Women in Work 2022

Technical appendix

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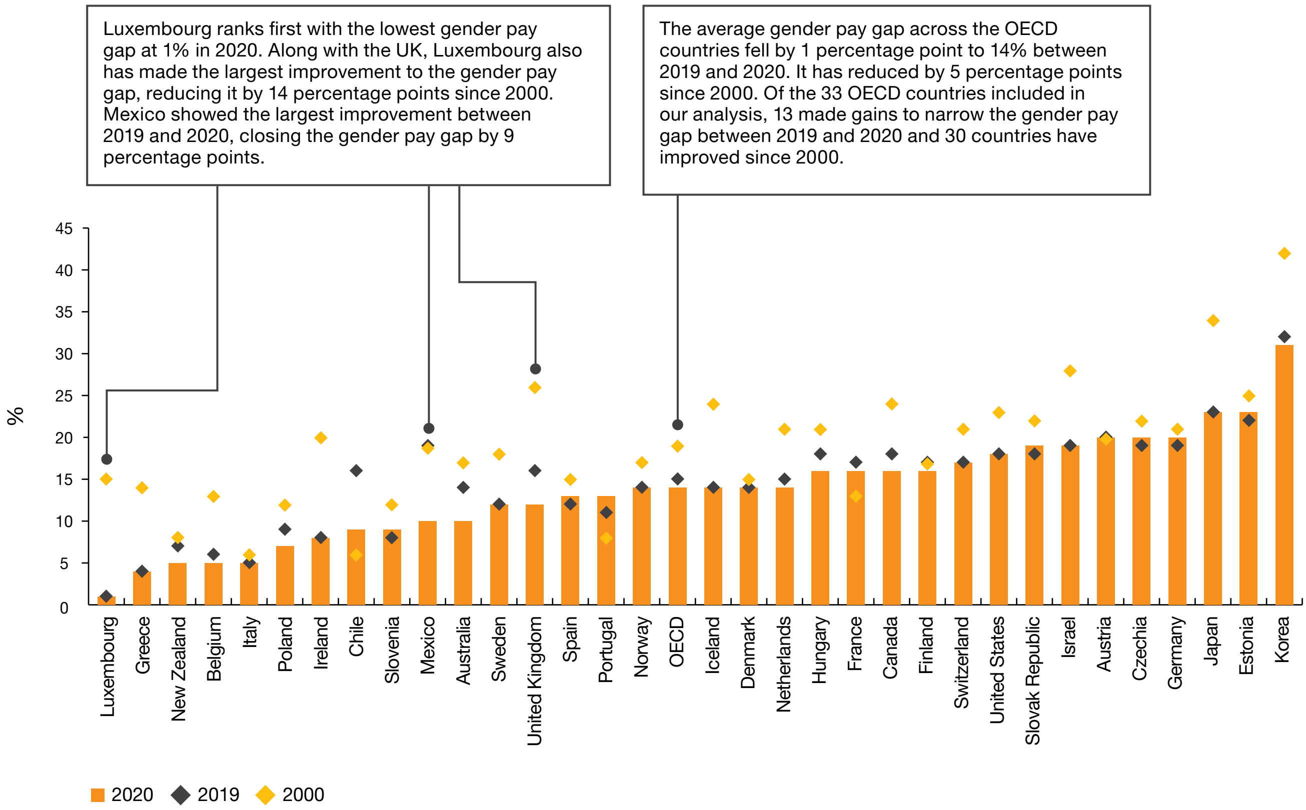
Individual labour market indicators

The gender pay gap

Gender wage gap, 2000-202



Source: OECD, Eurostat. OECD data refers to the difference in the median earnings for all full-time employees, while Eurostat compares the mean earnings. Data extrapolated using linear interpolation where data unavailable.

