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TFORECASTING WOMEN IN LEADERSHIP POSITIONS

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ABSTRACT:

This Technical Brief examines the persistent gender gap in managerial positions globally, highlighting that women hold only 28.2% of such roles despite advancements in educational attainment and labor force participation. The analysis reveals significant regional disparities, with women more likely to occupy management roles in sectors traditionally associated with female labor, such as health and education. Cultural norms and domestic responsibilities are identified as major barriers to women's advancement in leadership. The brief discusses the limited literature on this topic, particularly in low- and middle-income countries, and emphasizes the need for policy interventions, such as gender quotas, to enhance women's representation in leadership. Utilizing the International Futures modeling platform, the report forecasts trends in women's leadership from 2015 to 2050, aiming to inform strategies for achieving gender equality in the workplace.

INTRODUCTION

In most regions, women have caught up with or are even sur- passing men in terms of educational attainment, especially at the tertiary level. And women's labor force participation has increased in many countries over recent decades. However, women still remain underrepresented in management po- sitions in the workplace. In other words, the gender gap in power and leadership is an important component of the persistent lag in gender equality. Globally, women hold just
28.2 per cent of management positions in the workplace (UN Women, 2023).

Understanding more about the gender gap in manage- rial positions is an important component of understanding persistent gender inequality. This Technical Brief details the process of adding a measure of women in managerial posi- tions to the International Futures (IFs) integrated modeling platform in order to estimate and forecast women's lead- ership in the workplace globally. It begins with a review of relevant literature, data sources, and data challenges. It then presents the results of a regression analysis designed to identify relationships between women in managerial posi- tions and other variables for the purpose of identifying driver variables and relationships which are then implemented in the International Futures model. Finally, the brief explores current estimations and forecasts of women in management starting in 2015 and until 2050.

Keyword: Women in Leadership Management Positions Labor Force Participation

LITERATURE

Data show that women are underrepresented in manage- ment positions. In a set of G20 and guest countries with available data, just under 30 percent of middle and senior management positions are occupied by women (ILO, 2020), with considerable variation by region. According to data from the ILO (2019) from 1991-2018, the regions with the highest share of women in management positions are North America (36.2 percent), Latin America and the Caribbean (34.1 percent), and Europe and Central Asia (32.1). Rates are just under 20 percent for Asia and the Pacific and Africa, and lowest (10.1 percent) in Middle East and North Africa (ILO, 2019). Women are more likely to be in management roles in feminized functions, like human resources and administra- tion, and in more feminized sectors, like health, social work, and education than in traditionally male-dominated indus- tries like mining and construction (ILO, 2019, 2020). The share of women in managerial positions is higher in the public sec- tor than in the private sector (ILO, 2020).

Literature on the drivers of women in managerial positions is limited, and much is geographically focused on high-in- come and Western countries. However, there is evidence that greater economic development does not necessarily mean more women in leadership positions (Pande & Ford, 2011). And it is clear that women's representation in leadership has not kept pace with improvements in women's education and labor force participation (Pande & Ford, 2011).

Cultural norms and attitudes remain a major barrier for women advancing into leadership positions. In cultures that emphasize women's roles as subservient, these values may discourage women from working or seeking leadership po- sitions to begin with (Kiamba, 2009). And when women do seek to advance in the workplace, they are often faced with an organizational culture that subjects women in the work- place to sexual harassment, relegates women to secretarial duties and leadership only in certain roles, like human re- sources, and undervalues their expertise (Haile et al., 2016; Joshi, 2014; Joshi & Misangyi, 2018). Moreover, women often with considerable variation by region. According to data from the ILO (2019) from 1991-2018, the regions with the highest share of women in management positions are North America (36.2 percent), Latin America and the Caribbean (34.1 percent), and Europe and Central Asia (32.1). Rates are just under 20 percent for Asia and the Pacific and Africa, and lowest (10.1 percent) in Middle East and North Africa (ILO, 2019). Women are more likely to be in management roles in feminized functions, like human resources and administra- tion, and in more feminized sectors, like health, social work, and education than in traditionally male-dominated indus- tries like mining and construction (ILO, 2019, 2020). The share of women in managerial positions is higher in the public sec- tor than in the private sector (ILO, 2020). with considerable variation by region. According to data from the ILO (2019) from 1991-2018, the regions with the highest share of women in management positions are North America (36.2 percent), Latin America and the Caribbean (34.1 percent), and Europe and Central Asia (32.1). Rates are just under 20 percent for Asia and the Pacific and Africa, and lowest (10.1 percent) in Middle East and North Africa (ILO, 2019). Women are more likely to be in management roles in feminized functions, like human resources and administra- tion, and in more feminized sectors, like health, social work, and education than in traditionally male-dominated indus- tries like mining and construction (ILO, 2019, 2020). The share of women in managerial positions is higher in the public sec- tor than in the private sector (ILO, 2020).

