

# WORLD EMPLOYMENT AND SOCIAL OUTLOOK

## Trends for Women 2018 – Global snapshot

### Online appendices

#### Appendix A. Country groupings by region and income level

##### Africa

###### Northern Africa

Algeria  
Egypt  
Libya  
Morocco  
Sudan  
Tunisia  
Western Sahara

###### Sub-Saharan Africa

Angola  
Benin  
Botswana  
Burkina Faso  
Burundi  
Cameroon  
Cabo Verde  
Central African Republic  
Chad  
Comoros  
Congo  
Congo, Democratic Republic of the  
Côte d'Ivoire  
Djibouti  
Equatorial Guinea  
Eritrea  
Ethiopia  
Gabon  
Gambia  
Ghana  
Guinea  
Guinea-Bissau  
Kenya  
Lesotho  
Liberia  
Madagascar  
Malawi  
Mali  
Mauritania  
Mauritius  
Mozambique  
Namibia  
Niger  
Nigeria  
Rwanda  
Sao Tome and Principe  
Senegal  
Seychelles  
Sierra Leone  
Somalia  
South Africa  
South Sudan  
Swaziland  
Tanzania, United Republic of  
Togo  
Uganda  
Zambia  
Zimbabwe

##### Americas

###### Latin America and the Caribbean

Antigua and Barbuda  
Argentina  
Bahamas  
Barbados  
Belize  
Bolivia, Plurinational State of  
Brazil  
Chile  
Colombia  
Costa Rica  
Cuba  
Dominican Republic  
Ecuador  
El Salvador  
Grenada  
Guatemala  
Guyana  
Haiti  
Honduras  
Jamaica  
Mexico  
Nicaragua  
Panama  
Paraguay  
Peru  
Puerto Rico  
Saint Kitts and Nevis  
Saint Lucia  
Saint Vincent and the Grenadines  
Suriname  
Trinidad and Tobago  
United States Virgin Islands  
Uruguay  
Venezuela, Bolivarian Republic of

###### Northern America

Canada  
United States

###### Arab States

Bahrain  
Iraq  
Jordan  
Kuwait  
Lebanon  
Occupied Palestinian Territory  
Oman  
Qatar  
Saudi Arabia  
Syrian Arab Republic  
United Arab Emirates  
Yemen

##### Asia and the Pacific

###### Eastern Asia

China  
Hong Kong, China  
Japan  
Korea, Democratic People's Republic of  
Korea, Republic of  
Macau, China  
Mongolia  
Taiwan, China

###### South-Eastern Asia and the Pacific

Australia  
Brunei Darussalam  
Cambodia  
Fiji  
French Polynesia  
Guam  
Indonesia  
Kiribati  
Lao People's Democratic Republic  
Malaysia  
Marshall Islands  
Micronesia, Federated States of  
Myanmar  
Nauru  
New Caledonia  
New Zealand  
Palau  
Papua New Guinea  
Philippines  
Samoa  
Singapore  
Solomon Islands  
Thailand  
Timor-Leste  
Tonga  
Tuvalu  
Vanuatu  
Viet Nam  
Southern Asia  
Afghanistan  
Bangladesh  
Bhutan  
India  
Iran, Islamic Republic of  
Maldives  
Nepal  
Pakistan  
Sri Lanka

##### Europe and Central Asia

###### Northern, Southern and Western Europe

Albania  
Andorra  
Austria  
Belgium  
Bosnia and Herzegovina  
Channel Islands  
Croatia  
Denmark  
Estonia  
Finland  
France  
Germany  
Greece  
Iceland  
Ireland  
Italy  
Latvia  
Liechtenstein  
Lithuania  
Luxembourg  
Macedonia, the former Yugoslav Republic of  
Malta  
Monaco  
Montenegro  
Netherlands  
Norway  
Portugal  
Serbia  
Slovenia  
Spain  
Sweden  
Switzerland  
United Kingdom

###### Eastern Europe

Belarus  
Bulgaria  
Czech Republic  
Hungary  
Moldova, Republic of  
Poland  
Romania  
Russian Federation  
Slovakia  
Ukraine

