# Half the Sky? The Female Labor Income Share in a Global Perspective

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## Abstract

Gender remains one of the key characteristics along which inequalities take shape within countries and across the globe. In this paper, we analyze gender inequality from the perspective of labor income and explore the following questions: Which share of labor income do women earn in a country, a world region, and globally? How has this share evolved since 1990? Labor income includes wages and salaries as well as the labor share of self-employment income. Our inequality indicator, the female labor income share, considers gender differentials in earnings as well as labor force participation. Combining employment and labor income data from the International Labour Organization, the Luxembourg Income Study, and the European Union Statistics on Income and Living Conditions, we find that women earned about 30% of global labor income in the early 1990s and 35% today. The female labor income share varies across countries with some distinctive regional patterns. One factor for a low female labor income share is the under-representation of women in top-paying jobs. Based on administrative data, we show the evolution over time of women's share among top wage earners for Brazil, Costa Rica, France, Spain, and the U.S.

**Keywords: Labor Income, Gender, Inequality**

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# 1 Introduction

Gender equality is desirable as an end in itself as well as instrumentally. First, gender equality is an essential dimension of egalitarianism. From that perspective, access to the labor market and to labor income, which are both important dimensions of empowerment and human development, should not be different, on average, for men and women. Second, from an instrumental perspective, the relative position of women in society has been shown to be positively correlated with a number of desirable outcomes related to social and economic development. For instance, women's control over income and decision-making has been shown to enhance educational and nutritional outcomes for their children (Duflo, 2012).

With this background in mind, we try to answer the following questions: What is the share of labor income earned by women across the globe? How has this share evolved since the 1990s? And how do gender earnings differentials and gender employment differences influence the female labor income share? Our main income concept, labor income, comprises wage and salaries as well as the labor share of self-employment income.[1] The female labor income share is defined as the sum of labor income earned by women relative to the national aggregate of labor income within a country. In the area of employment and income, gender equality has often been investigated either through the lens of earnings or from the perspective of access to employment. Since female labor income at the national level is equal to the product of female employment and average female earnings, our indicator takes into account both sides of the issue.

One prominently discussed factor for still persisting gender wage gaps in many countries are glass ceilings, i.e. the phenomenon that women reach the top of the wage distribution at lower rates than men. In a further step, we gather and compare data on the representation of women at the top of the wage-and-salary distribution. Since survey data underestimates incomes at the top, we draw on high-quality administrative data for Brazil, Costa Rica, Spain, France, and the U.S. provided by WID.world fellows.

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[1]We assume the latter to be equal to 70% of full self-employment income.

Cross-country analyses of gender inequality are inherently difficult due to differing labor income concepts and the inclusion or exclusion of specific sectors or part-time workers (Ponthieux and Meurs, 2015). In this paper, we try to overcome this constraint by making use of harmonized survey data from the Luxembourg Income Study (LIS) and the European Union Statistics on Income and Living Conditions (EU-SILC) as well as ILO modelled series on wage and self-employment by gender.

To construct WIL modelled estimates of the female labor income share for 182 countries for the period 1991 to 2019, we proceed in different steps. First, for countries for which LIS and EU-SILC data is available, we compute the female share in total labor income directly from survey micro data. This provides a first database for 58 countries. Second, we interpolate linearly between survey years. Last, for countries not included in this database, we predict values by, first, estimating the relationship between the female labor income share and the female wage and self-employment shares, and, second, predicting the labor income share based on ILO wage and self-employment series. The resulting database includes 182 countries and a total of 5,278 country-year observations.

Our estimates suggest that the female share of labor income varies widely across countries and world regions. The MENA region (Middle East and Northern Africa) exhibits the lowest female income share with about 15% while the Former Eastern Bloc exhibits the highest at about 40%. Over the period 1991 to 2019, most countries exhibit an increase in the female labor income share. Exceptions are China as well as countries of the former Eastern Bloc, such as Lithuania, Poland, Russia, Slovenia and Slovakia. For these countries the female labor income share has stagnated or even slightly decreased from an already high level in international comparison. Globally, women's labor income accounts for about a third of global labor income and the share exhibits a small positive trend over the past three decades. Drivers of this increase vary across world regions: In Northern America, and Latin America and the Caribbean, the increase in the female labor income share is mainly driven by increased labor market participation of women. In Asia and Western Europe, both the gender earnings and employment ratios have been on the rise. The

MENA region exhibits a relatively high female earnings ratio but low participation rates of women. This hints at a selection process whereby only highly-paid women enter the labor market. Sub-Saharan Africa, on the contrary shows a high female employment rate but a relatively low and stagnating earnings ratio.

We add new insights to the study of gender inequality by using a broader concept of labor income, including the labor share of self-employment income which is an important source of income in many developing countries. This adds a new dimension to the debate of gender differences in labor incomes, since female self-employment patterns and the relative female earnings in self-employment can substantially differ from wage employment and wage income. Further, by employing the most comprehensive dataset on employment and labor incomes, and a dataset comprising 182 countries, we try to show a comprehensive picture of gender differences in labor income across the globe.

Gender wage differences, their cross-country patterns in "industrialized" countries and their causes have been researched extensively. This literature shows how women have increased their relative wage by closing the education gap and building careers of their own in many OECD countries since the 1970s (Goldin, Katz, and Kuziemko 2006; Blau and Kahn 2017). Today, horizontal segregation - women working in different jobs than men - as well as vertical labor market segregation - women facing a so-called glass ceiling in promotions to high-paid jobs -, but also unequal childcare duties are discussed as the main obstacles to close the gender gap in labor incomes completely. Glass ceilings have been researched for the European countries using survey data (Christofides, Polycarpou, and Vrachimis 2013, Arulampalam, Booth, and Bryan 2007). Since survey data usually underestimates top incomes, we compare gender inequality at the top of the wage distribution across five countries in Europe and Latin America using administrative data.

Our results indicate that women have increased their representation among top earners since the 1990s in many countries. Strikingly, while the U.S. and France have a higher representation of women among all wage earners, they lag behind in women's representation in top wage incomes. Brazil, Costa Rica and Spain exhibit substantially higher shares of women in the top 10% and top 1% of wage earners

than the U.S. and France.

This paper and its underlying database is a first step to a broader implementation of gender inequality indicators into the World Inequality Database in the future.

# 2 Data & Method

## 2.1 Data

Our analysis builds on a variety of datasets. First, we use survey micro data from the Luxemburg Income Study (LIS) and the European Union Statistics on Income and Living Conditions (EU-SILC) to compute labor income by gender. The combined LIS and EU-SILC databases comprise 58 countries.[2]

Our key income concept, labor income, comprises wages and salaries and 70% of self-employment. LIS provides this information at the individual level for 52 countries and 368 country-year observations[3] while EU-SILC provides information for 32 countries and 471 country-year observations. Since both datasets are overlapping, we end up with information for 58 countries and 795 country-year observations. As shown in section 3, the LIS-SILC data set covers not only rich countries, but also many low-income and developing countries, including the largest emerging countries like China, India, Brazil and South Africa.

Second, we use country-level ILO modelled estimates series for self-employment and wage employment by gender. The dataset covers 182 countries from 1991 to 2019 (5,278 observations). The ILO series provides a complete set of internationally comparable labor statistics, combining nationally reported observations and imputed data for countries with missing data. The ILO's imputations are produced through a series of econometric models which establish statistical relationships between observed labor market indicators and explanatory variables. These relationships are

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[2]For details on country coverage of LIS and ILO estimates see Appendix 4.

[3]For more information on country coverage, see Appendix 4. Egypt, India, South Korea, Romania, and Vietnam do not provide individualized self-employment income in LIS. We impute individualized self-employment income by applying the country-specific wage earnings share.

used to impute missing observations and to make projections for the indicators. [4]

For our analysis of women's representation at the top of the wage distribution, we draw on datasets provided by several WID.world fellows. For Brazil, we use an updated dataset of social security records which comprises all employees in the private sector (with the exception of domestic workers) provided by Morgan (2018). For the U.S., we use the updated datasets provided by Piketty, Saez, and Zucman (2020). For France, we draw on a similar dataset from Garbinti, Goupille-Lebret, and Piketty (2018). For Spain, Artola Blanco and Martínez-Toledano (2021) provided us with tax-data-based grouped data. For Costa Rica, we use a social-security-records-based dataset by Zúñiga-Cordero (2021). While glass ceilings have been researched using cross-country survey datasets, we can draw on cross-country harmonized administrative data which cover the top of the distribution more comprehensively.

## 2.2   Method

The main aim of this project is to provide an adequate picture of the level and trend of the female labor income share across the globe since 1991. To achieve this, we proceed in different steps. First, using LIS and EU-SILC data, we compute the female labor income share at the country level. For this, we aggregate labor income by gender within each country. The labor income aggregate thus depends, first, on the number of men and women working and earning labor income, and, second, on their earnings level. Combining LIS and EU-SILC, we arrive at a first database for 58 countries and a total of 795 country-year observations. Next, we interpolate linearly between survey years within countries. For countries not included in this database, we use an imputation approach that proceeds in 2 steps. First, we estimate the female labor income share as a simple linear function of the female shares in wage- and self-employment using the combined LIS and EU-SILC database. Second, combining estimated coefficients with ILO's employment series, we predict the female labor income share for all countries and years for which the ILO series exist.