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lack the social connections and networks that help men in power advance (Fairfax, 2006; Kiamba, 2009).

Women are also under-represented in sectors that matter for the health of our planet, including those related to resource management. In 2019, only 23.7 per cent of managers in large utility companies (with more than 200 employees) were wom- en. In smaller utility companies, the share was even lower, at
23.1 per cent (Azcona et al., 2023).

Another major challenge to women's advancement into lead- ership positions is the expectation that women perform the majority of domestic and childcare duties in a household (ILO, 2018; UN Women, 2020). Even when working full time, women are often expected to pick up family responsibilities in a "sec- ond shift," while many male leaders benefit from spouses who are expected to perform these duties (Ferrant et al., 2014; Hochschild & Machung, 2012; Kiamba, 2009). Alternative childcare options are often costly, resulting in some women staying home or pulling back on paid work commitments in order to care for children (Klettner et al., 2016).

One policy solution to the lack of women's representation in managerial positions is to institute a quota. Gender quotas have existed in some countries for politics for decades but have only recently been introduced to business. In 2003, Norway implemented a gender quota of 40 percent rep- resentation on public company boards, and several other countries have followed this example. Some companies have also implemented voluntary gender quotas for board or management positions. Quotas have found to be effective in increasing women's representation in both business and politics (Berevoescu & Ballington, 2021; Pande & Ford, 2011).

Very little research has looked at the performance effects of quotas in the private sector (Pande & Ford, 2011). While one study found that firms affected by Norway's gender quota showed reduced profits in the short term compared to other Nordic companies, that reduction was largely due to increased spending on labor (Matsa & Miller, 2013). And while another found that the increase in women's representation on boards due to a legislated quota was associated with a reduction in affected firms' market valuation, it also found that gender of the board members did not affect the value once other char- acteristics were controlled for (Ahern & Dittmar, 2010).

At the firm level, there is evidence that women's represen- tation in management and top leadership positions results in improved firm performance in the United States (Dezsö & Ross, 2012), Indonesia (Triana & Asri, 2017), and Canada and Pakistan (Faizan et al., 2019). In a survey of nearly 13,000 enterprises in 70 countries, the ILO (2019) found positive asso- ciations between the presence of a gender-inclusive business culture and gender diversity initiatives, and improved busi- ness outcomes and profit increases.

At regional and country levels, model simulations show that excluding women from leadership positions dampens economic growth. Esteve-Volart (2004) shows that excluding women from managerial positions in India negatively affects economic growth as well as the labor market, wages, and in- vestments in education. And globally, Cuberes and Teigneier (2012) show that excluding women from entrepreneurship reduces the average output per worker and results in income losses of around 5 percent.

DATA

Historical data for this variable are from the International Labour Organization (ILO) series: *Employment by sex and occupation – ILO modelled estimates, Nov, 2022 (thousands) – Annual*. The dataset includes absolute numbers of women and men in different employment classifications. For this dataset, we calculated the share of women in leadership posi- tions manually, using the occupation category "1. Managers."

The International Standard Classification of Occupations (ISCO) includes four sub-categories within the Managers category: 11. Chief Executives, Senior Officials and Legislators; 12. Administrative and Commercial Managers; 13. Production and Specialized Services Managers; and 14. Hospitality, Retail and Other Services Managers. Category 11 is considered senior management, 12 and 13 are considered middle man- agement, and 14 is considered junior management. Some analyses limit the focus to senior and middle management, excluding 14 (ILO, 2020). For our purposes, in order to ensure the greatest level of coverage, we included all Managerial categories, including those that were not delineated further into a second-digit categorization.

The dataset includes data for 165 countries, over 87 percent of the 188 countries in the model. Data are available from as early as 2010 and as recent as 2021. While some countries offer complete yearly coverage from 2010-2021, others only have one or two datapoints in the period. Altogether, data are available in just over half (53 percent) of country-years for IFs countries from 2010-2021.

