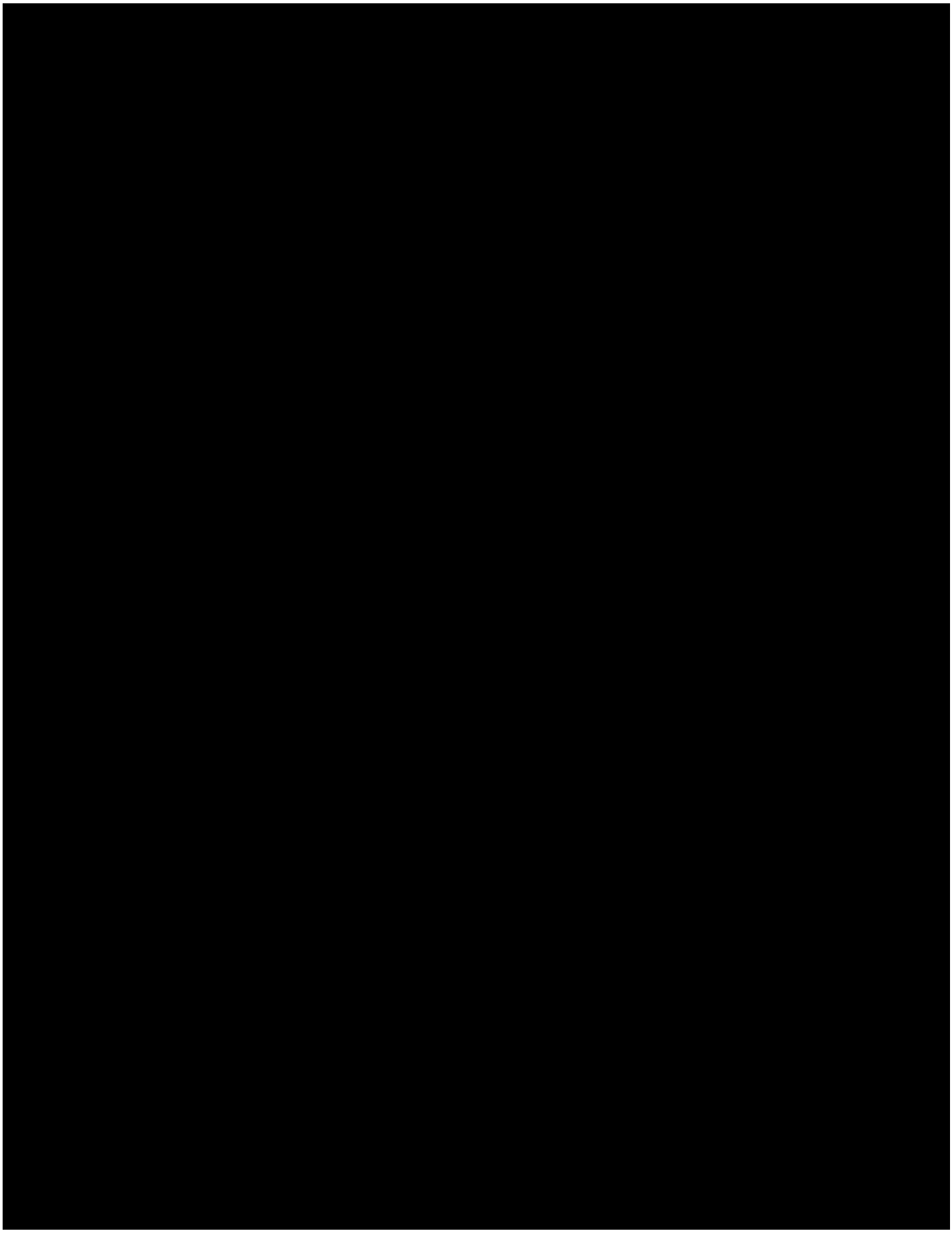

 WP/19/112

IMF Working Paper

Strategy, Policy and Review Department

Informality and Gender Gaps Going Hand in Hand

Prepared by Vivian Malta, Lisa Kolovich, Angelica Martínez Leyva, Marina Mendes Tavares[1]

Authorized for distribution by Johannes Wiegand

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Abstract

In sub-Saharan Africa women work relatively more in the informal sector than men. Many factors could explain this difference, including women's lower education levels, legal barriers, social norms and demographic characteristics. Cross-country comparisons indicate strong associations between gender gaps and higher female informality. This paper uses microdata from Senegal to assess the probability of a worker being informal, and our main findings are: (i) in urban areas, being a woman increases this probability by 8.5 percent; (ii) education is usually more relevant for women; (iii) having kids reduces men's probability of being informal but increases women's.

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Keywords: Informal Economy, Gender Gaps, sub-Saharan Africa, Senegal.

Authors' E-Mail Addresses: VMalta@imf.org, LKolovich@imf.org, AMartinezLeyva@imf.org, MMendesTavares@imf.org

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I. INTRODUCTION

Women are disproportionately overrepresented in the informal economy in more than 90 percent of countries in sub-Saharan Africa (SSA). The average share of informal employment of women in the non-agricultural sector in SSA is 83 percent while for men, the share is 72 percent. Including the agricultural sector, these shares raise to 94 percent and 89 percent, respectively.[2]

Informal employment is often characterized by less stability, a lack of social protection, lower earnings, and higher gender gaps. UN Women (2016) finds that the gender wage gap is 28 percent for the informal sector in sub-Saharan Africa, far higher than the 6 percent for the formal sector. Though some of the wage gap can be explained by observable differences such as job characteristics, number of hours worked, and the skills required for the job, gender wage gaps can also reflect gender discrimination—a wage premium for male workers that cannot be explained after controlling for observable individual and job characteristics.

In this paper, we investigate the factors that can explain the larger presence of women in the informal sector, including education, social norms, demographic characteristics, and legal barriers. We adopt two approaches: first, using cross-country data, we show the association between female overrepresentation in the informal sector and gender gaps, including in education, in social norms, and in the legal framework; second, using micro data from Senegal, we perform an empirical analysis using probit models. We focus on Senegal for many reasons: (i) it is a sub-Saharan African country with similar rates of employment in the informal sector when compared to the average of the region (91 percent vs 92 percent average in SSA, according to ILO); (ii) the informal sector share of GDP is close to the average of SSA countries (40 percent vs 38 percent in SSA[3]); (iii) the ratio of female-to-male employment in the informal sector is close to SSA average;[4] and (iv) Senegal has good quality micro-level survey data.

We find a high association between female excessive presence in the informal sector and other gender gaps. International comparisons show that higher female presence in the informal sector is associated with, on average, larger gender gaps in education, fewer family planning needs being satisfied, and higher rates of early marriage. Education plays a special role in explaining women's informality, as women tend to receive less education than men, and formal jobs often require more skills and education than informal jobs.

We use micro data and probit models to assess the determinants of informality in Senegal. Our estimations point to women in urban areas being 8.5 percentage points more likely to work in the informal sector than men, all else held constant. Furthermore, attaining primary and secondary education is usually more important for women than for men in lifting them out of informality.

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[2] Source: International Labour Organization, 2018.

[3] According to IMF estimations found in IMF Regional Economic Outlook, Sub-Saharan Africa, April 2017.

[4] Source: International Labour Organization, 2018.

For instance, completing secondary education decreases a working woman's chances of being in the informal sector by 61 percentage points (versus 54 percentage points for men). Being married or having children reduces a man's probability of being in the informal sector. For each additional child in the household, a working man has his probability of being in the informal sector decreased by 0.6 percent, whereas for a female worker in urban areas, each additional child increases her probability of being in the informal sector by 1.4 percent. We also find that male workers enjoy a lower probability of being in the informal sector the wealthier they become at a faster pace than their female counterparts.

Lower levels of education, traditional gender roles, discrimination, and gender-biased laws may curtail women's possibilities of working in the formal sector. Although informal jobs may offer certain appealing features such as the opportunity to be employed closer to home and greater flexibility, the informal sector can be a poverty trap for women. Female workers may remain in activities requiring lower skills and providing lower earnings, which can lead to fewer incentives to invest in young girls' education, creating perpetual gaps between men and women and reducing economic growth.

Several laws in sub-Saharan Africa still restrict women's economic possibilities and competitiveness. In many countries in the region, women cannot get a job without their husband's permission, make decisions for the household, travel outside the country the same way as men, administer marital property, perform the same jobs as men, or open a bank account. Furthermore, in more than half of the countries in sub-Saharan Africa, women's access to finance is not protected by law, and in several of them inheritance and property rights are not the same as men's (World Bank, 2018).

Governments have a range of policy options to tackle discrimination and women's overrepresentation in the informal economy, such as investing in the physical and human capital needed for quality education, removing discriminatory barriers from the legal framework, providing family planning to women and families that desire it, and improving infrastructure. Our analysis concludes with a list of policy recommendations to address these different angles of gender inequality.

This paper contributes to a large literature in development that studies the informal economy. This literature had been roughly divided into two segments: (i) a dual hypothesis that considers informal employment as a strategy of last resort to escape unemployment and poverty (Lewis, 1954; Harris and Todaro, 1970; Rauch, 1991; Magnac, 1991); and (ii) a hypothesis that sees informal employment as a voluntary choice for workers (Maloney 1999, 2004; Levy 2007). The literature also considers that the informal sector is a combination of both a strategy of last resort and a product of the worker's choice (Fields, 1990; Perry et al., 2007)—our paper belongs to this view.