###### Central and Western Asia

Armenia  
Azerbaijan  
Cyprus  
Georgia  
Israel  
Kazakhstan  
Kyrgyzstan  
Tajikistan  
Turkey  
Turkmenistan  
Uzbekistan

## Developed countries

Andorra  
Antigua and Barbuda  
Australia  
Austria  
Bahamas  
Bahrain  
Barbados  
Belgium  
Brunei Darussalam  
Canada  
Channel Islands  
Chile  
Cyprus  
Czech Republic  
Denmark  
Equatorial Guinea  
Estonia  
Finland  
France  
French Polynesia  
Germany  
Greece  
Guam  
Hong Kong, China  
Hungary  
Iceland  
Ireland  
Israel  
Italy  
Japan  
Korea, Republic of  
Kuwait  
Latvia  
Liechtenstein  
Lithuania  
Luxembourg  
Macau, China  
Malta  
Monaco  
Netherlands  
New Caledonia  
New Zealand  
Norway  
Oman  
Poland  
Portugal  
Puerto Rico  
Qatar  
Russian Federation  
Saint Kitts and Nevis  
Saudi Arabia  
Seychelles  
Singapore  
Slovakia  
Slovenia  
Spain  
Sweden  
Switzerland  
Taiwan, China  
Trinidad and Tobago  
United Arab Emirates  
United Kingdom  
United States  
United States Virgin Islands  
Uruguay

## Emerging countries (Upper-middle income)

Albania  
Algeria  
Argentina  
Azerbaijan  
Belarus  
Belize  
Bosnia and Herzegovina  
Botswana  
Brazil  
Bulgaria  
China  
Colombia  
Costa Rica  
Croatia  
Cuba  
Dominican Republic  
Ecuador  
Fiji  
Gabon  
Grenada  
Iran, Islamic Republic of  
Iraq  
Jamaica  
Kazakhstan  
Lebanon  
Libya  
Macedonia, the former Yugoslav  
Republic of  
Malaysia  
Maldives  
Marshall Islands  
Mauritius  
Mexico  
Mongolia  
Montenegro  
Namibia  
Palau  
Panama  
Paraguay  
Peru  
Romania  
Saint Lucia  
Saint Vincent and  
the Grenadines  
Serbia  
South Africa  
Suriname  
Thailand  
Tonga  
Tunisia  
Turkey  
Turkmenistan  
Tuvalu  
Venezuela, Bolivarian  
Republic of

## Emerging countries (Lower-middle income)

Angola  
Armenia  
Bangladesh  
Bhutan  
Bolivia, Plurinational State of  
Cameroon  
Cabo Verde  
Congo  
Côte d'Ivoire  
Djibouti  
Egypt  
El Salvador  
Georgia  
Ghana  
Guatemala  
Guyana  
Honduras  
India  
Indonesia  
Jordan  
Kenya  
Kiribati  
Kyrgyzstan  
Lao People's Democratic  
Republic  
Lesotho  
Mauritania  
Micronesia, Federated States of  
Moldova, Republic of  
Morocco  
Myanmar  
Nauru  
Nicaragua  
Nigeria  
Occupied Palestinian Territory  
Pakistan  
Papua New Guinea  
Philippines  
Samoa  
Sao Tome and Principe  
Senegal  
Solomon Islands  
Sri Lanka  
Sudan  
Swaziland  
Syrian Arab Republic  
Tajikistan  
Timor-Leste  
Ukraine  
Uzbekistan  
Vanuatu  
Viet Nam  
Western Sahara  
Yemen  
Zambia

## Developing countries

Afghanistan  
Benin  
Burkina Faso  
Burundi  
Cambodia  
Central African Republic  
Chad  
Comoros  
Congo, Democratic Republic  
of the  
Eritrea  
Ethiopia  
Gambia  
Guinea  
Guinea-Bissau  
Haiti  
Korea, Democratic People's  
Republic of  
Liberia  
Madagascar  
Malawi  
Mali  
Mozambique  
Nepal  
Niger  
Rwanda  
Sierra Leone  
Somalia  
South Sudan  
Tanzania, United Republic of  
Togo  
Uganda  
Zimbabwe