Data on the proportion of women in managerial positions come from labor force surveys but have important limitations. Many countries do not conduct labor force surveys regularly due to the required expense, and some others do not make data available at the level necessary to calculate the proportion of women in managerial positions or they are not harmonized to the codes necessary for cross-country comparison (ILO, 2020). Moreover, a review of the data reveals some sharp jumps that may be due to methodological differences from year to year. For example, in Togo the proportion of women in managerial positions more than doubles in two years, from 29.8 percent in 2015 to 70.1 percent in 2017. These large changes indicate that there may be discrepancies in the definitions, methodologies, and reporting in the Labor Force Surveys that inform this data series as well as sample size issues and should be approached with caution.

MODELLING WOMEN IN LEADERSHIP POSITIONS

International Futures

The International Futures (IFs) tool is an open-source integrated assessment modeling platform that allows for his- torical data analysis and scenario analysis for 188 countries. IFs represent integrated relationships across 12 core systems: agriculture, demographics, economics, education, energy, environment, finance, governance, health, infrastructure, in- ternational politics, and technology. All systems and modules within IFs are connected dynamically so that changes in one system lead to changes across all others. More information about IFs is available at pardeewiki.du.edu/ or in Hughes (Hughes, 2019).

For this project, we created a new variable in IFs – Percent of Managerial Roles Filled by Women (WOMENINLEADERSHIP). The variable is initialized using the ILO data series described in the previous section. If no data is available for a country, a value is initialized using the relationships described below, in the Drivers section.

Drivers of women in leadership positions

Based on a review of literature and consultation with experts, we assessed 12 different variables as potential drivers of the forecast of women in managerial positions that are available in the International Futures Model.

The following variables were included in this exploratory analysis:

- Education, average years for male, female, and total
- Female labor force participation rate
- Gender Development Index (GDI)
- Gender Inequality Index (GII)
- Homicide rate for adult women
- Household consumption as a percent of GDP
- Household size
- Life expectancy
- Region
- Social expenditure per GDP
- Total fertility rate
- Youth dependency ratio

TABLE 1: Regression results for the women's share of managerial positions. Sub-region indicator variables are omitted from the table

VARIABLES	(1) Initial	(2) Alt 1	(3) Alt 2	(4) Alt 3	(5) Alt 4	(6) Alt 5	(7) Alt 6	(8) Alt 7
Gdi	3.963***							
	(0.841)							
hhcon_per-cent_gdp	0.0116***	0.00935***	0.00818*	0.00788***	0.00989**			0.00946***
	(0.00244)	(0.00244)	(0.00419)	(0.00261)	(0.00411)			(0.00257)
edyrs_f	0.0615***	0.135***	0.0500**	0.143***	0.0588**	0.0326*	0.123***	0.113***
	(0.0171)	(0.0188)	(0.0195)	(0.0184)	(0.0230)	(0.0193)	(0.0147)	(0.0141)
Gii		0.745**	0.784	1.035***	0.00553	0.883*	1.025***	
		(0.297)	(0.478)	(0.289)	(0.487)	(0.485)	(0.262)	
lfpr_f			0.0176***	0.00868***		0.0172***	0.0109***	0.00638**
			(0.00628)	(0.00287)		(0.00636)	(0.00225)	(0.00300)
govsocialexp_per_gdp			-0.00451		-0.00628	-0.0124		
			(0.0124)		(0.0121)	(0.0117)		
Constant	-5.395***	-2.677***	-2.942***	-3.334***	-1.964***	-2.246***	-3.024***	-2.431***
	(0.716)	(0.388)	(0.586)	(0.371)	(0.484)	(0.511)	(0.292)	(0.244)
Observations	481	498	147	498	147	149	669	512

Drivers were assessed in different combinations and formula- tions. See Table 1 for a non-exhaustive selection of regression results, using a fractional response logistic regression with sub-region fixed effects.

Fractional response logistic regression allows for the model- ing of continuous variables bounded by the values of zero and one (Papke & Wooldridge, 1996), which is appropriate for our dependent variable modeled here given that the share

of women in leadership positions cannot be less than zero or more than one hundred percent. Moreover, this nonlin- ear model allows for variable marginal effects. For example, when the share of women in leadership positions is extremely low, a modest amount of liberalization in a society might re- sult in a relatively large increase in the share of women in leadership positions. Relatedly, once the share of women in leadership positions notably exceeds 50 percent, future in- creases might be expected to see a saturation effect rather than a continuous progression toward a 100 percent share. In contrast, more commonly used ordinary least squares meth- ods assume a constant marginal effect and can produce estimates that include large negative and positive values ex- ceeding the known zero-to-one bound defining any measure of shares or proportions.