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[4]https://ilostat.ilo.org/fr/resources/concepts-and-definitions/ilo-modelled-estimates/

More precisely, we estimate the following regression model:

$$Female\ Labor\ Income\ Share_{ct} = \alpha + \beta\ Female\ Wage\ Employment\ Share_{ct}$$
$$+ \gamma\ Female\ Self\ Employment\ Share_{ct}$$
$$+ \delta\ World\ Regions_c + \epsilon_{ct}$$

where $c$ indicates countries and $t$ years. The variable *Female Labor Income Share$_{ct}$* is the female labor income share for country $c$ and year $t$, the variables *Female Wage Employment Share$_{ct}$* and *Female Self Employment Share$_{ct}$* are the shares of female wage- or self-employed among all wage- or self-employed respectively. *World Region$_c$* corresponds to fixed-effects for institutional and cultural differences of nine world regions.[5] The model is estimated on the LIS-EU-SILC database. Results are presented Appendix 1. The model fit is high with an R2 of 75%. Both employment variables contribute positively to the female labor income share with a significantly stronger contribution of wage employment. This could be related to the fact that wage employment is associated with a more skilled labor force and higher earnings on average. Compared to Asia (excluding China) most regions exhibit a positive and significant fixed effect. Based on this estimation, we predict the female labor income share for all countries and all years for which ILO modelled estimates exist. To construct our final series of the female labor income share we combine observed LIS and EU-SILC values with predicted values. For countries for which LIS or EU-SILC surveys are available, we prioritize data points from LIS and EU-SILC and interpolated values between data points. Second, we extrapolate "tails" (backward to 1991 and forward to 2019) using the predicted estimates which we level-adjust to the survey data series. This means that we extrapolate the survey-based series according to the predicted profiles based on the evolution of gender wage- and self-employment shares. For countries without survey data, we use the regression-based predicted estimates. Given the overall good fit,

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[5]The nine world regions considered are: Asia (excluding China), China, Former Eastern Bloc, Latin America and Caribbean (LAC), MENA, Northern America, Oceania, Sub-Saharan Africa, and Western Europe. All variables are country-year aggregates.

we use these values to compute world region and world level estimates. To build regional averages and the GDP-weighted global share, we convert all labor incomes to constant 2021 US-dollars using market exchanges rates using data series from the World Inequality Database (Blanchet et al., 2021).

In the case of China, the two LIS data points (2002 and 2013) provide a picture that raises a number of concerns. First, the LIS data suggests a decrease in the female labor income share together with an increase in the female wage employment share which is hard to reconcile. Second, compared to other sources, the data appears to underestimate labor force participation for both females and males. Finally, the data suggests that labor force participation increased between 2002 and 2013 while most data and studies document a significant decrease (Wang and Klugman, 2020). For that reason, in the case of China, we chose to use ILO employment series and predicted the female labor income shares.

# 3   The female labor income share in the LIS  EU-SILC surveys

In this section, we present the value and evolution of the female labor income share based on LIS and EU-SILC survey data. Figures 1 and 2 show the evolution of the female labor income share in the 55 countries represented in LIS or EU-SILC data across all world regions.[6] Parity would be reached at 50%. Most countries exhibit an increase in the female labor income share since 1995. Exceptions are China as well as countries of the former Eastern Bloc (Lithuania, Poland, Slovenia, and Slovakia), for which the female labor income share has decreased from a high level in international comparison.

The level as well as the pace of change in the female labor income share differ substantially between and within world regions. Western European countries show female labor income shares between 35% and 44% in recent years.[7] However, the re-

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[6]Egypt, Palestine and the Dominican Republic only have one data point and we thus exclude them from this analysis.

[7]For this comparison we only consider the last data point of each series if the series ends in 2015 or later.

gion exhibits substantial heterogeneity in trajectories. Northern European countries - Finland, Iceland, Sweden, and Denmark - started with a female share of near 40% in 2000 and have only increased their share slightly since then. Southern European countries - Spain, Greece, and Malta - on the other hand, exhibited a female labor income share of below 30% in the 2000s and increased it substantially over the past decades. The United Kingdom, Ireland as well as Belgium, and Luxembourg started with a female labor income share around 30% in 2000 and increase it by 5 to 10 percentage points in the past 20 years to almost 40% today. Austria, Switzerland, the Netherlands, and Germany showed a female labor income share of slightly above 30% in 2000 but have progressed slower and stand at the lower end of the Western European spectrum with about 36% in recent years. Currently, Finland and Portugal show the highest female labor income shares among Western European countries with a value around 44%.

The countries of the former Eastern Bloc show a historically high female labor income share ranging from 38% to 45%. However, for Lithuania, Slovakia, Russia, Croatia and Slovenia the female labor income share has stagnated or even decreased since the 2000s. Only Romania and Bulgaria have increased their female shares by about three percentage points.

In the Americas, the U.S. and Canada show the highest female labor income share in recent years with values close to 40%.

In Latin America and the Caribbean, the female labor income share has risen substantially and stands between 30% and 40% in recent years for the majority of countries. Currently Uruguay, Brazil, and Panama show the highest female labor income share of about 38%. At the same time, stagnating trends are observed in Guatemala (below 30% since the mid-2000s) and Paraguay (around 33%).

In Asia, the most striking evolution is the decreasing share of female labor income from a relatively high level in China. The pattern is similar to that observed for some of the former Eastern Bloc countries.

For the MENA region and Sub-Saharan Africa, only scattered and quite heterogenous evidence is available. Israel and South Africa show an increase from about 33% to 37% and from 34% to 36% respectively in recent years. Evidence for Côte
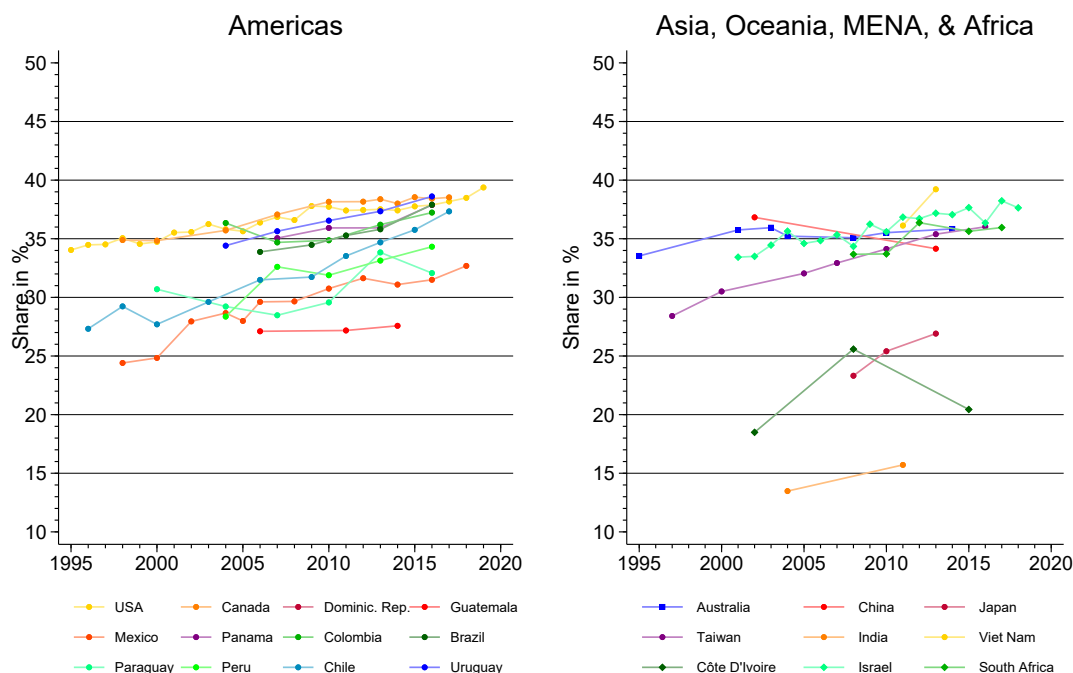
Figure 1: Female labor income share, Western  Eastern Europe. [8]
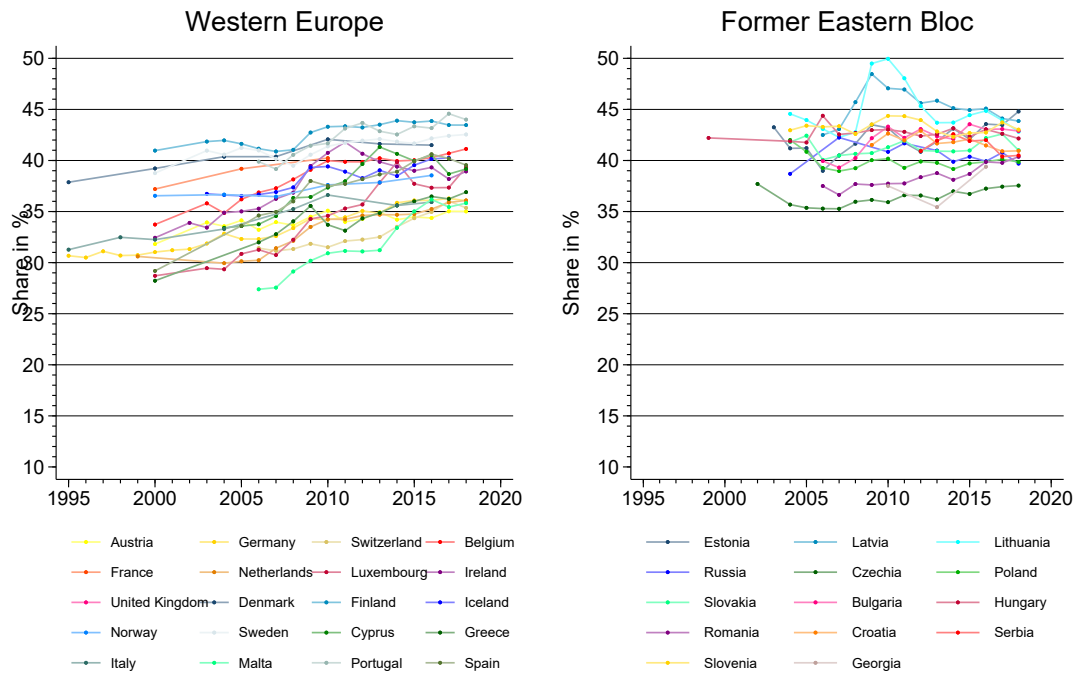
D'Ivoire shows much lower female labor income shares and no clear trend.[9]

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[9]Palestine and Egypt, which are not included due to only one datapoint, show much lower levels of less than 20% in the 2010s.