## Appendix B. Labour market estimates and projections

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The source of all global and regional labour market estimates in this *World Employment and Social Outlook* report is the ILO's Trends Econometric Models (TEM), November 2017. The ILO has designed and actively maintains econometric models, which are used to produce estimates of labour market indicators in the countries and years for which country-reported data are unavailable. These allow the ILO to produce and analyse global and regional estimates of key labour market indicators and related trends.

The TEM is used to produce estimates and projections – disaggregated by age and sex as appropriate – of unemployment, employment and status in employment. The output of the model is a complete matrix of data for 189 countries. The country-level data can then be aggregated to produce regional and global estimates of labour market indicators, such as the unemployment rate and the employment-to-population ratio.

Prior to running the TEM, labour market information specialists in the Research Department, in cooperation with ILOSTAT and specialists in ILO field offices, evaluate existing country-reported data and select only those observations deemed sufficiently comparable across countries, using criteria including: (i) type of data source; (ii) geographic coverage; and (iii) age group coverage.

With regard to the first criterion, in order for data to be included in the model, they must be derived from either a labour force survey or a population census. National labour force surveys are generally similar across countries, and the data derived from these surveys are more readily comparable than data obtained from other sources. A strict preference is therefore given to labour force survey-based data in the selection process. However, many developing countries, which lack the resources to carry out a labour force survey, do report labour market information based on population censuses. Consequently, due to the need to balance the competing goals of data comparability and data coverage, some population census-based data are included in the model.

The second criterion is that only nationally representative (i.e. not prohibitively geographically limited) labour market indicators are included. Observations which correspond to only urban or only rural areas are not included, as large differences typically exist between rural and urban labour markets, and using only rural or urban data would not be consistent with benchmark data such as GDP.

The third criterion is that the age groups covered by the observed data must be sufficiently comparable across countries. Countries report labour market information for a variety of age groups and the age group selected can have an influence on the observed value of a given labour market indicator.

Apart from country-reported labour market information, the TEM uses the following benchmark files:

- United Nations World Population Prospects, 2017 Revision, for population estimates and projections;
- ILO Labour Force Estimates and Projections (LFEP), 2017 Revision, for labour force estimates and projections;
- IMF/World Bank data on GDP (PPP, per capita GDP and GDP growth rates) from the World Development Indicators and the World Economic Outlook database, October 2017;
- World Bank poverty estimates from the PovcalNet database.

### Estimates of labour market indicators

The TEM produces estimates of unemployment rates to fill in missing values in the countries and years for which country-reported data are unavailable. Multivariate regressions are run separately for different regions in the world in which unemployment rates, broken down by age and sex (youth male, youth female, adult male, adult female), are regressed on GDP growth rates. Weights are used in the regressions to correct for biases that may result from the fact that countries which report unemployment rates tend to differ (in statistically important respects) from countries that do not report unemployment rates.<sup>1</sup>

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1. For instance, if simple averages of unemployment rates in reporting countries in a given region were used to estimate the unemployment rate in that region, and the countries that do not report unemployment rates should happen to differ from reporting countries with respect to unemployment rates, without such a correction mechanism the resulting estimated regional unemployment rate would be biased. The “weighted least squares” approach adopted in the TEM corrects for this potential problem.

For 2017, a preliminary estimate is produced, using quarterly and monthly information available up to the time of production of this *World Employment and Social Outlook* report (November 2017). The model also estimates employment by status using similar techniques to impute missing values at the country level. In addition to GDP growth rate, the variables used as explanatory variables are the value-added shares of the three broad sectors in GDP, per capita GDP and the share of people living in urban areas. Additional econometric models are used to produce global and regional estimates of working poverty and employment by economic class (Kapsos and Bourmpoula, 2013).