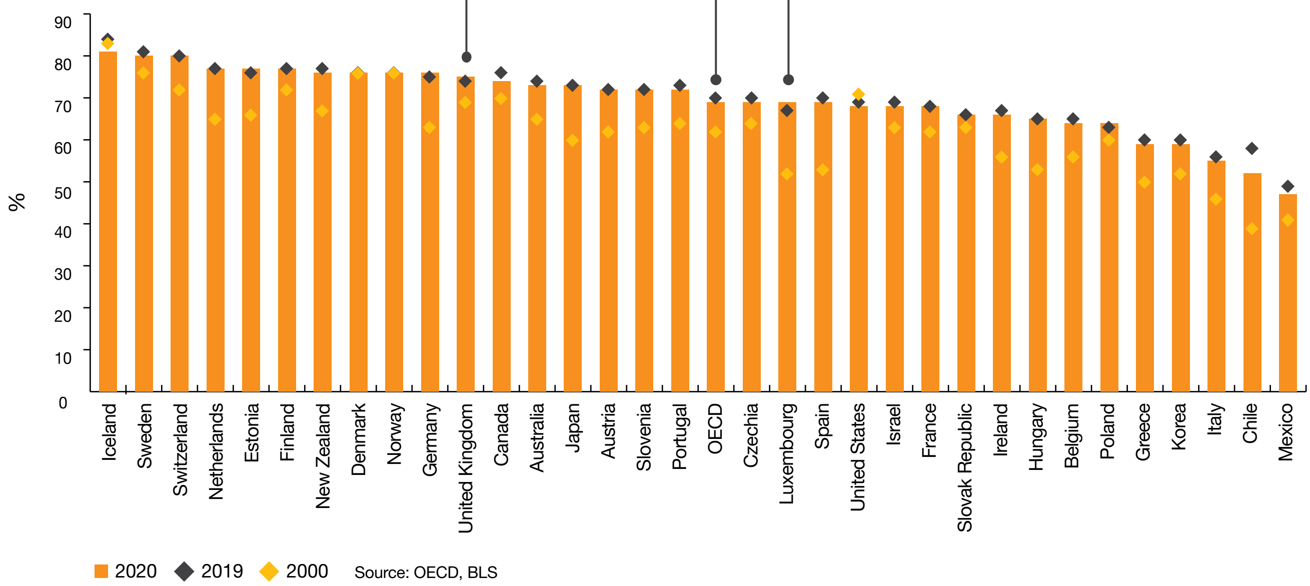
Female labour force participation rate

Female labour force participation rate, 2000-2020

The UK's female labour force participation rate increased by 1 percentage point since 2019, improving by 6 percentage points from 69% in 2000.

The average female labour force participation rate across the OECD fell by 1 percentage point to 69% between 2019 and 2020. However, it increased by 7 percentage points from 2000 (62%). All of the 33 countries included in the analysis except Iceland, Norway and the United States improved their female labour force participation rate between 2000 and 2020. Between 2019 and 2020 only 5 countries showed improvements.

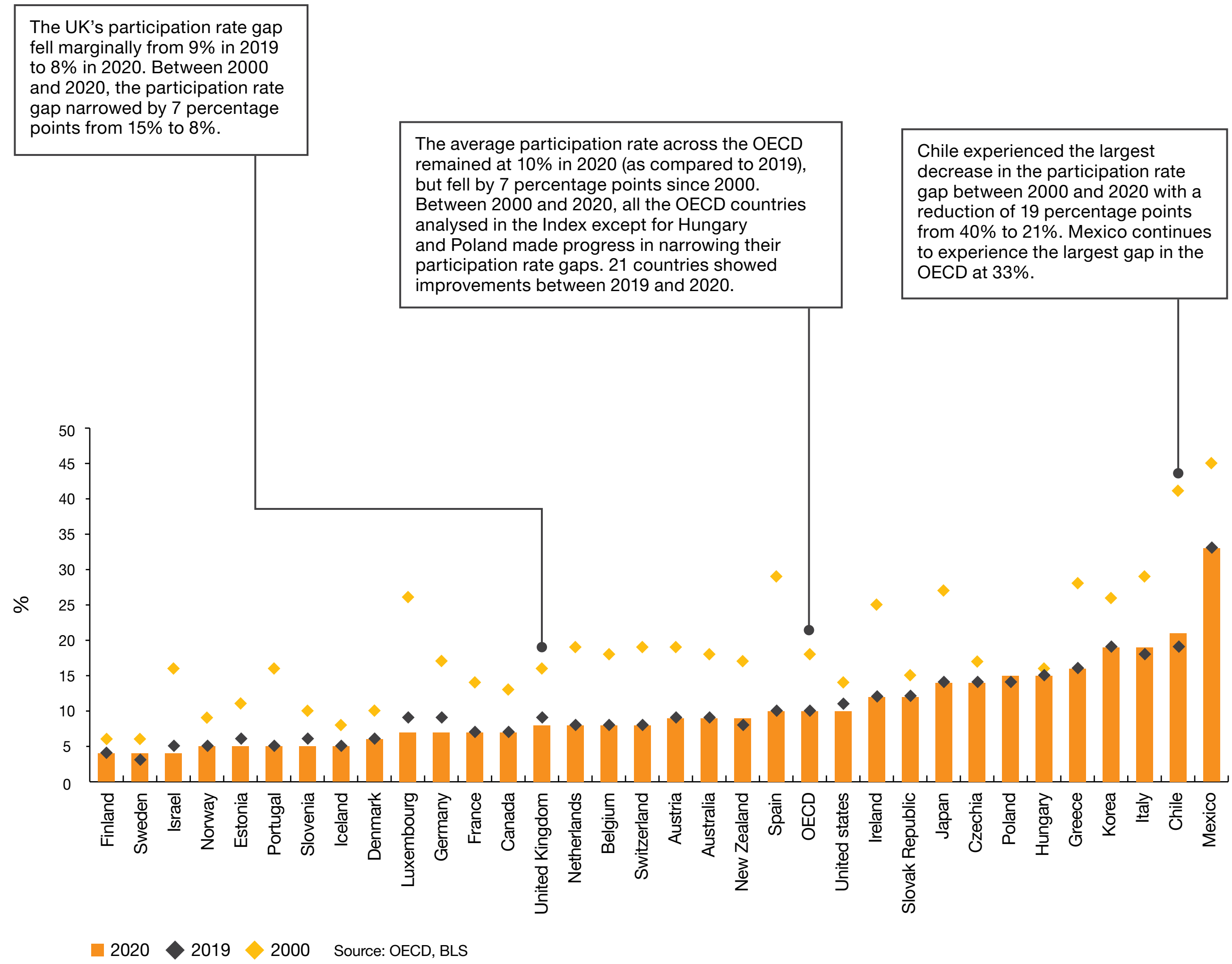
Over the longer term, Luxembourg's female labour force participation rate improved the most, increasing by 17 percentage points from 52% to 69%. The largest short-term gains were also observed in Luxembourg which increased its female labour force participation rate from 67% to 69%.



