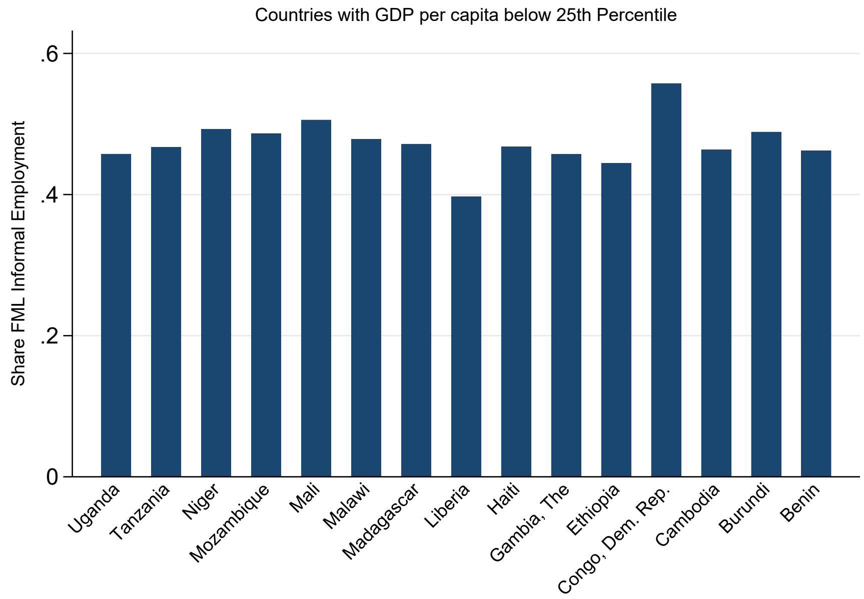


Figure 7. *Shares of Female Informal Employment, Poorest MLI Countries*

Note: Restricted MLI sample. Unweighted.

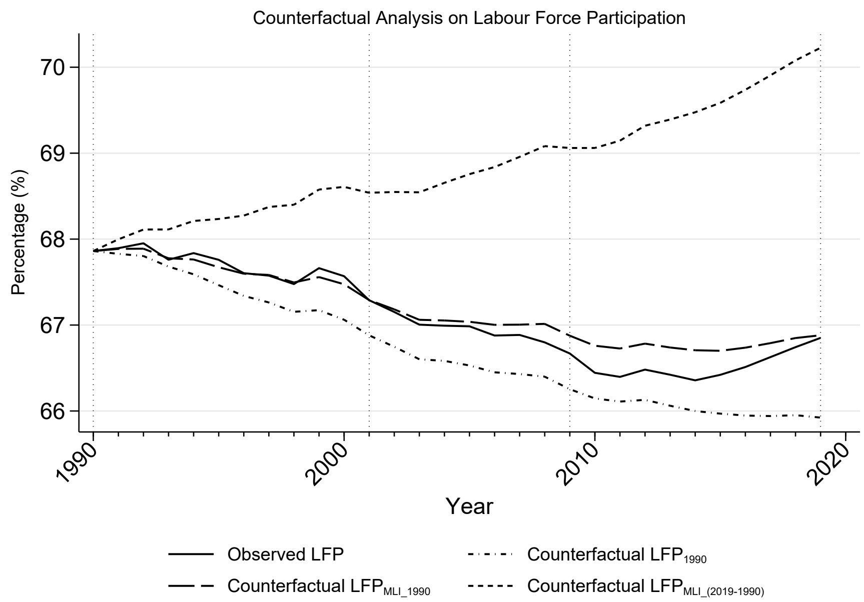
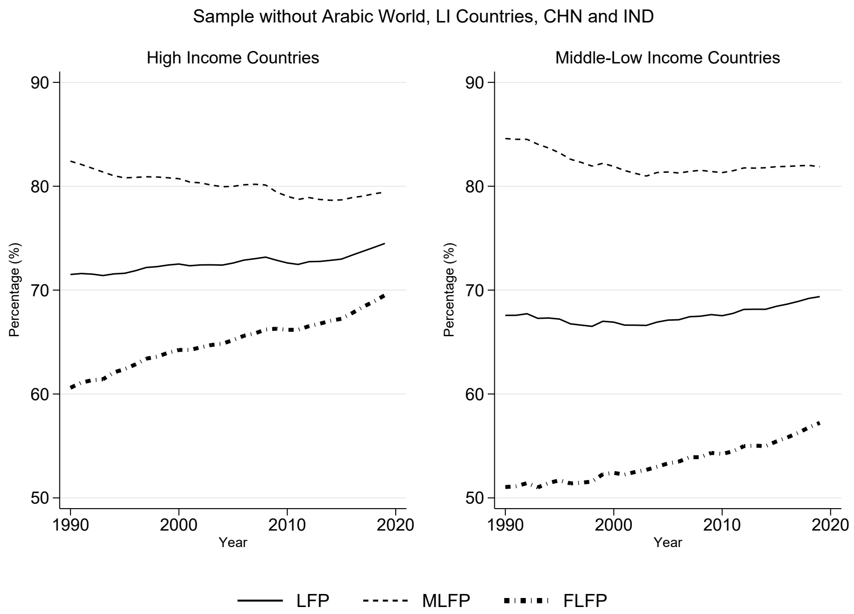


