

Title: Gender and vulnerable employment in the developing world: Evidence from global micro-data

Author(s): Maria C. Lo Bue, Tu Thi Ngoc Le, Manuel Santos Silva, Kunal Sen

Corresponding author: Manuel Santos Silva

Corresponding author's email address: manuel.santos.silva@uni-muenster.de

All affiliations: UNU-WIDER, Hoa Sen University, University of Münster, UNU-WIDER

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1 Introduction

In 1990, the global labour force participation rate for women was around 29 percentage points below that of men (ages 15+). Since then, the gender gap has remained stubbornly stagnant, declining by two percentage points over the next three decades (ILO, 2019), even though glacial change at the global level hides widely uneven progress across regions (Klasen et al., 2021).

Gender gaps in labor market access are mirrored by gender disparities in employment outcomes. In rich countries, where the vast majority of workers are wage employees in the formal sector, an extensive literature has documented that women earn less than comparable men, are often segregated in specific industries and occupations, and are under-represented in high-paying jobs (e.g., Blau and Kahn, 2017; Bertrand, 2018; Cortes and Pan, 2018).¹ In contrast, most workers in developing countries are self-employed, with women more likely than men to be unpaid workers in family enterprises and less likely to be employers or own-account workers (Rijkers and Costa, 2012; Gindling and Newhouse, 2014). Thus, in the developing world, gender wage gaps and career progression in salaried employment are only informative outcomes for a relatively small (and highly selected) group of women. To fully assess women’s position in the workforce, more comprehensive employment indicators are needed.

In this article, our primary employment indicator is vulnerable employment, as defined by the International Labor Organization (ILO). Vulnerable employment was one of the four key indicators used in the Millennium Development Goals (MDG) framework to assess and monitor progress towards the “achievement of full and productive employment and decent work for all, including women and young people” (MDG Target 1B).² The ILO’s definition is based on status in employment and classifies as vulnerable the categories of own-account workers and contributing family workers (ILO, 2010).³ Vulnerable workers are less likely to have formal work arrangements, access to benefits or social protection programmes, and are more exposed to economic cycles (ILO, 2013). Worryingly, over the past decade no progress has been achieved globally on this indicator: vulnerable employment rates have essentially remained above 46 per cent (of total employment) in emerging economies and reached up to 76 per cent in developing countries (ILO, 2018).

Apart from a few studies that describe vulnerable employment by gender using ILO global and regional aggregate estimates (Elder and King, 2016; ILO, 2016, 2018; Gammarano, 2018) and a few country case-studies (e.g., Otobe, 2017), very little is known about gendered patterns of vulnerable employment. At the macro-level, the literature lacks a comprehensive assessment on, and explanation of, cross-country heterogeneity in levels and trends of vulnerable employment by gender. At the micro-level, evidence is needed on the proximate drivers of vulnerable employment—such as worker and household characteristics, labor market structure—and how these drivers differ by gender, country, and time period.

¹ For literature surveys of gender inequality in labor economics see Altonji and Blank (1999) and Bertrand (2011).

² The other key indicators used by the ILO to monitor MDG Target 1B were the employment-to-population ratio, labor productivity, and the share of working poor (at 1 USD/day) in total employment.

³ Other definitions of employment vulnerability have been proposed by the literature. However, these alternatives essentially focus on formal employment and largely apply to the context of developed countries. For instance, Bardhan and Tang (2010) define vulnerable occupations in the United States in terms of the risk of job loss owing to adverse economic shocks. Hudson (2009) and Pollert and Charlwood (2009) focus instead on low incomes and define vulnerable workers as those earning below given thresholds of the median wage. Using data from European countries, Bazillier et al. (2016) propose an extended definition of vulnerable employment that takes into account, among other indicators, the type of employment contract, employment relationship, type of organization, firm size, ability to influence policy decisions regarding the organization’s activities, responsibility for supervising other employees and ability to decide how daily work is organized.

Our study makes a relevant contribution in these directions. Using global microdata from the World Bank’s International Income Distribution Database (I2D2), a large collection of harmonized household surveys from developing countries (Montenegro and Hirn, 2008), we measure long-run trends, describe geographical patterns, and estimate drivers of gender inequalities in vulnerable employment.

There are two main advantages of focusing on ILO’s vulnerable employment indicator. First, status in employment information is widely available in household surveys and is measured in a relatively consistent way across countries and over time. In contrast, definitions of labor market informality, for example, are conceptually context specific, and, in practice, have less coverage across surveys and are typically not measured in a comparable fashion across countries. Second, status in employment is a meaningful descriptive tool to rank workers in terms of welfare. Using global microdata for 98 countries, Gindling and Newhouse (2014) show that “jobs exhibit a clear pecking order” (p. 313) with respect to worker education and household income: on average, employers are the best-off, followed by wage employees—i.e., the two non-vulnerable categories according to the ILO. Among the vulnerable, off-farm own-account workers are better off than off-farm contributing family workers.⁴ Agricultural workers are the worst off, irrespective of status in employment.⁵ In short, vulnerable employment aims at capturing the most precarious and ‘at risk’ types of work, using straightforward and widely available indicators.⁶

Our analysis proceeds in four stages. First, we present aggregate stylized facts on vulnerable employment using the latest year available for each of 101 developing countries. There is substantial cross-country variation in vulnerable employment as a share of total employment. However, in 81 per cent of the countries, working women are more likely to be vulnerable than working men. The gender gap in vulnerable employment, which is 9 percentage points on average across countries, is due entirely to unpaid employment. Whereas the largest share of vulnerable workers are found in agriculture (72 per cent of male workers and 79 of female workers in the average country), the largest gender *gap* across industries occurs in manufacturing (16 percentage points) and commerce (10 percentage points).

Second, we pool detailed individual and household characteristics for 76 countries and estimate regression correlates of vulnerable employment for all workers and by gender. Although all estimates are descriptive, and do not have a causal interpretation, the large sample size allows us to remove considerable heterogeneity at various levels and rely on increasingly fine-grained variation: within sub-national region, within industry, within occupation, and even within household. We find that, conditional on individual and household characteristics, women are 7 percentage points more likely to be vulnerably employed than comparable men, irrespective of how restricted the models are.

By gender, the experiences of marriage and parenthood create an important wedge between male and female vulnerable employment propensities. On average, for women, being currently married is associated with a 5–6 percentage point increase in the probability of working in vulnerable employment, but, for men, the association is not statistically significant (and the point estimate is negative). The number of children at all ages has a vulnerability-increasing effect for both genders, but the magnitudes are al-

⁴ Gindling et al. (2016) further distinguish between own-account professionals and own-account non-professionals. While employers and own-account professionals earn more than comparable employees in most countries, own-account non-professionals earn a premium in the poorest countries, but face a penalty in middle and high-income countries. Across income levels, women face larger self-employment penalties than men.

⁵ Because status in employment on-farm is likely ill-defined in contexts where subsistence agriculture is prevalent, we conduct all our analyses with and without agricultural workers.

⁶ The binary nature of the vulnerable employment indicator is also in line with theories of labor markets duality in poor countries (e.g., Lewis, 1954; Harris and Todaro, 1970). For a recent example, see Rud and Trapeznikova (2021), who model a dual labor market in a low income setting, consisting of a wage sector (with many frictions, such as entry barriers, search and matching) and a residual, frictionless, subsistence sector.

ways larger for women and inversely related to the child's age. The difference in the effect of children is particularly large when agricultural workers are excluded; the female-specific coefficients are 2 to 3 times larger than the male-specific counterparts. For instance, a married woman with one child of age 0–2 is around 6–7 percentage points more likely to be vulnerably employed than a man with identical characteristics—a difference similar to the conditional gender gap in the pooled sample.

Third, we relax the assumption of coefficient homogeneity across countries. The conditional gender gap in vulnerable employment is positive in the vast majority of countries (67 out of 76, or 88 per cent). Excluding agriculture, the gender gap is positive in 71 out of 76 countries. We then correlate the estimated country-specific gender gaps with economic and demographic structural factors, as well as legal gender disparities, which are measured from the World Bank's 'Women, Business, and the Law' (WBL) database (Hyland et al., 2020). The off-farm gender gap correlates negatively with per capita income and the old age dependency ratio. In turn, the gender gap correlates positively with total fertility rate, the young age dependency ratio, and the overall prevalence of vulnerable employment. Laws also matter. Countries with more gender egalitarian laws exhibit smaller conditional gender gaps in vulnerable employment. Negative correlations are particularly strong for laws regulating marriage, parenthood, assets, and entrepreneurship.

Fourth, we exploit temporal variation in the data: first by estimating birth-cohort effects for all country-years, and then by decomposing the change in vulnerable employment shares by gender between the 1990s and the 2010s for a selected group of countries with surveys in both periods. Overall, once individual and household characteristics are controlled for, cohort effects are limited.⁷ Over a 50 birth-year period, roughly two generations, the decline in vulnerable employment propensity is around 5 percentage points, which compares to the conditional difference in propensity between currently married and non-married women. Consistent with limited cohort-effects, the reductions in the share of vulnerable employment for both genders between the 1990s and the 2010s are almost entirely explained by composition effects, streaming in particular from rising education, declining fertility, structural change, and urbanization. However, that process is largely exhausted, with current levels of the gender gap in vulnerable employment being almost entirely *unexplained* by standard labor supply factors at the individual or household levels.

Our findings relate to several strands of literature. One prominent set of studies investigates gender and microentrepreneurship in developing countries.⁸ Typically, microenterprises are defined as off-farm businesses with less than five workers (Jayachandran, 2020), with most enterprises having no employees other than the owner (Nagler and Naudé, 2017; McKenzie and Paffhausen, 2019). On average, female microentrepreneurs run smaller and less productive firms, and operate in low-productivity sectors of the economy (Rijkers and Costa, 2012; Hardy and Kagy, 2018; Islam et al., 2020). Moreover, evidence from randomized business grants (or loans) finds that returns to capital are substantially higher for male than for female microentrepreneurs (e.g., de Mel, McKenzie, and Woodruff, 2008; Fafchamps et al., 2014; McKenzie, 2017). However, a recent study by Bernhardt et al. (2019) shows that this gender gap in returns to capital is entirely explained by female grants being partly invested in (or captured by) businesses run by *male* household members. When business outcomes are measured at the *household* (rather than at the microenterprise) level, there are no significant differences based on the gender of the grant recipient.

One limitation of the microentrepreneurship literature is the conflation, under the label 'microentrepreneur', of employers, own-account workers, and (sometimes) contributing family workers. As discussed in Gin-

⁷ To estimate cohort effects, we leverage all surveys available since 1991. The sample of roughly 19.2 million workers includes 531 surveys from 95 countries.

⁸ See Jayachandran (2020) for a recent survey of microentrepreneurship in developing countries with a special emphasis on gender issues.

dling and Newhouse (2014), there is a clear welfare ranking among off-farm employment categories, with employers ranked first, wage employees second, followed by own-account workers, and, lastly, by unpaid family workers. The indicator of vulnerable employment used in this article preserves this welfare rank. In practice, because women are more likely than men to work unpaid in family enterprises, vulnerable employment is particularly well-suited to investigate gender differences at the very bottom of the job-quality scale.⁹

Our findings also add to a large literature documenting the labor market consequences of the unequal gender distribution of the costs of reproductive labor and unpaid household production (e.g., Bittman et al., 2003; Chen et al., 2006; Sayer, 2005; Folbre, 2018). Often, vulnerable employment constitutes the only type of activities that is compatible with the constraints imposed on women by unpaid domestic work. For example, childcare is easier to combine with work on a family enterprise or as own-account than with a full-time wage job (Rijkers and Costa, 2012; Delecourt and Fitzpatrick, 2021). Family-related time constraints prevent women from growing their businesses and absorb shocks (Berge and Pires, 2017). McKenzie and Paffenhausen (2019), for instance, find that female-owned microenterprises are much more likely to fail due to household shocks (sickness or family reasons), whereas male-owned firms are more likely to fail due to firm shocks (lack of profits or better earning opportunities in another activity). Constraints on women's time are typically interlinked with social norms on women's 'appropriate' role in society. These norms often hinder women's access to better labor market opportunities, in particular paid employment outside the home (e.g., Boserup, 1970; Heintz, Kabeer, and Mahmud, 2018; Jayachandran, 2021).

We also contribute to a recent but growing literature arguing that gender discrimination embedded in legislation affects women's labor market outcomes.¹⁰ At the country level, more gender egalitarian laws associate positively with female labor participation outside of agriculture and negatively with the gender wage gap (Hyland et al., 2020). Using firm-level microdata across 94 developing countries, Islam et al., (2019) find that legal gender disparities are associated with fewer women hired as paid employees, as top managers, and with fewer female business owners. In a case study, Hallward-Driemeier and Gajigo (2015) exploit the staggered regional roll-out of a reform of Ethiopia's family law in the early 2000s. By striking out restrictions to wives' work outside the home and expanding their access to marital property, the reform increased women's share of wage and full-time employment.

Lastly, at a broader level, our results attest to women's continuing position as secondary earners in many households. Previous studies have found that, in the short term, female self-employment is mostly stress-driven and counter-cyclical in all developing regions, rising in recessions and decreasing during booms (Bhalotra and Umaña-Aponte, 2010). Over the long term, the development process is accompanied by a rising share of wage employment and a reduction in the share of own-account and family workers, who first move out of agriculture to the non-farm sector (Boserup, 1970; World Bank, 2011; Gindling and Newhouse, 2014; Beegle and Bundervoet, 2019). However, the expansion of the formal wage employment sector is not a gender-neutral process. As a result of high and persistent levels of gender segregation by industry and occupation, women's opportunities in salaried employment depend to a large extent on the sectoral pattern of labor demand (Seguino and Braunstein, 2019; Borrowman and Klasen, 2020; Arora et al., 2021).