Our paper is related to many others, for instance, to Gunther and Launov (2012) who use Cote d'Ivoire data to test the existence of segmentation in the informal sector. The authors find that

returns to education and experience are higher in the formal sector and that the gender wage gap is wider in the informal sector than in the formal sector. Our paper is also related to McCaig and Pavcnik (2015) who study work transitions between the formal and informal sector in Vietnam using panel data. They find that educated male workers in urban areas are more likely to switch to the formal sector than other workers initially in the informal sector. Our paper is also related to De Mel et al (2008), which examines the case of Sri Lanka and finds that female education is a more important determinant than male education when choosing between being a wage worker in the formal sector versus being in the informal sector as an own account worker. Ahn el al (2019) study youth labor market outcome in emerging markets and development economies using census data from 57 countries and find that female workers are more likely to work informally than male workers and that younger and less educated workers are more likely to be employed in informal sector. Our paper is also related to a scarce literature that studies labor markets and gender gaps in Senegal. IMF (2018a) analyzes the trends in gender gaps in education and labor markets in Senegal and simulates the macroeconomic impact of closing the gender gaps in education between men and women. Marzo & Atuesta (forthcoming) analyzes gender differences in access to economic opportunities in Senegal in terms of participation, productivity, and earnings.

The remaining of this paper is divided into three sections. In section II, we present cross-country evidence of gender gaps in informality and in other dimensions. In section II.A we focus our analysis on difference in educational attainment between boys and girls in sub-Saharan Africa; in Section II.B we analyze the importance of social norms and family planning; and in Section II.C we present gender gaps in the legal framework of sub-Saharan Africa countries. In section III, using micro-data from Senegal we estimate the impact of gender, level of education, and demographic characteristics on the probability of a worker being employed in the informal sector. Section IV concludes the paper and offers policy recommendations based on the cross-country and empirical analysis.

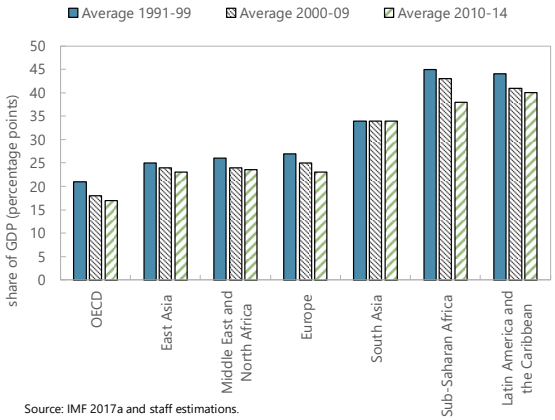
II. INFORMAL SECTOR AND GENDER GAPS

Globally, the informal economy is large, particularly in developing and emerging economies. According to the International Labour Organization (ILO, 2018), 70 percent of employment in these economies is informal, contrasting with only 18 percent in developed economies. Informal work in sub-Saharan Africa is an even higher share, corresponding to 92 percent of total employment.[5] IMF (2017) estimates that the informal sector in SSA accounted for 38 percent of GDP between 2010 and 2014 (Figure 1a). Across sub-Saharan Africa countries, there is wide

[5] The ILO (2018) publication explains the definitions of employment in the informal sector and informal employment. Employment in the informal sector (or in the informal economy) is a concept based on the characteristics of the enterprise or the place of work of the worker. Examples of informal sector are unincorporated private economic units and economic units not registered to relevant national institution or with no formal bookkeeping. By contrast, informal employment is a job-based concept and it is defined in terms of the employment relationship and protections associated with the job. Examples of informal employment is own account workers and employers in the informal sector, and employees that are not subjected to national labor legislation, income taxation, social protection or entitlement to employment benefits.

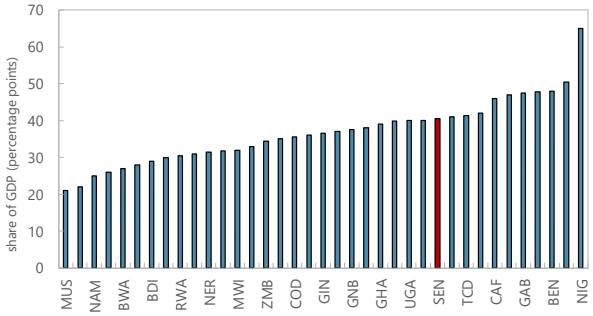
Figure 1. Informality Around the World and in Sub-Saharan Africa

(a) Size of informal economy, by region



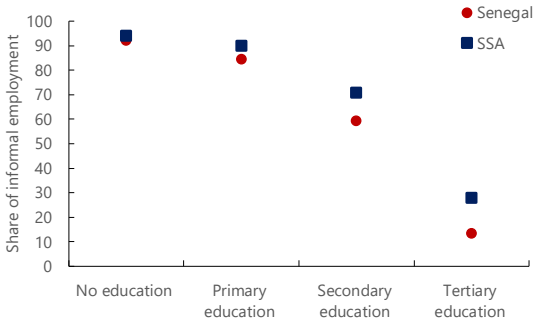
Source: IMF 2017a and staff estimations.

(b) Size of informal economy in SSA countries



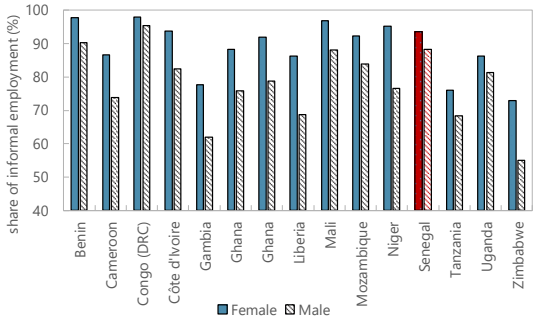
Source: IMF 2017a and staff calculations.

(c) Share of informal employment in total employment, by level of education



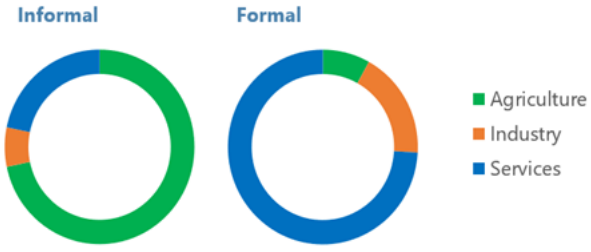
Source: International Labour Organization (2018),
Enquete de Suivi De La Pauvrete Au Senegal – ESPS II (2011)

(d) Share of informal employment (non-agriculture)



Source: ILO statistics. Latest available year for each country

(e) Sectoral composition of formal and informal employment in SSA:



Source: ILO statistics and IMF calculations.

variation in the size of the informal economy (Figure 1b). For example, in Mauritius the informal sector is relatively small, hovering around 20 percent of GDP, which is comparable to OECD countries. On the other hand, in Nigeria the informal economy accounts for more than 60 percent of GDP. In sub-Saharan Africa as a whole, informal jobs are concentrated in the agriculture sector, while most of formal jobs are in the services sector (Figure 1e).

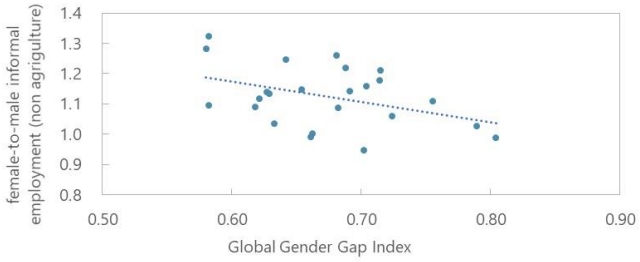
In half of the countries in SSA the share of female workers in the informal sector is larger than 95 percent.[6] Meanwhile, in no SSA country is the male share of workers in the informal sector larger than 95 percent. Even when excluding agricultural activities, informality dominates in all sub-Saharan Africa countries, and women work on average more often in the informal sector (ILO, 2018; see also Figure 1d).

Most informal workers in the region are *own account workers*, and this is true for both men and women. According to ILO (2018), after *own account workers*, male informal workers tend to be *employees* (32 percent) while female informal workers tend to be *contributing family workers* (24 percent), defined as those "who hold self-employment jobs in an establishment operated by a related person, with a too limited degree of involvement in its operation to be considered a partner." This means that these women - although working - are not fully independent and do not have control over the family business.

In sub-Saharan Africa, higher gender gaps in the informal sector are associated with higher levels of gender inequality. Figure 2 shows for 24 sub-Saharan Africa countries the relationship between gender gaps in the informal sector (as measured by the female-to-male non-agricultural informal employment ratio) and the World Economic Forum's 2018 Global Gender Gap Index (GGI). We included all sub-Saharan Africa countries for which data were available. The index is a weighted average of four indicators: educational empowerment, legal empowerment, financial access, and health and survival perspectives. As can be seen, higher levels of overall gender equality (higher GGI values) are associated with lower relative rates of women in informal employment.

There are several potential reasons why women tend to work more in the informal sector than men in sub-Saharan Africa. Factors such as lower levels of education, social norms (including more unpaid care work and household responsibilities for women), legal barriers, early pregnancy and marriage, preferences for job flexibility, difficulty and lack

Figure 2. Informality and Gender Inequality in SSA



Source: IMF calculations using ILO and WEF statistics.

[6] Female labor force participation in sub-Saharan Africa has increased from 60 to 63 percent according to the ILO (2018); at the same time that informality has declined.

of safety to go to work, poverty, and discrimination can all play important roles in women's labor market outcomes, including higher participation in the informal sector. Workers with lower levels of education have a reduced probability of joining the formal sector; for instance, ILO (2018) estimates that in Africa[7] only 17.4 percent of informal workers have completed secondary education compared to 40 percent of formal workers. We now investigate some of the possible factors behind women's overrepresentation in the informal sector in sub-Saharan Africa countries in more detail.