Source: OECD, BLS

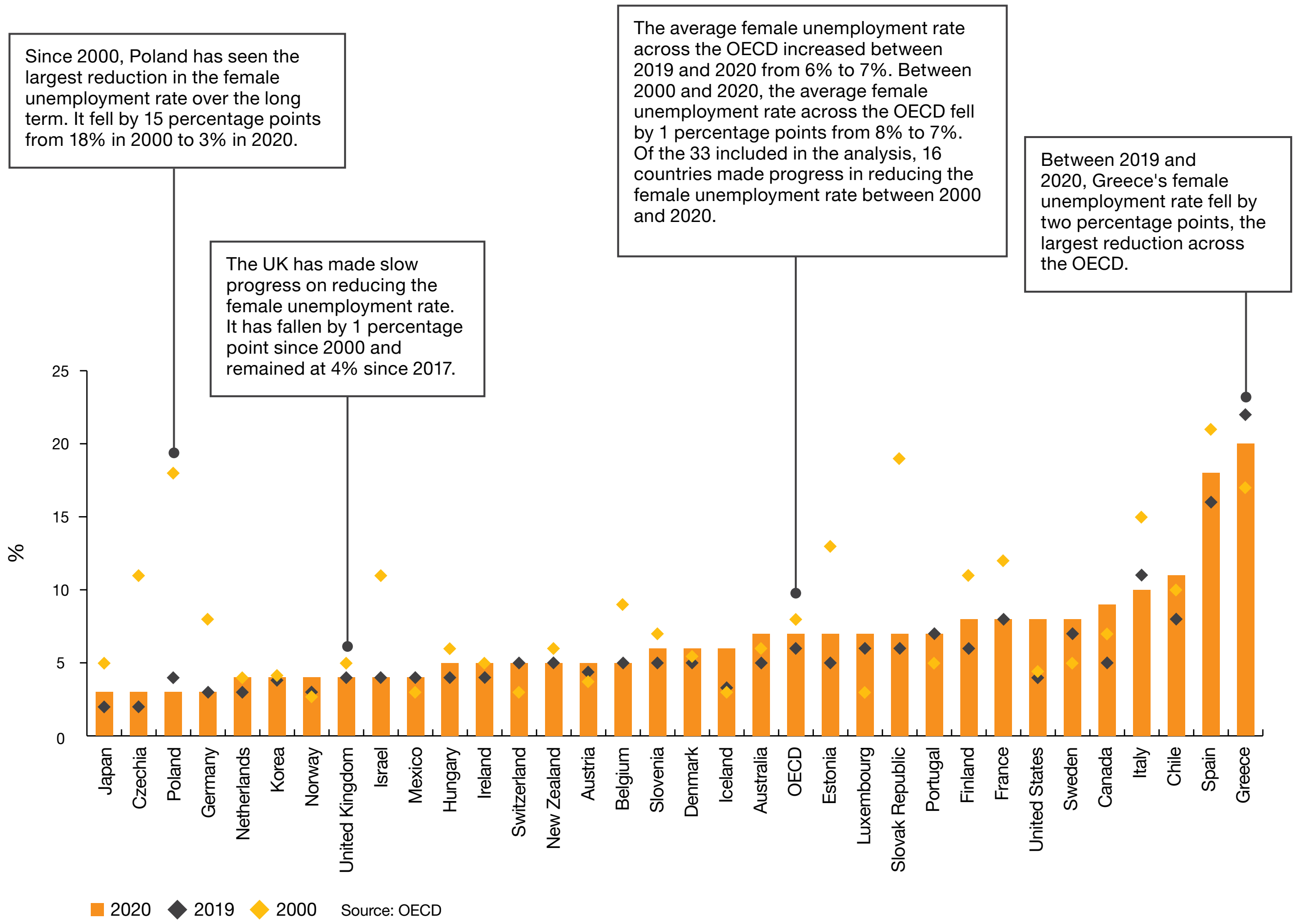
Gap between male and female labour force participation rate