⁹ Naturally, some own-account or contributing family workers might be high-potential, highly productive entrepreneurs operating under severe capital constraints (e.g., lack of access to credit). See, among others, de Mel, McKenzie, and Woodruff (2008) and Grimm et al. (2012). However, to the extent that those constraints are real and hard to overcome, it seems reasonable to classify them as vulnerable. They may not be 'queuing' for salaried employment, but they are likely 'queuing' for becoming employers.

¹⁰See Roy (2019) for a survey of the literature on legal discrimination against women.

The rest of the paper is organized as follows: Section 2 presents the I2D2 data and descriptive statistics. Section 3 describes the econometric methods used, with the results shown and discussed in section 4. Section 5 concludes.

2 Data and methodology

Our main source of data is the World Bank's International Income Distribution Database (I2D2), a collection of over 1,000 household surveys from 150 countries (World Bank, 2020). The I2D2 includes about 50 harmonized variables on demographic characteristics, education, labor and household income or consumption. The database draws on different types of nationally representative surveys, usually conducted by national statistical agencies, including Household Budget Surveys, Household Income and Consumption Surveys, Labor Force Surveys, and multi-topic surveys (such as Living Standards Measurement Study Surveys).¹¹

2.1 Sample selection

We consider the period 1990–2017 for low and middle-income countries and exclude surveys with missing information on employment status, sex, or household identifiers. Surveys where two or more categories of status in employment are missing are also excluded. In the I2D2, status in employment information distinguishes between paid employees, employers, own-account workers, and unpaid employees. These categories are a good approximation to the ILO's standard (ICSE-93), which divides workers into paid employees, employers, own-account workers, members of producers' cooperatives, contributing family workers, and workers not classifiable by status. Following the ILO definition (ILO, 2010), we classify own-account workers and unpaid employees in the I2D2 as vulnerable, and paid employees and employers as not vulnerable (see Table A1 for a schematic overview). To systematically assess data quality, we compare the estimate of vulnerable employment as a share of total employment for the 15+ population from I2D2 with ILO's modeled estimate for the same year. We exclude from our micro database all country-years for which the two estimates differ by more than 10 percentage points (in absolute terms). After this step, our final sample contains 101 countries for which vulnerable employment can be meaningfully defined and estimated: 11 from East Asia and the Pacific, 17 from Europe and Central Asia, 19 from Latin America and the Caribbean, 7 from Middle East and North Africa, 6 from South Asia, and 41 from Sub-Saharan Africa.

2.2 Female and male vulnerable employment: patterns and trends

We start by describing patterns of vulnerable employment by gender across countries. To provide the latest snapshot, we select the most recent year available for each country. The median year is 2011; the 25th and 75th percentiles are 2008 and 2014. Across the 101 developing countries, the (un-weighted) average share of vulnerable employment in total employment is 0.478 for men and 0.567 for women, resulting in a global gender gap of 8.9 percentage points (Table 1).

There are clear regional differences in the extent of vulnerable employment, as shown in Table 1. Vulnerable employment is least prevalent in Europe and Central Asia, where, in the average country, 27 per cent of employed men and 29 per cent of women are vulnerable. In Sub-Saharan Africa, vulnerable employment is most prevalent, with 63 per cent of employed men and 76 per cent of women being vulnerable in the average country. The average female-male gender gap in vulnerable employment shares is positive in all regions. The gender gap is relatively small (below 5 percentage points) in East Asia and the Pacific, Latin America and the Caribbean, and Europe and Central Asia. The gender gap is relatively

¹¹See Montenegro and Hirn (2008) for a description of the database and its construction.

Table 1: Vulnerable employment by world region

	Number of countries	Vulnerable employment as a share of total employment		
		Male	Female	Female – male
East Asia & Pacific	11	0.544	0.592	0.048
Europe & Central Asia	17	0.273	0.288	0.015
Latin America & Caribbean	19	0.371	0.414	0.043
Middle East & North Africa	7	0.259	0.419	0.160
South Asia	6	0.469	0.638	0.169
Sub-Saharan Africa	41	0.632	0.763	0.131
Total	101	0.478	0.567	0.089

Note: Based on World Bank's regional classification. Regional means are based on un-weighted country means. For each country, the most recent year is selected; it ranges from 1992 to 2017.

Source: Authors' calculations based on I2D2.

large (above 13 percentage points) in Sub-Saharan Africa, Middle East and North Africa, and South Asia.

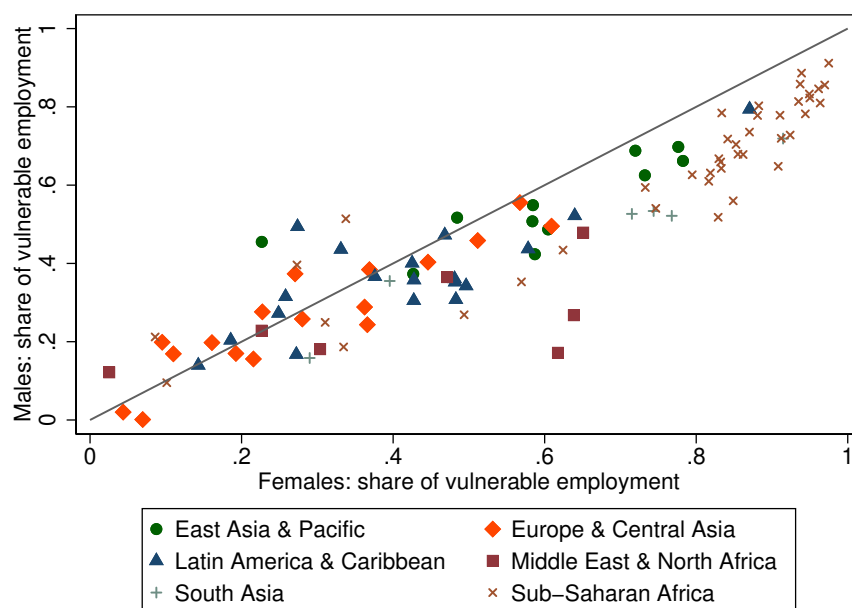
As shown in Figure 1, beyond regional differences, there is substantial cross-country variation in the share vulnerable employment. Vulnerable employment ranges from less than 10 per cent of total employment, for both genders, in two countries of Europe and Central Asia (Belarus and Russia) to more than 85 per cent, for both genders, in four Sub-Saharan countries (Burkina Faso, Niger, Nigeria, and Chad). In 81 per cent of the countries (82 out of 101), the share of vulnerable employment in total employment is larger for women than for men. The size of the gender gap increases with the prevalence of vulnerable employment in a country's labor market. The few countries where men are more likely to be vulnerably employed than women cluster at low levels of vulnerable employment (south-west region of Figure 1). Descriptively, a 10 percentage point increase in the share of vulnerable employment for men (women) is associated with a 1.3 (2.5) percentage point increase in the female-male gender gap.¹²

Figure 2 reveals that the global gender gap in vulnerable employment is due entirely to unpaid employment. In virtually every country, women are more likely to be unpaid workers than men, and, for the average country, this gender gap is 11 percentage points. In contrast, gender differences in the share of own-account work are small and go in the opposite direction. In most countries (61 out of 101), men are more likely to be own-account workers than women; the average female-male gap across countries is –2 percentage points.

Not surprisingly, the share of vulnerable employment varies considerably by industry. As illustrated in Table 2, agriculture is, by a large margin, the industry where vulnerable employment is most prevalent: in the average country, 72 per cent of men and 79 per cent of women working in agriculture are vulnerable workers. Agriculture also exhibits the largest share of unpaid workers: 18 per cent of male and 36 per cent of female workers. In most other industries, women are also more likely to work in vulnerable employment than men. The gender gap is largest for manufacturing (16 percentage points) and commerce (10 percentage points). It can be noted, moreover, that countries where a large share of the labor force works in agriculture have large rates of vulnerable employment *and* large gender gaps in vulnerable employment: these are the Sub-Saharan African countries in the northeast region of Figure 1. Because of the special role of agriculture, which is linked to patterns of subsistence and smallholder farming in poor countries, we conduct our remaining analyses for two sets of workers: (i) all industries, and (ii) excluding the agricultural sector.

¹²OLS estimates from regressing female-male difference in vulnerable employment shares on male (female) share in vulnerable employment (and an intercept). $n = 101$ countries.

Figure 1: Vulnerable employment as a share of total employment by gender



Notes: Unit of analysis is the country ($n = 101$). Un-weighted country means. For each country, the most recent year is selected; it ranges from 1992 to 2017.

Source: Authors' calculations based on I2D2.

This distinction is even more relevant when considering long-term trends in vulnerable employment. Figure 3 plots the distribution of the gender gap across decades, either including or excluding the agricultural sector.¹³ When agricultural workers are included, the average gender gap increases over time, from 6.6 percentage points in the 1990s to 7.9 percentage points in the 2010s.¹⁴ In contrast, among non-agricultural workers, the average gender gap remained essentially constant, from 10.8 percentage points in the 1990s to 10 percentage points in the 2010s. However, the distribution of countries around the

¹³To produce these figures we compute the average vulnerable employment share by gender for each country-year, and then, for each country, average across three decades: 1990–99, 2000–09, and 2010–17. To keep the number of countries per decade fixed, we only consider the 32 countries that have at least one survey per decade.

¹⁴The increase in the gender gap is not an artifact of the 32 country sub-sample. Across all available surveys, the average gender gap increased from 5.8 percentage points in the 1990s ($n=49$) to 9 percentage points in the 2010s ($n=65$).

Table 2: Share of vulnerable employment in total employment, by gender and industry

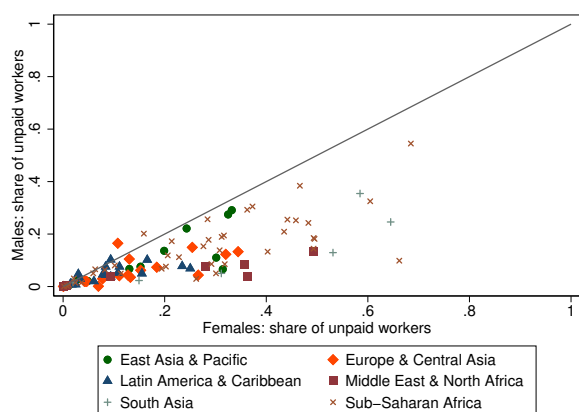
% of industry's employment	Vulnerable		Own-account		Unpaid	
	Male	Female	Male	Female	Male	Female
Agriculture	72	79	54	43	18	36
Mining	28	35	25	27	3	9
Manufacturing	32	48	27	39	5	9
Public utilities	16	20	13	13	4	7
Construction	27	22	23	15	4	7
Commerce	51	61	44	51	6	10
Transport & communications	35	23	32	17	3	6
Financial & business services	18	16	16	13	2	4
Public administration	8	8	6	6	1	2
Other Services, unspecified	25	26	20	17	4	9

Note: Un-weighted means across 101 countries, using each country's most recent year.

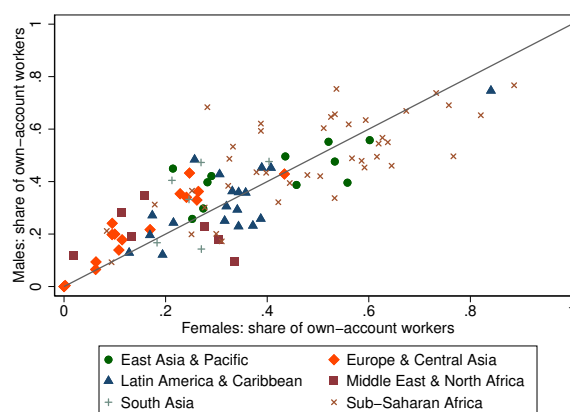
Source: Authors' calculations based on I2D2.

Figure 2: Vulnerable employment categories as a share of total employment by gender.

(a) Unpaid workers



(b) Own-account workers



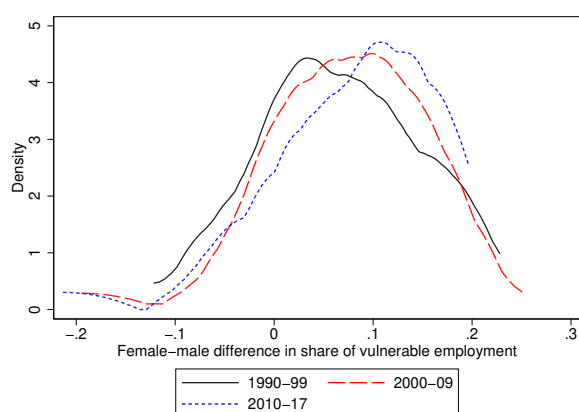
Notes: Unit of analysis is the country ($n = 101$). Un-weighted country means. For each country, the most recent year is selected; it ranges from 1992 to 2017.

Source: Authors' calculations based on I2D2.

average changed. In the 1990s, gender gaps across the globe were more dispersed and clustered around two modes: a first mode centered around zero and a second mode centered around 20 percentage points. Over time, this bimodality appears to be slowly converging towards a unimodal (and left-skewed) distribution with an average (median) gap of 10 (11.7) percentage points. These changes can be explained in light of the process of structural transformation that took place in several South Asian and Sub-Saharan countries (e.g. Ethiopia, Tanzania, Niger, Pakistan and Sri-Lanka) which were located at the lower mode, or between the two modes, of the 1990s distribution. In these countries, the increase of the gender gap results from rapidly declining vulnerable employment among men, rather than increasing vulnerable employment among women.¹⁵

Figure 3: Gender gap in vulnerable employment as a share of total employment (1990–2017), by decade.