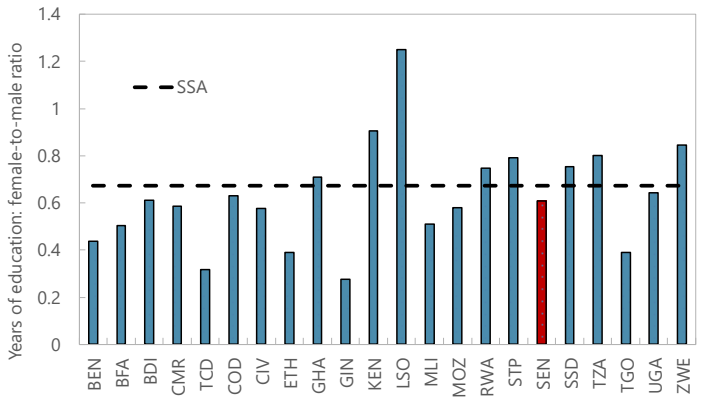
A. Women are less educated than men

In sub-Saharan Africa and around the world, informal jobs are disproportionally held by low-skilled workers with zero or little formal education. According to ILO (2018) more than 90 percent of low-skilled workers are employed in the informal economy in SSA. Among workers with no education, 95 percent are employed in the informal sector, and for workers with only primary education, 90 percent are in the informal sector. In stark contrast, only 27 percent of workers with tertiary education are in the informal economy (Figure 1c).

Women in sub-Saharan African countries are still, on average, less educated than men despite improvements over the last two decades. The gender gap in primary education completion rates has been eliminated in most countries; however, gender gaps persist at higher levels of education. Figure 3 shows the female-to-male ratios of average years of education for sub-Saharan Africa countries. As depicted in the figure, the average for female years of schooling is only 70 percent that of male years of schooling, and in countries like Chad and Guinea, the ratio is around 30 percent.

GDP losses from incomplete education can be quite high. Patrinos (2008) analyzes data from 13 countries including nine in sub-Saharan Africa and concludes that investing in girls to ensure that they complete the level of education from which they dropped out (primary or secondary) would lead to lifetime earnings equivalent to up to 68 percent of annual gross domestic product depending on the country and education level (the 68 percent case is the estimation for secondary education in Burundi). The GDP loss due to secondary school dropouts is estimated at 48 percent for Kenya, 32 percent for Tanzania, 35 percent for

Figure 3. Gender Gaps in Education in SSA



Source: World Bank statistics (latest available year for each country)

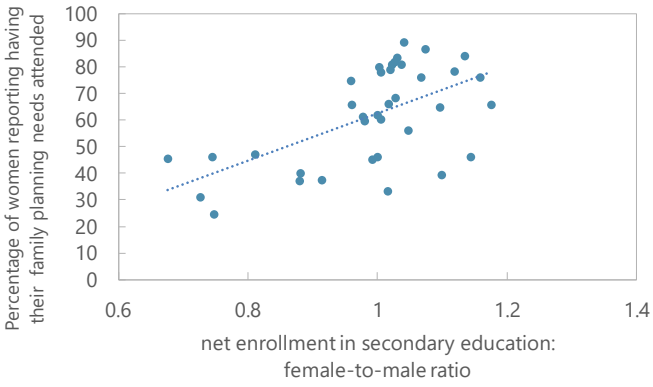
[7] Includes seven north African states in the "Africa" regional grouping.

Uganda and 24 percent for Senegal. Note that while these losses are calculated in terms of these girls' own generation, benefits from girls' education go beyond their own life-cycles: besides improving their individual employment opportunities, educating future mothers impacts their children's health, cognitive skills, grades, educational attainment and future employment opportunities. This generates a virtuous cycle of human capital formation and economic prosperity.

Secondary education provides large returns for women. According to Psacharopoulos & Patrinos (2004), women's return on secondary education (18.4 percent) is higher than their returns on primary education (12.8 percent) and post-secondary education (10.8). Furthermore, the paper shows that Latin American and sub-Saharan African countries have the highest returns on education in the world. Dropping out of secondary education may be due to the high opportunity costs of being at school at this stage of life; that is, the girls may be required to work for a family business or in other jobs, help with household chores, and take care of the younger children in the household. Moreover, early marriage and/or early childbearing happens during the time when girls would be in secondary education. In fact, early marriage is one of the main reasons for dropping out of school,[8] preventing girls from the full development of their human capital potential. This in turn often leads to them finding work in low-paying jobs in the informal sector. For instance, Herrera & Sahn (2014) estimates that in Madagascar, early childbearing increases the probability of dropping out of school by 42 percent and decreases the chances of completing secondary school by 44 percent.

Countries with more family planning needs being attended to also have more girls in secondary school. Figure 4 shows a strong correlation between the female-to-male secondary education enrollment ratio and family planning needs being attended to around the world (including in 14 sub-Saharan African countries[9]). The vertical axis measures the percentage of women who think their demands for family planning are satisfied by modern methods, while the horizontal axis depicts the female-to-male ratio in net secondary school enrollment.

Figure 4. Attended Family Planning Needs and Gender Gaps in Education in SSA



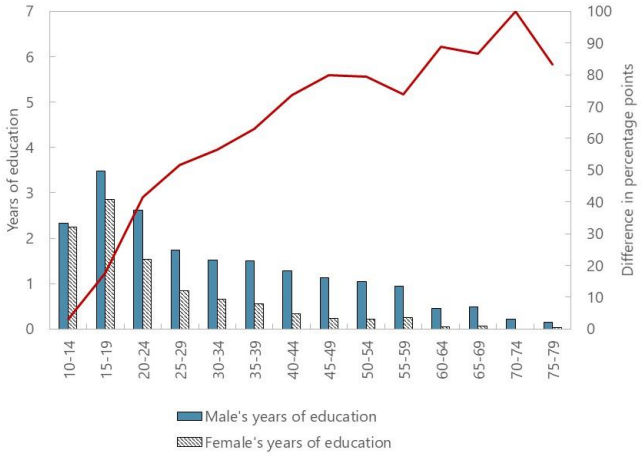
Source: IMF calculations using ILO and UN statistics.

[8] Source: World Development Report: Gender Equality, 2012.

[9] All countries with available data were included in the figure.

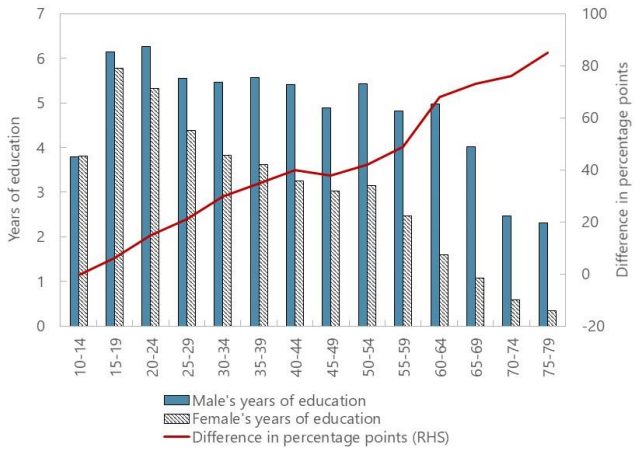
Gender gaps in education should also be analyzed under the urban-rural divide. Educational attainment in rural areas of SSA is significantly lower than in urban areas. For instance, according to Senegal's 2011 household survey,[10] boys and girls between the ages of 10 and 14 in rural regions in Senegal have on average approximately 1.5 years less of education than their urban counterparts. The urban-rural divide only increases as we look at boys and girls between ages 15 to 19, with urban students having completed approximately twice as many years of education than their rural counterparts. Figures 5 and 6 show years of education in Senegal for men and women by age groups, from 10-14 to 75-79 years old. As can be seen, gender gaps in number of years of education are larger in urban areas than in rural areas (1.3 vs 0.7 years of gap in education, on average). However, in percentage terms, women in rural areas of Senegal complete much less education than boys: while the difference in urban areas averages 31 percent (vertical axis), in rural areas it increases to 57 percent.

Figure 5. Years of Education Per Age Group and Gender - Senegal Rural Areas



Source: Senegal household survey (2011)

Figure 6. Years of Education Per Age Group and Gender - Senegal Urban Areas



Source: Senegal household survey (2011)

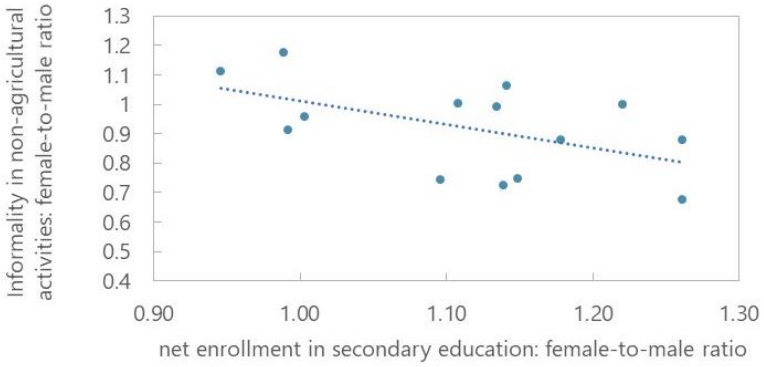
Sub-Saharan African countries with wider gender disparities in education also have relatively more women working in informality. Figure 7 plots the relationship between gender gaps in informal employment and secondary education in 14 SSA countries (all countries where data was available). The horizontal axis depicts the female-to-male ratio in net secondary school enrollment, and the vertical axis plots the female-to-male ratio of share of non-agricultural informal employment

[10] "Enquete de Suivi De La Pauvrete Au Senegal – ESPS II, 2011", which is the latest available comprehensive household survey in Senegal containing individual and household level data on social and economic characteristics.

in total employment. The negative correlation of 0.53 shows an interesting negative linear relationship between gender gaps in informal employment and gender gaps in secondary education.

In Senegal, despite the overall gender gaps in education, women who work in the formal sector have on average similar years of education as men. According to the 2011 Senegal household survey, women working in the formal sector have on average 6.0 years of education, not much lower than men's average of 6.5 years. In the informal sector, female workers have on average 1.3 years of education while males have 1.9 years.

Figure 7. Gender Gaps in Informality and in Education in SSA



Source: IMF calculations using ILO and UN statistics.