Gap between male and female labour force participation rate, 2000-2020



Female unemployment rate

Female unemployment rate, 2000-202



Source: OECD

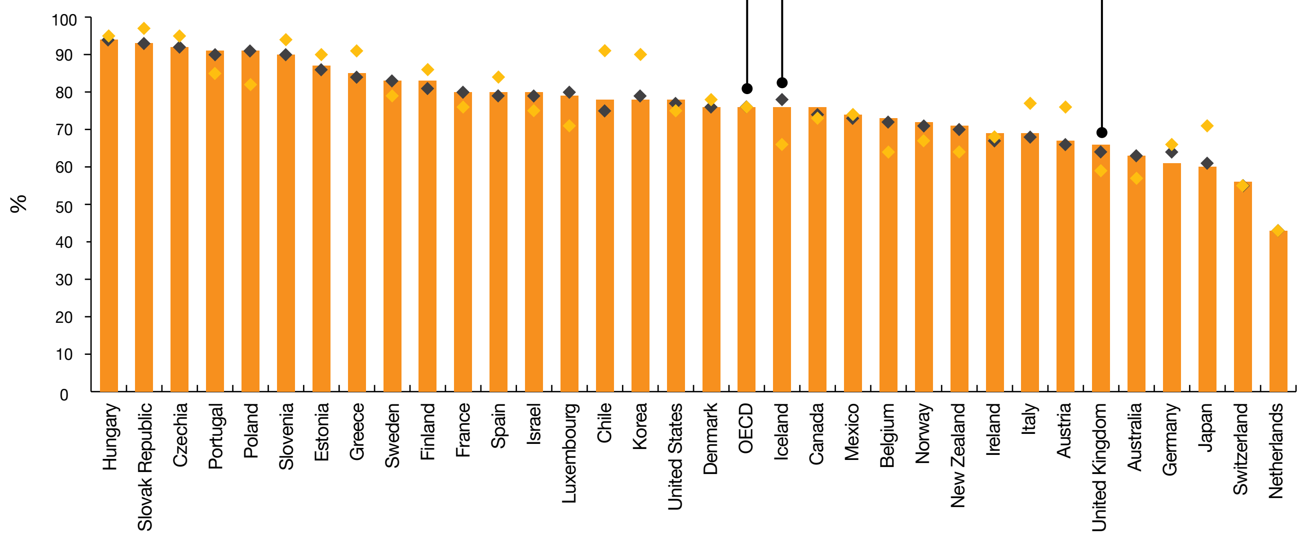
Female full-time employment rate

Female full-time employment rate, 2000-2020

The average share of female employees in full-time employment across the OECD remained at 76% between 2019 and 2020. Of the 33 countries included in the Index, 17 have made progress in increasing the female full-time employment rate since 2000 and 27 have improved between 2019 and 2020.

Iceland's share of female employees in full-time employment increased by 10 percentage points from 66% in 2000 to 76% in 2020, the largest improvement across the OECD. Between 2019 and 2020, Chile experienced the largest improvement of 3 percentage points to 78%.

In the UK, the female full-time employment rate has increased from 59% to 66% since 2000. However, it continues to lag behind the OECD average by 10 percentage points.



Source: OECD, BLS

Methodology and data sources

Definitions and terminology

OECD: For the purposes of this report, this refers to the 33 OECD countries included in the PwC Women in Work Index. This consists of all OECD members except for Colombia, Costa Rica, Latvia, Lithuania and Turkey. The only exception to this is in Section 5 (Impact of the transition to net zero). When we refer to the OECD in this section, this refers to 28 of the 33 OECD countries on our Index. This is because this analysis uses scenario data on jobs composition at 2030 from the ILO and is not available for all countries. The 5 countries included in our Index but not in the net zero analysis include Canada, Chile, Iceland, Israel and New Zealand.

OECD average: This refers to the average taken across all 33 OECD countries in the Women in Work Index and applies where we discuss 2020 data relating to the main Index results and potential long-term economics gains. It does not adjust for the population size of different OECD countries.