## Projections of labour market indicators

Unemployment rate projections are obtained using the historical relationship between unemployment rates and GDP growth during the worst crisis/downturn period for each country between 1991 and 2005, and during the corresponding recovery period.<sup>2</sup> This was done through the inclusion of interaction terms of crisis and recovery dummy variables with GDP growth in fixed effects panel regressions.<sup>3</sup> Specifically, the logistically transformed unemployment rate was regressed on a set of covariates, including the lagged unemployment rate, the GDP growth rate, the lagged GDP growth rate and a set of covariates consisting of the interaction of the crisis dummy and the interaction of the recovery-year dummy with each of the other variables.

Separate panel regressions were run across three different groupings of countries, based on:

- (1) geographic proximity and economic/institutional similarities;
- (2) income levels;<sup>4</sup>
- (3) level of export dependence (measured as exports as a percentage of GDP).<sup>5</sup>

The rationale behind these groupings is as follows: Countries within the same geographic area or with similar economic/institutional characteristics are likely to be similarly affected by the crisis and have similar mechanisms to attenuate the impact of the crisis on their labour markets. Furthermore, because countries within given geographic areas often have strong trade and financial linkages, the crisis is likely to spill over from one country to its neighbour (e.g. Canada's economy and labour market developments are intricately linked to developments in the United States). Countries with similar income levels are also likely to have similar labour market institutions (e.g. social protection measures) and similar capacities to implement fiscal stimulus and other policies to counter the crisis impact. Finally, as the decline in exports was the primary crisis transmission channel from developed to developing countries, countries were grouped according to their level of exposure to this channel, as measured by their exports as a percentage of GDP. The impact of the crisis on labour markets through the export channel also depends on the type of exports (the affected sectors of the economy) involved, the share of domestic value added in exports and the relative importance of domestic consumption (for instance, countries such as India and Indonesia, with a large domestic market, were less vulnerable than countries such as Singapore and Thailand). These characteristics are controlled for by using fixed effects in the regressions.

In addition to the panel regressions, country-level regressions were run for countries with sufficient data. The ordinary least squares country-level regressions included the same variables as the panel regressions.

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2. The crisis period comprises the span between the year in which a country experienced the largest drop in GDP growth and the "turning point year" when growth reached its lowest level following the crisis before starting to climb back to its pre-crisis level. The recovery period comprises the years between the "turning point year" and the year when growth has returned to its pre-crisis level.

3. In order to project unemployment during the current recovery period, the crisis-year and recovery-year dummies were adjusted, based on the following definition: a country was considered to be "currently in crisis" if the drop in GDP growth after 2007 was larger than 75 per cent of the absolute value of the standard deviation of GDP growth over the 1991–2008 period and/or larger than 3 percentage points.

4. The income groups correspond to the World Bank income group classification of four income categories, based on countries' 2008 gross national income (GNI) per capita (calculated using the Atlas method): low-income countries, US\$975 or less; lower middle-income countries, US\$976–US\$3,855; upper middle-income countries, US\$3,856–US\$11,905; and high-income countries, US\$11,906 or more.

5. The export dependence-based groups are: highest exports (exports  $\geq$  70 per cent of GDP); high exports (exports  $<$ 70 per cent but  $\geq$ 50 per cent of GDP); medium exports (exports  $<$ 50 per cent but  $\geq$ 20 per cent of GDP); and low exports (exports  $<$ 20 per cent of GDP).

To take into account the uncertainty surrounding GDP prospects, as well as the complexity of capturing the relationship between GDP and unemployment rates for all the countries, a variety of ten (similar) multilevel mixed-effects linear regressions (varying-intercept and varying-coefficient models) are utilized. The main component that changes across these ten versions is the lag structure of the independent variables. The potential superiority of these models lies in the fact that not only is the panel structure fully exploited (e.g. increased degrees of freedom), but it is also possible to estimate the coefficients specifically for each unit (country), taking into account unobserved heterogeneity at the cluster level and correcting for the random effects approach caveat that the independent variables are not correlated with the random effects term.