B. Social norms and lack of family planning curtail women's competitiveness

Social norms such as traditional gender roles reduce women's competitiveness in the formal labor market. Gender roles that impose significantly higher burdens on women prevent women from joining the labor force. Moreover, if they do enter the labor force, they often need to look for more flexible opportunities to maintain the "double shift" of work inside and outside the home. Unpaid care work and household responsibilities fall disproportionally on women and girls, starting from an early age (UNICEF, 2016[11]). For instance, in Senegal, women (both inside and outside the labor force) spend on average six times more time than men taking care of the family and doing household chores.[12] Even when women are employed, they still spend considerably more time completing household activities than men. According to Wodon & Blackden (2006), in Benin, working women spend 208 minutes a day on household chores, while men spend 67 minutes. In South Africa, these numbers are 228 minutes for women and 75 minutes for men, and in Mauritius, 277 minutes for women and 73 minutes for men. The substantially larger amount of time spent on

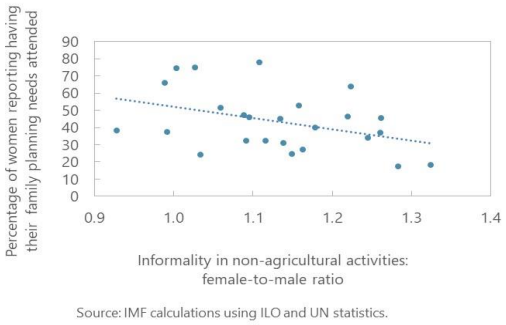
[11] Available at: https://www.unicef.org/press-releases/girls-spend-160-million-more-hours-boys-doing-household-chores-everyday

[12] Calculated using Senegal's 2011 household survey.

domestic activities diminishes not only women's productivity at work but also their competitiveness in the labor market.

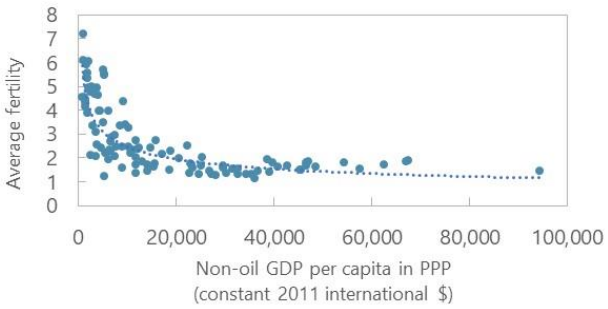
Early marriage, early childbearing, and lack of family planning impose further constraints on women's abilities to compete in the labor market. As noted earlier, early marriage is one of the main reasons for school dropouts, impeding women from developing fully their human capital potential and thus increasing their probability of working in low-remunerated jobs in the informal sector. Women who have children at a young age face additional time constraint, impairing their human capital formation, which further reduces their competitiveness in the labor market. Herrera et al (2016) find that women whose first birth occurred during adolescence largely find work in low-quality informal jobs. Figure 8 shows that in sub-Saharan African countries, unattended family planning needs are associated with more women working in the informal sector relative to men. Given that women in sub-Saharan Africa carry the higher burden of unpaid care work, higher fertility rates and number of children (due to family needs not being attended) pose further obstacles to women's entrance in the labor market.[13] Figure 9 shows that high fertility rates are associated with low levels of income.[14]

Figure 8. Gender Gaps in Informality and Family Planning Needs Being Attended



Source: IMF calculations using ILO and UN statistics.

Figure 9. GDP Per Capita (Non-Oil) and Fertility Around the World



Source: IMF calculations using WB data.

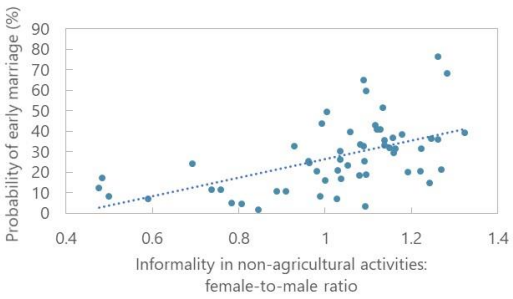
Women marrying at a young age is associated with higher levels of informal employment. Figure 10 uses data from 57 countries (24 in sub-Saharan Africa) and shows the relationship between early marriage and non-agricultural informality outcomes. Countries where women marrying before the age of 18 is more common tend to have higher rates of informal employment for women relative to men (the correlation between these two variables is 0.54).

[13] Bloom et al (2009) estimates a large negative effect of the fertility rate in the labor force participation using a cross-country panel data.

[14] See the 2018 IMF Staff Report on Nigeria for a discussion on how high fertility rates can lower economic growth.

The combination of low education, gender roles, early pregnancy, and early marriage can create a poverty trap for women and girls. Expectations play a large role in economic outcomes, and this is no different for the case of women in poor employment conditions. Parents expecting lower returns from their daughters in the labor market will have fewer incentives to keep their girls in school. Girls with less education and fewer professional opportunities may not prioritize improving their skills and will choose to stay out of the labor force or to have more flexible jobs that allow them to reconcile the demands of work at home and work outside home. This cycle can leave them trapped in informal and lower paying jobs.

Figure 10. Gender Gaps in Informality and Early Marriage



Source: IMF calculations using ILO and UN statistics.

C. Legal Frameworks Impose Barriers for Working Women

Legal barriers may impose additional constraints for women trying to pursue a career, including working in the formal sector or being a successful entrepreneur. World Bank's Women, Business and the Law publications (since 2009) provide information on legal rights and restrictions in 189 countries around the world and cover 47 countries in sub-Saharan Africa. The analysis draws on several indicators, of which we highlight four: women's ability to access institutions, to use property, to build credit, and to go to court.

SSA ranks sixth out of seven groups for women's ability to access institutions.[15] The "access to institutions" indicator measures women's legal ability to make their own choices and to transform them into economic outcomes. If laws prevent women from interacting with public authorities or with the private sector in the same way as men, then their agency and economic activities will be limited, pushing them out of formality. According to the 2018 report, for this indicator SSA countries outperform only Middle East and North Africa countries. Some examples: a woman may still need her husband's permission to sign a contract in Equatorial Guinea or to open a bank account in Chad, Guinea-Bissau, and Niger. Sometimes women cannot register a business the same way as men (Guinea-Bissau) or travel outside the country as men can (Sudan). In Benin, Cameroon, Republic of Congo, Mauritius, and Namibia, women cannot apply for a national identification card in the same way as men. In nine countries,[16] women cannot get a job without their husband's permission. In 15

[15] The seven groupings are: High-income Countries, Europe & Central Asia, Latin America & Caribbean, East Asia & Pacific, Sub-Saharan Africa, South Asia, Middle East & North Africa.

[16] Cameroon, Chad, Comoros, Gabon, Guinea, Guinea-Bissau, Mauritania, Niger and Sudan.

countries,[17] women cannot be the head of the household the same way as men. In another set of 15 countries,[18] women cannot choose where to live. Finally, in 11 countries,[19] women cannot apply for a passport the same way as men.

Property rights for women are still compromised in many sub-Saharan Africa countries. In eight[20] sub-Saharan African countries, only husbands can legally administer marital property. In nine countries, married women may not have equal ownership rights[21] and female and male surviving spouses do not have equal inheritance rights.[22]

In most sub-Saharan African countries, women's access to finance is not protected by law. The survey reports on aspects regarding women's ability to build credit, including their access to finance. In the vast majority of sub-Saharan African countries,[23] discrimination based on gender or marital status is not prohibited in access to finance.

Women's working opportunities and conditions are many times impaired by law. In 27 sub-Saharan African countries,[24] women a legally barred from performing the same jobs as men. For example, in Guinea-Bissau, São Tomé and Príncipe, South Sudan, and Sudan women cannot work the same night hours as men. The availability of workplace protection and the parental benefits in sub-Saharan Africa are also below the global average. Parental

[17] Burundi, Cameroon, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Gabon, Guinea, Guinea-Bissau, Madagascar, Mali, Mauritania, Niger, Senegal and Sudan.

[18] Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Republic of Congo, Equatorial Guinea, Gabon, Guinea, Guinea-Bissau, Mali, Niger, Senegal, Sudan.

[19] Benin, Botswana, Cameroon, Republic of Congo, Gabon, Malawi, Mali, Nigeria, Sudan, Uganda, Zambia.

[20] Cameroon, Chad, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea-Bissau.

[21] Cameroon, Chad, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea-Bissau and Mauritania.

[22] Comoros, Gambia, Guinea, Kenya, Mauritania, Senegal, Sudan, Tanzania and Uganda.

[23] These countries are: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Republic of Congo, Democratic Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, South Sudan, Sudan, Tanzania, Togo, Uganda, Zimbabwe.

[24] Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Eswatini, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Lesotho, Madagascar, Mali, Mauritania, Mozambique, Niger, Nigeria, São Tomé and Príncipe, Senegal, South Sudan, Sudan.

leave and the availability of high-quality childcare options can help encourage women to enter and remain in the labor force.[25]

Other legal barriers outside the labor market sphere impair women's ability to achieve their full potential. For instance, 19 sub-Saharan African countries do not have laws prohibiting or invalidating child or early marriage; in 21 countries there is no legislation on domestic violence; and nine countries do not have legislation specifically addressing sexual harassment.

Although advancements are largely needed in the region, many countries have already significantly improved their legal frameworks. Since the beginning of the Women, Business, and Law publication in 2009, 31 out of the 47 sub-Saharan African countries covered in the reports have seen some improvement in terms of gender equality in their legal frameworks. The Democratic Republic of Congo has made the most progress: in 2018 women conquered equal rights in many economic-related areas such as in the pursue of jobs, signing contracts, opening bank accounts, registering businesses, and nondiscrimination by creditors. Furthermore, married women are now not legally required to obey their husbands, and women who wish to participate in the labor market now enjoy nondiscrimination laws in employment. Other countries with considerable advancements in gender equity in the legal framework in the last ten years were Guinea, Mauritius, Rwanda, São Tomé and Príncipe, and Zambia.