Figure 2: Female labor income share, Americas, Asia, MENA and Sub Saharan Africa.



# 4    The share of female labor income in total pretax labor income across 182 countries

## 4.1    The female labor income share across the globe in 2019

As presented in section 2.2, the combination of observed and predicted values provides a picture of the female income share for all countries and years covered by ILO employment series. Since they rely in part on a statistical model, country-level estimates should be interpreted cautiously. However, we believe they provide credible information when considered from a cross-country comparative perspective and to approximate regional level values.

Figure 3 maps the female labor income share across 182 countries. The regional pattern appears clearly, with MENA and Eastern-Asian countries lagging behind, and Former Eastern Bloc countries exhibiting the highest female labor income shares.

Figure 3: World map of female labor income shares, 2019.
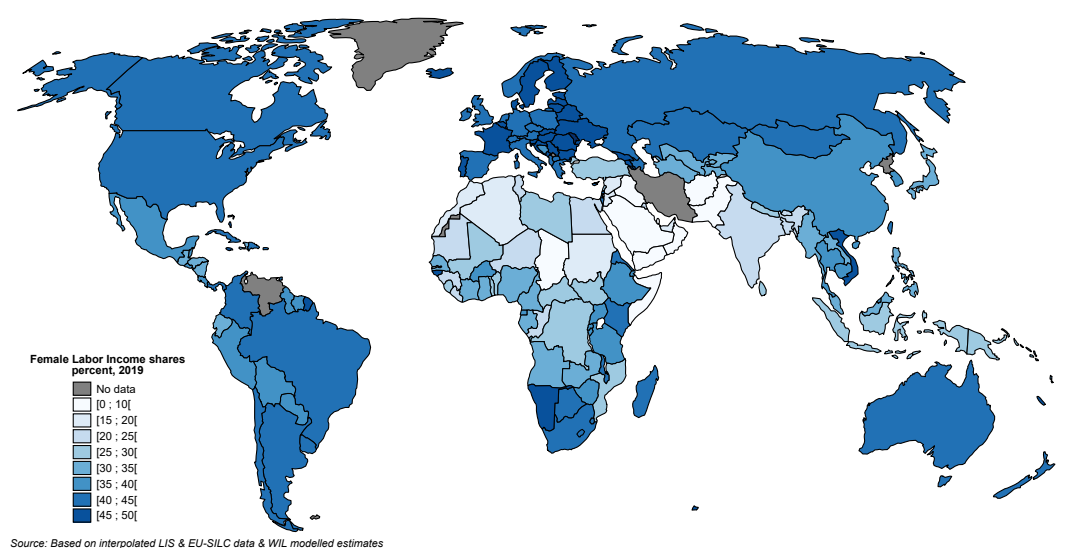


The estimates indicate that MENA countries exhibit the lowest levels of the female labor income share with a population-weighted average of 15.0% in 2019.[10] A majority of countries exhibit shares under 20% and several countries under 10%. Israel stands out with a share above 38%.

Asian countries exhibit higher shares than MENA with a population-weighted average of 26%. A wide range of values and a strong East-West pattern is observed with Eastern Asian countries exhibiting much higher shares. Several countries mainly in Eastern Asia exhibit values above 30%, while the share drops below 10% in some Western Asian countries. The two most populated countries, China and India, exhibit very different patterns. While China's female labor income share stands at about 33%, it is only about 18% for India. When China is excluded, the population-weighted average share for Asia drops to 22%.

Female labor income shares are found to be higher on average in Sub Saharan African countries with a population-weighted average share of 29%. Also here, female labor income shares show wide variation across the continent, from about

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[10]All regional averages are population-weighted for the year 2019. While the populations-weighted estimates give more weight to the most populous countries of a region, like India or Brazil, the income-weighted averages puts more emphasis on the most prosperous countries of each region. The population-weighted average is our benchmark. The corresponding income-weighted average female labor income shares are as follows: Asia (excl. China) 26%; China 33%; Former Eastern Bloc 40%; Latin America and Caribbean 36%; MENA 17%; Northern America 39%; Oceania 37%; Sub Saharan Africa 31%, and Western Europe 38%.

10% to around 40%. With a female labor income share of 36%, South Africa stands among the high-share countries.

Instead, Latin American and Caribbean (LAC) countries appear more homogeneous. Their average female labor income share stands at about 36% with values ranging from 26% to 42%. The two most populated countries, Brazil and Mexico, exhibit shares of 38% and 33% respectively.

Female labor income shares in Western Europe and Northern America are generally above 35%. Austria, Germany and Switzerland are on the lower end with share of 35 to 36%, while Finland and Portugal take the lead with 44%. The population-weighted average share stands at 38% in Western Europe, and 39% in Northern America.
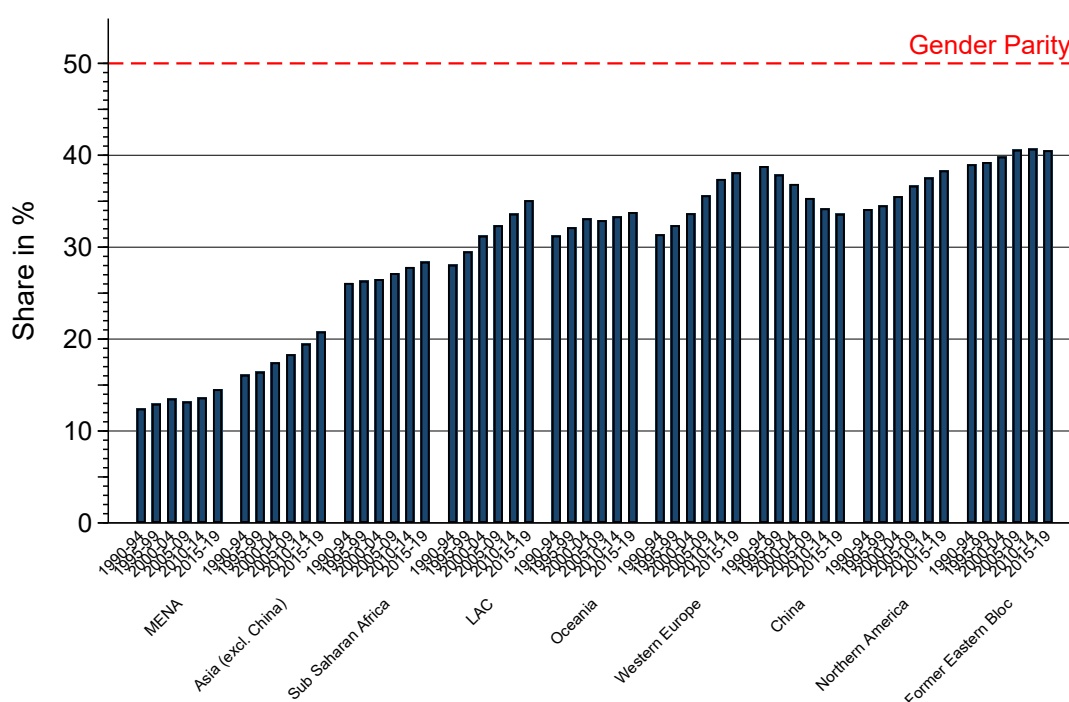
Female labor income shares are the highest in the Former Eastern Bloc with an average female share of 40%. Across countries, the female share varies from 34% to 45%. In the Russian Federation, the female labor income stands at about 40% in 2019.

The regional perspective provides some clues about the underlying structures and norms influencing the levels observed. MENA countries share a similar religious and cultural background with social norms that tend to hinder the participation of women in the labor market (Jayachandran, 2020). These norms are also found in some Asian countries. Instead, Former Eastern Bloc countries experienced similar communist regimes that strongly supported the participation of women in the labor market through law and policy (Lippe and Dijk, 2002) and had lasting effects on gender norms and female labor market participation (Becker, Mergele, and Woessmann, 2020). From that perspective, the case of China raises some questions given the strong policy emphasis on gender equality and high female labor force participation illustrated by the slogan of the Communist Party of China â "Women hold up half the sky" â inspired by Mao Zedong. While the labor income share in China is high by Asian standards, it is lower than that of the Former Eastern Bloc countries. We return to that issue below.

## 4.2    Trends in different world regions and globally since 1991

Figure 4 presents the evolution of the female labor income share over time by aggregating the country-year-specific estimates by region and 5-year groups. The results underline the strikingly low position of MENA and Asian countries (excluding China) relatively to other world regions. In terms of evolution over time, the female labor income share appears to have increased in all regions except China. In Former Eastern Bloc countries, the female labor income share appears to have stagnated in the last two decades.