(a) All industries



(b) Excluding agriculture



Notes: Unit of analysis is the country ($n = 32$). Un-weighted country means for each decade. Only countries with at least one survey per decade are included.

Source: Authors' calculations based on I2D2.

¹⁵There are nine countries that started with gender gaps below 15 percentage points in the 1990s and had a larger gender gap by the 2010s. Their average gender gap rose from 2 to 10 percentage points over the period. Their average male share in vulnerable employment declined from 44 per cent in the 1990s to 34 per cent in the 2010s, whereas their female vulnerable share fell only slightly, from 47 to 44 per cent.

3 Methods

In this section, we present the econometric methods used in the remainder of the article. First, we estimate the micro-level correlates of vulnerable employment. Second, we decompose differences in vulnerable employment shares by gender and over time.

Modelling vulnerable employment

To identify the socio-economic correlates of vulnerable employment at the micro level, we estimate a parsimonious linear probability (LP) model for the employed population of age 15+:

$$P(V_{irstuo} = 1) = \beta Female_{irstuo} + \mathbf{X}_{irstuo}\gamma + \delta_{rst} + \omega_u + \theta_o + \varepsilon_{irstuo}, \quad (1)$$

where t is the most recent year available for each country. The dependent variable, V , takes value 1 if worker i is in vulnerable employment and 0 otherwise. $Female$ is a female dummy and \mathbf{X}_{irstuo} is a vector of individual and household characteristics. Included individual characteristics are age, age squared, whether the individual is currently married, and a set of dummies capturing educational attainment (less than primary education as the omitted group, completed primary education, completed secondary education, and any post-secondary education). Household characteristics include the household head's educational attainment and whether the head is female. In addition, to capture how the employment status of other household members may correlate with the respondent's vulnerable status, we include sex-specific dummy variables for whether any other male or female household member is a wage employee. We then include variables that flexibly account for household size and structure: number of children of ages 0–2, and 3–5, number of boys and number of girls of ages 6–14, number of adult males and number of adult females—given the richness of the data, we can precisely estimate the coefficients of these different demographic groups. Lastly, the vector \mathbf{X}_{irstuo} includes a urban residence indicator.

Although the estimates are descriptive correlates, and do not have a causal interpretation, the large sample size allows us to remove considerable heterogeneity at various levels. Observing how coefficients change between less and more restricted models could hint at the direction and magnitude of omitted variable bias. To absorb regional heterogeneity, the model includes Admin1-level dummies (δ_{rst}) for region r , in survey s and year t . To absorb sectoral and occupational heterogeneity, 1-digit industry and occupation dummies are also included (ω_u and θ_o , respectively). In the most restricted model, we rely solely on within-household variation through the inclusion of household fixed effects.

An important source of bias is selection into employment. Because female labor force participation rates vary substantially across countries, but vulnerability is only observed for the employed, selection on unobservables in the participation decision will likely correlate with vulnerable status in employment. To try to remove this bias, we include in all models a fine-grained measure of average employment shares for different demographic groups. We assign to each individual the average employment share of her/his gender, 5-year age cohort, education level, in the country-year and urban-rural area of residence. By controlling for this variable, we purge the variation in vulnerable employment that is systematically related to the employment propensity of different socio-demographic groups in different contexts.¹⁶

We have complete covariate data for 76 countries, which are pooled together in un-weighted regressions. ε_{irstuo} is the error term; standard errors are clustered at the survey-year level. The estimation sample in-

¹⁶In further specifications, we also included the squared term of the employment share, but did not find significant evidence for non-linearities.

cludes about 2.94 million observations. Table A3 reports the sample mean for individual and household characteristics. The sample is 41 per cent female and 54 per cent urban, with the average respondent being 38 years-old. 53 per cent of workers in the estimation sample are in vulnerable employment: 48 per cent of men and 61 per cent of women. Table A4 shows the composition of the sample by industry and occupation. The largest industry is, by far, agriculture with 35 per cent of employment in the sample, followed by commerce (18 per cent) and manufacturing (10 per cent). In terms of occupations, the three most common are skilled agricultural workers (23 per cent), elementary occupations (15 per cent), and service and market sales vendors (12 per cent).

Decomposition analyses

Men and women differ both in their individual and household characteristics and in how those characteristics affect the likelihood of vulnerable status in employment. Moreover, both characteristics and their associations with vulnerable employment change over time and differently across genders. To account for these moving parts in a unified framework, and estimate their relative importance, we decompose vulnerable employment shares by gender and over time using the non-linear technique proposed by Fairlie (2006).

Consider two mutually exclusive groups, A and B . The overall gap in the average vulnerable employment share between group A and group B is:

$$\Delta_O \equiv \mathbb{E}[V_B|D_B = 1] - \mathbb{E}[V_A|D_A = 1],$$

where D_g is a dummy determining group membership, with $g = A, B$. Then, decompose the gap between the usual composition effect, Δ_X , and unexplained term, Δ_U , by plugging in a logit model, $L(\cdot)$, of vulnerable employment and rearranging terms¹⁷:

$$\begin{aligned} \Delta_O &= (\mathbb{E}[L(X\beta_A)|D_B = 1] - \mathbb{E}[L(X\beta_A)|D_A = 1]) \\ &\quad + (\mathbb{E}[L(X\beta_B)|D_B = 1] - \mathbb{E}[L(X\beta_A)|D_B = 1]) \\ &= \Delta_X + \Delta_U, \end{aligned}$$

After replacing the expectations by their empirical counterparts, we obtain:

$$\bar{V}_B - \bar{V}_A = \left[\sum_{N_B} \frac{L(X_B \hat{\beta}_A)}{N_B} - \sum_{N_A} \frac{L(X_A \hat{\beta}_A)}{N_A} \right] + \left[\sum_{N_B} \frac{L(X_B \hat{\beta}_B)}{N_B} - \sum_{N_B} \frac{L(X_B \hat{\beta}_A)}{N_B} \right],$$

with N_g being the size of group g . In this case, composition effects are weighted by the coefficients of group A , $\hat{\beta}_A$; whereas the unexplained term is weighted by the covariate distribution of group B , X_B . Alternatively, $\hat{\beta}_B$ could be used to weigh the composition effects and X_A could be used to weigh the unexplained term. Because, a priori, we have no reason to prefer one alternative over the other, we always report results based on both weighing schemes.

In a classical linear decomposition, it is straightforward to further decompose the composition effect, Δ_X , into the contributions of each covariate. In a non-linear setting, however, this step is not trivial, because the contribution of each covariate depends on the distributions of all covariates. The solution proposed by Fairlie (2006) consists of computing a series of counterfactuals through sequentially replacing the distribution of a covariate in one group with its distribution in the other group, holding the other covariates constant. The covariate's individual contribution is then given by the average difference between

¹⁷In practice, add and subtract the counterfactual quantity $\mathbb{E}[L(X\beta_A)|D_B = 1]$, i.e., the expected vulnerable employment share of group B , if it faced the coefficients (and unobservables) of group A .

the observed values and each counterfactual. However, the results are not independent from the ordering of covariates in the sequence of counterfactuals. In practice, as suggested by Fairlie (2006), we draw 1,000 sequences for each decomposition with the ordering of covariates being randomly determined and then average the results over the draws.¹⁸

We perform two decomposition exercises. In the first exercise, we decompose the gender gap in vulnerable employment for the latest year available for each country. This exercise asks: to which extent is the gender gap explained by differences in the distribution of covariates between men and women (*composition effect*) or, rather, by differences in the sex-specific returns to those covariates or to unobservables (*unexplained term*)? The composition effect is then further decomposed to assess the contribution of each group of covariates. In the second exercise, we decompose the *change* in vulnerable employment share between the 1990s and the 2010s for a selected group of countries with surveys in both periods. We run these decompositions separately for men and women. This exercise asks: to which extent are changes in vulnerable employment over the last two decades for men and women explained by changes in the distribution of covariates, or, rather, by changes in coefficients and unobservables?

Our large dataset has two limitations. First, with a large sample, Fairlie decompositions quickly become computationally intensive, both due to the fitting of nonlinear (logit) models and due to the 1,000 random sequences drawn for each set of estimates. Second, sample sizes vary widely between countries and years. Countries with large samples will disproportionately influence the decomposition estimates. To deal with both limitations, for each decomposition exercise, a random sample of 1,500 men and 1,500 women is selected from each survey. For the gender gap decompositions, the random sample has 243,000 observations, equally divided between men and women, from 81 countries. For the 1990s–2010s decomposition, the random sample has 87,000 observations, also equally split by gender, from 29 countries. To further alleviate computational costs, the decompositions are based on parsimonious models that include all individual and household covariates of vector X_{irstuo} in equation (1), industry dummies (ω_u), and world region dummies. In practice, we do not include Admin1 dummies or occupational dummies. Standard errors are clustered at the country level. As usual, we run all decompositions with and without the agricultural sector.

4 Results

4.1 Drivers of vulnerable employment

We first estimate the LP model for the whole population, introducing the sets of controls sequentially. Table 3 shows the results. The gender gap in vulnerable employment is stable at around 7 percentage points for models that control for individual characteristics (columns 2–5). Strikingly, adding household fixed effects barely affects the female coefficient. In terms of economic magnitude, the conditional gap of 7 percentage points corresponds roughly to 15 per cent of the male vulnerable employment share in the average developing country (0.48; see Table 1).

Older, married, and less educated workers are more likely to be in vulnerable employment. The effect of age is approximately linear, with 10 additional years linked to a 3–4 percentage point increase in vulnerable employment’s propensity, once industry dummies are included (columns 3–5). Currently married workers are 2–3 percentage points more likely to be vulnerable. The effects of education are overall negative but concentrated at post-secondary level. Relative to the omitted group with less than primary education, completing primary school has null effects in most specifications and is even positive and significant in the within-household model (column 5); completed secondary schooling has a negative effect

¹⁸See Fairlie (2006) for more details.

of 3–5 percentage points in the most restrictive specifications (columns 3–5); post-secondary schooling has a large negative coefficient between 9 and 15 percentage points (columns 3–5). The vulnerability-reducing effects of secondary and post-secondary schooling weaken considerably (by about 60 and 50 per cent, respectively) when industry dummies are included (c.f. columns 2 and 3), suggesting that education mainly affects the likelihood of being in vulnerable employment through the sorting of workers across industries, rather than by affecting vulnerability propensities within industries.

The employment share of the worker’s socio-demographic group correlates negatively with vulnerable employment: a 10 percentage point increase in the employment share is associated with a 2 percent point reduction in the likelihood of being vulnerably employed. Because, on average, male employment shares are larger than female shares, failing to include this variable would inflate the gender gap in vulnerable employment.

With respect to household characteristics, workers are at a lower risk of being vulnerable if they belong to a household headed by a more educated member or by a woman, where there are other adults working as wage employees, with fewer children and adult males, and located in urban areas. Of these correlates, we highlight the large magnitude of having at least one other household member who is a wage employee. The presence of a male (female) wage employee in the household is associated with a 15 (11) percentage point lower probability of being in vulnerable employment.

We then re-run the pooled LP models excluding the agricultural sector (see Table A5 in the Appendix). The gender gap in vulnerable employment is marginally smaller in some specifications, but remains of the same order of magnitude, between 6 and 8 percentage points for models that control for individual characteristics. Excluding agricultural workers leads to three main differences in the correlates of vulnerable employment. First, the negative effects of own education are stronger and much more linear across attainment levels. Second, the employment share coefficients, while still negative and highly significant, decline in absolute terms by around 40 per cent. Third, the positive association between the number of children and vulnerable employment becomes larger: across all age groups, most coefficients nearly double once agriculture is excluded. In short, outside of agriculture, education and number of children are stronger predictors of vulnerable employment, whereas the employment shares of different socio-demographic groups matter less.

By gender

We now ask if the role that these individual and household characteristics have as correlates of vulnerable employment systematically differs between women and men. To answer this question, we re-estimate the model with fixed effects at the regional and industry levels (i.e., corresponding to column 3 of Table 3) separately for men and women. Table 4 reports the results. We emphasize three correlates that differ markedly by gender: marriage, the number of children, and employment share. On average, for women, being currently married is associated with a 5–6 percentage point increase in the probability of working in vulnerable employment, but, for men, the association is statistically insignificant (and the point estimate is negative). The number of children at all ages has a vulnerability-increasing effect for both genders, but the magnitudes are always larger for women and inversely related to the child’s age. The differences in the effect of children are particularly large when agricultural workers are excluded (columns 3–4); the female-specific coefficients are 2 to 3 times larger than the male-specific counterparts. For example, the presence of an additional child of age 0–2 is associated with a 1.8 percentage point increase in the vulnerable probability for women, whereas, for men, the increase is of 0.5 percentage points. In sum, a married women with one child of age 0–2 is around 6–7 percentage points more likely to be vulnerably employed than a man of similar characteristics. The higher child penalty for women results from women’s need to fulfill their role in the household as primary care providers. In this sense, being in vulnerable employment appears as the only viable solution as it allows for a more flexible use of time. Family constraints as shaped by social norms can be also one of the reasons behind

Table 3: Correlates of vulnerable employment. Pooled sample.