Figure 8. *Counterfactual Exercise*

Note: Full sample; weighting using average GDP in 2000-2005. For the first counterfactual exercise (Conterfactual LFP_{1990}), the female labour force participation was fixed to the level of 1991 for both HI and MLI countries; in the second counterfactual exercise (Counterfactual MLI_{1990}), only FLFP of MLI countries is kept constant at its level of 1990; in the third counterfactual exercise (Counterfactual $MLI_{2019-1990}$), we let FLFP in MLI countries increase at the same rate at which FLFP increased for HI countries between 2019-1990. Vertical dotted lines are in correspondence of global crises.



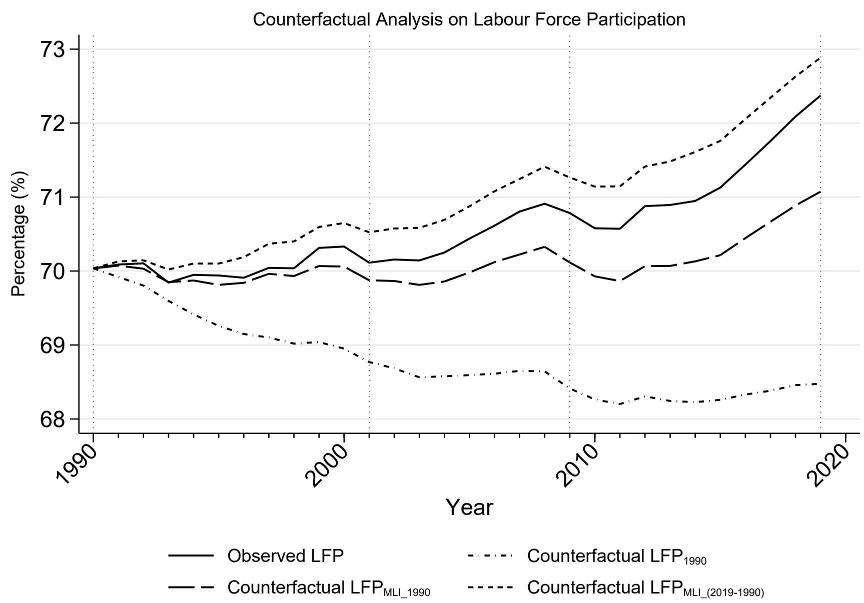


Figure 9. *Labour Force Participation and Counterfactual Exercise, Restricted Sample*

Note: Restricted sample excluding low income countries, Arabic countries, China and India. Weighting using average GDP in 2000-2005.