Gender and sex: The Authors would like to acknowledge the limitation of the report in its focus on binary gender identities ('men' and 'women'), which excludes analysis of the employment outcomes and experiences of those who identify their gender differently, beyond these two categories. This is mainly due to a lack of available data for other gender identities. Furthermore, in cases where data sources have been disaggregated by 'sex' rather than 'gender', the assumption has been applied that a person's gender identity is aligned with their biological sex characteristics (e.g. we have used 'female' and 'women' interchangeably in some places), however we recognise that the two are not equivalent and that this is not always the case.

Race and ethnicity: Throughout the report we frequently use the terms White and Ethnic Minority (as well as referring to other ethnic groups such as Black and Mixed Ethnic Group) and report on findings for White and Ethnic Minority people as a whole. We acknowledge the limitations of this approach and recognise that the employment outcomes and experiences of people who fall within these groups will vary significantly and that are many types of Ethnic Minority groups, including White Ethnic Minority groups. We also acknowledge that people may prefer to self-identify using other terms such as People of Colour.

Changes to PwC's Women in Work Index results for 2019

Due to retrospective changes to the OECD and Eurostat gender pay gap data used in the Index, the Index scores and rankings for 2019 for have changed compared to those reported in the PwC Women in Work Index 2021 (last year's Index).

At the time of publication of the 2021 Index, actual data for the gender pay gap for 2019 was not available for the majority of countries in the Index. Therefore, we estimated the 2019 gender pay gap by linearly extrapolating historical data. At the time of publication of the Index this year, actual gender pay gap data for 2019 is now available for all OECD countries. We have revised and updated the 2019 estimated gender pay gap with actual data resulting in changes to the Index score and rank in 2019 for a number of countries in the Index.

Changes to the rankings of each country as a result of the update to the gender pay gap data can be seen in the adjacent table.

- Estonia's ranking changed the most, moving five places from 19th to 14th place. This was due to a decrease in the gender pay gap by 2 percentage points from 24% to 22% following the revision.
- Hungary's ranking also changed by 5 places, but unlike Estonia's, it's ranking was revised down, from 18th to 23rd. This was due to the gender pay gap increasing by 5 percentage points from 13% to 18%.
- Portugal's gender pay gap was revised down by 3 percentage points and the country's ranking showed the next largest Index movement, rising three places from 9th to 6th place
- The United States, Germany and Czechia all saw their ranking rise by two places whilst Australia and Switzerland's ranking saw a decline of two places following the revisions.
- The UK's ranking did not change and its gender pay gap remained at 16%.

Changes to Index rankings for 2019

Country	2019 (old)	2019 (updated)	Change in ranking
Australia	15	17	-2
Austria	25	25	0
Belgium	10	10	0
Canada	12	12	0
Chile	31	31	0
Czechia	22	20	2
Denmark	7	8	-1
Estonia	19	14	5
Finland	8	9	-1
France	23	24	-1
Germany	21	19	2
Greece	30	30	0
Hungary	18	23	-5
Iceland	1	1	0
Ireland	14	13	1
Israel	20	21	-1
Italy	29	29	0
Japan	27	28	-1
Korea	32	32	0
Luxembourg	5	5	0
Mexico	33	33	0
Netherlands	17	18	-1
New Zealand	3	4	-1
Norway	6	7	-1
Poland	11	11	0
Portugal	9	6	3
Slovak Republic	26	26	0
Slovenia	4	3	1
Spain	28	27	1
Sweden	2	2	0
Switzerland	13	15	-2
United Kingdom	16	16	0
United States	24	22	2

Index methodology – Variables included in scoring

Our Index includes all OECD member countries except for Colombia, Costa Rica, Latvia, Lithuania and Turkey. The OECD average refers to the average taken across these 33 countries and applies where we discuss 2020 data relating to the main Index results and potential economics grains. Population size for different countries is not adjusted for.