Sub-region fixed effects were added to control for unique, unmeasured and oftentimes unmeasurable factors that describe the cultural, historical, geographical, and other fac- tors that define a given country's place in the world. While our preference would have been to use country fixed effects, minimum sample size requirements dictated that sub-re- gions were the most micro-level geographic control variable available for use (Harrell, 2015).

Our first model (1) was oriented around three buckets of drivers: gender inequality overall, household burden, and women's education and skill. We take GDI as our measure of gender inequality. As the ratio between male and female Human Development Index (HDI) scores, it accounts for gen- der inequality in income, education, and health outcomes, and reflects broad societal inequalities. We also explored the GII as a measure of gender inequality, but curiously GII consistently showed the opposite sign to what was expected: increased gender inequality was associated with more wom- en in managerial positions. This could be due to a number of reasons, including a small sample size due to limited data and the existence of an unmeasured confounding variable.

Women's educational attainment was significantly associat- ed with women in managerial positions in all formulations and reflects a relationship found in the literature. Household consumption is significantly and positively associated with women in managerial positions. Government welfare spend- ing was tried as a variable, but significantly limited data availability reduced the observation pool such that it was not a viable option.

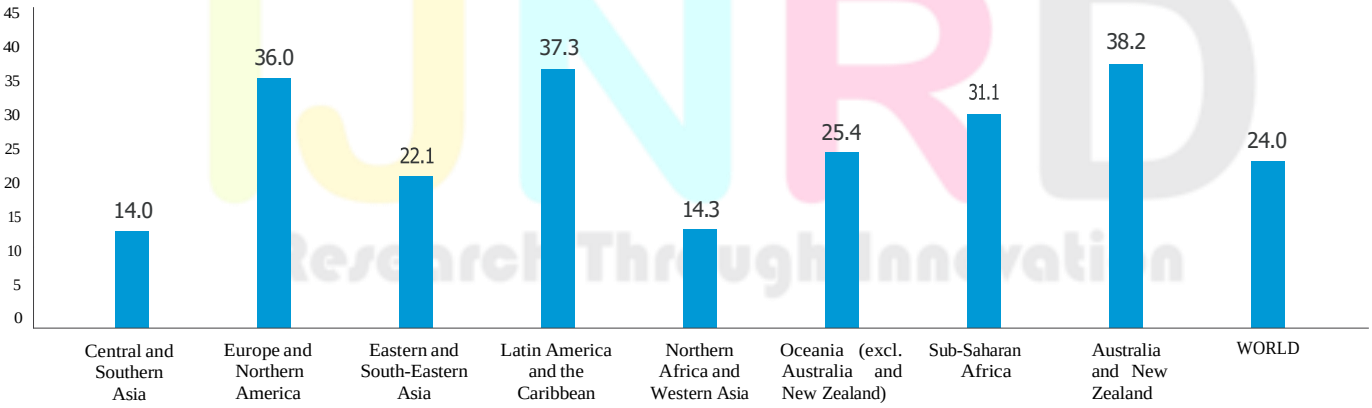
For women in leadership, we ultimately used the initial for- mulation – (1) in Table 1 – in which the portion of women in managerial positions is driven by GDI, household consump- tion, and female education. A number of other difficult to measure variables such as gender norms, are not taken into account. Slow changes in such characteristics may lead to a longer trajectory towards achieving gender parity in mana- gerial positions, which is beyond the scope of the estimates and projections presented in this paper.

ESTIMATES AND FORECASTS OF WOMEN IN MANAGERIAL POSITIONS

We estimate that, globally, women hold about 24 percent of managerial positions in 2023. Northern Africa and Western Asia (NAWA) and Central and Southern Asia (CSA) are the regions with the lowest female representation at 14.3 and 14 percent of managerial positions, respectively. Levels in Eastern and South-eastern Asia (ESEA) are just below the global average at 22.1 percent. The region with the highest proportion of women in managerial positions is Australia and New Zealand at 38.2 percent, while Europe and Northern America (ENA) and Latin America and the Caribbean (LAC) are at 36 and 37.3 per cent respectively.