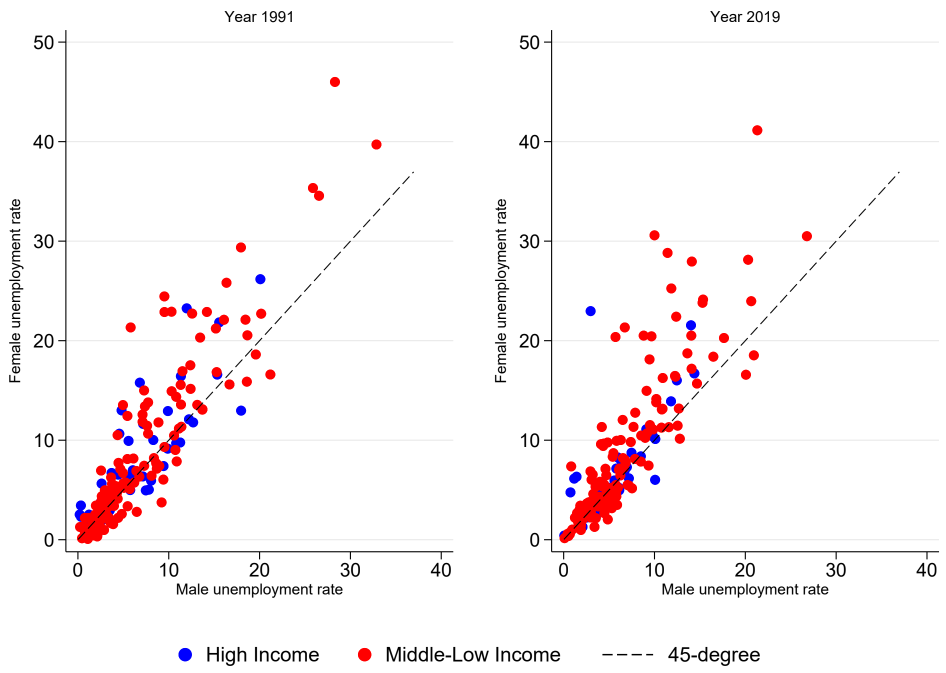


Figure 10. *Unemployment rate*

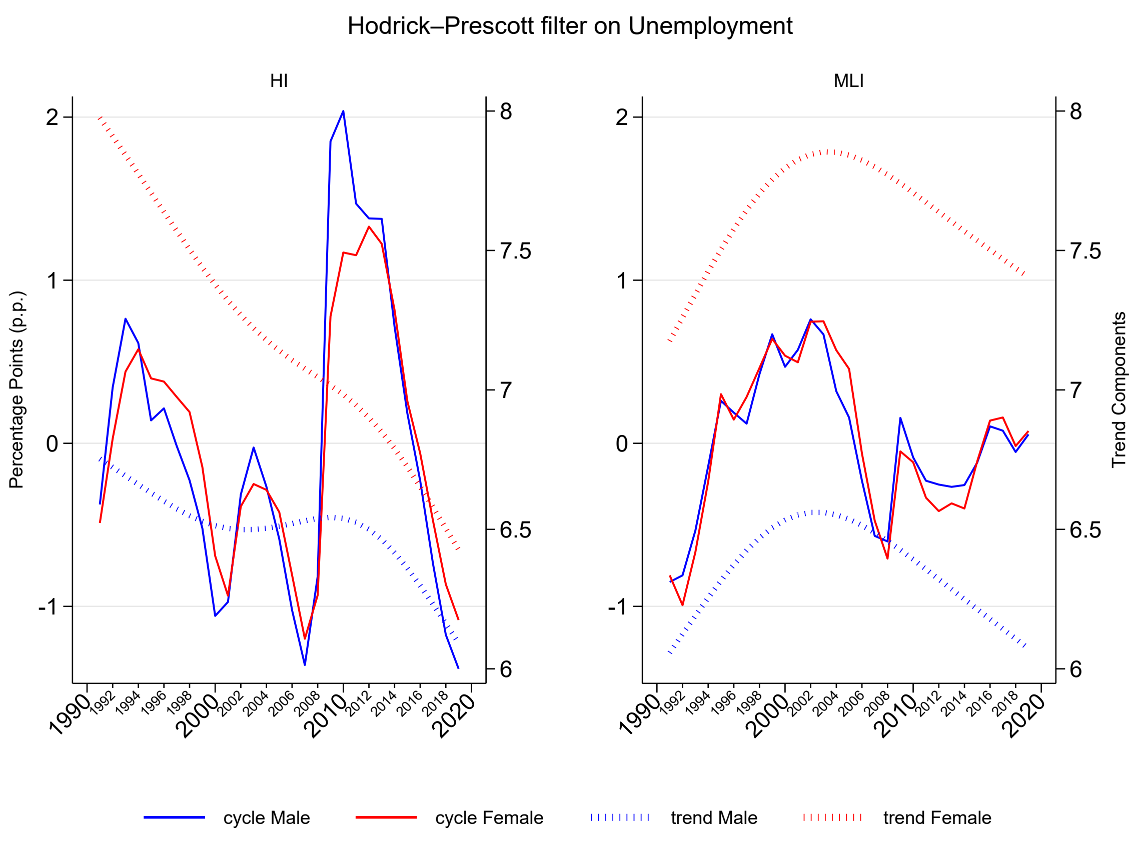


Figure 11. *Unemployment: Cycle and Trend Components by Income Region*

Note: The Hodrick-Prescott filter separates the female and male unemployment series into a trend and a cyclical component. The trend component (dotted lines) may contain a deterministic or a stochastic trend. The estimated cyclical component (solid line) is the deviation of the Hodrick-Prescott trend from the unemployment series.