Variable	Weight %	Factor	Rationale	Dataset(s) used
Gender pay gap	25	Constructed by subtracting median female income from median male income and expressing it relative to median male income. Wider pay gap penalised.	Higher share of full-time employment given higher score	**Decile ratios of gross earnings, OECD** Series: Gender wage gap Frequency: Annual **Gender pay gap in unadjusted form by NACE Rev. 2 activity – structure of earnings survey methodology, Eurostat** Frequency: Annual
Female labour force participation rate	25	Higher participation rates given higher score	Female economic participation is one of the cornerstones of economic empowerment, which is a factor of the level of skills and education of women, conducive workplace conditions and broader cultural attitudes outside the workplace (e.g. towards shared childcare and distribution of labour at home).	**Labour force statistics by sex and age – indicators, OECD** Series: Labour force Frequency: Annual Age: 15 to 64
Gap between female and male labour force participation rates	20	Higher female participation rate relative to male participation rate given higher score	Equality in participation rates reflect equal opportunities to seek and access employment opportunities in the workplace.	**Labour force statistics by sex and age – indicators, OECD** Series: Labour force Frequency: Annual Age: 15 to 64
Female un-employment rate	20	Higher unemployment penalised	The female unemployment rate reflects the economic vulnerability of women. Being unemployed can have longer-term impacts in the form of skills erosion, declining pension contributions and increased reliance on benefits.	**Labour force statistics by sex and age – indicators, OECD** Series: Unemployment rate Frequency: Annual Age: 15 to 64
Share of female employees in full-time employment	10	Higher share of full-time employment given higher score	The tendency for part-time employment may adversely affect earnings, pensions and job security. However, this factor is given a lower weight in the Index since some women may prefer part-time jobs to fit flexibly with caring roles. This variable only measures the share for women and does not compare with the share of male employees in full-time employment.	**Incidence of FTPT employment – common definition, OECD** Series: Full-time employment Frequency: Annual Age: 15 to 64 **Household data, US Bureau of Labour Statistics Series: Employed and unemployed full – and part-time workers by age, sex, race, and Hispanic or Latino ethnicity** Frequency: Annual Age: 16 years and over

Data sources – UK regional data

We have applied the same methodology as for the main Index to construct the UK regional Index. This includes using the same weights and factors.

Indicator	Country coverage	Year	Source	Adjustments and assumptions
Female labour force participation rate	UK	2019, 2020	Annual Population Survey, Office of National Statistics Labour Force Survey, Office of National Statistics	
Gap in male and female labour force participation rates	UK	2019, 2020	Annual Population Survey, Office of National Statistics Labour Force Survey, Office of National Statistics	
Female unemployment rate	UK	2019, 2020	Annual Population Survey, Office of National Statistics Labour Force Survey, Office of National Statistics	
Female full-time employment rate	UK	2019, 2020	Annual Population Survey, Office of National Statistics	
Gender pay gap	UK	2019, 2020, 2021	Annual Survey of Hours and Earnings, Office of National Statistics Dataset: Gender Pay Gap	Full-time employees only
Median weekly earnings	UK	2019, 2020, 2021	Annual Survey of Hours and Earnings, Office of National Statistics Dataset: Time series of selected estimates, Table 2	Full-time employees only, excluding overtime, by sex
Median hourly earnings	UK	2019, 2020, 2021	Annual Survey of Hours and Earnings, Office of National Statistics Dataset: Time series of selected estimates, Table 2	Full-time employees only, excluding overtime, by sex
Weekly paid hours	UK	2011-2021	Annual Survey of Hours and Earnings, Office of National Statistics Dataset: Time series of selected estimates, Table 2	Full-time employees only, excluding overtime, by sex

Additional data sources

Section	Indicator	Country coverage	Year	Source	Adjustments and assumptions
OECD performance during the COVID-19 pandemic	**Global unemployment rate**	Global	1991-2020	World Bank: Unemployment, total (% of total labour force) (modelled ILO estimate)	
OECD performance during the COVID-19 pandemic	**Forecast unemployment rate and labour force participation rate**	OECD	2021, 2022, 2023	OECD: Unemployment rate forecast (Total, % of labour force) and labour force forecast (Total persons)	These forecasts are not disaggregated by gender
OECD performance during the COVID-19 pandemic	**Male and female unemployment rate**	OECD	2019,2020	Labour force statistics by sex and age – indicators, OECD Series: Unemployment Rate	Frequency: Annual Age: 15 to 64 Sex: Male only and Female only
OECD performance during the COVID-19 pandemic	**Male and female employment, labour force and unemployment**	OECD	2014-2020	OECD: LFS by sex and age Series 1: Employment Series 2: Labour Force Series 3: Unemployment	Frequency: Annual Age: 15 to 64 Sex Men and Women Unit: Persons
OECD performance during the COVID-19 pandemic	**Average child penalty on earnings for men and women across six OECD countries**	Austria, Denmark, Germany, Sweden, UK and USA	N/A	Child Penalties Across Countries (Kleven et. al., 2019), which uses the following data sources: • Austria – individual-level administrative data (Statistics Austria) • Denmark – individual-level administrative data (Statistics Denmark) • Germany – German Socio-Economic Panel survey data • Sweden – individual-level administrative data (Statistics Sweden) • UK – British Household Panel Survey • US – Panel Study of Income Dynamics	Authors prepared the sample from each of the countries using the following restrictions: Individuals who have their first child between the ages of 20 and 45. Individuals who are observed between 5 years before and 10 years after childbirth. Focus only on first child births where the parents are known and alive