FIGURE 1

Proportion of managers who are women by region, 2023

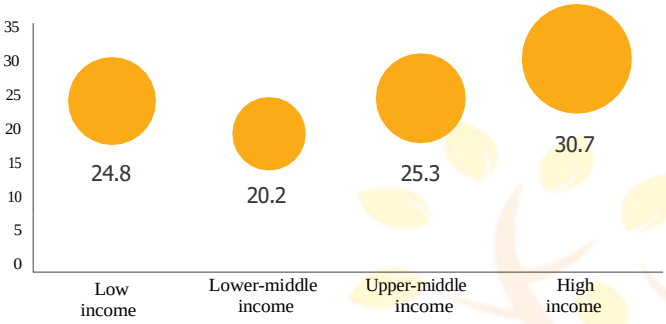


Source: UN Women and the Pardee Center for International Futures using IFs v. 7.97.

By income group, women's representation in management is the lowest in lower-middle income countries (LMICs), at 20.2percent. This is followed by low income countries (LICs) at 24.8 per cent, upper-middle income countries (UMICs) at 25.3 percent, and finally high income countries (HICs) with 30.7 percent.

FIGURE 2

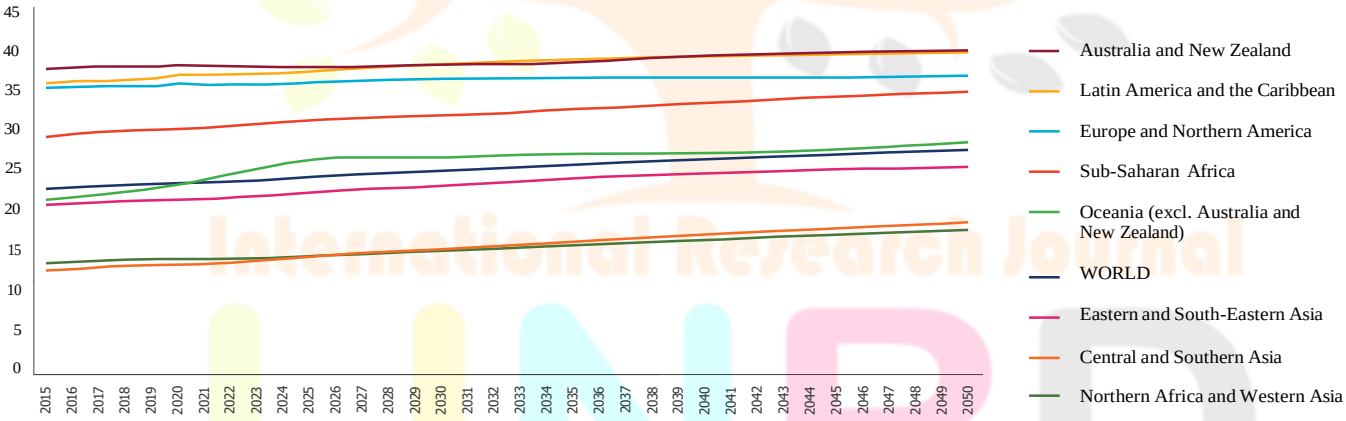
Proportion of managers who are women by World Bank Income Classifications, 2023



Source: UN Women and the Pardee Center for International Futures using IFs v.7.97.

FIGURE 3

Proportion of managers who are women by region, 2015-2050



Source: UN Women and the Pardee Center for International Futures using IFs v.7.97.

The proportion of women in managerial positions is expected to grow modestly through the horizon in most regions. Prog- ress is the most muted in Europe and Northern America and Australia and New Zealand, in which improvements of 1 and 2 percentage points are projected, respectively. The great- est relative increase is projected in Central and Southern Asia, where the portion of women in managerial positions is projected to grow from 14 percent in 2023 to 19 per cent in 2050 - 4.8 percentage points. And in Sub-Saharan Africa, an increase of 4 percentage points is projected.

Women's representation in management varies significantly across countries. 2023 estimates based on recent data from Burkina Faso, Jamaica and Lao People's Republic suggest a proportion of women managers near or above 60 percent. However, it is important to take data limitations into consid- eration, as these figures may obscure challenges to women reaching more senior managerial roles or managerial roles across sectors. For example, the ILO (2021) cautions that while according to the data, women in Jordan made up 62 percent of managers in 2019, female labor force participa- tion is only 14 percent and the majority of female respondents worked in the education sector – less than three percent of female managers work outside of the education sector.