	(1)	(2)	(3)	(4)	(5)
Female	0.0983*** (0.0225)	0.0730*** (0.0153)	0.0679*** (0.0065)	0.0668*** (0.0081)	0.0666*** (0.0070)
Age		0.0010 (0.0021)	0.0037** (0.0017)	0.0034** (0.0016)	0.0039* (0.0020)
Age squared		3.05e-05 (2.35e-05)	-6.63e-06 (1.98e-05)	-2.83e-06 (1.74e-05)	-3.17e-05 (2.87e-05)
Married		0.0292*** (0.0040)	0.0195*** (0.0044)	0.0194*** (0.0048)	0.0275*** (0.0048)
<i>Education level (Ref.: Less than primary)</i>					
Primary		-0.0102 (0.0134)	0.0131 (0.0156)	0.0146 (0.0149)	0.0228** (0.0106)
Secondary		-0.1159*** (0.0149)	-0.0476** (0.0207)	-0.0379* (0.0218)	-0.0300* (0.0155)
Post-secondary		-0.3055*** (0.0264)	-0.1535*** (0.0207)	-0.1081*** (0.0268)	-0.0943*** (0.0218)
Employment share		-0.1796*** (0.0335)	-0.1668*** (0.0305)	-0.1544*** (0.0314)	-0.1843** (0.0754)
<i>Household head education (Ref.: Less than primary)</i>					
Primary		-0.0154** (0.0065)	-0.0136* (0.0071)	-0.0128* (0.0076)	
Secondary		-0.0340** (0.0143)	-0.0251 (0.0168)	-0.0263 (0.0168)	
Post-secondary		-0.0650*** (0.0180)	-0.0364* (0.0195)	-0.0347* (0.0203)	
Missing: person is household head		-0.0917*** (0.0212)	-0.0742*** (0.0239)	-0.0757*** (0.0238)	
Female household head		-0.0335*** (0.0104)	-0.0237*** (0.0077)	-0.0256*** (0.0071)	
Other member: male wage employee		-0.1802*** (0.0132)	-0.1492*** (0.0075)	-0.1470*** (0.0077)	
Other member: female wage employee		-0.1413*** (0.0221)	-0.1134*** (0.0133)	-0.1092*** (0.0120)	
Children, 0–2		0.0040 (0.0026)	0.0046* (0.0027)	0.0052* (0.0027)	
Children, 3–5		0.0063*** (0.0024)	0.0057** (0.0024)	0.0057** (0.0024)	
Boys, 6–14		0.0060*** (0.0011)	0.0044*** (0.0011)	0.0042*** (0.0012)	
Girls, 6–14		0.0045*** (0.0009)	0.0035*** (0.0009)	0.0035*** (0.0010)	
Adult males		0.0258*** (0.0031)	0.0213*** (0.0023)	0.0208*** (0.0023)	
Adult females		0.0032 (0.0058)	0.0025 (0.0050)	0.0019 (0.0048)	
Urban		-0.1346*** (0.0159)	-0.0518*** (0.0125)	-0.0489*** (0.0114)	
<i>Fixed effects:</i>					
Admin1 region (1491)	Yes	Yes	Yes	Yes	
Industry (11)			Yes	Yes	Yes
Occupation (12)				Yes	Yes
Household (894609)					Yes
<i>N</i>	2943797	2943797	2943797	2943797	2251105
<i>R</i> ²	0.175	0.306	0.392	0.403	0.720

Note: LPM estimates reported with robust standard errors clustered at the survey-year level shown in parentheses. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 76 countries and 80 survey-years included. For each country, the most recent year is selected; it ranges from 1992 to 2017. 74 per cent of observations are from 2010 or later. Column 5: sample size is reduced due to the exclusion of singleton households. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' calculations based on I2D2.

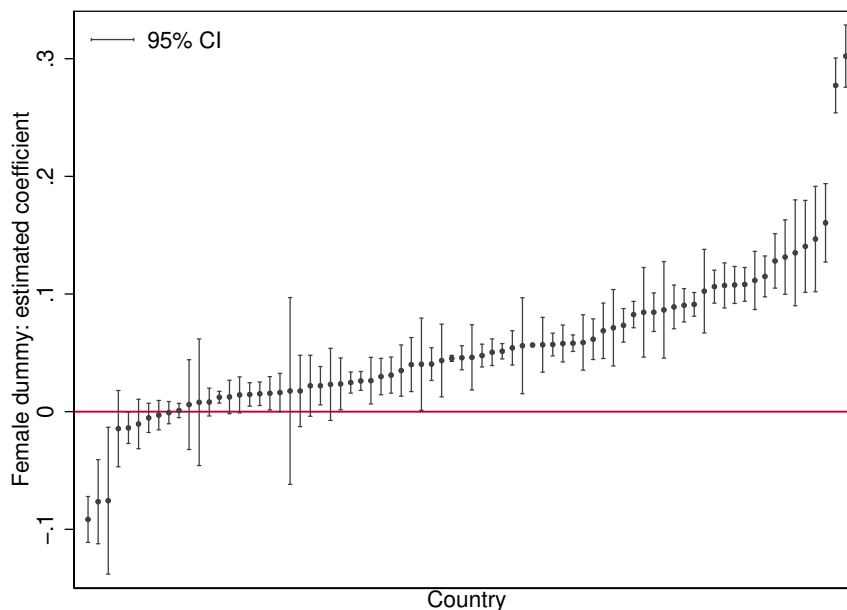
the relatively smaller magnitude of the correlation with the overall employment share. This is indeed stronger (in absolute terms) for men than for women: a 10 percentage point increase in the employment share reduces vulnerable employment propensity by 1.7 percentage points among men and 1.1 percentage points among women (all industries, columns 1–2).

4.2 Exploring and understanding cross-country variation in gender differences in vulnerable employment

How heterogeneous are the vulnerable employment correlates across countries? To provide an answer, we re-estimate the three LP models (whole population, men, women) separately for each country. As in Table 4, the specifications include regional (Admin1-level) and industry fixed effects, and are estimated with and without the agricultural sector. We focus on the heterogeneity of three coefficients: the female dummy in the whole population model; and the married dummy and the number of young children (0–2) in the gender-specific models.

Figure 4 plots, in ascending order, the country-specific estimates of the female dummy for the model that includes all industries. The estimates range from –9 percentage points in Namibia (2002) to 30 percentage points in Egypt (2004). The average estimate is 5 percentage points, which is below, but still comparable to, the female dummy coefficient in the pooled model with all countries (6.8 percentage points; see Table 3, column 3). In 67 out of 76 countries (88 per cent), the female dummy estimate is positive. When agriculture is excluded, the average estimate increases to 7 percentage points, and it is positive in 71 out of 76 countries.

Figure 4: Conditional gender gap in vulnerable employment propensity: country-specific estimates, all industries included.



Notes: Female dummy coefficient, conditional on controls, reported with 95 per cent confidence intervals, based on robust standard errors clustered at the survey-year level. 76 countries included. For each country, the most recent year is selected; it ranges from 1992 to 2017. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise.

Source: Authors' calculations based on I2D2.

For women, marriage is positively associated with vulnerable employment in virtually all countries (72 out of 75).¹⁹ Average estimates for women across countries are similar with or without the agricultural sector: 4 and 5 percentage points, respectively. For men, the average estimate is approximately zero

¹⁹Married estimate is not available for West Bank and Gaza (2009).

Table 4: Correlates of vulnerable employment by gender. Pooled sample.

	All industries		Excluding agriculture	
	(1) Men	(2) Women	(3) Men	(4) Women
Age	0.0027 (0.0017)	0.0022 (0.0017)	0.0016 (0.0024)	0.0027 (0.0029)
Age squared	3.17e-06 (1.81e-05)	1.10e-05 (1.89e-05)	2.94e-05 (2.55e-05)	2.25e-05 (3.15e-05)
Married	-0.0129 (0.0106)	0.0525*** (0.0062)	-0.0145 (0.0117)	0.0583*** (0.0043)
<i>Education level (Ref.: Less than primary)</i>				
Primary	0.0145 (0.0167)	0.0196 (0.0122)	-0.0416** (0.0169)	-0.0400** (0.0172)
Secondary	-0.0404* (0.0208)	-0.0506** (0.0199)	-0.1241*** (0.0206)	-0.1366*** (0.0212)
Post-secondary	-0.1364*** (0.0200)	-0.1713*** (0.0243)	-0.2119*** (0.0232)	-0.2382*** (0.0273)
Employment share	-0.1714*** (0.0248)	-0.1062*** (0.0222)	-0.1172*** (0.0231)	-0.0778** (0.0334)
<i>Household head education (Ref.: Less than primary)</i>				
Primary	-0.0187** (0.0082)	-0.0024 (0.0056)	-0.0182 (0.0126)	-0.0208* (0.0123)
Secondary	-0.0398* (0.0210)	0.0040 (0.0091)	-0.0175 (0.0124)	-0.0150 (0.0123)
Post-secondary	-0.0193 (0.0229)	-0.0104 (0.0091)	0.0003 (0.0118)	-0.0274** (0.0121)
Missing: person is household head	-0.0672*** (0.0239)	-0.0167 (0.0102)	-0.0402*** (0.0127)	-0.0283*** (0.0088)
Female household head	-0.0390*** (0.0138)	-0.0233*** (0.0034)	-0.0186** (0.0078)	-0.0178*** (0.0048)
Other member: male wage employee	-0.1675*** (0.0092)	-0.1359*** (0.0113)	-0.1506*** (0.0126)	-0.1245*** (0.0135)
Other member: female wage employee	-0.1169*** (0.0180)	-0.1124*** (0.0114)	-0.0905*** (0.0123)	-0.0927*** (0.0093)
Children, 0–2	0.0015 (0.0037)	0.0089*** (0.0022)	0.0053** (0.0026)	0.0183*** (0.0023)
Children, 3–5	0.0050* (0.0027)	0.0061** (0.0024)	0.0097*** (0.0017)	0.0178*** (0.0023)
Boys, 6–14	0.0034*** (0.0011)	0.0047*** (0.0016)	0.0044*** (0.0010)	0.0112*** (0.0019)
Girls, 6–14	0.0028** (0.0012)	0.0035*** (0.0011)	0.0037*** (0.0010)	0.0080*** (0.0015)
Adult males	0.0189*** (0.0033)	0.0181*** (0.0020)	0.0216*** (0.0030)	0.0155*** (0.0024)
Adult females	0.0169*** (0.0048)	0.0011 (0.0026)	0.0115*** (0.0035)	-0.0042 (0.0026)
Urban	-0.0420*** (0.0139)	-0.0573*** (0.0138)	-0.0382** (0.0156)	-0.0532*** (0.0153)
<i>Fixed effects:</i>				
Admin1 region	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
<i>N</i>	1724758	1219039	1141240	781459
<i>R</i> ²	0.342	0.473	0.237	0.377

Note: LPM estimates reported with robust standard errors clustered at the survey-year level shown in parentheses. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 76 countries and 80 survey-years included. For each country, the most recent year is selected; it ranges from 1992 to 2017. More than 71 per cent of observations are from 2010 or later. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

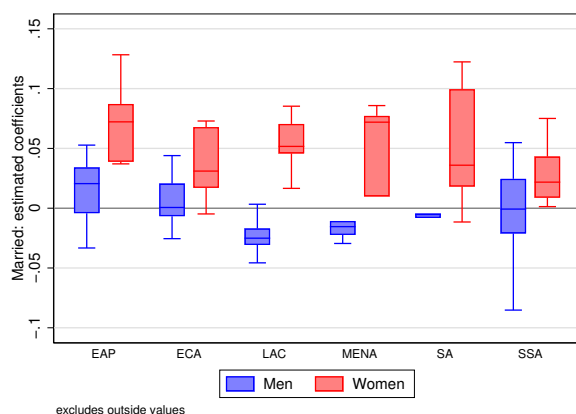
Source: Authors' calculations based on I2D2.

in both cases. Figure 5a shows regional box-plots for the estimates of being married by gender (all industries included). The median is above 5 percentage points in the Middle East and North Africa, Latin America and the Caribbean, and East Asia and the Pacific; the median is lower, between 2 to 3.6 percentage points, in Sub-Saharan Africa, South Asia, and Europe and Central Asia. For men, the estimates are much lower. In fact, in Latin America and the Caribbean, the Middle East and North Africa, and South Asia, the male median is negative.

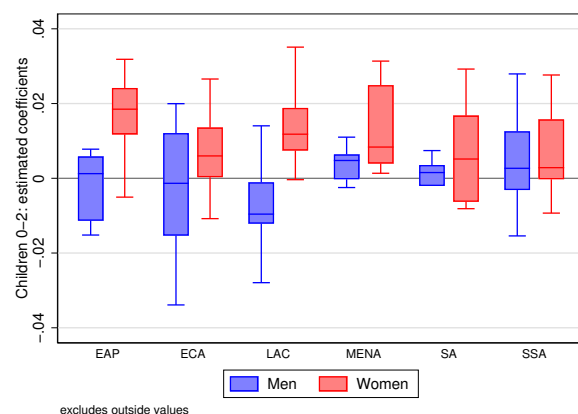
Young children (ages 0–2) increase the probability of vulnerable employment for women in 60 out of 76 countries. In contrast, the effect is positive for men in 41 countries. For models including all industries, the average estimate across countries is 1.2 percentage points for women and approximately 0 for men. Excluding agriculture, the average rises to 1.7 percentage points for women and to 0.3 percentage points for men. Figure 5b shows regional box-plots for the estimates when all industries are included. Everywhere, the female median is positive and larger than the male median. In East Asia, Europe and Central Asia, and Latin America, these gender gaps are large. In East Asia and Europe and Central Asia, the median for men is close to zero, whereas in Latin America the male median is negative. In Sub-Saharan Africa, South Asia, and MENA, the median effects are much more similar across genders, although always slightly larger for women than for men.