III. CASE STUDY: SENEGAL

This section investigates further the relationship between gender and informal employment in Senegal. In addition to presenting relevant stylized facts for the country, in this section we use probit regression models to estimate the importance of factors in determining the probability of Senegalese workers, notably women, being employed in the informal sector. For this purpose, we use micro data from the 2011 household survey in Senegal (*Enquete de Suivi De La Pauvrete Au Senegal – ESPS II, 2011*), which is the latest available comprehensive household survey in Senegal containing individual and household level data on social and economic characteristics. In the dataset, we define a formal worker as a paid worker who declares having a formal contract with the employer (11.9 percent of workers) and/or a paid worker who declares having affiliation, through the employer, to a social security system (7.7 percent of workers). In sum, 14.3 percent of all workers are formal workers under this classification. Although international standards separate the definition of informal worker and informal sector, here we will use both terms interchangeably.

[25] Ensuring that all boys and girls have access to high quality pre-primary childhood education by 2030 is also one of the Sustainable Development Goals. Countries that are considering options to increase access to childcare to increase female labor force participation include Macedonia (IMF, 2019), Egypt (IMF, 2018b), and Austria (IMF, 2017b).

A. The Context of Senegal

Senegal's sectoral division is similar to other low-income SSA countries. Like many SSA countries, employment in Senegal is concentrated in the agricultural sector, accounting for almost half of total employment, the second largest sector is industry, and the smallest is services. Senegal's economic structure resembles a country that is in the beginning of the process of structural transformation process.[26]

Senegal has taken important steps to close gender gaps. Gender gaps in primary education in both enrollment and completion rates have closed and have even reversed (IMF 2018a). According to UNESCO, from 1999 to 2016 gross enrollment rates in primary education jumped from 59 percent to 88 percent for girls while for boys, the rates improved from 71 percent to 78 percent. Primary education completion rates rose from 33 percent for girls and 43 percent for boys in 2000 to 64 percent and 54 percent, respectively, in 2016. However, the average years of education in Senegal was only 2.8 in 2015 (according to UNDP), lower than the average of WAEMU (3.0 years) and SSA (5.1 years).

More progress is needed as girls' completion rates in secondary education and enrollment in tertiary education are still substantially lower than those of boys. The Demographic and Health Survey program (DHS) reported that, in 2012, the average female completion rate in secondary education was only 13 percent compared to 21 percent for boys. The female completion rate for tertiary education doubled from 4 percent in 2006 to 8 percent in 2016; however, the male rate is still relatively much higher, having increased from 8 percent to 13 percent. As previously mentioned, despite these gender gaps in education, women who work in the formal sector in Senegal are on average almost as educated as men.

Female labor force participation increased since 2000. Women's labor force increased from 34 percent of the total labor force in 2000 to 41 percent in 2016. Furthermore, according to the ILO, the ratio of female-to-male unemployment rates of young people (from 15 years to 24 years old) dropped from 1.7 to 1.1 between 2000 and 2017.

Women in Senegal rarely work part time, even when employed in the informal sector. One of the benefits of working in the informal sector is the possibility of more flexibility in terms of location (being closer to home), in hours, and/or in days worked. The part-time or flexible work arrangement is especially valuable for women, as they are almost always responsible for the bulk of unpaid care work. As a result, woman could potentially prefer a job that requires fewer hours or offers greater flexibility over job security, higher compensation, and other benefits. Using the Senegal household survey data, we calculate the share of men and women working full-time and part-time in the formal and informal sector. Table 1 confirms that Senegalese women are more likely to work part-time than men (probability of 20 percent for women versus 7 percent for men), but still the majority of men

[26] For a review on the literature on structural transformation see Herrendorf, Rogerson, and Valentinyi (2014).

and women work full-time. The table shows that only in urban areas women tend to work more part-time in the informal sector than in the formal sector. On average, women work 43 hours per week in the formal urban sector and 48 hours per week in the informal urban sector. Thus, it does not seem that in Senegal women are benefiting from the part-time flexibility more often given by the informal sector.

Table 1. Percentage of Part-Time Workers

	Rural		Urban		All	
	Formal	Informal	Formal	Informal	Formal	Informal
Male	8.4	8.1	7.9	5.4	8	7.2
Female	25.1	20.8	16.4	19.5	19	20.3

Source: Senegal Household survey (2011)

Gender gaps vary across the distribution of income. Female Senegalese workers from the top income groups are more often informal workers than their male counterparts, but that statistic does not hold for lower income groups. For instance, at the top 40 percent of the income distribution female workers are on average 9.0 percentage points more often in the informal sector than male workers from the same income group (82 percent vs 73 percent). In contrast, at the bottom 40 percent of the income distribution, the average of this gender gap falls from 9.0 percent to zero. This could be partially explained by education gaps, as gender gaps in years of education are larger among richer households: while at the top 40 percent of the income distribution the gap is 0.92 years of education, at the bottom 30 percent, the gap is 0.60 years.

The overall legal framework index for women in Senegal is below the SSA average. World Bank (2018) calculates that Senegal scores below the SSA average in terms of women's legal rights (see Figure 11), in particular for the indicators "using property" (related to asset ownership), "getting a job", "building credit" and "accessing institutions". For instance, in Senegal, there are still legal restrictions that prevent non-pregnant, non-nursing women from performing the same job as men. Moreover, sexual harassment is not recognized as a criminal offense and, according to Marzo & Atuesta (forthcoming), 18 percent of working Senegalese women declared that they were asked to have sexual relations to get a promotion while 16 percent claimed they were refused a work contract for having rejected sexual advances. Furthermore, the constitution does not formally recognize, nor does it prohibit discrimination against women that may result from customary laws.

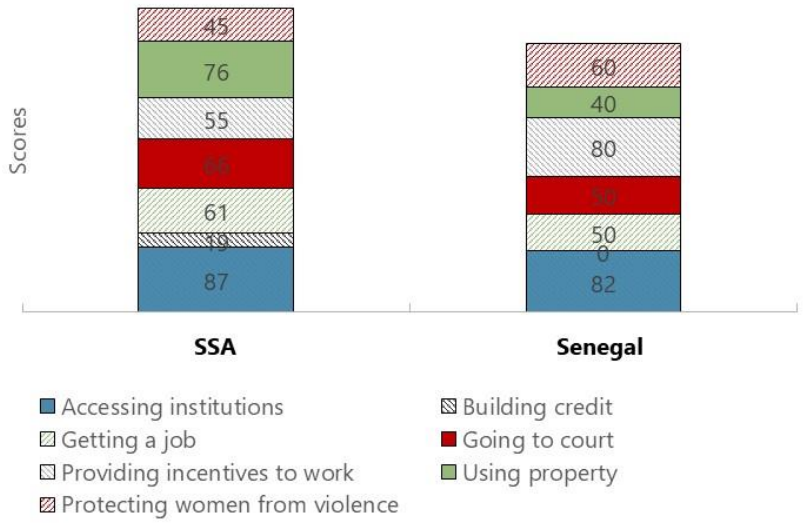
The Senegalese Family Code allows for early marriage. The Code, which was passed into law in 1974, sets minimum age of marriage at only 16. However, household survey data shows that Senegalese women tend to marry earlier than men, and these women receive less education. Twenty-three percent of female adolescents aged from 15 to 19 are already married, while among males in the same age group, only two percent are married. The female adolescents who are married have on average one-third fewer years of education than the

unmarried ones (2.6 years vs 3.9 years), suggesting that early marriage might have substantial negative effects on education outcomes.

Senegal scores above the SSA average in key components, such as "providing incentives to work" and "protecting women from violence". Women working in the formal sector have a legal guarantee of an equivalent position after maternity leave, and the government provides child allowances to parents who work. In addition, Senegal has made important progress in passing legislation against domestic violence, improving the performance of the "protecting women from violence" index component.

Women's asset ownership is low and is not protected by law. The Senegalese Family Code gives husbands the power to make all the decisions for the household. This directly affects women's asset ownership. Complicating the gender equality in asset ownership, the system of inheritance described in the Family Code also gives advantages to men. This hampers women's ability to have their own land or own equipment to produce, reducing their competitiveness in the labor market.

Figure 11. Legal Framework for Women: Scores for SSA and for Senegal



Source: Women, Business and the Law, 2018

B. Empirical Analysis

Using micro-level data from Senegal, we examine factors that could determine whether a worker is formal or informal. Using Senegal's 2011 household survey, we construct probit models to quantify the probability of Senegalese workers between the ages of 15 and 64 being formal or informal. We are interested in the marginal effects of the following variables on the probability of being an informal worker: gender, educational attainment, if worker is head of the household, if worker is married, number of kids in the household,

decile in the income distribution (variable ranging from 1 to 10, the households in poorest conditions being in decile 1), and age group. In addition, we control for specific geographical regions. We run probit models using the entire household sample as well as urban and rural areas separately, which is standard in the literature. For each of these three cases, we run models including all workers, female workers only, and male workers only. Table 2 presents the coefficients and standard errors of the marginal effects of the resulting eight probit models. Table 3 in the Appendix presents these results including the controls for geographic regions and the z-tests for all variables.

Our results indicate that women are more likely to be in the informal sector than men. Table 2 shows that being a woman increases by 3.4 percentage points the probability of the worker being employed in the informal sector and this coefficient is significant at the one percent level. In urban areas, this discrepancy is even higher: all else constant, a working woman is 8.5 percentage points more likely to be in the informal sector than a working man.