Overall, the final projection was generated as a simple average of the estimates obtained from the three group panel regressions and also, for countries with sufficient data, the country-level regressions. For a selection of countries (40 out of 189), an average of another set of forecast combinations was made according to a judgement-based appraisal in order to represent more realistically the recent trends observed in each country's economic forecast.

### Short-term projection model

For 41 countries, the preliminary unemployment estimate for 2017 and the projections for 2018 and 2019 are based on results from a country-specific short-term projection model. The ILO maintains a database on monthly and quarterly unemployment flows that contains information on inflow and outflow rates of unemployment, estimated on the basis of unemployment by duration, following the methodologies proposed by Shimer (2012) and Elsby, Hobijn and Sahin (2013). A multitude of models are specified that either project the unemployment rate directly or determine both inflow and outflow rates, using ARIMA, VARX and combined forecast techniques. The short-term projection model relies on several explanatory variables, including hiring uncertainty (Ernst and Viegelahn, 2014), policy uncertainty (Baker, Bloom and Davis, 2015), macroeconomic forecasts by Oxford Economics and the Manpower Employment Survey Outlook. All estimated models are evaluated on an eight-quarter ahead rolling pseudo out-of-sample forecasting evaluation starting in Q1 2009, among which five models are selected using a weighting of the mean and maximum forecast error. The top five model forecasts are then averaged.

### Sectoral employment estimates and projections

In addition to the labour market indicators mentioned above, this report also presents estimates and projections of the distribution of the employed population across sectors of economic activity. The main data source used for the estimation and projection of the employment shares by sector is the database on "Employment by sex and economic activity" available on ILOSTAT, which is complemented with data on sectoral employment from the OECD. To produce estimates and projections of sectoral employment shares, data on sectoral value added shares of GDP are taken from the United Nations Statistics Division – System of National Accounts – National Accounts Main Aggregates (UNSD SNAAMA, December 2016) database. The Economist Intelligence Unit (EIU) database was used to supplement the data from the above sources and also to assist in projecting the value added shares by sector. The demographic variables used in the model come from the United Nations World Population Prospects (UN WPP), the United Nations World Urbanization Prospects (UN WUP) and the ILO Labour Force Estimates and Projections (ILO LFEP). Other sources of data for explanatory variables are the IMF World Economic Outlook database, the World Bank World Development Indicators database and the IMF International Financial Statistics database. The explanatory variables that are considered include: GDP per capita, output per worker, investment, exports of goods, imports of goods, general government final consumption expenditure, gross capital formation, trade in services, real effective exchange rate index, value added by sector, ratio of female-to-male labour force aged 30 to 64 years old, share of urban population in total population, share of population aged less than 15 years old in total population, share of population aged less than 15 years old and population aged above 65 years old in total population, share of wage and salaried workers in total employment. Estimates and projections are produced on the basis of a methodology that proceeds in three steps: (i) run regressions with a set of different combinations of the potential explanatory variables; (ii) select the specifications for which the goodness-of-fit is best; and (iii) run a bootstrap procedure on those specifications and calculate for each geographical region and each sector the root mean square error (RMSE), based on this procedure. At this point, the

RMSE is produced not only for these specifications but also for the average prediction among all the specifications selected, the average among the three best and among the five best performers. Then, for each sector or occupation and for each region, the specification with the lowest RMSE is selected to be used for the final estimates. Finally, some adjustments are made to the estimates in order to make sure that the sum of shares across all categories equals 100 and that the sum of men and women working in a specific sectoral equals the number of the estimate for both sexes.

Estimated sectors represent an ILO-specific classification that allows maximum consistency between the third and fourth revision of the International Standard of Industry Classification (ISIC). The sectors A, B, C, F, G, I, K, O, P and Q correspond to the ISIC Rev.4 classification. Furthermore, the following composite sectors are defined:

- “Utilities” is composed of sectors D and E
- “Transport, storage and communication” is composed of sectors H and J
- “Real estate, business and administrative activities” is composed of sectors L, M and N
- “Other services” is composed of sectors R, S and T.

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