Figure 5: Estimated effect of selected covariates in vulnerable employment's propensity: distribution of country-specific estimates, by gender and world region. All industries included.

(a) Currently married



(b) Number of children (0–2)



Notes: The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. All boxplots exclude outside values. For each country, the most recent year is selected; it ranges from 1992 to 2017. (a) Boxplot of currently married dummy coefficient, conditional on controls. 75 countries included. (b) Boxplot of coefficient for number of children (0–2) in the household, conditional on controls. 76 countries included. World regions follow the World Bank's classification and are East Asia and the Pacific (EAP), Europe and Central Asia (ECA), Latin America and the Caribbean (LAC), Middle East and North Africa (MENA), South Asia (SA), and Sub-Saharan Africa (SSA).

Source: Authors' calculations based on I2D2.

What explains heterogeneity in the correlates of vulnerable employment? In particular, why is the conditional gender gap larger in some countries than in others? To shed light on this issue, we correlate the estimated female coefficient with country-level structural characteristics. We create two groups of structural characteristics. The first covers the economic and demographic structure of the country and consists of seven indicators, selected from the World Bank's World Development Indicators database: (1) log of GDP per capita (PPP-adjusted), (2) Gini coefficient of income inequality, (3) log of population, (4) total fertility rate, (5) young age dependency ratio, (6) old age dependency ratio, and (7) vulnerable employment as a percentage of total employment, estimated by the ILO. The second group of characteristics covers the extent of legal discrimination against women as measured in the World Bank's 'Women, Business, and the Law' (WBL) database (Hyland et al., 2020). We select the global index (WBL index), as well as the eight sub-indexes: Mobility, Workplace, Pay, Marriage, Parenthood, Entrepreneurship, Assets, and Pension. Higher values reflect more gender equality in a country's legislation.

We match each country-level indicator to the year of the I2D2 survey from which the conditional female coefficient is estimated. Given the relatively small sample size of 76 countries, we run simple bivariate regressions of the estimated gender gap (in percentage points) on each of the country-level indicators. These correlations are purely descriptive and have, of course, no causal interpretation. Moreover, because the dependent variable is itself estimated from microdata, the coefficients' standard errors are underestimated and should be interpreted with caution.

Table 5 reports the correlates of economic and demographic characteristics. In panel A, the dependent variable is the estimated gender gap in country-specific models that include all industries. None of the economic and demographic factors correlates strongly with the gender gap: all coefficients are relatively small and statistically indistinguishable from zero at the 5 per cent level. However, in panel B, when agriculture is excluded, several correlations become sizable and significant. Descriptively, the gender gap in vulnerable employment outside of agriculture correlates negatively with per capita income and the old age dependency ratio. In turn, the gender gap correlates positively with total fertility rate, the young age dependency ratio, and the overall prevalence of vulnerable employment.

Table 5: Conditional gender gap in vulnerable employment propensity: association with countries' demographic and economic characteristics.

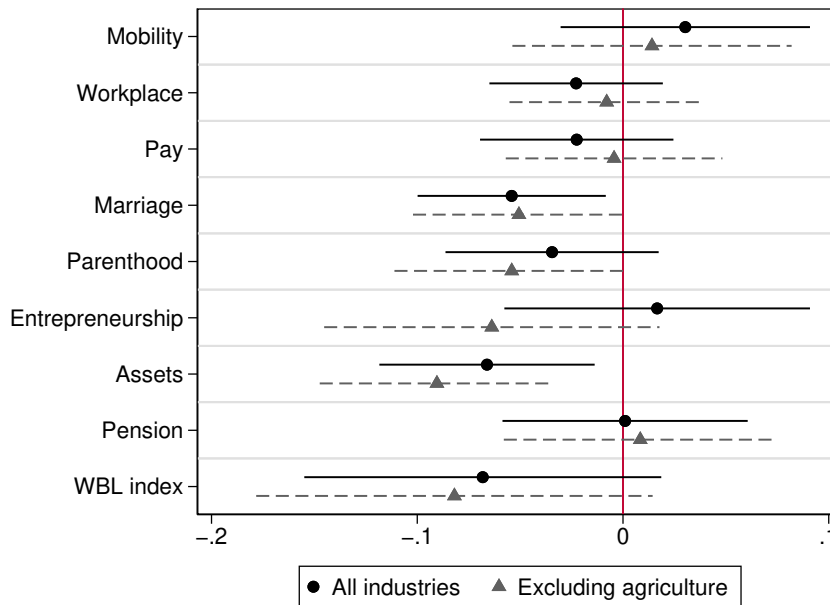
	<i>Panel A: All industries</i>				Age dependency ratio		
	(1) log GDP p.c.	(2) Gini	(3) log Population	(4) Total fertility rate	(5) Young	(6) Old	(7) Vulnerable emp (ILO)
Female coeff. × 100	-0.2723 (0.7981)	-0.0934 (0.1151)	0.1982 (0.4527)	0.4224 (0.4901)	0.0364 (0.0329)	-0.2516* (0.1407)	0.0068 (0.0314)
<i>N</i>	74	58	76	76	76	76	76
<i>R</i> ²	0.002	0.012	0.003	0.010	0.016	0.041	0.001
<i>Panel B: Excluding agriculture</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female coeff. × 100	-2.8216*** (0.8555)	0.1483 (0.1165)	0.2544 (0.5039)	2.1606*** (0.4877)	0.1517*** (0.0325)	-0.5488*** (0.1467)	0.1233*** (0.0319)
<i>N</i>	74	58	76	76	76	76	76
<i>R</i> ²	0.131	0.028	0.003	0.210	0.227	0.159	0.168

Note: OLS estimates reported with standard errors shown in parentheses. Each cell reports the coefficient of a separate bivariate regression. The outcome variable is the row variable; the regressor is shown in each column. All models include a constant. 76 countries and 80 survey-years included. For each country, the most recent year is selected; it ranges from 1992 to 2017. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' calculations based on I2D2 and WDI data.

Countries with more gender egalitarian laws exhibit smaller conditional gender gaps in vulnerable employment. Figure 6 plots the bivariate regression coefficients, with 95 per cent confidence intervals, of the indexes of legal gender equality in different dimensions. For the overall index, and most sub-indexes, the correlation is negative. The correlations are very similar whether or not agriculture is included in the estimation of the gender gap, with the exception of the Entrepreneurship sub-index, whose coefficient is only negative for the gender gap outside of agriculture.

Figure 6: Conditional gender gap in vulnerable employment propensity: association with Women, Business, and the Law data.



Notes: Bivariate regression coefficients reported with 95 per cent confidence intervals. Solid black lines: models that include all industries. Dash grey line: models that exclude agricultural sector. Dependent variable is the female dummy coefficient $\times 100$, conditional on controls. Each regression includes a constant and one of the variables shown in the figure. 76 countries included. For each country, the most recent year is selected; it ranges from 1992 to 2017.

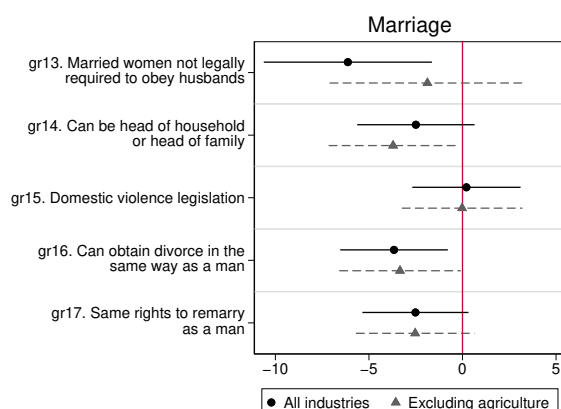
Source: Authors' calculations based on I2D2 and Women, Business, and the Law.

Negative correlations are particularly strong (in absolute terms) for the Marriage, Parenthood, Assets, and Entrepreneurship (excluding agriculture) sub-indexes. For these four dimensions, we further report the correlations between gender gaps in vulnerable employment and each of the sub-indexes' constitutive indicators, which take the form of a yes/no dummy answering a specific legal question.²⁰ Figure 7 plots the coefficients. In the marriage dimension (Figure 7a), all indicators except domestic violence legislation are associated with smaller gender gaps in vulnerable employment. Where women are not required by law to obey their husbands, can be the head of the household, and have the same access to divorce and rights to remarry as men, the gender gap in vulnerable employment is smaller. With respect to parenthood, gender gaps are around 5 percentage points smaller in countries with paid parental leave or where the government administers 100 per cent of maternity leave benefits (Figure 7b). When agriculture is excluded, constraints in women's ability to start and run businesses matter. Countries where women can register a business and open a bank account in the same way as a man have, on average, smaller gender gaps (Figure 7c). With respect to the Assets dimension, equal rights to inheritance of parental or spousal assets and the legal valuation of non-monetary contributions are associated with smaller gender gaps in vulnerable employment (Figure 7d).

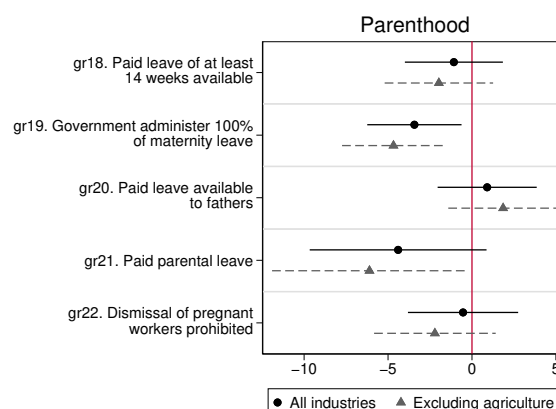
²⁰For completeness, in Figure A1, reported in the Appendix, we report correlations for all remaining WBL indicators, sorted by dimension: Mobility, Workplace, Pay, and Pension.

Figure 7: Conditional gender gap in vulnerable employment propensity: association with Marriage, Parenthood, Entrepreneurship, and Assets indicators of Women, Business, and the Law data.

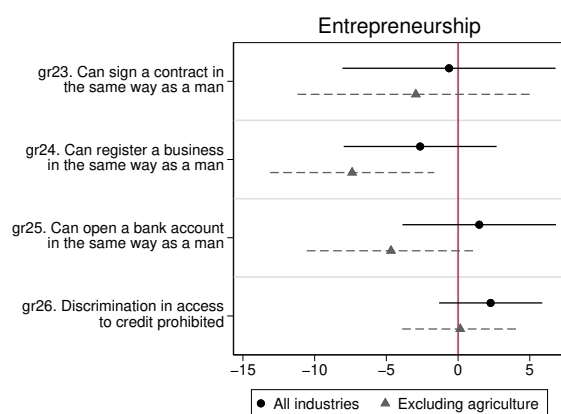
(a) Marriage



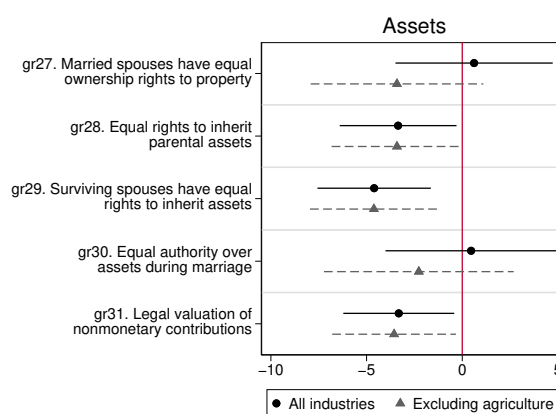
(b) Parenthood



(c) Entrepreneurship



(d) Assets



Notes: Bivariate regression coefficients reported with 95 per cent confidence intervals. Solid black lines: models that include all industries. Dash grey line: models that exclude agricultural sector. Dependent variable is the female dummy coefficient $\times 100$, conditional on controls. Each regression includes a constant and one of the variables shown in the figure. 76 countries included. For each country, the most recent year is selected; it ranges from 1992 to 2017.

Source: Authors' calculations based on I2D2 and Women, Business, and the Law.

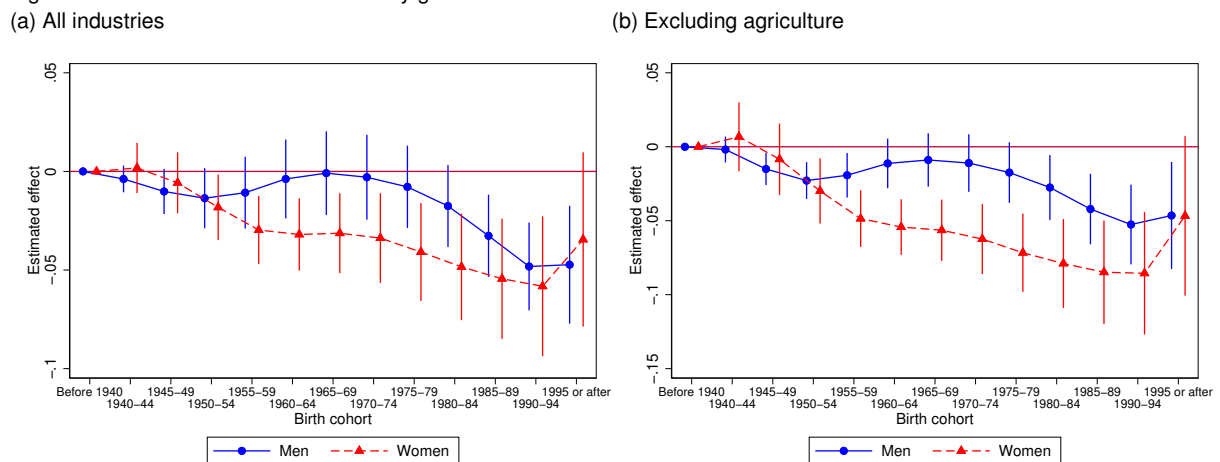
4.3 Changes in vulnerable employment over time: Cohort effects

So far, our analysis has focused on the most recent I2D2 survey available for each country. In contrast, we now leverage all surveys available to describe how the likelihood of vulnerable status in employment has evolved across birth cohorts. The sample of roughly 19.2 million individuals includes 531 surveys between 1991 and 2017 from 95 countries. For each gender, we run a LP model of vulnerable employment on the usual set of individual and household characteristics, industry, occupation, and survey-year fixed effects.²¹ To flexibly purge out age effects, a age polynomial of degree four is included. In addition, we estimate birth-cohort coefficients, with dummies for each 5-year birth cohort, ranging from 1940–44 up to 1990–94. There are two residual cohorts: those born before 1940 (the omitted group) and those born after 1994. As usual, models are estimated with and without the agricultural sector and standard errors are clustered at the survey-year level.