Additional data sources

Section	Indicator	Country coverage	Year	Source	Adjustments and assumptions
Gender and ethnicity in the workplace	**Quarterly unemployment rate 16+ by ethnic group and gender**	UK	Q3 2011 to Q3 2021	ONS: A09: Labour market status by ethnic group (Release date: 16th November 2021). Series: Unemployment by ethnicity: Women (not seasonally adjusted), Men (Not seasonally adjusted).	Frequency: Annual Age: 16+ Sex: Men and Women Ethnicity: White and All other ethnic groups combined
Gender and ethnicity in the workplace	**Percentage change in the number of employees by sector**	UK	Q3 2019 to Q3 2020	ONS: A01: Summary of labour market statistics	
Gender and ethnicity in the workplace	**Pay penalties by gender and ethnicity**	UK	2020	ONS: Annual Population Survey 2021	
Impact of the transition to net zero	**Employment by sex and sector (scenario analysis data)**	Used only for countries included in our Index (coverage of 28 out of 33 countries on our Index, excludes Canada, Chile, Iceland, Israel and New Zealand)	Scenario analysis: 2030 Baseline: 2017	ILO	
Impact of the transition to net zero	**Employment by sex and economic activity**	Used only for countries included in our Index that had ILO scenario data on (coverage of 28 out of 33 countries in our Index, excludes Canada, Chile, Iceland, Israel and New Zealand)	2017, 2020	ILOSTAT: Employment by sex and economic activity (thousands)	

Methodology for calculating potential GDP impacts from increasing employment rates

GDP boost	=	Output per unit FTE labour unit GDP/FTE	x	Increase in female FTE measured as increase in FT women + 0.5 x (increase in PT women)

We calculate a unit of full-time equivalent employment (FTE) as a unit of full-time employment plus half a unit of part-time employment. This is a measure of the effective labour force size, accounting for differences in output of part time and full time workers. We consider the potential boost to GDP under the following scenario:

- Increasing the female full-time equivalent employment rates (FTE) to that of a benchmark country (holding the male rates constant). We use Sweden as our benchmark country as it has the second highest female labour force participation rate. Iceland has the highest female labour force participation rate, however we use Sweden as it is a reasonably large economy and therefore a more suitable comparator country for the OECD.

Simplifying assumptions
In order to estimate the GDP impacts of increasing female employment rates, with the data available, we have made the following simplifying assumptions:

- A full-time (FT) worker produces twice as much output on average as a part-time (PT) worker each year.
- Total employment in the economy is equal to employment within the 15-64 age group.

Methodology for calculating potential gains to female earnings from closing the gender pay gap

We break down annual total earnings in the following way

Total earnings	**=**	**Average male earings * male works**	**+**	**Average female earnings * female workers**

where

Average male earnings	**=**	**Average female earnings**	**/**	**(1 – gender pay gap)**

Simplifying assumptions

- In order to estimate the potential gains from closing the gender pay gap, we made the following simplifying assumption:
- Total employment in the economy is equal to employment within the 15-64 age group.
- The median wages are equivalent to the mean wages.
- The gender pay gap is closed by increasing female wages to match male wages.
- The elasticity of female employment to a change in wages is 0, meaning that a 1% increase in wages results in no change in female employment. This takes into account the counteracting effects of labour supply and demand elasticities: an increase in wages makes it more expensive for employers to hire more workers, however higher earnings also incentivise potential workers to seek employment. Our literature review suggests that:
  – Estimates of labour supply elasticity range from 0.5 to 0.962
  – Estimates of labour demand elasticity range from 0.5 to – 0.363
- We take a conservative view that the counteracting effects cancel each other out with no resulting change in female employment.
- The simplifying assumptions provide us with conservative gain estimates because:
  – The gender pay gap is likely to be higher at the mean, which may be skewed upwards by a small number of high earners amongst male employees, than at the median which has been used to obtain data for at least 10 countries, as noted in the data sources above.
  – The 64+ age group has not been included in the analysis.

Methodology for calculating the Index using forecasted data and estimating the impact of COVID-19

To estimate the impact of COVID-19 and the future trajectory of the Women in Work Index, we used OECD country-level forecasts from December 2021 for **(1) the unemployment rate (percentage) and (2) the labour force size (number of persons)** in each Index country for 2021, 2022 and 2023. *We undertook the following steps:

1. We converted the OECD country-level forecasts for the two variables into year-on-year growth rates (2020-21, 2021-22, 2022-23). This provided an estimate of the annual growth rate of the unemployment rate and labour force size from 2020 through to 2023 for each country.
    - This step was undertaken so that we had data that was suitable for input into our Index calculations. E.g. The OECD forecasts are for the labour force size whereas the Index requires the labour force participation rate as an input. We took the growth rate in the labour force size to be the same as the growth rate in the labour force participation rate – this is a reasonable assumption if the population size remains constant over the three years considered in the forecast.
2. We applied the growth rates for each variable to the 2020 Index variable values to generate estimates until 2023 for the following indicators:
    i. Female unemployment rate
    ii. Gap in male and female unemployment rate – The male and female unemployment rates until 2023 were both generated separately before being differenced.
    iii. Female labour force participation rate.