Getting an education has the largest positive effect on the probability of being a formal worker and it is usually more important for women. Among all regressors, primary, secondary, and tertiary education variables have the largest marginal effects on the probability of being in the informal sector, with the exception of primary education in rural areas. The regressions using female subsamples have larger coefficients for primary and secondary education than the regressions on male subsamples (with the exception of primary education in rural areas). Paid workers who completed primary education (12.6 percent of paid workers) are 16.4 percent less likely to be in the informal sector (25.5 percentage points if they live in urban areas). In particular, female workers in urban areas are 31.2 percent less likely to be in the informal sector when they complete primary schooling, while the reduction is 22.5 percent for men. A primary school diploma in rural areas is not as relevant to lift a worker from the informal to the formal sector, decreasing the probability of being informal by 7.2 percent for men and 4.6 percent for women. This might result from the limited size of the formal sector in rural areas. Note that in rural areas of Senegal only 6.7 percent of workers have primary school diploma while in urban areas this percentage increases to 21.7.

The likelihood of being in the informal sector decreases as educational attainment increases. Workers who earned a secondary degree diploma (2.4 percent of paid workers) are on average 55.5 percent less likely to be in the informal sector. Among urban residents, this premium reaches 60.4 percent. The importance of a secondary degree education is larger for women, who account for 30 percent of workers with that diploma, than for men: 61.0 percent vs 53.8 percent, respectively. In urban areas these numbers rise to 66.4 for women and 57.1 for men. Individuals with tertiary education (0.5 percent of paid workers) are 72.8 percentage points less likely to be working in the informal sector. Contrary to primary and secondary education, women with tertiary education are less likely to be in the informal sector than men (marginal effects of -65.5 percent for women and -76.2 percent for men). However, only 22 observations in the sample of 163,490 observations correspond to female workers with tertiary education; thus, the estimations suffer from small sample bias. Using

the urban sample, the tertiary education premium is higher for women (69.4 percent) than for men (68.6 percent).

Chi-squared tests confirm that primary and secondary education are usually more relevant for women's than for men's labor outcomes. To compare the impact of males' and females' education on their probabilities of being in the informal sector, we run probit regressions including as regressors the interactions between gender and other variables, including education variables. We also add as regressors the interactions between gender and other variables to investigate which factors such as marital status, number of children, and level of income (or decile) contribute to the probability of being an informal worker depending on the gender. Tables 4, 5 and 6 in the appendix present these regressions for, respectively, all areas, urban areas only, and rural areas only. For the case of education, the results for the Chi-squared tests confirm that females have larger coefficients (in absolute terms) in primary and secondary education in general and in urban areas, indicating that the impact of primary and secondary education is higher for women than for men in terms of their reduction in probability of working in the informal sector.

Men enjoy a bonus from being married and from fatherhood. In Senegal, married men have on average a 2.1 percent lower probability of being in the informal sector when compared to single men, and this rate rises to 10.2 percent if ones takes into consideration only urban areas. For the female and rural subsamples, the marriage variable is not significant. Moreover, for each additional child in the household, the working man sees his probability of being in the informal sector decrease by 0.6 percent, while for females in urban areas each additional child increases her probability of being in the informal sector by 1.4 percent.[27] Given that women in Senegal have on average five children, the overall effect of having children on labor informality can be sizable. Robustness checks using the regressions that include interaction terms (Tables 4 to 6) confirm these results.

Being the head of the household reduces the probability of being an informal worker, particularly for women. The probability of a Senegalese worker being an informal worker is 2.5 percent lower when s/he is head of the household, and 5.3 percent lower if s/he is the head of the household in urban areas. Separating the male and female subsamples, only the female subsample has a significant coefficient (at the five percent level) for head of the household, improving the probability of being a formal worker by 2.8 percent.

[27] Correll, Benard, and Paik (2007) show, using a randomized control trial in the US, that mothers are perceived as less competent, are less likely to be promoted, and have lower wages than fathers. Bear and Glick (2016) examine how reframing mothers as "breadwinners" can reduce the motherhood penalty.

Table 2. Marginal Effects from Probit Regressions

Dependent variable: informal worker (binary variable)

Samples → / ↓ Independent variables	All workers	Female workers	Male workers	Urban workers	Urban female workers	Urban male workers	Rural workers	Rural female workers	Rural male workers
Female	0.0340***			0.0850***			0.0088*		
	(0.0050)			(0.0113)			(0.0049)		
No education	0.0336***	0.0197**	0.0376***	0.0634***	0.0269	0.0803***	0.0186***	0.0175*	0.0153**
	(0.0062)	(0.0090)	(0.0084)	(0.0135)	(0.0189)	(0.0187)	(0.0056)	(0.0095)	(0.0066)
Primary Education	-0.1640***	-0.2010***	-0.1506***	-0.2547***	-0.3120***	-0.2248***	-0.0656***	-0.0461**	-0.0720***
	(0.0115)	(0.0216)	(0.0138)	(0.0177)	(0.0301)	(0.0221)	(0.0111)	(0.0191)	(0.0132)
Secondary Education	-0.5553***	-0.6098***	-0.5384***	-0.6044***	-0.6643***	-0.5707***	-0.4577***	-0.6073***	-0.4364***
	(0.0311)	(0.0582)	(0.0365)	(0.0267)	(0.0478)	(0.0314)	(0.0645)	(0.1530)	(0.0664)
Tertiary Education	-0.7285***	-0.6551***	-0.7625***	-0.6990***	-0.6939***	-0.6862***	-0.7793***		-0.7899***
	(0.0611)	(0.1610)	(0.0415)	(0.0367)	(0.1131)	(0.0220)	(0.1503)		(0.1504)
Head of the Household	-0.0249***	-0.0279**	-0.0063	-0.0530***	-0.0361	-0.0292	-0.0190**	-0.0239	-0.0031
	(0.0071)	(0.0131)	(0.0087)	(0.0155)	(0.0230)	(0.0210)	(0.0074)	(0.0177)	(0.0071)
Married	-0.0213***	0.0071	-0.0392***	-0.0477***	0.0173	-0.1016***	-0.0000	0.0079	-0.0013
	(0.0062)	(0.0082)	(0.0090)	(0.0134)	(0.0166)	(0.0212)	(0.0059)	(0.0088)	(0.0069)
Number of Kids	-0.0020	0.0036	-0.0059**	-0.0007	0.0139**	-0.0084	-0.0033**	-0.0011	-0.0049***
	(0.0019)	(0.0027)	(0.0025)	(0.0047)	(0.0067)	(0.0064)	(0.0014)	(0.0022)	(0.0018)
Income Decile (1 to 10)	-0.0116***	-0.0060***	-0.0161***	-0.0254***	-0.0165***	-0.0310***	-0.0055***	-0.0020	-0.0081***
	(0.0011)	(0.0016)	(0.0014)	(0.0029)	(0.0039)	(0.0042)	(0.0009)	(0.0015)	(0.0010)
Urban	-0.0735***	-0.0560***	-0.0836***						
	(0.0052)	(0.0076)	(0.0070)						
Age: 15-19	-0.0054	-0.0090	-0.0002	-0.0272	-0.0258	-0.0367	-0.0123	-0.0167	-0.0065
	(0.0116)	(0.0171)	(0.0147)	(0.0403)	(0.0465)	(0.0593)	(0.0088)	(0.0159)	(0.0096)
Age: 20-24	-0.0353***	-0.0372*	-0.0338*	-0.0840**	-0.0614	-0.1109*	-0.0380***	-0.0395*	-0.0337**
	(0.0132)	(0.0196)	(0.0176)	(0.0405)	(0.0478)	(0.0585)	(0.0125)	(0.0204)	(0.0153)
Age: 25-29	-0.0669***	-0.0806***	-0.0529***	-0.1354***	-0.1183**	-0.1531***	-0.0624***	-0.0720***	-0.0446***
	(0.0145)	(0.0236)	(0.0167)	(0.0408)	(0.0496)	(0.0575)	(0.0147)	(0.0251)	(0.0136)
Age: 30-34	-0.0910***	-0.0793***	-0.1027***	-0.1971***	-0.1776***	-0.2136***	-0.0622***	-0.0364*	-0.0872***
	(0.0144)	(0.0216)	(0.0192)	(0.0419)	(0.0516)	(0.0580)	(0.0135)	(0.0206)	(0.0170)
Age: 35-39	-0.0909***	-0.0685***	-0.1145***	-0.2104***	-0.1688***	-0.2410***	-0.0511***	-0.0306	-0.0805***
	(0.0153)	(0.0218)	(0.0213)	(0.0428)	(0.0543)	(0.0583)	(0.0145)	(0.0198)	(0.0210)
Age: 40-44	-0.0801***	-0.0535***	-0.1081***	-0.1948***	-0.1544***	-0.2228***	-0.0401***	-0.0125	-0.0792***
	(0.0152)	(0.0193)	(0.0224)	(0.0441)	(0.0520)	(0.0615)	(0.0121)	(0.0146)	(0.0188)
Age: 45-49	-0.0931***	-0.0330*	-0.1576***	-0.2184***	-0.0834*	-0.3211***	-0.0473***	-0.0192	-0.0865***
	(0.0163)	(0.0194)	(0.0243)	(0.0449)	(0.0494)	(0.0602)	(0.0138)	(0.0183)	(0.0199)
Age: 50-54	-0.0739***	-0.0323*	-0.1167***	-0.1898***	-0.1065**	-0.2508***	-0.0322**	-0.0051	-0.0687***
	(0.0161)	(0.0190)	(0.0243)	(0.0460)	(0.0522)	(0.0635)	(0.0126)	(0.0139)	(0.0201)
Age: 55-59	-0.0821***	-0.0408*	-0.1209***	-0.2491***	-0.1451**	-0.3100***	-0.0080	0.0143	-0.0359**
	(0.0184)	(0.0224)	(0.0270)	(0.0502)	(0.0574)	(0.0676)	(0.0114)	(0.0120)	(0.0181)
Age: 60-64	-0.0433*	-0.0233	-0.0655**	-0.1286**	0.0008	-0.2244***	-0.0232	-0.0381	-0.0201
	(0.0260)	(0.0397)	(0.0274)	(0.0536)	(0.0596)	(0.0748)	(0.0268)	(0.0461)	(0.0213)
Pseudo R^2 of the probit model	0.2435	0.2209	0.2588	0.2212	0.2326	0.2159	0.1021	0.0919	0.1218
Number of Observations	47,169	19,367	27,802	19,069	7,583	11,486	28,100	11,783	16,316

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: we included "no education", complete "primary education", complete "secondary education", complete "tertiary education" in the regressions, omitting incomplete primary education.