²¹In the models up to now, only 76 countries were included, because several surveys do not have information on Admin1 regions. For the cohort regressions, we do not include Admin1 fixed effects, because the regional codes are not harmonized over time in the I2D2. As a result, there is complete covariate data for 95 countries.

Figure 8 plots the birth-cohort estimates for men and women with 95 per cent confidence intervals. For men, cohort effects are small and mostly insignificant until birth year 1980. For those born between 1980 and 1994, the probability of vulnerable decreases substantially and then stabilizes around 5 percentage points below the level of the omitted group (born before 1940). For women, cohort effects start declining much earlier, from birth year 1950 on-wards. For those born after 1950, the negative female coefficient is always stronger than the male coefficient for all cohorts except the most recent one (1995 or after). The cohort effects are larger (in absolute terms) and more precisely estimated when agriculture is excluded (Figure 8b). Overall, cohort effects are limited. Over a 50 birth-year period, roughly two generations, the decline in vulnerable employment propensity is around 5 percentage points, which is comparable to the conditional difference in propensity between currently married and non-married women.

Figure 8: Estimated birth-cohort effects by gender.



Notes: Birth-cohort coefficients (reference group: cohort born before 1940), conditional on controls. 95 countries and 531 survey-years included. The earliest survey year is 1991 and the latest is 2017. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise.

Source: Authors' calculations based on I2D2.

4.4 Decomposing changes and levels in gender inequality in vulnerable employment

To complement the birth-cohort analysis above, we now decompose changes in vulnerable employment over time by gender, using Fairlie's (2006) method. Because cohort effects are of modest size, we expect most of the change over time to be explained by composition effects—i.e., by changes in individuals' (and their households') labor supply characteristics.

Indeed, changes in female and male vulnerable employment between the 1990s and the 2010s are almost entirely explained by composition effects (Figure 9a).²² The effect of these changes contributed to a similar reduction of female (4.1 percentage points) and male (4.7 percentage points) vulnerable employment shares. However, once considering workers outside the agricultural sector (see Table A7 and Figure A2a), the reduction in vulnerable employment was more than twice as large for women (7.6 percentage points) than for men (3.2 percentage points).

Over time, the evolution of most covariates reduced vulnerable employment for both genders: changing industry composition, rising education attainment and urbanization, declining family sizes (both as number of adults and children), increasing wage employment among other household members, and rising numbers of female household heads (Figures 9b and 9c). The only significant countervailing force is ageing of the workforce, which increased the likelihood of vulnerable employment by 0.2 to 0.6 percentage points over the two decades.

²²Point estimates and standard errors are shown in Table A6.

Across genders, education and fertility played a larger role in pulling women away from vulnerable employment than men. Between the 1990s and 2010s, rising education and fewer children account for a 2.8 percentage point reduction in vulnerable employment among women, and for a 1.4 percentage point reduction among men (at 1990s coefficients).²³

In the future, it is likely that trends of structural change (e.g., away from agriculture), urbanization, rising education, and declining fertility will continue and, consequently, will help reduce vulnerable employment for both genders. However, it is doubtful that, on their own, these structural trends will substantially reduce the *gap* in vulnerable employment between men and women. First, if past decades are a good guide, these trends tend to (overall) affect male and female vulnerable employment by a similar magnitude. Second, with the narrowing of gender differences in education and number of children—key variables that disproportionately lifted women from vulnerable employment in the past—there is fewer room for reducing the gender gap through supply-side characteristics in the future.

To ground the argument above, we decompose current levels of the gender gap in vulnerable employment, using the last available year for each country. The entire gender gap in vulnerable employment is left unexplained (Figure 10a). Compositions effects are close to zero at male coefficients and even negative, at minus 1.5 percentage points, at female coefficients. In other words, the current gap in vulnerable employment is not driven by gender differences in standard supply-side characteristics. For example, existing gender differences in education attainment explain only 0.4 percentage points (or 4 per cent) of the 10 percentage point gap in vulnerable employment (Figure 10b).²⁴

The only covariate with a sizable positive contribution to the gender gap is industry of employment. In decompositions with or without the agricultural sector, eliminating gendered sectoral segregation would reduce the vulnerable employment gender gap by 2–3 percentage points. However, gendered sectoral segregation is remarkably persistent and unlikely to decrease substantially in the near future. In fact, since 1980, sectoral segregation has *increased* in many developing countries (Borrowman and Klasen, 2020).

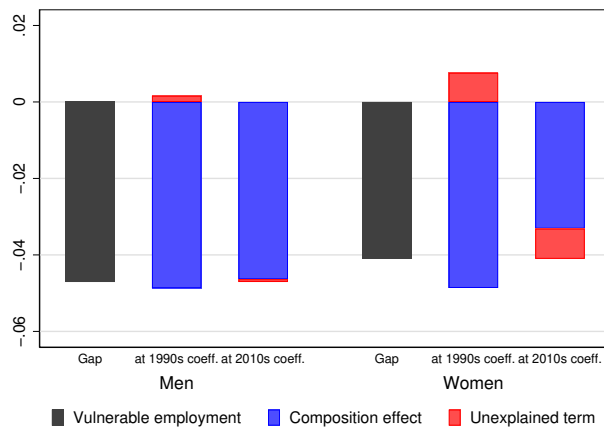
In sum, while vulnerable employment levels are likely to decrease in the future as the developing world's workforce becomes more educated, urbanized, and with less dependent household members, the *gap* between men and women will probably not be very responsive to these supply-side forces. In contrast, all of the current gender gap stems from gender differences in the returns to supply-side factors and other unobservables, which likely include gendered-patterns of labor demand, labour market discrimination, and gender-biased norms.

²³When the agricultural sector is excluded, the difference is even larger: over time, rising education and fewer children reduce female vulnerable employment by 3.9 percentage points, and male vulnerable employment by 1.6 (at 1990s coefficients; see Table A7).

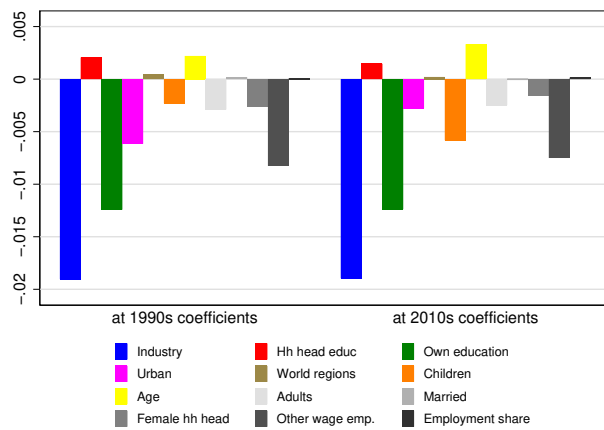
²⁴Point estimates and standard errors are shown in Table A8. Similar patterns emerge when agriculture is excluded; see Figure A3.

Figure 9: Decompositions over time. All industries included.

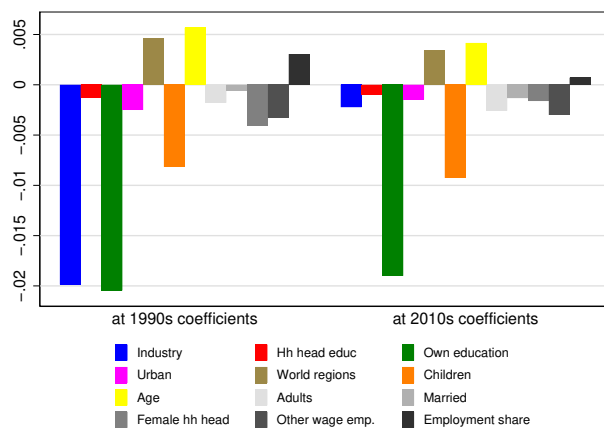
(a) Composition effect and unexplained term



(b) Detailed composition effects: Male sample



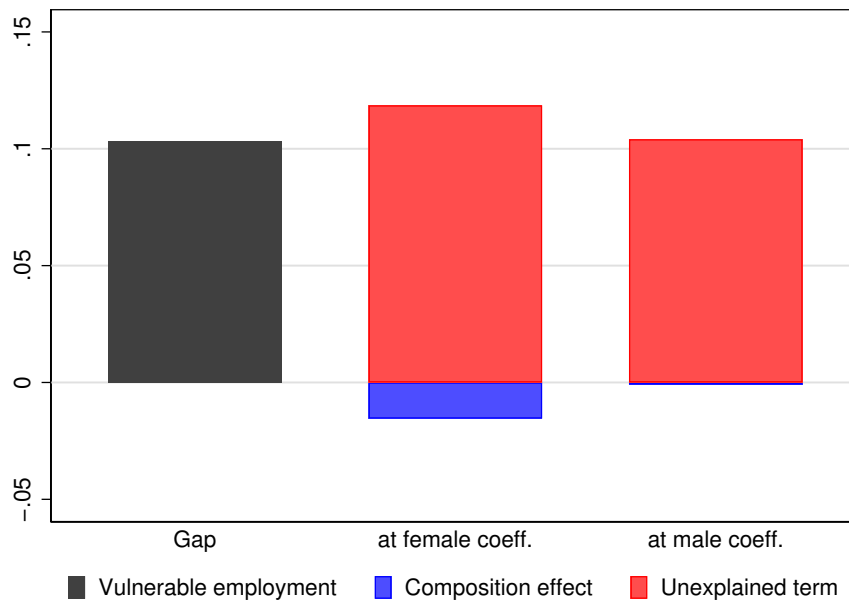
(c) Detailed composition effects: Female sample



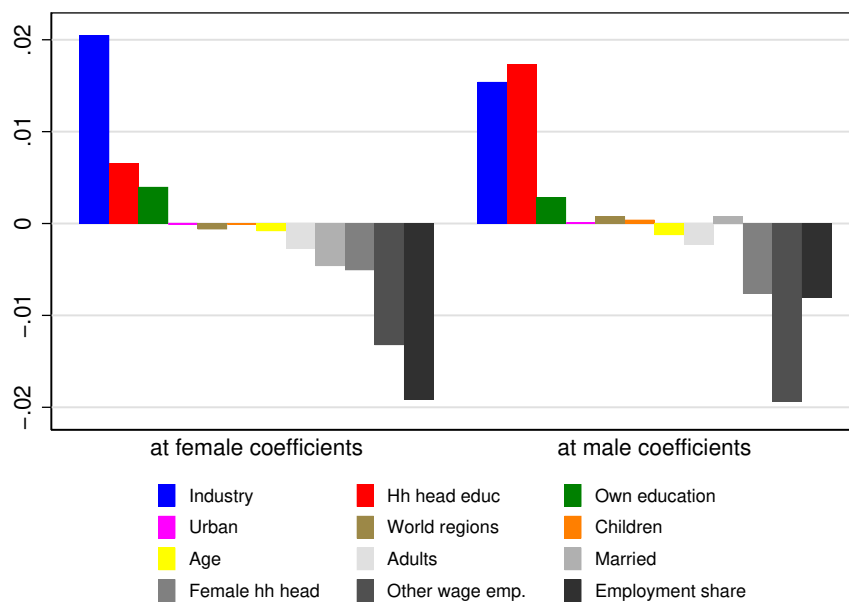
Notes: Fairlie (2006) decompositions. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 29 countries included. For each country, the earliest survey in 1990–99 and the latest survey in 2010–17 are selected, conditional on having at least 1,500 male and 1,500 female observations with complete covariate data. Decompositions are performed for a random sample of 1,500 men and 1,500 women drawn from each survey. Each decomposition is the average over 1000 sequences where the ordering of covariates is randomly determined. See Fairlie (2006) for more details. See Table A6 for point estimates and standard errors.

Source: Authors' calculations based on I2D2.

Figure 10: Decompositions by gender. All industries included.
 (a) Composition effect and unexplained term



(b) Detailed composition effects



Notes: Fairlie (2006) decompositions. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 81 countries included. For each country, the latest survey is selected, conditional on having at least 1,500 male and 1,500 female observations with complete covariate data. Decompositions are performed for a random sample of 1,500 men and 1,500 women drawn from each survey. Each decomposition is the average over 1000 sequences where the ordering of covariates is randomly determined. See Fairlie (2006) for more details. See Table A8 for point estimates and standard errors.

Source: Authors' calculations based on I2D2.

5 Conclusion

Ever since the Millennium Declaration and the adoption of the Global Employment Agenda, the promotion of women's empowerment and access to decent work has been a primary goal of development policy. Beyond direct welfare and empowerment gains for women, coupling rising female labor force participation with increasing access to high-quality jobs can generate sizable aggregate economic gains through a variety of positive externalities, such as lower fertility, improved child health, better allocation of talent (see Santos Silva and Klasen, 2021, for a review).