Since the OECD forecasts are not disaggregated by gender it was assumed that there is no difference in growth rates for men and women in both the unemployment rate and labour force forecasts.

3. Forecast data was not available to generate estimates for the remaining two Index indicators (female full-time employment and gender pay gap) so these were held constant at 2020 values for our Index estimates 2021-23. As discussed in the main body of the report, this is likely to be a conservative approach as both indicators could have worsened as a result of the pandemic.

Key assumptions

1	Women and men see a proportionate change in the unemployment rate and the participation rate from COVID-19
2	The gender pay gap and the female full time employment rate are constant at 2020 values until 2023
3	The size of the working population (those aged 16-65) in a country remains constant from 2020 through to 2023.

*OECD Labour Market forecasts from OECD Economic Outlook: Statistics and Projections

Methodology for calculating the ethnicity pay gap

Our approach

Our data is sourced from the Annual Population Survey (APS). We first present simple comparisons of median hourly pay earned by individuals from different ethnic backgrounds and genders. While comparisons of median hourly earnings are useful, they alone do not take into account the differences between demographic characteristics that are common to different ethnic groups and genders. For example, on average men and women tend to work in different occupations, and ethnic groups are not evenly distributed across the country.

In order to account for this, we conduct a quantile regression analysis to estimate pay penalties. We define this as differences in pay when a selection of personal and work-related characteristics are held constant (see variables considered to the right). In other words, we try to compare ‘like-for-like’.

When cleaning the data, we make a couple adjustments to account for data limitations. First, we remove the top 1% and bottom 2% of pay distribution from our data, in order to account for outliers. Second, we apply an income weight to the APS, to account for the poor response rate of earnings questions within the APS. This approach is consistent with that taken by the ONS. More information on the calculation of this weight can be found in Volume 6 of the Labour Force Survey User Guide.

Personal and work related characteristics held constant

For our quantile regression, we use the logarithm of hourly pay as our dependent variable, controlling for the following independent variables:

- Logarithm of hourly pay
- Ethnicity
- Country of birth
- Sex
- Occupation
- Highest qualification obtained
- Age and age2
- Region
- Marital status
- Working pattern
- Sector of employment
- Gender * Ethnicity (interaction term)
- Gender * Working status (interaction term)
- Country of origin * Ethnicity (interaction term)

Methodology for calculating the employment impacts of transition to net zero

Our approach

Our analysis uses a dataset developed by the International Labour Organisation (ILO). The ILO developed a multi-regional input-output model to estimate the employment impacts of the energy sector's transition to net zero. This model estimates the employment impacts not only within the energy sector but also the knock-on impacts of energy sector transitions on other sectors. The changes in the energy sector are in line with the transition to an 'energy sustainability' scenario that is associated with global warming of 2°C. The dataset provides the employment composition across 163 exiobase sectors for 44 countries (disaggregated by gender and skill-level) at 2030, under the following two scenarios:

2°C scenario: This scenario assumes that changes in energy production and consumption occur in line with the 2°C global warming scenario by the International Energy Agency (IEA).

6°C scenario: This is a 'Business-As-Usual' scenario that assumes no climate action between now and 2030.

We filter the dataset to only include the OECD countries that are part of our Index. This gives us 28 out of the 33 countries included in the Index (excluding Canada, Chile, Iceland, Israel and New Zealand). We also split the dataset by male and female in order to get gender-level results.

We then calculate the difference between the employment composition by sector and country in each of these two scenarios in order to quantify the employment impacts (job creation and job destruction). By calculating the difference between the two scenarios at 2030, we are able to control for any other drivers of change in employment between now and 2030, such as automation.Exiobase sectors are mapped to Standard Industry Classification sectors in order to get employment impacts results for our selected group of countries by ISIC Rev. 4 sectors. Results for male and female workers are aggregated when assessing sector-level results. Results for male and female workers are compared in order to estimate the difference in net job gains for men and women.

This analysis only considers the energy sector's transition to net zero

The climate scenario we consider is based solely on the impact of transformations in energy production and consumption as the sector transitions to net zero. Examples of these transformations include the increased use of renewable energy sources and improved energy efficiency in buildings. The analysis does not account for the estimated employment impacts resulting from other transformations such as a transition to a circular economy mode (based on minimising resource use and extraction) or transformations within the agricultural sector. Therefore, our results do not capture the total magnitude of employment effects as a result of the transition to net zero.

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