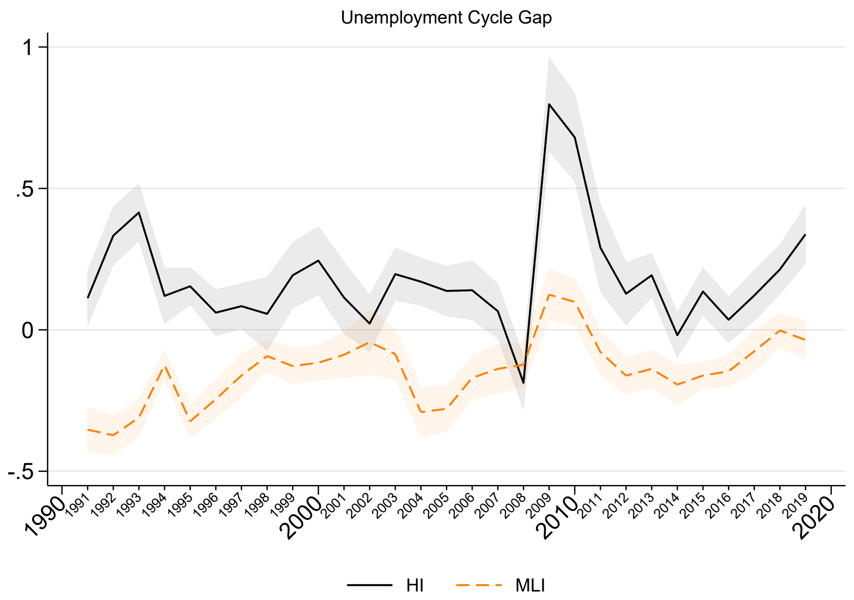


Figure 12. *Gap between Male and Female Unemployment cycle (by Income Region)*

Note: The index is calculated as $|cycle_M| - |cycle_F|$.