Figure 4: Regional trends in female labor income share, 1991-2019 (population-weighted averages). GDP-weighted estimates in Appendix 2.
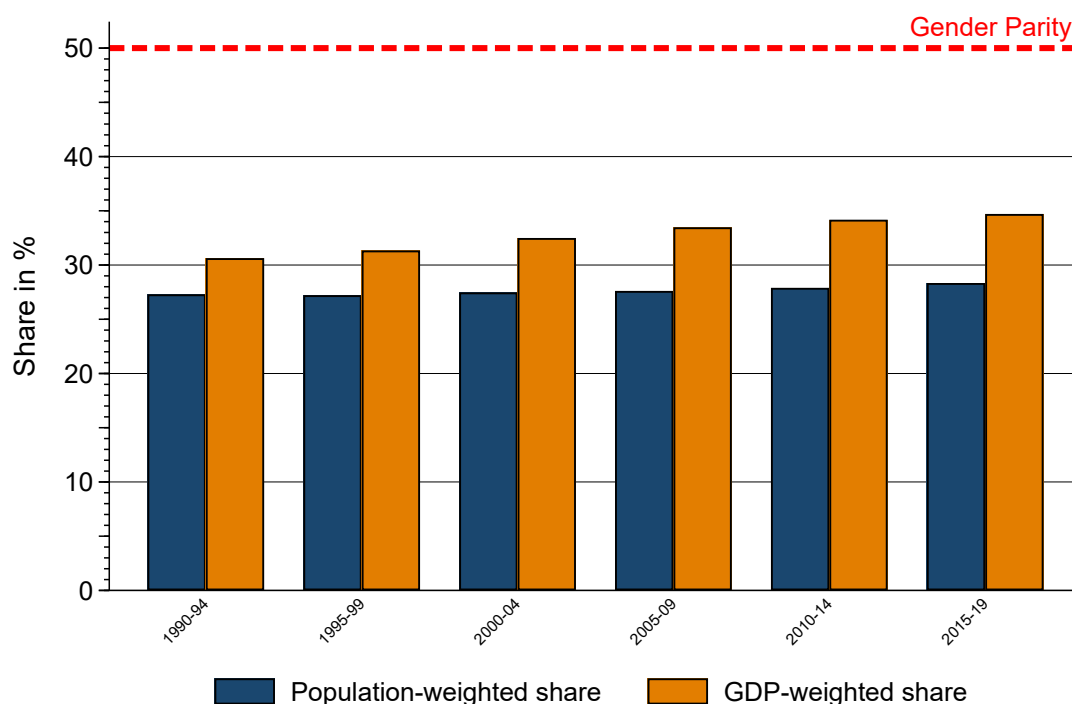


Source: WIL modelled estimates using ILO and LIS, and EU-SILC data. Note: Population-weighted average of country-level female labor income shares.

As noted above, the picture provided for China might appear surprising at first. According to our estimates, the female labor income share has declined significantly over the period, from about 39% in 1991 to about 33% in 2019. This result is supported by several studies that indicate a declining trend and slowed progress towards gender equality despite strong policy emphasis on gender equality and high

female labor force participation (Dasgupta, Matsumoto, and Xia 2015, Tang and Long 2013). According to these studies, the decline could be due to different factors: the downsizing of state-owned enterprises (SOEs) which led to a sharper decline in labor force participation for urban women than for urban men; or the relaxation of the "One-Child Policy" at the end of 2013.

How do these regional dynamics translate at the global level? Figure 5 provides two different answers. The first statistic corresponds to the population-weighted average of country-level values of the female labor income share: since 1991-1994, the population-weighted average of labor income shares held by women has hardly changed, from 27% in 1991-1994 to 29% in 2015-2019. A different perspective is taken to compute the global female labor income share by adding up all female labor income and dividing it by global labor income. According to this statistic, the female income share has increased from 31% in 1991-1994 to 35% in 2015-2019. While the population-weighted average gives more emphasis to the most populated countries, like India, China and Brazil, the GDP-weighted average gives more weight to dynamics in the more prosperous countries like the Western European and North American countries. The higher value and more dynamic increase obtained with the GDP-weighted share can be explained by the relatively high share and significant increase in the rich Western European countries. Instead, the lower and stagnating population-weighted share is connected to the situation in India with its stable and relatively low female labor income share and China with its higher but declining share. Despite their differences, these two statistics provide strong evidence that although women hold half the sky, they only get a third of labor income for it.

Figure 5: Female labor income share in a global perspective, 1991-2019.



Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

## 4.3 Earnings or Employment? Is the lower share of female labor income due to employment or the wage ratio? Do drivers differ across world regions?

In order to try and understand why the female labor income share differs between regions and varies over time, we turn to examining the levels and trends of the earnings and employment ratios.[11] The labor income share held by women can be decomposed into two âproximate determinantsâ: their labor force participation compared to men, and, conditional on participation, the gender earnings ratio. We use ratios instead of gaps to maintain a "visual" consistency with the female income share. The female labor income share increases with both ratios. In other words,

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[11]The term ratio relates female employment or earnings to male employment or earnings. The earnings ratio provides a measure of female earnings as a share of male earnings. Similarly, the employment ratio measures the number of wage- and self-employed women to the number of employed men. In contrast, the term Â« share Â» is used to refer to the proportion of female labor income in total labor income.

when both the earning and employment ratios are high, the female labor income share is high as well. More specifically, when both ratios reach 100%, meaning that women's labor force participation and earnings are equal to those of men, then the labor income share held by women should equal 50%. Results are presented by world region and in 5-year brackets in Figure 6.

Asia (excluding China) and MENA both exhibit low female income shares. However, the underlying determinants differ. In Asia, the female to male employment ratio is higher while the female to male earnings ratio is lower compared to MENA. In other words, females participate more in the labor market in Asia than in MENA: the employment ratio is about 49% on average over the period for Asia, against 28% for MENA. Conversely, when working, females' earnings as a share of male earnings is 46% in Asia and 58% in MENA. This pattern suggests that selection into the labor market is stronger in MENA where more high earning females participate.

Figure 6: Regional trends in earnings and employment ratios (population-weighted averages).
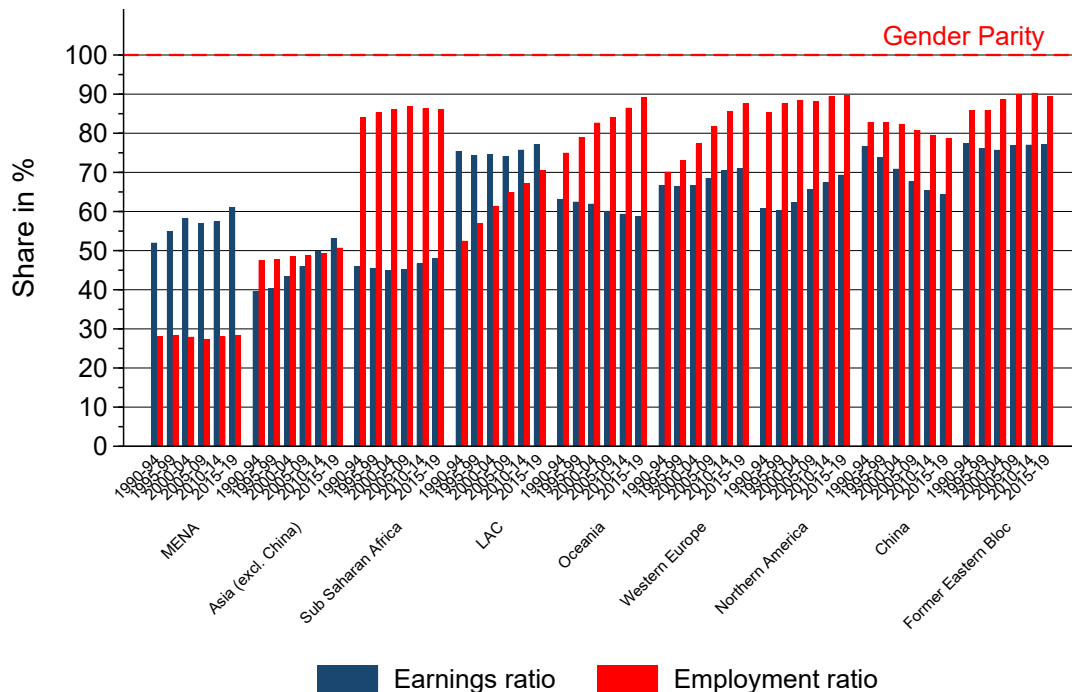


Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

Moving to other regions, Sub Saharan Africa exhibits a high employment ratio: it stands at 86% on average over the whole period. Instead, the earnings gap is much lower, at about 46%. This could be due to persistent education gender gap in secondary and higher education which hinder the access of women to wage employment.

As in MENA, results for Latin America and the Caribbean (LAC) are consistent with the selection of high-earning women into the labor market: there again the employment ratio is lower than the earnings ratio. However, an increase in the employment ratio since the early 1990s could signal a convergence to a labor market structure similar to Western countries with a broad base of formal wage employment and a low selection effect into employment.

Turning to Western countries, the ratio pattern is similar across Oceania, Western Europe and Northern America: in all three regions, the employment ratio is high (83%, 78%, 85% respectively) while the earnings ratio is lower (61%, 71%, 67%) but relatively high by international standards. Oceania exhibits a decrease in the earnings ratio. This might be linked to the persistent increase in female employment. With more low- and medium-skilled women entering the labor market, the average female earnings might decrease while the earnings ratio within skill groups stays constant.