However, very little progress has occurred in ensuring equitable access to decent work for women. In this paper we ask whether and to what extent are working women over-represented in vulnerable employment. Using a rich and large collection of household and labour force surveys, we show that women have a higher probability of being in vulnerable employment than men of similar characteristics in many comparative dimensions: within countries, sub-national regions, industries, occupations, and even within households.

The experiences of marriage and parenthood appear to generate the decisive wedge between male and female vulnerable employment propensities. Marriage increases the probability of being in vulnerable employment for women, but not for men. Likewise, the vulnerability-increasing effect of the number of children (at all age-groups) is substantially larger for women than for men.

We have also shown that cross-country differences in the gender gap in vulnerable employment correlate with differences in economic development, fertility, the age dependency ratio of the young, and the extent of legal discrimination against women, particularly in laws regulating marriage, parenthood, access to assets, and access to entrepreneurship.

Further results from decomposition analyses suggest that, between 1990 and 2010, the narrowing of the gender gap in educational attainment and rapidly falling fertility contributed substantially to reducing the share of female vulnerable workers. However, that process is largely exhausted, with current levels of the gender gap in vulnerable employment being almost entirely unexplained by standard labor supply factors at the individual or household levels. Instead, the current gap is likely attributable to gender-biased norms and institutions that continue to constraint women to the role of secondary earners, who disproportionately bear the brunt of domestic responsibilities.

Policies that address these female-specific constraints or that, overall, boost labor demand in female-intensive segments of the wage employment sector are promising avenues to closing the gender gap in vulnerable employment. However, in the short and medium term, only a small share of vulnerable workers will be absorbed by wage employment (Beegle and Bundervoet, 2019). As a result, complementary policies should target the welfare of women working *within* the vulnerable categories of own-account work and contributing family work.

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Appendix

Table A1: Vulnerable employment: ILO's definition

ICSE-93	I2D2	Vulnerable
Paid employees	Paid employees	No
Employers	Employers	No
Own-account workers	Own-account workers	Yes
Contributing family workers	Unpaid employees	Yes
Members of producers' cooperatives		n.d.
Workers not classifiable by status		n.d.

Note: n.d.—Not defined. ICSE-93—International Classification of Status in Employment, 1993. I2D2—International Income Distribution Database.

Table A2: Table of 49 countries have at least one survey in each decade.

Region	Number of country	Countries
East Asia and the Pacific (EAP)	4	Indonesia, Cambodia, Philippines, Thailand
Europe and Central Asia (ECA)	4	Armenia, Belarus, Romania, Russian Federation
Latin America and the Caribbean (LAC)	17	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Mexico, Nicaragua, Panama, Peru, Paraguay, El Salvador, Trinidad and Tobago, Uruguay
the Middle East and North Africa (MENA)	2	Djibouti, Tunisia
South Asia (SA)	4	Bangladesh, India, Sri Lanka, Pakistan
Sub-Saharan Africa (SSA)	18	Burundi, Burkina Faso, Cameroon, Ethiopia, Ghana, Guinea, Gambia, Madagascar, Mali, Mozambique, Mauritius, Malawi, Namibia, Niger, Senegal, Tanzania, Uganda, Zambia

Note: Based on World Bank's regional classification.

Source: Authors' calculations based on I2D2.

Table A3: Estimation sample: means of individual and household characteristics

	All	Men	Women
Vulnerable employment	0.53	0.48	0.61
Female	0.41		
Age	38.21	38.35	38.02
Married	0.68	0.70	0.64
Employment share	0.74	0.82	0.63
<i>Education level:</i>			
Less than primary	0.15	0.13	0.18
Primary	0.35	0.37	0.33
Secondary	0.36	0.38	0.33
Post-secondary	0.14	0.13	0.16
<i>Household head education:</i>			
Less than primary	0.11	0.08	0.14
Primary	0.21	0.15	0.30
Secondary	0.16	0.10	0.25
Post-secondary	0.05	0.03	0.09
Missing: person is household head	0.47	0.64	0.22
Female household head	0.21	0.13	0.32
Other member: male wage employee	0.24	0.18	0.33
Other member: female wage employee	0.17	0.20	0.12
Children, 0–2	0.29	0.29	0.28
Children, 3–5	0.31	0.31	0.31
Boys, 6–14	0.47	0.47	0.47
Girls, 6–14	0.45	0.44	0.45
Adult males	1.54	1.72	1.28
Adult females	1.58	1.45	1.77
Urban	0.54	0.54	0.54
<i>N</i>	2943797	1724758	1219039

Note: Estimation sample: un-weighted means of individual and household characteristics. 76 countries and 80 survey-years included. For each country, the most recent year is selected; it ranges from 1992 to 2017. 74 per cent of observations are from 2010 or later.

Source: Authors' calculations based on I2D2.

Table A4: Estimation sample: industry and occupation composition

	All	Men	Women
<i>Industry:</i>			
Agriculture	0.35	0.34	0.36
Mining	0.01	0.01	0.00
Manufacturing	0.10	0.10	0.10
Public utilities	0.01	0.01	0.00
Construction	0.05	0.09	0.01
Commerce	0.18	0.15	0.23
Transport & communications	0.05	0.08	0.02
Financial & business services	0.03	0.03	0.03
Public administration	0.07	0.08	0.06
Other Services, Unspecified	0.09	0.06	0.14
Missing	0.05	0.06	0.04
<i>Occupation:</i>			
Senior officials	0.03	0.03	0.02
Professionals	0.05	0.04	0.05
Technicians	0.04	0.05	0.04
Clerks	0.05	0.04	0.05
Service and market sales workers	0.12	0.10	0.16
Skilled agricultural	0.23	0.23	0.23
Craft workers	0.09	0.11	0.06
Machine operators	0.04	0.06	0.02
Elementary occupations	0.15	0.15	0.15
Armed forces	0.00	0.01	0.00
Others	0.00	0.00	0.00
Missing	0.19	0.18	0.21
<i>N</i>	2943797	1724758	1219039

Note: Estimation sample: un-weighted means of industry and occupation dummies. 76 countries and 80 survey-years included. For each country, the most recent year is selected; it ranges from 1992 to 2017. 74 per cent of observations are from 2010 or later.

Source: Authors' calculations based on I2D2.

Table A5: Correlates of vulnerable employment, excluding agriculture. Pooled sample.

	(1)	(2)	(3)	(4)	(5)
Female	0.0824*** (0.0264)	0.0845*** (0.0276)	0.0726*** (0.0117)	0.0681*** (0.0130)	0.0575*** (0.0095)
Age		0.0005 (0.0025)	0.0025 (0.0021)	0.0024 (0.0018)	0.0030** (0.0014)
Age squared		4.40e-05* (2.59e-05)	2.27e-05 (2.23e-05)	2.38e-05 (1.92e-05)	-2.90e-06 (1.83e-05)
Married		0.0332*** (0.0068)	0.0233*** (0.0065)	0.0240*** (0.0070)	0.0310*** (0.0058)
<i>Education level (Ref.: Less than primary)</i>					
Primary		-0.0586*** (0.0163)	-0.0503*** (0.0158)	-0.0476*** (0.0122)	-0.0164* (0.0098)
Secondary		-0.1646*** (0.0202)	-0.1400*** (0.0187)	-0.1290*** (0.0162)	-0.0834*** (0.0118)
Post-secondary		-0.3273*** (0.0218)	-0.2347*** (0.0223)	-0.1938*** (0.0228)	-0.1437*** (0.0175)
Employment share		-0.1157*** (0.0273)	-0.1073*** (0.0209)	-0.0988*** (0.0224)	-0.1068*** (0.0337)
<i>Household head education (Ref.: Less than primary)</i>					
Primary		-0.0196 (0.0143)	-0.0272* (0.0138)	-0.0271** (0.0132)	
Secondary		-0.0180 (0.0140)	-0.0263** (0.0132)	-0.0257* (0.0133)	
Post-secondary		-0.0471*** (0.0138)	-0.0355*** (0.0133)	-0.0315** (0.0135)	
Missing: person is household head		-0.0746*** (0.0132)	-0.0718*** (0.0130)	-0.0710*** (0.0134)	
Female household head		-0.0135** (0.0056)	-0.0142*** (0.0049)	-0.0130*** (0.0046)	
Other member: male wage employee		-0.1572*** (0.0161)	-0.1352*** (0.0101)	-0.1314*** (0.0086)	
Other member: female wage employee		-0.1062*** (0.0144)	-0.0884*** (0.0097)	-0.0847*** (0.0074)	
Children, 0–2		0.0092*** (0.0020)	0.0097*** (0.0020)	0.0101*** (0.0021)	
Children, 3–5		0.0124*** (0.0013)	0.0124*** (0.0014)	0.0124*** (0.0015)	
Boys, 6–14		0.0072*** (0.0013)	0.0073*** (0.0010)	0.0072*** (0.0012)	
Girls, 6–14		0.0057*** (0.0011)	0.0059*** (0.0009)	0.0058*** (0.0009)	
Adult males		0.0265*** (0.0035)	0.0225*** (0.0026)	0.0216*** (0.0022)	
Adult females		-0.0032 (0.0033)	-0.0037 (0.0031)	-0.0042 (0.0028)	
Urban		-0.0258 (0.0179)	-0.0462*** (0.0159)	-0.0430*** (0.0131)	
<i>Fixed effects:</i>					
Admin1 region (1491)	Yes	Yes	Yes	Yes	Yes
Industry (10)			Yes	Yes	Yes
Occupation (12)				Yes	Yes
Household (531857)					Yes
<i>N</i>	1922705	1922705	1922705	1922705	1272177
<i>R</i> ²	0.114	0.210	0.289	0.302	0.680

Note: LPM estimates reported with robust standard errors clustered at the survey-year level shown in parentheses. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 76 countries and 80 survey-years included. For each country, the most recent year is selected; it ranges from 1992 to 2017. 75 per cent of observations are from 2010 or later. Column 5: sample size is reduced due to the exclusion of singleton households. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' calculations based on I2D2.

Table A6: Decompositions over time: 1990s–2010s.

	Men		Women	
	At 1990s coeff. (1)	At 2010s coeff. (2)	At 1990s coeff. (3)	At 2010s coeff. (4)
Pr(Vulnerable employment) 2010s		0.499		0.597
Pr(Vulnerable employment) 1990s		0.546		0.638
Difference		-0.047		-0.041
Age	0.002*** (0.001)	0.003*** (0.001)	0.006*** (0.002)	0.004*** (0.001)
Own education	-0.012*** (0.003)	-0.012*** (0.002)	-0.020*** (0.002)	-0.019*** (0.003)
Married	0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)	-0.001*** (0.000)
Employment share	0.000 (0.000)	0.000 (0.000)	0.003** (0.001)	0.001 (0.001)
Urban	-0.006*** (0.001)	-0.003*** (0.001)	-0.003** (0.001)	-0.001*** (0.001)
Female household head	-0.003*** (0.001)	-0.002** (0.001)	-0.004*** (0.001)	-0.002* (0.001)
Household head education	0.002** (0.001)	0.001** (0.001)	-0.001 (0.001)	-0.001 (0.001)
Household wage employees	-0.008*** (0.001)	-0.008*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Children	-0.002** (0.001)	-0.006*** (0.001)	-0.008*** (0.001)	-0.009*** (0.001)
Adults	-0.003*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.003*** (0.001)
Industry	-0.019*** (0.007)	-0.019 (0.017)	-0.020*** (0.006)	-0.002 (0.011)
World regions	0.000 (0.001)	0.000 (0.001)	0.005** (0.002)	0.003* (0.002)
Composition	-0.049	-0.046	-0.049	-0.033
Unexplained	0.002	-0.001	0.008	-0.008
<i>N</i>	87000	87000	87000	87000

Note: Fairlie (2006) decompositions with robust standard errors clustered at the country level shown in parentheses. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 29 countries included. For each country, the earliest survey in 1990–99 and the latest survey in 2010–17 are selected, conditional on having at least 1,500 male and 1,500 female observations with complete covariate data. Decompositions are performed for a random sample of 1,500 men and 1,500 women drawn from each survey. Each decomposition is the average over 1000 sequences where the ordering of covariates is randomly determined. See Fairlie (2006) for more details. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' calculations based on I2D2.

Table A7: Decompositions over time, excluding agricultural sector: 1990s–2010s.

	Men		Women	
	At 1990s coeff. (1)	At 2010s coeff. (2)	At 1990s coeff. (3)	At 2010s coeff. (4)
Pr(Vulnerable employment) 2010s		0.317		0.394
Pr(Vulnerable employment) 1990s		0.348		0.470
Difference		-0.032		-0.076
Age	0.004*** (0.001)	0.005*** (0.001)	0.008*** (0.002)	0.008*** (0.001)
Own education	-0.012*** (0.002)	-0.015*** (0.002)	-0.028*** (0.003)	-0.023*** (0.003)
Married	0.001 (0.000)	0.000* (0.000)	-0.000 (0.000)	-0.001** (0.000)
Employment share	-0.000 (0.001)	-0.001 (0.001)	0.005 (0.003)	-0.003 (0.002)
Urban	-0.003* (0.002)	-0.001 (0.001)	-0.006*** (0.002)	-0.002* (0.001)
Female household head	-0.002*** (0.000)	-0.001** (0.000)	-0.003*** (0.001)	-0.002** (0.001)
Household head education	0.001 (0.001)	0.000 (0.001)	-0.002 (0.001)	-0.000 (0.001)
Household wage employees	-0.004*** (0.001)	-0.005*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Children	-0.004*** (0.001)	-0.005*** (0.002)	-0.011*** (0.001)	-0.012*** (0.001)
Adults	-0.003*** (0.001)	-0.003*** (0.001)	-0.001 (0.001)	-0.001** (0.000)
Industry	-0.013 (0.010)	-0.017 (0.016)	-0.024*** (0.007)	-0.018** (0.007)
World regions	-0.000 (0.003)	0.005* (0.003)	0.005 (0.004)	0.011*** (0.004)
Composition	-0.036	-0.036	-0.060	-0.046
Unexplained	0.004	0.004	-0.017	-0.030
<i>N</i>	69000	69000	69000	69000

Note: Fairlie (2006) decompositions with robust standard errors clustered at the country level shown in parentheses. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 23 countries included. For each country, the earliest survey in 1990–99 and the latest survey in 2010–17 are selected, conditional on having at least 1,500 male and 1,500 female observations with complete covariate data. Decompositions are performed for a random sample of 1,500 men and 1,500 women drawn from each survey. Each decomposition is the average over 1000 sequences where the ordering of covariates is randomly determined. See Fairlie (2006) for more details. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' calculations based on I2D2.