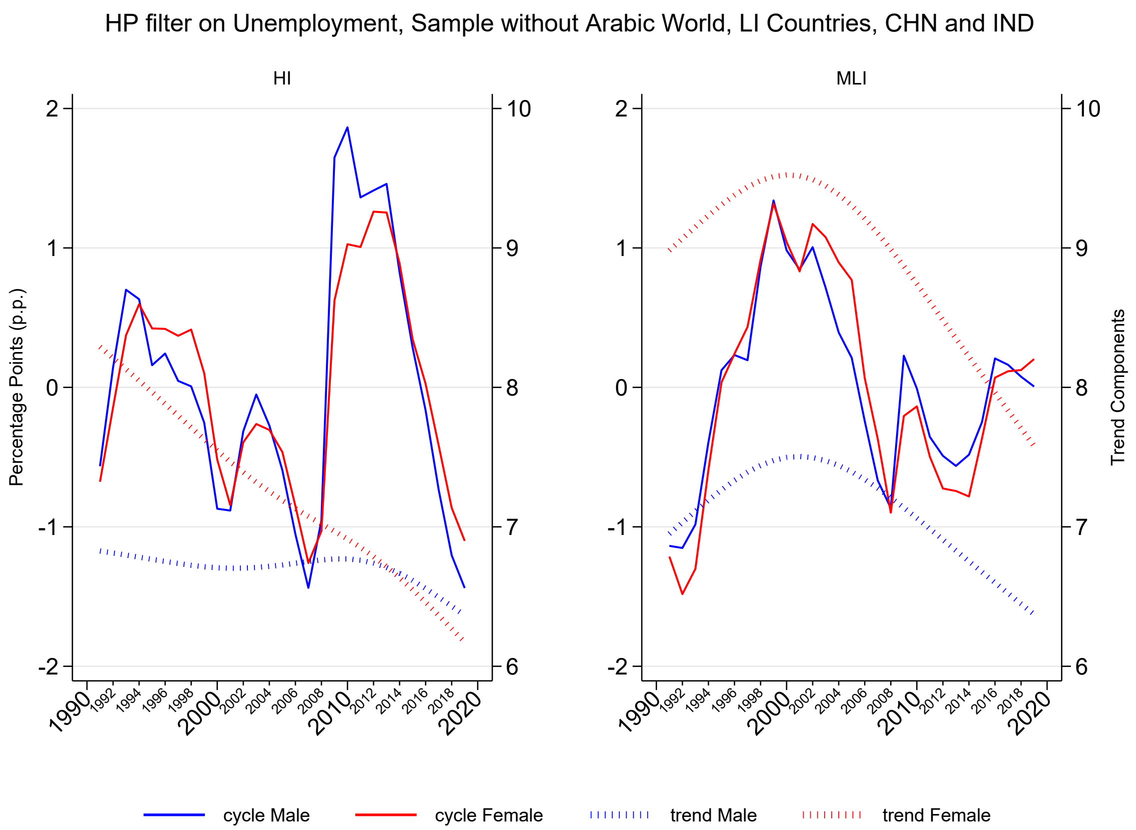


Figure 13. *Unemployment: Cycle and Trend Components by Income Region*

Note: Restricted sample; weights based on average 2000-2005 GDP.

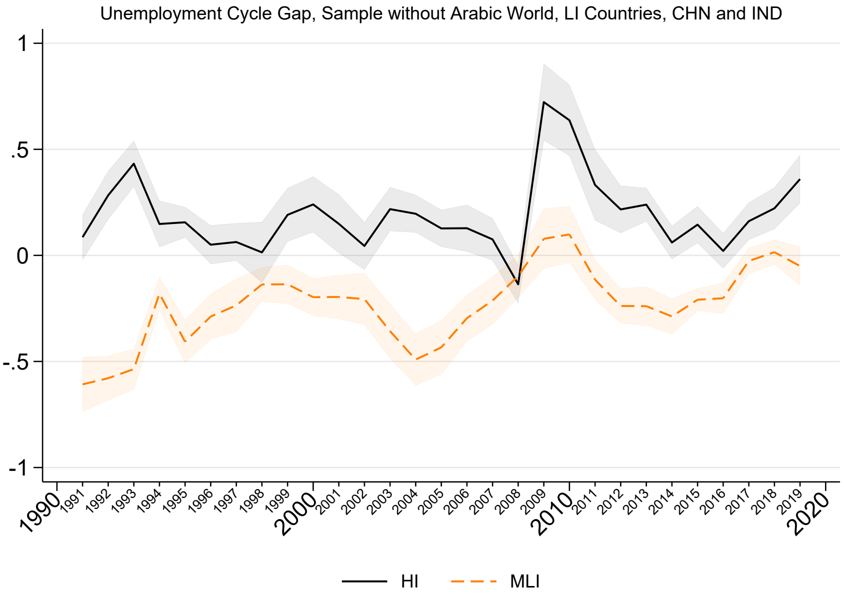


Figure 14. *Gap between Male and Female Unemployment cycle (by Income Region)*

Note: Restricted sample; weights based on average 2000-2005 GDP. The index is calculated as $|cycle_M| - |cycle_F|$. The area around the series is the confidence interval constructed from the standard error of the mean.

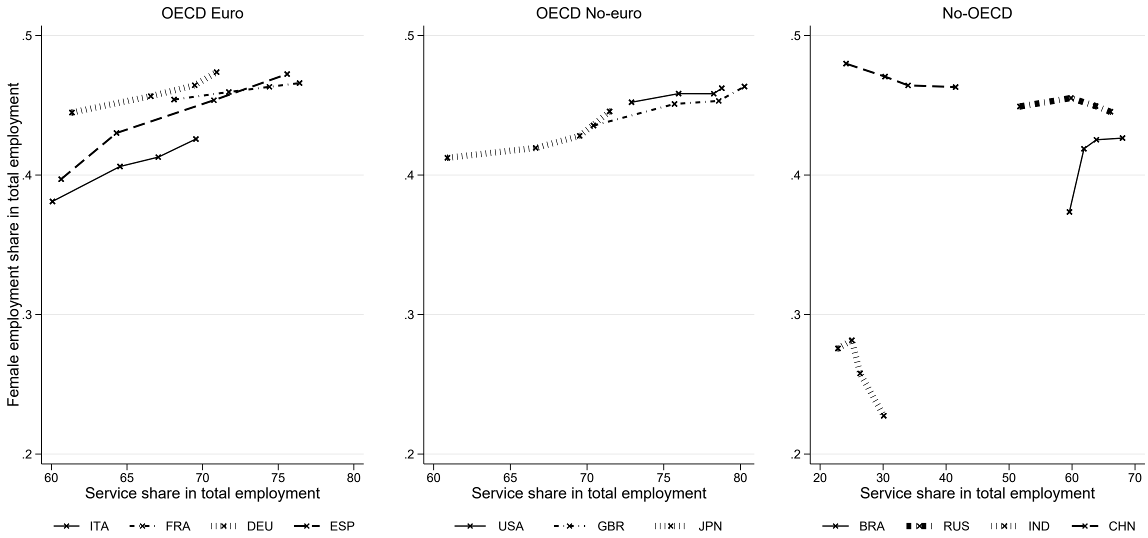


Figure 15. *Evolution of Female Employment and Service Expansion*

Note: Means over the periods 1990-2000, 2001-2007, 2008-2010, 2011-2019 by selected countries.