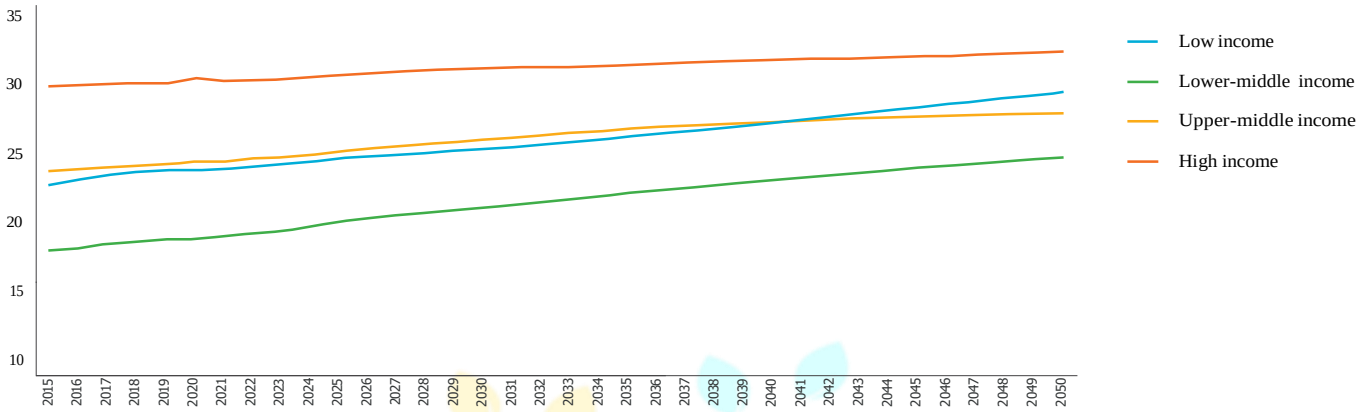
WOMEN IN MANAGERIAL POSITIONS ALONG THE CURRENT PATH

At the current pace of progress, we forecast the proportion of women in managerial positions to rise over time, from roughly 24 percent in 2023 to 28 percent by 2050.

Improvements are expected to be more modest in other re- gions, but all are expected to grow somewhat through the horizon. The portion of women in management grows from 35 to 36 percent in Europe and Northern America, 25 to 29 percent in Oceania (excluding Australia and New Zealand), and 37.3 to 40 percent in Latin America and the Caribbean.

FIGURE 4

Proportion of managers who are women by World Bank Income Classifications, 2015-2050



Source: UN Women and the Pardee Center for International Futures using IFs v.7.97.

The proportion of managerial positions held by women is expected to improve across income groups as well. By income group, we forecast the greatest growth in women in mana- gerial positions in LICs, which are expected to see a growth of about 5 percentage points between 2023 and 2040- from 25 percent in 2023 to nearly 30percent of managerial roles held by women in 2050, and LMICs, from 20 percent to 25 percent in the same period. Improvement is more muted for UMICs (25 to 28 percent) and HICs (31 to 33 percent).

While women's representation in leadership is expected to improve in coming decades, without transformative action it will do so only gradually. According to IFs estimates, the proportion of women in managerial positions has grown on average just 0.5 percent per year from 2015 to 2023. In order to reach 48 percent by mid-century, that growth would need to be over 4 times faster than projected.

CONCLUDING REMARKS

It is important to acknowledge the limitations inherent to these estimations and forecasts. First, as described in the Data section, the data availability is very limited and data across countries may reflect difference in survey meth- odologies and definitions as well as the size of certain female-oriented sectors (like education or hospitality) re- sulting in high values for women in management that may not reflect the state of management across other sectors.

Moreover, data only date back to 2010, so we have very little data about how this variable changes over long time ho- rizons. Thus, long-term forecasts should be seen as highly uncertain. Finally, forecasts in this brief are presented using a 2015 base year in the IFs model. This means that data since that date may not be fully incorporated into the forecasts. Recent data estimates (UNESC, 2022) suggest that the por- tion of women in managerial positions fell slightly in some regions in 2020, a reduction which is not reflected in the Current Path of the IFs model.

This brief details the addition of a new variable measuring the percentage of managerial positions occupied by women to the IFs modeling platform. This has resulted in:

1. Incorporation of data from ILO on women in manage- ment into the IFs system;
2. Estimation of values for countries where data are not available;
3. A forecast of the women in management positions, driven by changes in education, economic, and gender dynamics.

Currently, the variable does not have forward linkages to drive changes in the IFs model. Future work pertaining to this question could further explore existing relationships and long-term forecast dynamics to improve long-term forecasts of this variable, as well as explore potential forward linkages and effects of changes to this variable.

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