Table A8: Decompositions by gender: latest year available.

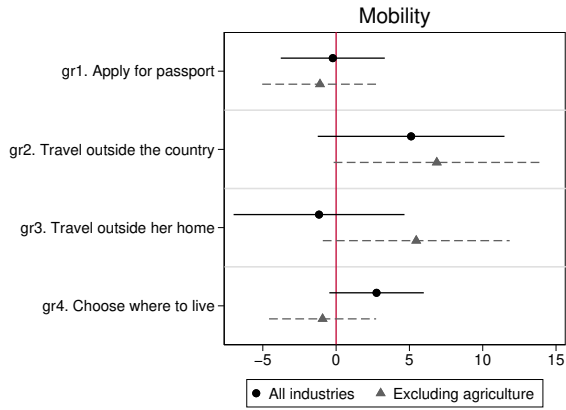
	All industries		Excluding agriculture	
	At male coeff. (1)	At female coeff. (2)	At male coeff. (3)	At female coeff. (4)
Pr(Vulnerable employment) Women	0.600		0.439	
Pr(Vulnerable employment) Men	0.497		0.336	
Difference	0.103		0.104	
Age	-0.001*** (0.000)	-0.001* (0.000)	-0.001*** (0.000)	-0.002*** (0.000)
Own education	0.003** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Married	0.001 (0.001)	-0.005*** (0.001)	0.001 (0.001)	-0.006*** (0.001)
Employment share	-0.008 (0.009)	-0.019** (0.010)	-0.003 (0.011)	-0.013 (0.013)
Urban	0.000 (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.001** (0.000)
Female household head	-0.008*** (0.001)	-0.005** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)
Household head education	0.017*** (0.004)	0.007** (0.003)	0.014*** (0.004)	0.007* (0.004)
Household wage employees	-0.019*** (0.001)	-0.013*** (0.001)	-0.023*** (0.002)	-0.017*** (0.002)
Children	0.000* (0.000)	-0.000 (0.000)	0.001*** (0.000)	-0.000 (0.000)
Adults	-0.002* (0.001)	-0.003* (0.002)	-0.003* (0.002)	-0.003* (0.002)
Industry	0.015*** (0.003)	0.021*** (0.007)	0.021*** (0.004)	0.026* (0.014)
World regions	0.001 (0.001)	-0.001 (0.001)	0.003** (0.001)	0.001 (0.002)
Composition	-0.001	-0.015	0.005	-0.012
Unexplained	0.104	0.119	0.099	0.115
<i>N</i>	243000	243000	222000	222000

Note: Fairlie (2006) decompositions with robust standard errors clustered at the country level shown in parentheses. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 81 countries included. For each country, the latest survey is selected, conditional on having at least 1,500 male and 1,500 female observations with complete covariate data. Decompositions are performed for a random sample of 1,500 men and 1,500 women drawn from each survey. Each decomposition is the average over 1000 sequences where the ordering of covariates is randomly determined. See Fairlie (2006) for more details. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

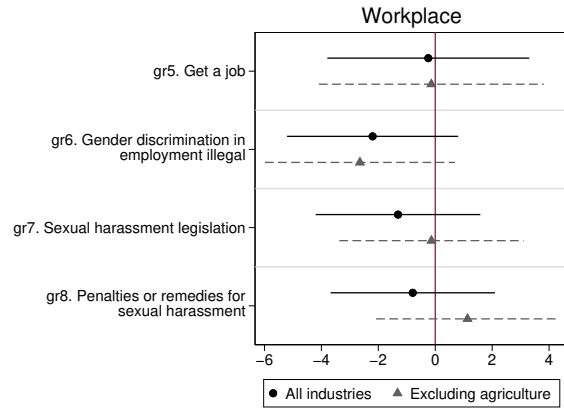
Source: Authors' calculations based on I2D2.

Figure A1: Conditional gender gap in vulnerable employment propensity: association with Mobility, Workplace, Pay, and Pension indicators of Women, Business, and the Law data.

(a) Mobility



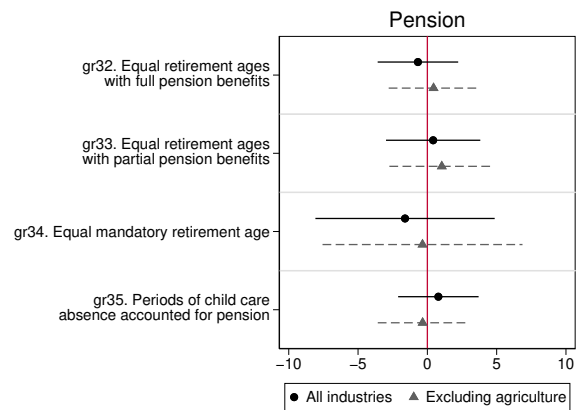
(b) Workplace



(c) Pay



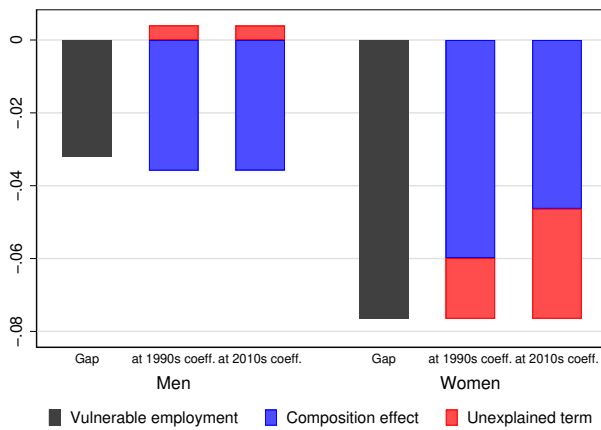
(d) Pension



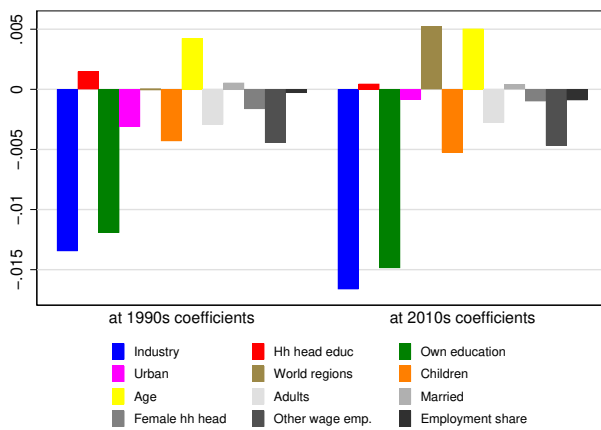
Notes: Bivariate regression coefficients reported with 95 per cent confidence intervals. Solid black lines: models that include all industries. Dash grey line: models that exclude agricultural sector. Dependent variable is the female dummy coefficient $\times 100$, conditional on controls. Each regression includes a constant and one of the variables shown in the figure. 76 countries included. For each country, the most recent year is selected; it ranges from 1992 to 2017.

Source: Authors' calculations based on I2D2 and Women, Business, and the Law.

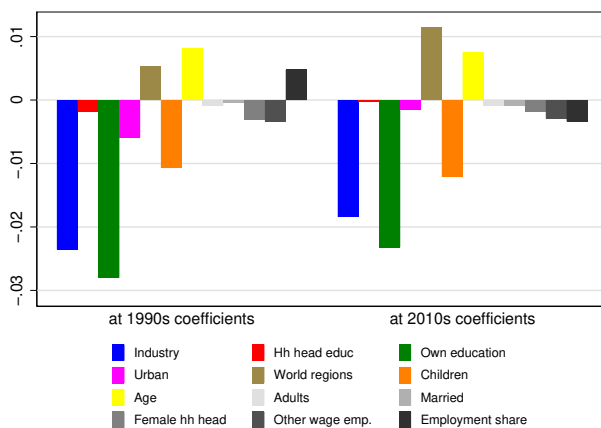
Figure A2: Decompositions over time: excluding agriculture.
 (a) Composition effect and unexplained term



(b) Detailed composition effects: Male sample



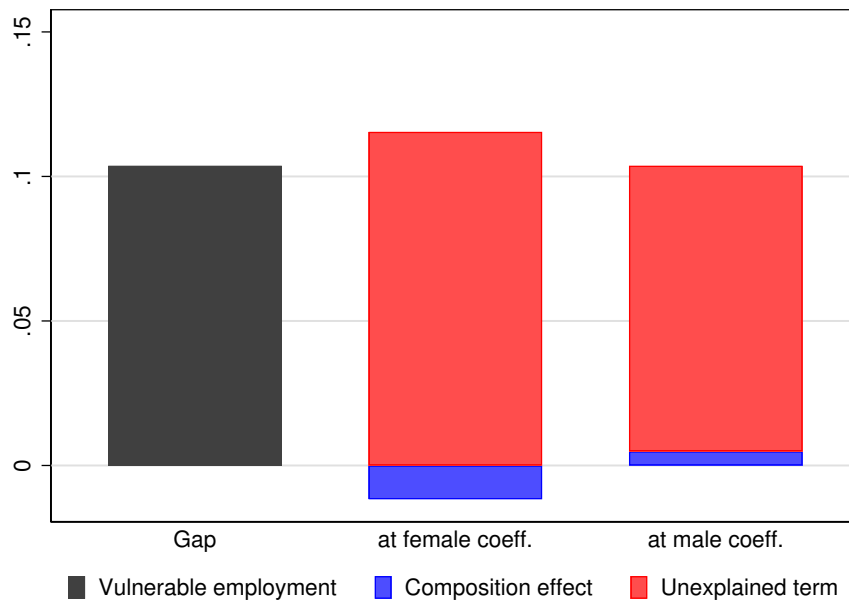
(c) Detailed composition effects: Female sample



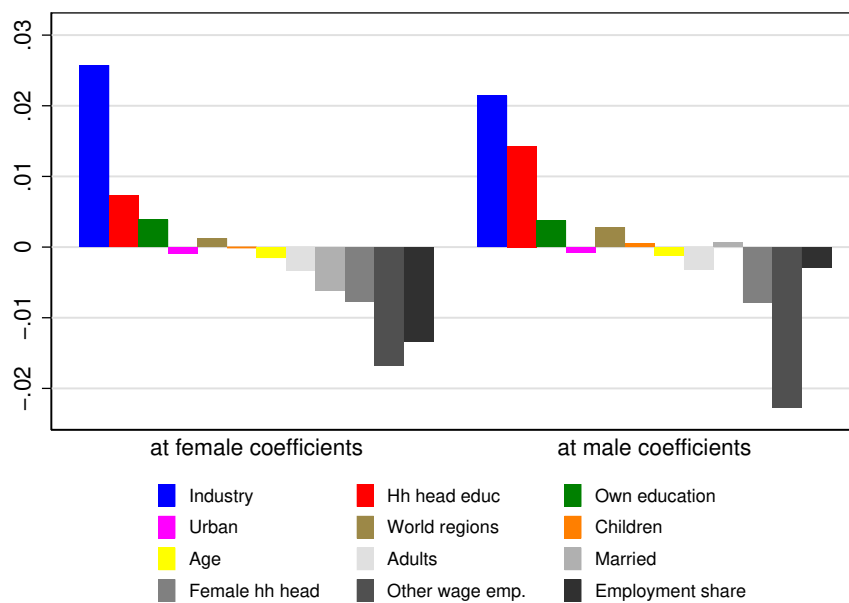
Notes: Fairlie (2006) decompositions. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 29 countries included. For each country, the earliest survey in 1990–99 and the latest survey in 2010–17 are selected, conditional on having at least 1,500 male and 1,500 female observations with complete covariate data. Decompositions are performed for a random sample of 1,500 men and 1,500 women drawn from each survey. Each decomposition is the average over 1000 sequences where the ordering of covariates is randomly determined. See Fairlie (2006) for more details. See Table A7 for point estimates and standard errors.

Source: Authors' calculations based on I2D2.

Figure A3: Decompositions by gender: excluding agriculture.
 (a) Composition effect and unexplained term



(b) Detailed composition effects



Notes: Fairlie (2006) decompositions. The outcome variable is 1 if the worker is in vulnerable employment, and 0 otherwise. 81 countries included. For each country, the latest survey is selected, conditional on having at least 1,500 male and 1,500 female observations with complete covariate data. Decompositions are performed for a random sample of 1,500 men and 1,500 women drawn from each survey. Each decomposition is the average over 1,000 sequences where the ordering of covariates is randomly determined. See Fairlie (2006) for more details. See Table A8 for point estimates and standard errors.

Source: Authors' calculations based on I2D2.