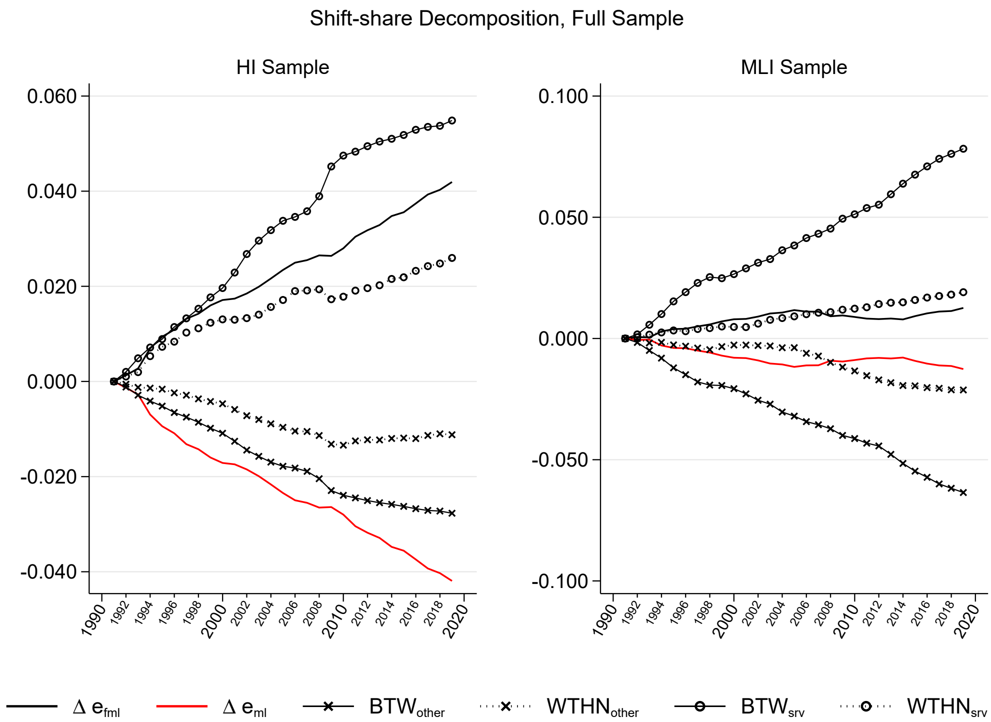


Figure 16. *Shift-share Decomposition, by Income Area*

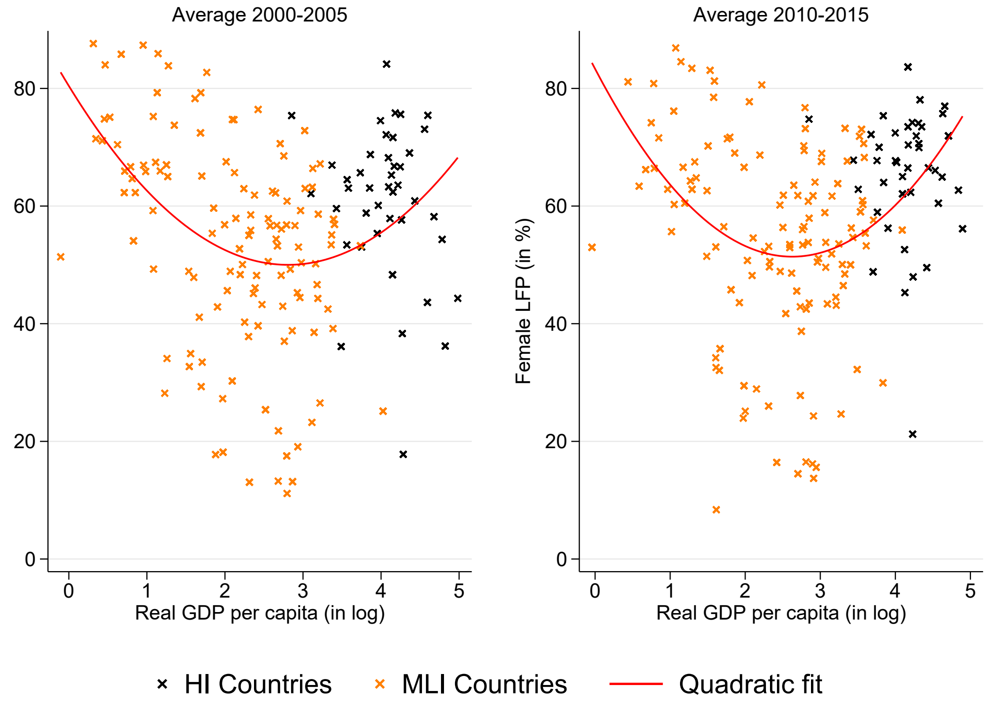


Figure 17. *Checking the U-shape Hypothesis, by Income Region*

Note: U-shape relation between FLFP and development in 2000-2005 (left panel), and 2010-2015 (right panel).