Last, China and countries of the Former Eastern Bloc exhibit a similar pattern to that of Western countries, with higher earnings than employment ratios. The Former Eastern Bloc countries stand out by having the highest earnings and employment ratios globally. China's declining female labor income share goes along with a decrease in both the earnings and employment ratios

# 5 Female Representation at the top of the wage distribution and glass ceilings

In countries where women have overtaken men in educational attainment, the key factors inhibiting the closing of the gender pay gap are linked to horizontal and vertical segregation of the labor markets (Ponthieux and Meurs 2015; Blau and

Kahn 2017). In this section, we take a closer look at the issue of vertical segregation which is empirically illustrated by the underrepresentation of women at the top of the wage distribution. Since survey data underrepresent high incomes, analyzing the very top of the wage distribution requires high-quality administrative data. Because only very few countries provide this individual-level data from social security records or tax data, this part of the analysis will be limited to the US, Spain, Brazil, Costa Rica and France. In the future, we will try to extend this sample to more countries.

Figures 7 and 8 show the representation of women among the top 10% and top 1% of wage earners for Brazil, Costa Rica, Spain, and the US. All countries exhibit an increasing representation of women at the top of their wage distributions since the 1990s. While the share of women in the top 10% of the US-American wage distribution rises from 22% in 1995 to 30% in 2019, Spanish women increase their share from 19% in 1995 to almost 36% in 2019. Similarly, Brazilian women increase their share in the top 10% of wage earners from 24% in 1996 to about 36% in 2018.[12] Costa Rica's women's share among the top 10% is about 40% in recent years.

Women's representation in the top 1% is substantially lower than in the top 10% in all countries. This indicates an increasing "glass-ceiling" effect towards the top, i.e. the wage gap widens towards the top of the wage distribution. This effect can be mainly attributed to the under-representation of women in top-paying and executive jobs. Women's representation in the top 1% has slowed in the United States and France, while it has increased faster in Spain and Brazil (Figure 8). It is striking that Costa Rica, Brazil, and Spain show a substantially higher representation of women in the top 10% and top 1% of wage earners than the U.S. or France in recent years. Overall, women are still under-represented at the top of the national wage distributions though to differing degrees. The glass ceiling effect seems particularly pronounced in the US and France, whereas Spain, Brazil and Costa Rica have a relatively high female representation at the top of their wage distributions.[13]

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[12]The Brazilian dataset, different to the countries, comprises only employees in the private sector without domestic employees. However, in many countries the gender gap and glass ceiling effect are higher in the private than the public sector.

[13]To underline the previous findings, in Appendix 3, we plot the gender gap along the wage distribution following Albrecht, Björklund, and Vroman (2003). For the U.S., we see a prominent and steep glass ceiling effect, i.e. the widening of the gender pay gap at the top of the distribution (Figure 15). The glass ceiling effect is much more pronounced and steeper in the U.S. than in

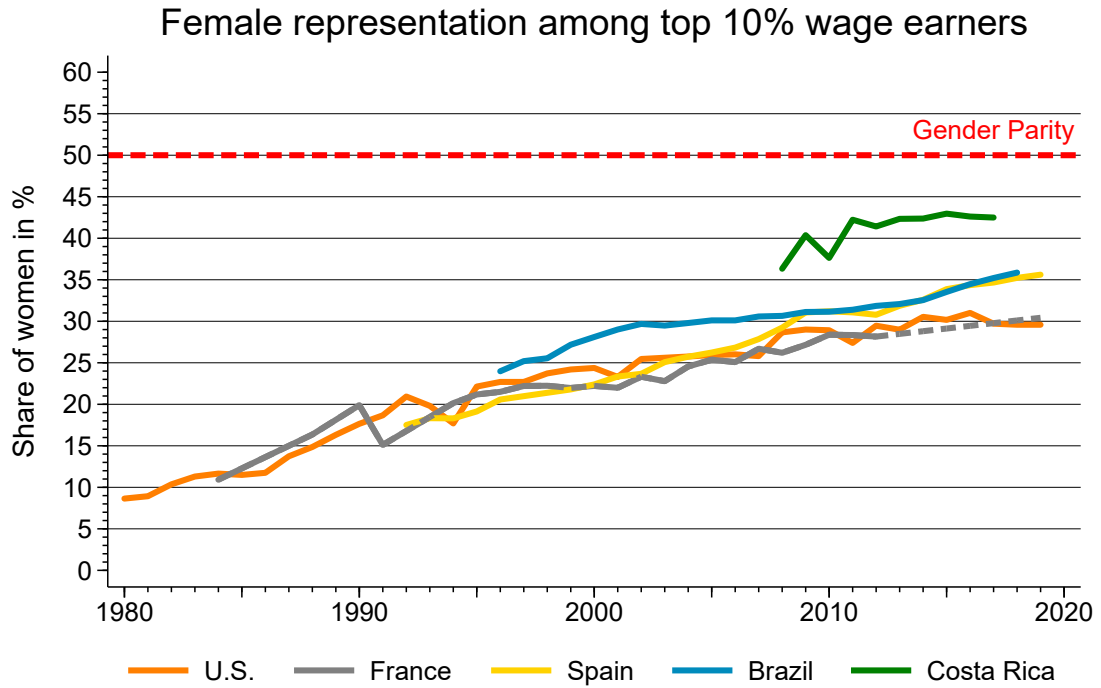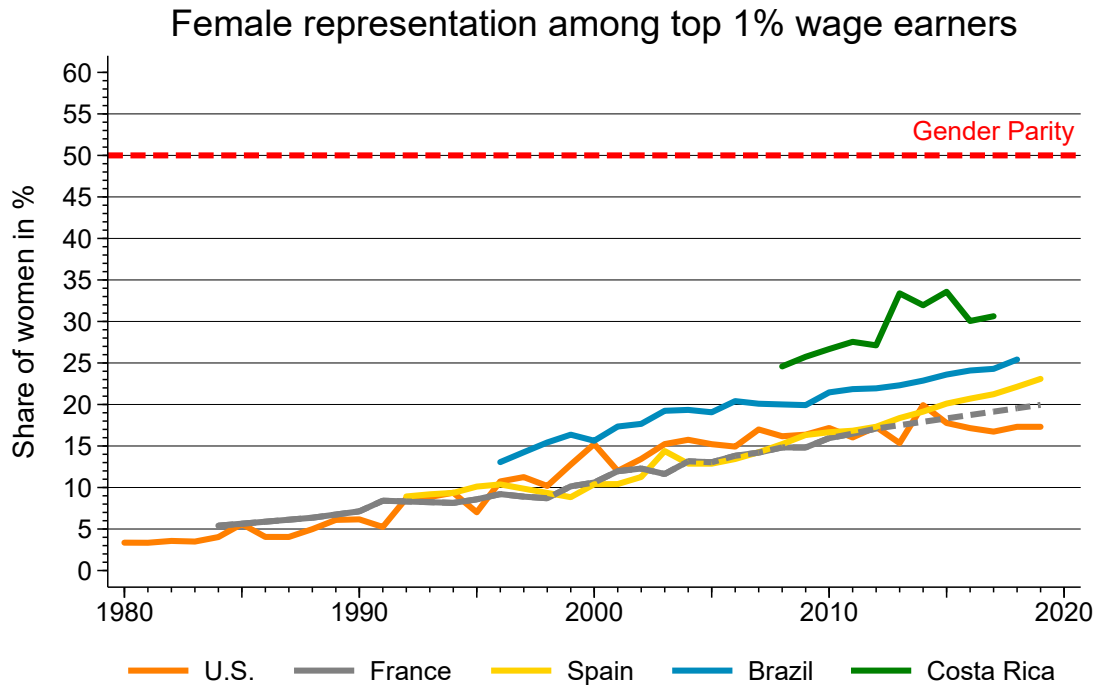Figure 7: Representation of women in the Top 10% of the wage distribution.

## Female representation among top 10% wage earners



Figure 8: Representation of women in the Top 10% of the wage distribution.

## Female representation among top 1% wage earners



Costa Rica or Spain. Also, the glass ceiling effect seems to have been stable over time in the US while it has slightly diminished in Costa Rica and Spain.

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The reasons for these cross-country differences in female representation in top-paying are not easily detected. Spain, Brazil and Costa Rica appear to have increased the representation of women among all wage earners in recent years without having reached parity in the labor market. This could hint at a selection effect â only the more highly-skilled and well-paid women enter formal wage employment (Figure A3.1). Goldin (2014) stresses that one important step toward gender equality in the US labor market is the temporal inflexibility of many high-paying jobs, particularly the more than proportional reward for working long hours in executive jobs. Because of childcare and household duties, these jobs are often less attractive for women. Why is it the case that highly skilled women in Spain, Brazil and Costa Rica appear to better manage family and career and reach high paying jobs?

There is no evidence that public childcare provision is more extensive in Brazil or Spain compared to France (OECD, 2020, Fig. 6). Nonetheless, costs for early childcare compared to middle-income earnings seem to be lower in Spain than in France (OECD, 2020, Fig. 1). A possible explanation might be related to the high skill premium in these countries which allows women in career jobs to afford full time private child care. Indeed, Arulampalam, Booth, and Bryan, 2007 point out that they find similar glass ceiling effects across many European countries despite differences in parental leave and public childcare provision systems. They point out that women could make use of private childcare and household help opportunities when it is affordable. They find a negative correlation between the dispersion of the wage distribution and the glass ceiling effect, i.e. a higher skill premium seems to go along with a higher representation of women at the top.[14] The point of the affordability of private childcare provision is underlined by Albrecht, Björklund, and Vroman (2003) that point out that high wages in the lower segment of the Swedish wage distribution might make it difficult for career-oriented women to afford private childcare especially for very young children that are not eligible for formal childcare yet. In contrast, Spain exhibits a high skill premium. This might lead to more women in executive jobs paying for private childcare and household help, since it is more affordable, and a better compatibility of family and work especially for women

[14]On the contrary, Christofides, Polycarpou, and Vrachimis (2013) find that work family reconciliation policies decrease the gender pay gap at the mean, median and at the top of the distribution.

with very young children.