Wealth improves the probability of being a formal worker for men more than for women. For each decile a working man's household climbs in Senegal's income distribution, the chances of him being in the informal sector decreases by 1.6 percent (3.1 percent in urban areas), whereas for the working woman this reduction is smaller, at 0.6 percent (1.6 percent in urban areas). This diverging process is in line with higher gender gaps in informality at the top of the income distribution – as illustrated in the previous subsection.

IV. CONCLUSIONS AND POLICY RECOMMENDATIONS

Women are disproportionately overrepresented in the informal economy in sub-Saharan Africa, where they have less stability, reduced social protection, lower productivity, lower earnings and suffer more discrimination. We show evidence that countries with higher informality among female workers have, on average, larger gender gaps in education, fewer family planning needs being satisfied, and higher incidences of early marriage. We further point out how legal frameworks create constraints for women, as laws in sub-Saharan Africa reduce women's economic possibilities and competitiveness by reducing their access to property, jobs, and credit.

The combination of low education, traditional gender roles, legal constraints, early pregnancy, and early marriage can create a trap for females in the informal sector. Parents expecting lower returns from their daughters in the labor market will have fewer incentives to keep their girls in school. Girls with less education and those who bear the burden of the work associated with traditional gender roles will have lower chances of joining the formal labor market. Early pregnancy and early marriage push further down their chances. This cycle can leave women trapped in informal or less attractive jobs.

Using microdata from Senegal, we find that women are more likely to be in the informal sector than men; that primary and secondary education are usually more relevant to women's lifting out of informality than to men's; that being married or having children implies a lower probability for men of being an informal worker – but the effect is opposite for the case of working women having children; and that becoming wealthier decreases the probability of men being in the informal sector faster than for women.

Governments can adopt several policies to address the different angles of gender inequality. The paper shows important links between gender inequality and scarcer opportunities for women in the labor market, in particular in the formal sector. Policy makers have a role to play in diminishing these inequalities and making sure men and women can compete equally in the labor market. Policy recommendations include:

- **Increasing girls' educational attainment can diminish substantially the probability of women being employed in the informal sector**, in particular in terms of completion of primary and secondary education. Also, more quality years of

education leads to higher salaries and thus better living standards for families. Governments should improve the access to, the quality of, and the effectiveness of their education systems. The costs of education policies will depend on the level of infrastructure already in place. Costs can be much lower in countries where, for instance, the physical infrastructure is in place, but for reason such as social stigma, early marriage/childbearing, and discrimination, girls abandon school before completion of secondary education. In this case, policy makers can provide incentives for parents to keep their daughters at school, for instance by using targeted cash transfers to those who keep their girls until completion of primary and secondary education[28]. Additionally, prohibiting child marriage and disseminating information on women's health will help reduce early female dropouts, especially in rural areas.

- **Changing the legal framework to confer equality before the law for men and women is financially costless**. Section II.C listed legal rights that are not conferred to women in many sub-Saharan countries. Governments should expunge these legal differences, not only because they violate the basic principle of equality between individuals before the law, but also because economically speaking, they create distortions and wrong incentives. The achievement of sustainable growth cannot happen without half of the population not having the same access to institutions, to assets, to credit, to freedom of mobility, and to freedom of choice. Enforcement of property rights - including inheritance - is particularly relevant, especially in countries where small agriculture plots are the main economic activity, and thus where land ownership is so valuable. Moreover, enforcing women's legal rights by combating domestic violence, sexual harassment and child marriage are important ways to improve women's life standards and break the cycle of gender inequality.

- **Educating the population on family planning where there is unattended demand for it is imperative**. Policy makers can play an important role by running education campaigns and providing quality health care and information for young women who want to learn about family planning. Disseminating knowledge and creating an atmosphere where women learn and have access to family planning, sexual education, and modern contraceptives can pave the way to a healthier, more informed and more prosperous generation of women.

- **Investing in infrastructure will reduce time spent on home production and provide safe transportation options for women**. Women's disproportionately high participation in the informal labor sector is linked to the reduced hours they have available to dedicate to work outside their homes. Often, their choices are to find an informal job close to home or not participate in the labor market at all. However,

[28] See for example IMF Staff Reports on Guatemala (2016), Jordan (2017), Morocco (2017), Nigeria (2016), and Pakistan (2016), which discuss targeted cash transfers to increase female enrollment.

governments can make their contribution by facilitating households' access to water and energy so that women do not spend so much time in home production, and by providing safe transportation to and from workplaces and schools.[29]

- **Addressing social norms that place women in economic disadvantage**: policy makers should enforce equal rights and opportunities. In many sub-Saharan countries social norms have already been changing in urban areas, but gender inequalities still prevail in rural areas. In this context, policy recommendations include: enforcing civil laws where customary laws reduce women's freedom and power; combating domestic violence; promoting and encouraging a more equal division of labor at home through education campaigns and through introduction of paternity leave; acting as a role model inside governments' administrations.

- **Addressing unequal opportunities in the labor market**: discrimination in the formal labor market can be addressed through changes in the legal framework (by including laws against gender discrimination), by providing childcare subsidies or organizing childcare facilities, offering parental leave, and combating sexual harassment. These policies can have positive spillovers to the informal sector as well. Fiscal policies such as tax breaks or subsidies for families with young children and generous parental leave (provided by the government, not the private sector) can help incentivize women to enter to the labor force, specially to the formal sector. Making sure the tax system, particularly income tax, does not penalize secondary wage earners is an important incentive for women to work in the formal sector. Access to credit and to assets are paramount in promoting equal opportunity of entrepreneurship between men and women – and this is helpful for both formal and informal sectors. Spillovers from an overall reduction of gender discrimination in social norms and a curtail in education gaps will also positively affect all working women and girls who one day wish to participate in the labor force.

Methodological barriers should not keep policy makers from working on pro-gender equality measures. Some of the policy recommendations above have already vast empirical basis in the literature, such as "more education generates better salaries and living standards". Meanwhile, other channels and causalities linking gender inequality and informality might be challenging to prove. However, this should not impede governments from ensuring equal opportunities for men and women, and thus doing their part in trying to eliminate economic distortions related to gender inequality.

[29] See for example, Mexico City's and Bolivia's efforts to create safe transportation options (Kolovich, 2018) along with IMF Staff Reports such as Chile (2015), Jordan (2017), and India (2017).

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APPENDIX

Table 3. Marginal Effects of Probit Regressions (Including Z-Tests and All Control Variables)

Dependent variable: informal worker (binary variable)

Samples → / ↓ Independent variables		All workers	Female workers	Male workers	Urban workers	Urban female workers	Urban male workers	Rural workers	Rural female workers	Rural male workers
Female		0.0340***			0.0850***			0.0088*		
	std error	(0.0050)			(0.0113)			(0.0049)		
	z	6.76			7.51			1.82		
	P>z	0.000			0.000			0.069		
No education		0.0336***	0.0197**	0.0376***	0.0634***	0.0269	0.0803***	0.0186***	0.0175*	0.0153**
	std error	(0.0062)	(0.0090)	(0.0084)	(0.0135)	(0.0189)	(0.0187)	(0.0056)	(0.0095)	(0.0066)
	z	5.42	2.19	4.50	4.70	1.42	4.30	3.32	1.85	2.31
	P>z	0.000	0.028	0.000	0.000	0.155	0.000	0.001	0.065	0.021
Primary Education		-0.1640***	-0.2010***	-0.1506***	-0.2547***	-0.3120***	-0.2248***	-0.0656***	-0.0461**	-0.0720***
	std error	(0.0115)	(0.0216)	(0.0138)	(0.0177)	(0.0301)	(0.0221)	(0.0111)	(0.0191)	(0.0132)
	z	-14.26	-9.31	-10.91	-14.41	-10.37	-10.18	-5.92	-2.41	-5.46
	P>z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.000
Secondary Education		-0.5553***	-0.6098***	-0.5384***	-0.6044***	-0.6643***	-0.5707***	-0.4577***	-0.6073***	-0.4364***
	std error	(0.0311)	(0.0582)	(0.0365)	(0.0267)	(0.0478)	(0.0314)	(0.0645)	(0.1530)	(0.0664)
	z	-17.88	-10.48	-14.74	-22.64	-13.90	-18.15	-7.09	-3.97	-6.57
	P>z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tertiary Education		-0.7285***	-0.6551***	-0.7625***	-0.6990***	-0.6939***	-0.6862***	-0.7793***		-0.7899***
	std error	(0.0611)	(0.1610)	(0.0415)	(0.0367)	(0.1131)	(0.0220)	(0.1503)		(0.1504)
	z	-11.92	-4.07	-18.37	-19.05	-6.13	-31.12	-5.18		-5.25
	P>z	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000
Head of the Household		-0.0249***	-0.0279**	-0.0063	-0.0530***	-0.0361	-0.0292	-0.0190**	-0.0239	-0.0031
	std error	(0.0071)	(0.0131)	(0.0087)	(0.0155)	(0.0230)	(0.0210)	(0.0074)	(0.0177)	(0.0071)
	z	-3.54	-2.13	-0.72	-3.42	-1.57	-1.39	-2.56	-1.35	-0.44
	P>z	0.000	0.033	0.472	0.001	0.117	0.165	0.010	0.176	0.660
Married		-0.0213***	0.0071	-0.0392***	-0.0477***	0.0173	-0.1016***	-0.0000	0.0079	-0.0013
	std error	(0.0062)	(0.0082)	(0.0090)	(0.0134)	(0.0166)	(0.0212)	(0.0059)	(0.0088)	(0.0069)
	z	-3.42	0.87	-4.34	-3.57	1.05	-4.80	-0.01	0.90	-0.20
	P>z	0.001	0.383	0.000	0.000	0.295	0.000	0.994	0.370	0.845
Number of Kids		-0.0020	0.0036	-0.0059**	-0.0007	0.0139**	-0.0084	-0.0033**	-0.0011	-0.0049***
	std error	(0.0019)	(0.0027)	(0.0025)	(0.0047)	(0.0067)	(0.0064)	(0.0014)	(0.0022)	(0.0018)
	z	-1.06	1.37	-2.32	-0.14	2.07	-1.31	-2.29	-0.52	-2.69
	P>z	0.289	0.171	0.020	0.886	0.038	0.189	0.022	0.604	0.007
Income Decile (1 to 10)		-0.0116***	-0.0060***	-0.0161***	-0.0254***	-0.0165***	-0.0310***	-0.0055***	-0.0020	-0.0081***
	std error	(0.0011)	(0.0016)	(0.0014)	(0.0029)	(0.0039)	(0.0042)	(0.0009)	(0.0015)	(0.0010)
	z	-10.74	-3.68	-11.55	-8.60	-4.21	-7.45	-6.45	-1.32	-8.47
	P>z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.186	0.000