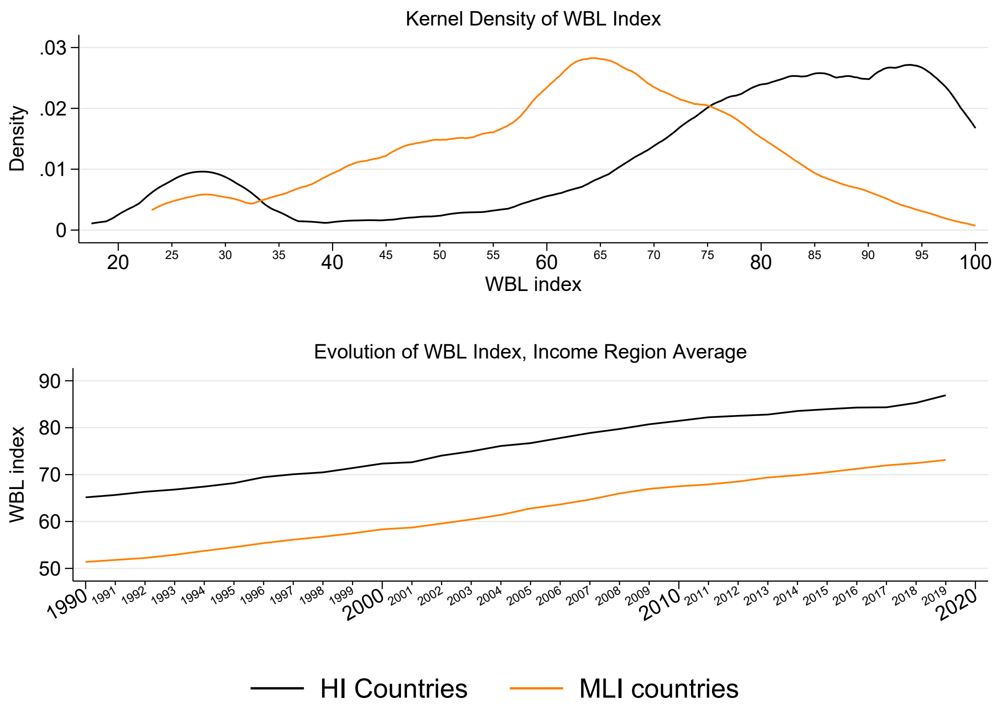


Figure 18. *WBL Index, by Income Region*

Note: Full sample. Unweighted.

Figure 19. *Dynamics of Unemployment during Crises, by Income Region, Population 15-64*

Note: Quarterly ILO sample; weighted using 2000-2005 average GDP.