Knowing whether the difference emerges from progressive policies, more affordable private childcare and household help or from a different structure and time inflexibility of jobs at the top of the wage distribution will require further research.

# 6    Conclusion

In this article, we analyze the level and evolution of the female share in factor labor income across the globe. The female labor income share takes into account labor force participation differences between the genders as well as gender earnings differentials. We find that Women earn about one third of global labor income today and that the female share in labor income has increased slowly since the early 1990s.

We also underline important cross country and regional diversity in levels and trends. Indeed, the evolution of the female share in labor income is influenced by historical, cultural, and institutional settings which translate into different dynamics in gender employment and earnings ratios. In the MENA region and Latin America, the gender earnings ratio is high for women in the labor market. However, the low female participation rate, locates those regions at the lower end of the distribution of female labor income shares. Further, the contrast between high earnings ratios and low participation ratio in these regions indicates that only highly educated women take up employment.

Latin America and the Caribbean show a substantial increase in female labor market participation since the 1990s which might be interpreted as a convergence to patterns observed in Europe and the US with high earnings ratio and high female participation.

Western Europe and the former Eastern Bloc countries share relatively high earnings and employment ratios in international comparison. While the earnings ratio stagnated in Western European economies, the increase in female employment has increased the female income share substantially.

Women are still underrepresented at the top of the national wage distributions. The glass ceiling is, however, thicker in the U.S. and France than in Costa Rica,

Spain or Brazil. Those cross-country differences of the female representation at the top suggest that it is easier for highly paid women in Costa Rica, Spain or Brazil to reconcile family and work despite weak public childcare provision. One possible reason is the affordability of private household help and childcare due to a highly unequal wage distribution and high skill premiums. Further research is needed however, to substantiate this hypothesis further.

This article is the first step to a broader implementation of gender inequality indicators into the World Inequality Database in the future.

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# A   Appendix A: Modelled Female Labor Income Share

We compute the female labor income share using survey-based LIS data. This is done simply by aggregating LIS survey data at the national level for each country-year survey data set available. For each survey, LIS provides a household file and a person file. We take the population weighted sum of the variables presented in Table A.1.

The computation of the female labor income share at the national level relies on different steps. First, we compute the number of self-employed and wage-employed by gender. Those we define as having non-zero self-employment or wage income respectively by gender. Second, we compute personal self-employment and wage income by gender. In LIS, we disregard the household income variable, if information on self-employment is available. Third, we compute total labor income by gender as follows:

$Female\ Labor\ Income_{ct} =$

$$\sum_i Female_i \times (Female\ wage\ income_i + 0.7 \times Female\ Self\ employment\ Income_i)$$

where Female Labor income for country c in year t is the sum of labor income that accrues to women. *Female* indicates the gender dummy.

Table A.1: Regression underlying WIL modelled estimates for imputed countries.

| | (1) Female Labor Income Share |
|---|---|
| Female self employment share | 0.0791*** |
| | (0.0167) |
| Female wage employment share | 0.785*** |
| | (0.0314) |
| *World Regions indicators* | |
| Asia (excl. China) | *reference* |
| Western Europe | 0.0220*** |
| | (0.00783) |
| Latin America | 0.0395*** |
| | (0.00855) |
| MENA | 0.0114 |
| | (0.00941) |
| North America | 0.0124 |
| | (0.00875) |
| Oceania | 0.0153 |
| | (0.0119) |
| SS Africa | 0.0488*** |
| | (0.0121) |
| China | 0.0140 |
| | (0.0188) |
| Former Eastern Bloc | 0.0597*** |
| | (0.00804) |
| Constant | -0.0525*** |
| | (0.0151) |
| Observations | 615 |
| R-squared | 0.749 |

Standard errors in parentheses
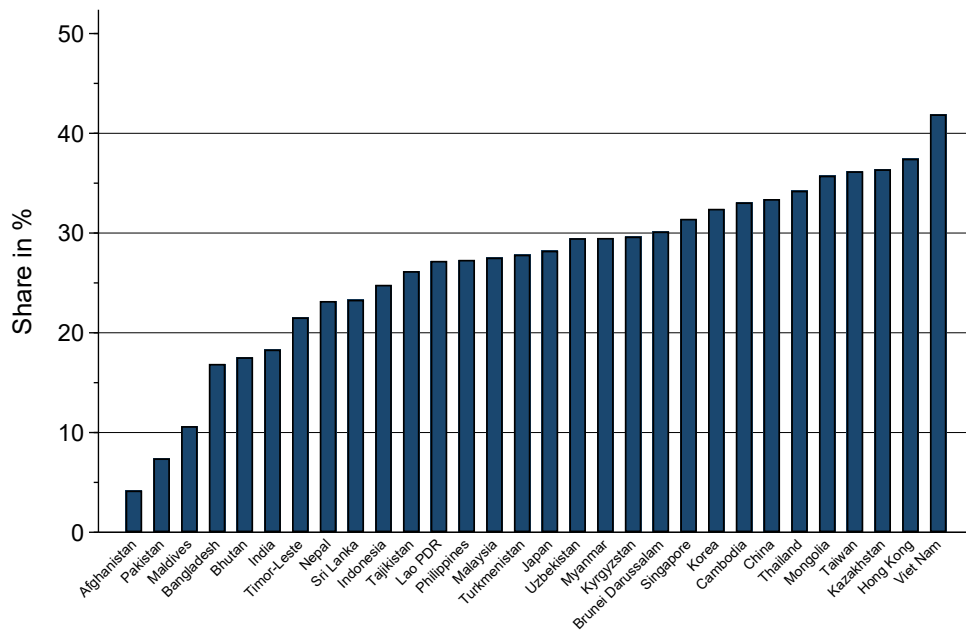*** p<0.01, ** p<0.05, * p<0.1

# B    Appendix B: Further graphs and results

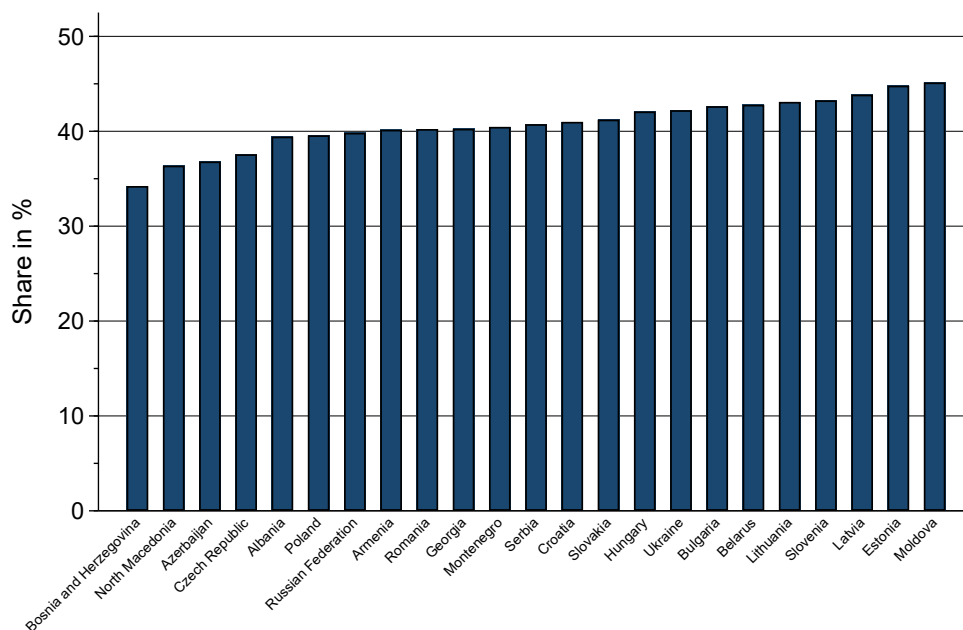Figure B.1: Regional trends in female labor income share, 1991-2019 (income-weighted averages).
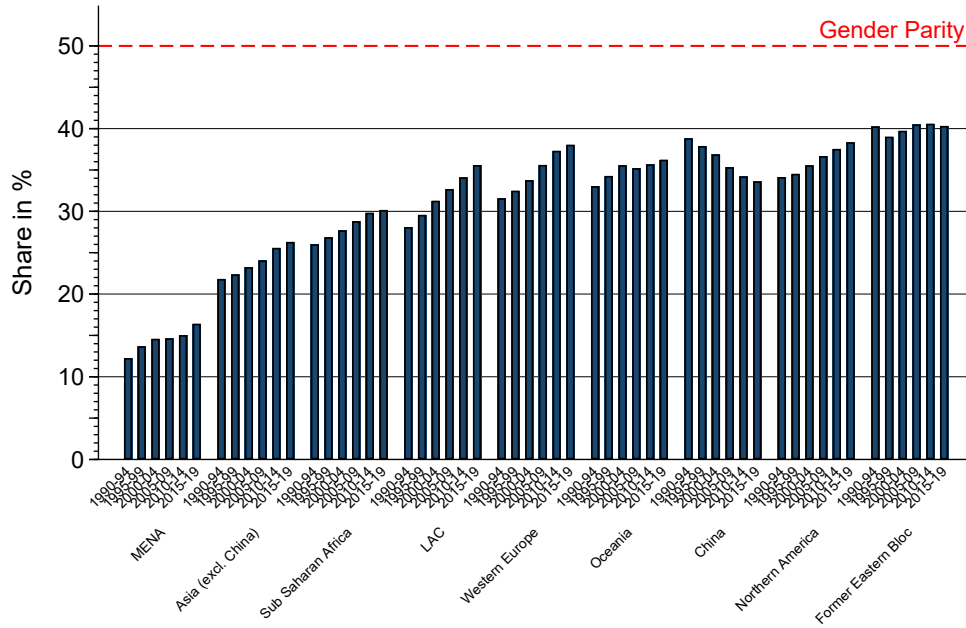


Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

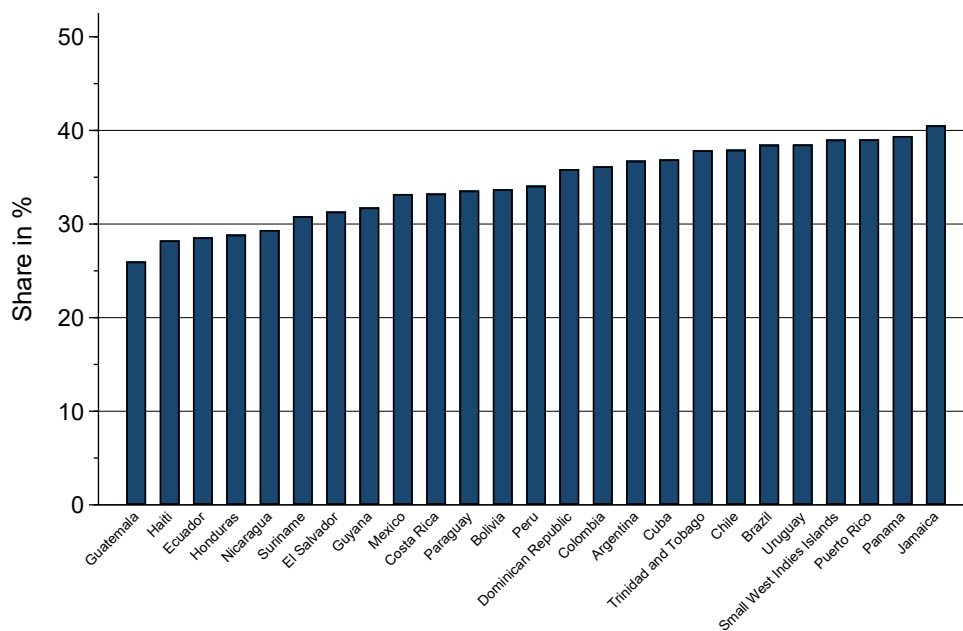Figure B.2: Predicted estimates of the female labor income share, Asia.



Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

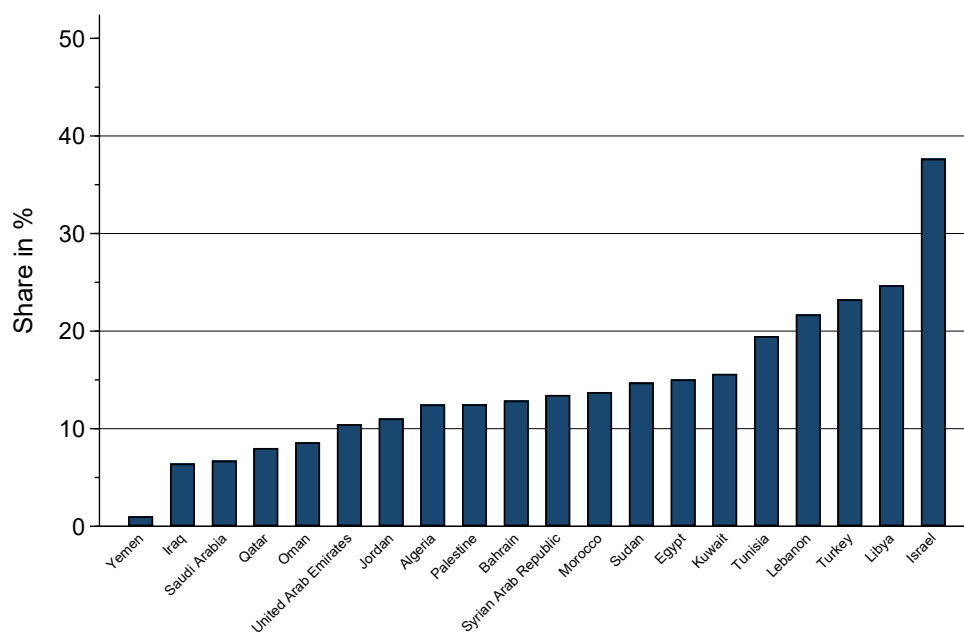Figure B.3: Predicted estimates of the female labor income share, Former Eastern Bloc.



Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

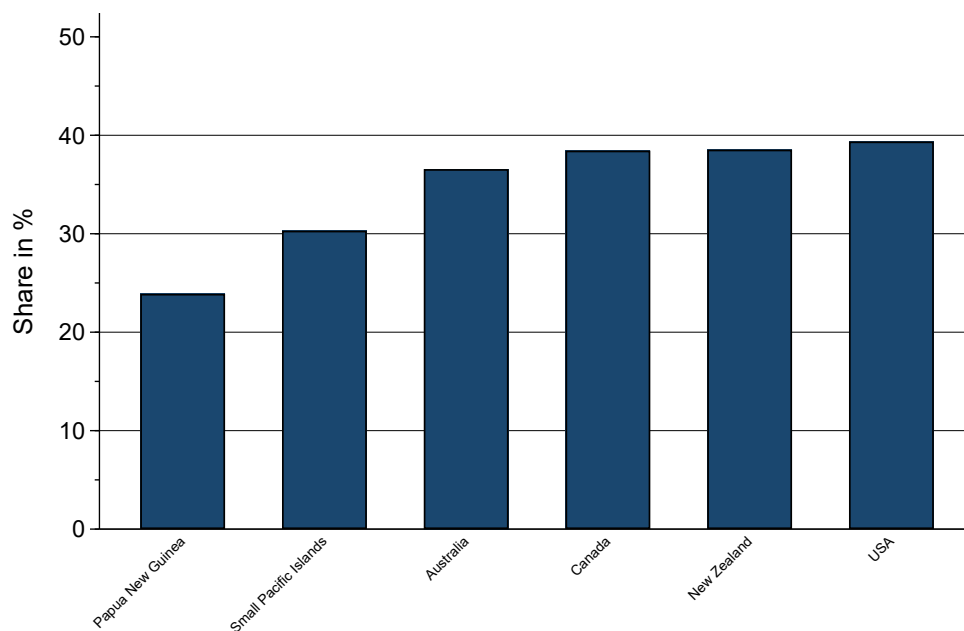Figure B.4: Predicted estimates of the female labor income share, Latin America and Caribbean.



Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

Figure B.5: Predicted estimates of the female labor income share, Middle East and Northern Africa.
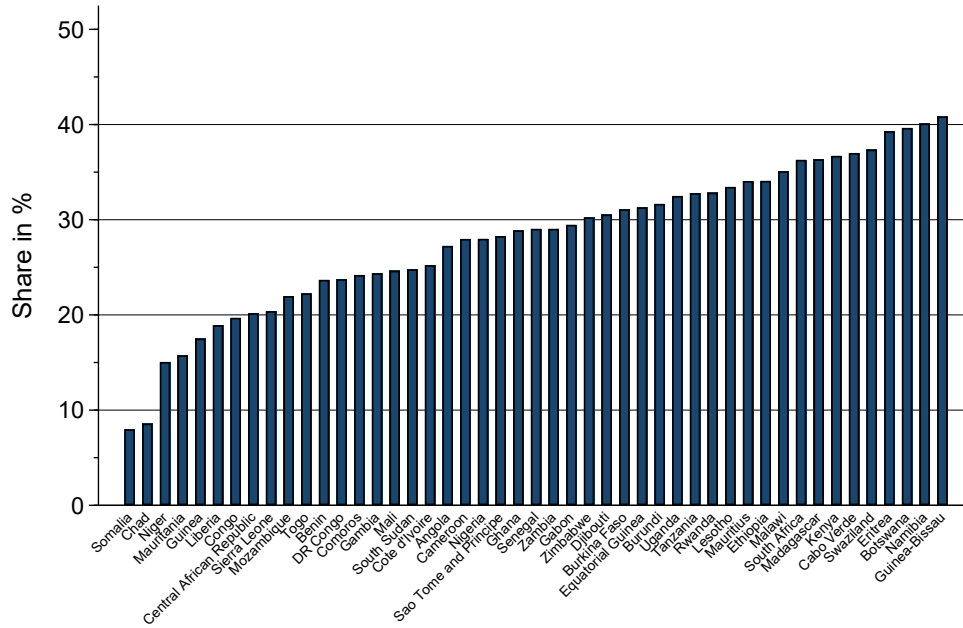


Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

Figure B.6: Predicted estimates of the female labor income share, North America and Oceania.
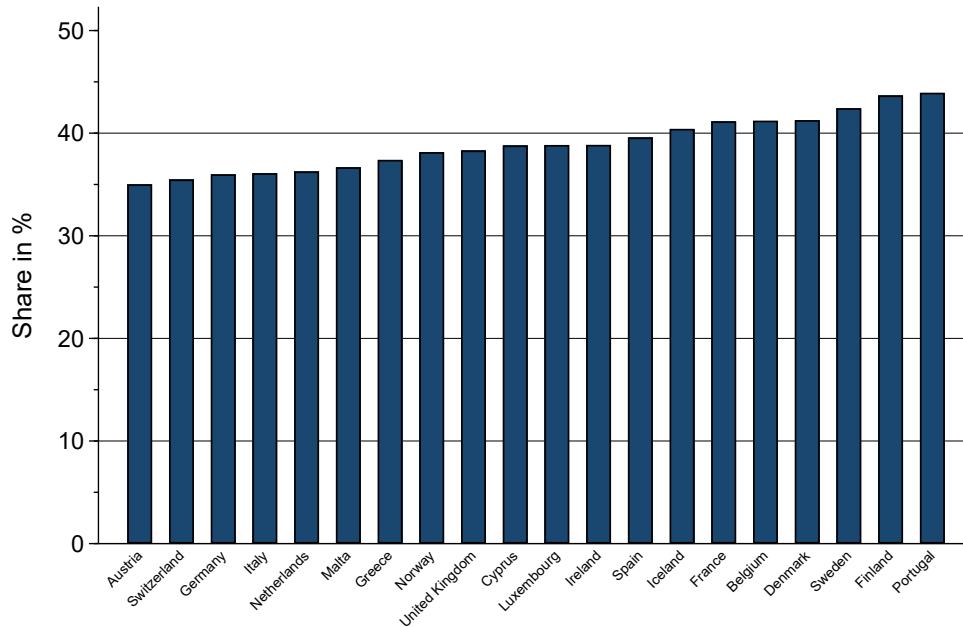


Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

Figure B.7: Predicted estimates of the female labor income share, Sub-Saharan Africa.



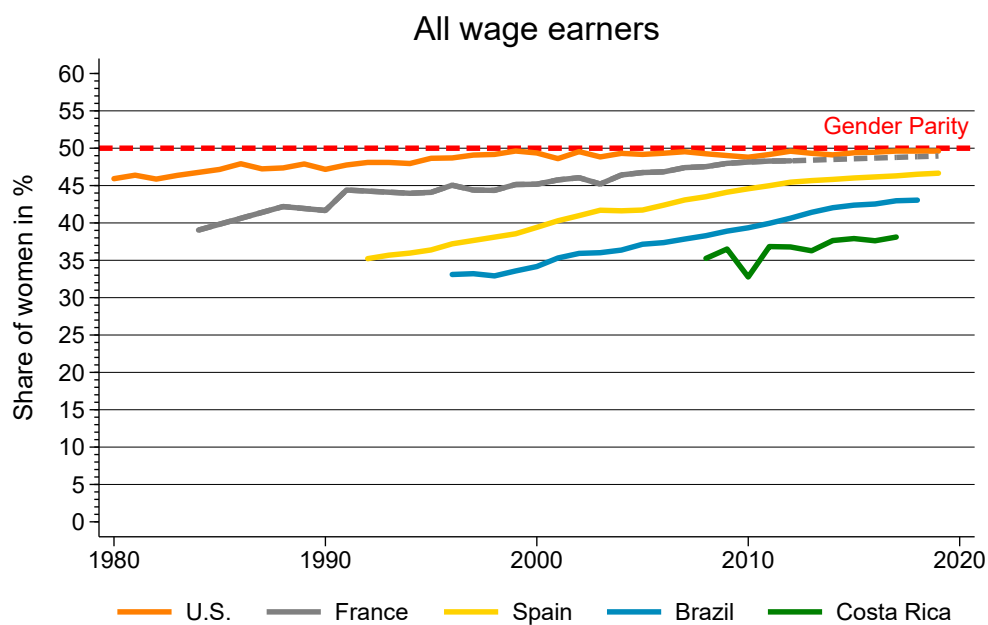Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

Figure B.8: Predicted estimates of the female labor income share, Western Europe.



Source: WIL modelled estimates using ILO and LIS, and EU-SILC data.

# C  Appendix C: Women's Representation among wage earners

Figure C.9: Women's representation among all wage earners.



Source: based on adiminstrative data provided by WID.world research fellows.

# D  Appendix D: Data availability

Table D.2: Data-availability of wage- and self-employment income in LIS and EU-SILC. Country-years in brackets were not used for the analysis.

| Indicator | Wage income | | Self-employment income | |
|---|---|---|---|---|
| Dataset | LIS | EU-SILC | LIS | EU-SILC |
| **Sub-Saharan Africa** | | | | |
| CÃ´te D'Ivoire | 2002, 2008, 2015 | | 2002, 2008, 2015 | |
| South Africa | 2008, 2010, 2012, 2015, 2017 | | 2008, 2010, 2012, 2015, 2017 | |
| **Asia** | | | | |
| India | 2004, 2011 | | 2004, 2011, only household level | |
| Japan | 2008, 2010, 2013 | | 2008, 2010, 2012, 2015, 2017 | |
| Taiwan | 1991, 1995, 1997, 2000, 2005, 2007, 2010, 2013, 2016 | | since 1997 individualized | |
| Vietnam | 2011, 2013 | | only household level | |
| China | 2002, 2013 | | 2002, 2013 | |
| **Former Eastern Bloc** | | | | |
| Bulgaria | | 2006-2018 | | 2006-2018 |
| Czechia | 1992, 1996, 2002 | 2004-2018 | individualized since 2002 | 2004-2018 |
| Estonia | | 2003-2018 | | 2003-2018 |
| Georgia | 2010, 2013, 2016 | | 2010, 2013, 2016 | |
| Croatia | 2009-2018 | | 2009-2018 | |
| Hungary | 1991, 1994, 1999 | 2004-2018 | ind. since 1999 | 2004-2018 |
| Lithuania | | 2004-2018 | | 2004-2018 |
| Latvia | | 2006-2018 | | 2006-2018 |
| Poland | | 2004-2018 | | 2004-2018 |
| Romania | | 2006-2018 | | 2006-2018 |
| Serbia | | 2012-2018 | | 2012-2018 |
| Russia | 2000, 2004, 2007, 2010, 2011, 2013-2018 | | ind. since 2004 | |

Table D.2: Data-availability of wage- and self-employment income in LIS and EU-SILC. Country-years in brackets were not used for the analysis.

| Indicator | Wage income | Self-employment income |
|---|---|---|
| Slovenia | 2004-2018 | 2004-2018 |
| Slovakia | 1992 | only houshold level |
| **Latin America and Caribbean** | | |
| Brazil | 2006, 2009, 2011, 2013, 2016 | 2006, 2009, 2011, 2013, 2016 |
| Chile | 1992-2017 biennially or triennially | 1992-2017 biennially or triennially |
| Colombia | 2004-2016 biennially | 2004-2016 biennially |
| Dominican Rep. | 2007 | 2007 |
| Guatemala | 2006, 2011 | 2006, 2011 |
| Mexico | 1992-2018 biennially | 1992-2018 biennially |
| Panama | 2007-2016 triennially | 2007-2016 triennially |
| Peru | 2004-2016 triennially | 2004-2016 triennially |
| Paraguay | 2000, 2004-2016 triennially | 2000, 2004-2016 triennially |
| Uruguay | 2004-2016 triennially | 2004-2016 triennially |
| **Northern America** | | |
| Canada | 1991, 1994, 1997, 1998, 2000, 2004, 2007, 2010, 2012-2017 | individualized since 1998 |
| U.S. | 1991-2019 | 1991-2019 |
| **Oceania** | | |
| Australia | 1995, 2001, 2003, 2004, 2008, 2010, 2014 | 1995, 2001, 2003, 2004, 2008, 2010, 2014 |
| **Western Europe** | | |
| Austria | 1994, 1997, 2000 | individualized since 2000 |
| | 2003-2018 | 2003-2018 |
| Belgium | 1995, 1997, 2000 | individualized since 2000 |
| | 2003-2018 | 2003-2018 |
| Switzerland | 1992 | 2006-2018 |
| | 2006-2018 | |
| Cyprus | 2004-2018 | 2004-2018 |
| Germany | 1991-2018 | 1991-2018 |
| | (2004-2018) | (2004-2018) |

Table D.2: Data-availability of wage- and self-employment income in LIS and EU-SILC. Country-years in brackets were not used for the analysis.

| Indicator | Wage income | Self-employment income | |
|---|---|---|---|
| Denmark | 1992, 1995, 2000, 2004, 2007, 2010, 2013, 2016 | (2003-2018) | ind. since 1995 |
| Spain | 1995, 2000 | 2005-2018 | ind. since 2000 |
| Finland | 1995, 2000 | 2003-2018 | ind. since 2000 |
| France | 1994, 2000, 2005, 2010, | (2003-2018) | ind. since 2000 |
| Great Britain | 1991, 1994-2018 | (2005-2018) | ind. since 1994 |
| Greece | 1995, 2000 | 2006-2018 | ind. since 2000 |
| Ireland | 1994-1996, 2000, 2002 | 2003-2018 | ind. since 2000 |
| Iceland | | 2003-2018 | |
| Italy | 1991, 1993, 1995, 1998, 2000, 2004, 2008, 2010, 2014, 2016 | (2006-2018) | ind. since 1995 |
| Luxembourg | 1991, 1994, 1997, 2000 | 2003-2018 | |
| Malta | | 2006-2018 | |
| Netherlands | 1993, 1999 | 2004-2018 | ind. since 1999 |
| Norway | 1991, 1995, 2000, 2004, 2007, 2010, 2013, 2016 | (2003-2018) | ind. since 2000 |
| Portugal | | 2006-2018 | |
| Sweden | 1992, 1995, 2000 | 2003-2018 | ind. since 2000 |