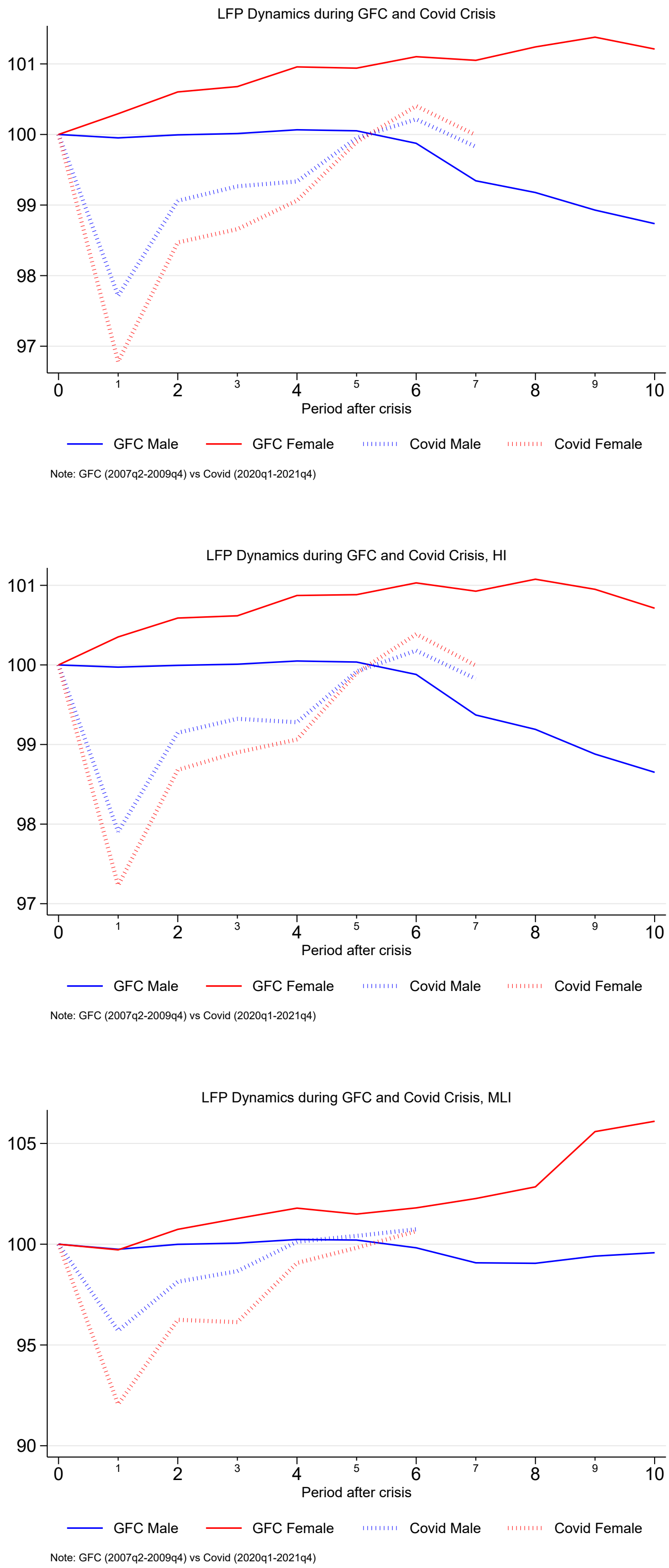


Figure 20. *Dynamics of LFP during Crises, by Income Region, Population 15-64*

Note: Quarterly ILO sample; weighted using 2000-2005 average GDP; seasonally adjusted series.

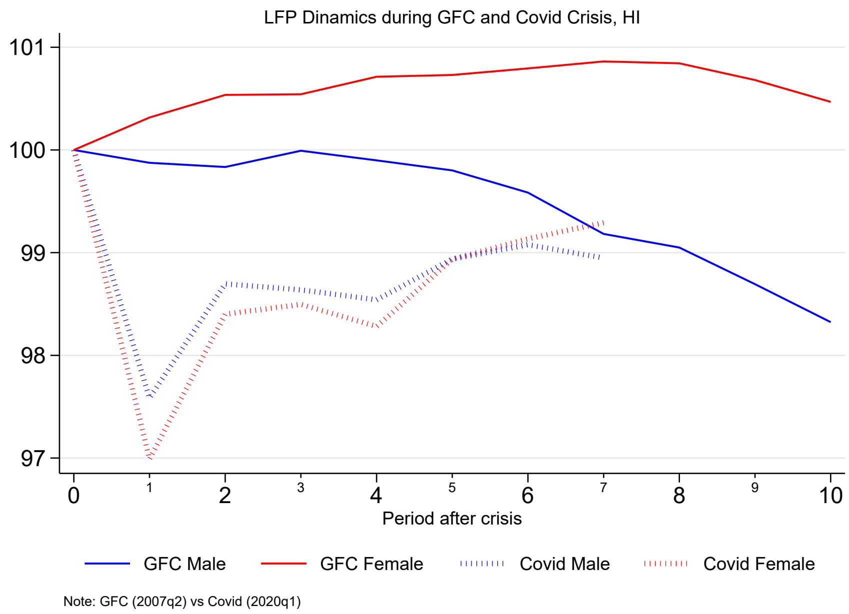


Figure 21. *Dynamics of LFP during Crises, by Income Region, Population 15+*

Note: Quarterly ILO sample; weighted using 2000-2005 average GDP; seasonally adjusted series.