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Table 3 continued:

		All workers	Female workers	Male workers	Urban workers	Urban female workers	Urban male workers	Rural workers	Rural female workers	Rural male workers
Urban		-0.0735***	-0.0560***	-0.0836***						
	std error	(0.0052)	(0.0076)	(0.0070)						
	z	-14.25	-7.33	-11.96						
	P>z	0.000	0.000	0.000						
Age: 15-19		-0.0054	-0.0090	-0.0002	-0.0272	-0.0258	-0.0367	-0.0123	-0.0167	-0.0065
	std error	(0.0116)	(0.0171)	(0.0147)	(0.0403)	(0.0465)	(0.0593)	(0.0088)	(0.0159)	(0.0096)
	z	-0.47	-0.52	-0.02	-0.68	-0.55	-0.62	-1.39	-1.05	-0.68
	P>z	0.637	0.600	0.988	0.499	0.580	0.536	0.165	0.293	0.495
Age: 20-24		-0.0353***	-0.0372*	-0.0338*	-0.0840**	-0.0614	-0.1109*	-0.0380***	-0.0395*	-0.0337**
	std error	(0.0132)	(0.0196)	(0.0176)	(0.0405)	(0.0478)	(0.0585)	(0.0125)	(0.0204)	(0.0153)
	z	-2.67	-1.89	-1.92	-2.07	-1.28	-1.89	-3.05	-1.93	-2.20
	P>z	0.008	0.058	0.055	0.038	0.199	0.058	0.002	0.053	0.028
Age: 25-29		-0.0669***	-0.0806***	-0.0529***	-0.1354***	-0.1183**	-0.1531***	-0.0624***	-0.0720***	-0.0446***
	std error	(0.0145)	(0.0236)	(0.0167)	(0.0408)	(0.0496)	(0.0575)	(0.0147)	(0.0251)	(0.0136)
	z	-4.61	-3.42	-3.16	-3.32	-2.38	-2.66	-4.24	-2.86	-3.29
	P>z	0.000	0.001	0.002	0.001	0.017	0.008	0.000	0.004	0.001
Age: 30-34		-0.0910***	-0.0793***	-0.1027***	-0.1971***	-0.1776***	-0.2136***	-0.0622***	-0.0364*	-0.0872***
	std error	(0.0144)	(0.0216)	(0.0192)	(0.0419)	(0.0516)	(0.0580)	(0.0135)	(0.0206)	(0.0170)
	z	-6.30	-3.67	-5.34	-4.71	-3.44	-3.69	-4.60	-1.77	-5.11
	P>z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.077	0.000
Age: 35-39		-0.0909***	-0.0685***	-0.1145***	-0.2104***	-0.1688***	-0.2410***	-0.0511***	-0.0306	-0.0805***
	std error	(0.0153)	(0.0218)	(0.0213)	(0.0428)	(0.0543)	(0.0583)	(0.0145)	(0.0198)	(0.0210)
	z	-5.92	-3.14	-5.38	-4.92	-3.11	-4.14	-3.53	-1.55	-3.84
	P>z	0.000	0.002	0.000	0.000	0.002	0.000	0.000	0.121	0.000
Age: 40-44		-0.0801***	-0.0535***	-0.1081***	-0.1948***	-0.1544***	-0.2228***	-0.0401***	-0.0125	-0.0792***
	std error	(0.0152)	(0.0193)	(0.0224)	(0.0441)	(0.0520)	(0.0615)	(0.0121)	(0.0146)	(0.0188)
	z	-5.29	-2.77	-4.83	-4.42	-2.97	-3.62	-3.32	-0.85	-4.21
	P>z	0.000	0.006	0.000	0.000	0.003	0.000	0.001	0.394	0.000
Age: 45-49		-0.0931***	-0.0330*	-0.1576***	-0.2184***	-0.0834*	-0.3211***	-0.0473***	-0.0192	-0.0865***
	std error	(0.0163)	(0.0194)	(0.0243)	(0.0449)	(0.0494)	(0.0602)	(0.0138)	(0.0183)	(0.0199)
	z	-5.72	-1.70	-6.48	-4.86	-1.69	-5.34	-3.42	-1.05	-4.35
	P>z	0.000	0.089	0.000	0.000	0.091	0.000	0.001	0.296	0.000
Age: 50-54		-0.0739***	-0.0323*	-0.1167***	-0.1898***	-0.1065**	-0.2508***	-0.0322**	-0.0051	-0.0687***
	std error	(0.0161)	(0.0190)	(0.0243)	(0.0460)	(0.0522)	(0.0635)	(0.0126)	(0.0139)	(0.0201)
	z	-4.59	-1.70	-4.80	-4.13	-2.04	-3.95	-2.55	-0.37	-3.41
	P>z	0.000	0.088	0.000	0.000	0.041	0.000	0.011	0.713	0.001
Age: 55-59		-0.0821***	-0.0408*	-0.1209***	-0.2491***	-0.1451**	-0.3100***	-0.0080	0.0143	-0.0359**
	std error	(0.0184)	(0.0224)	(0.0270)	(0.0502)	(0.0574)	(0.0676)	(0.0114)	(0.0120)	(0.0181)
	z	-4.47	-1.82	-4.48	-4.96	-2.53	-4.59	-0.70	1.19	-1.99
	P>z	0.000	0.068	0.000	0.000	0.011	0.000	0.486	0.233	0.047
Age: 60-64		-0.0433*	-0.0233	-0.0655**	-0.1286**	0.0008	-0.2244***	-0.0232	-0.0381	-0.0201
	std error	(0.0260)	(0.0397)	(0.0274)	(0.0536)	(0.0596)	(0.0748)	(0.0268)	(0.0461)	(0.0213)
	z	-1.67	-0.59	-2.39	-2.40	0.01	-3.00	-0.87	-0.83	-0.94
	P>z	0.095	0.557	0.017	0.016	0.990	0.003	0.386	0.409	0.346

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Table 3 continued:

		All workers	Female workers	Male workers	Urban workers	Urban female workers	Urban male workers	Rural workers	Rural female workers	Rural male workers
Dakar		-0.0344***	-0.0194*	-0.0407***	-0.0378***	-0.0022	-0.0568***	-0.1024***	-0.1284***	-0.0903***
	std error	(0.0078)	(0.0110)	(0.0105)	(0.0132)	(0.0186)	(0.0177)	(0.0179)	(0.0320)	(0.0218)
	z	-4.39	-1.77	-3.86	-2.88	-0.12	-3.20	-5.73	-4.01	-4.15
	P>z	0.000	0.077	0.000	0.004	0.904	0.001	0.000	0.000	0.000
Diourbel		-0.0476***	-0.0747***	-0.0066	-0.0986***	-0.0894***	-0.0984***	-0.0243**	-0.0477**	0.0029
	std error	(0.0173)	(0.0252)	(0.0187)	(0.0188)	(0.0269)	(0.0253)	(0.0119)	(0.0187)	(0.0124)
	z	-2.75	-2.97	-0.36	-5.24	-3.33	-3.89	-2.04	-2.55	0.23
	P>z	0.006	0.003	0.722	0.000	0.001	0.000	0.041	0.011	0.815
Kaffrine		-0.2032***	-0.1858***	-0.2086***				-0.1481***	-0.1413***	-0.1506***
	std error	(0.0138)	(0.0202)	(0.0186)				(0.0109)	(0.0165)	(0.0146)
	z	-14.72	-9.18	-11.23				-13.62	-8.59	-10.33
	P>z	0.000	0.000	0.000				0.000	0.000	0.000
Kaolack		-0.0333***	-0.0227	-0.0403***				-0.0329***	-0.0267**	-0.0369***
	std error	(0.0105)	(0.0150)	(0.0146)				(0.0087)	(0.0134)	(0.0114)
	z	-3.16	-1.51	-2.76				-3.78	-1.99	-3.24
	P>z	0.002	0.130	0.006				0.000	0.046	0.001
Kedougou		-0.0160*	-0.0041	-0.0256**	-0.1490***	-0.1062***	-0.1764***			
	std error	(0.0094)	(0.0135)	(0.0129)	(0.0253)	(0.0404)	(0.0314)			
	z	-1.71	-0.30	-1.99	-5.88	-2.63	-5.61			
	P>z	0.087	0.761	0.047	0.000	0.009	0.000			
Louga		-0.0358***	-0.0708***	-0.0154	-0.2204***	-0.2991***	-0.1507***			
	std error	(0.0088)	(0.0146)	(0.0115)	(0.0205)	(0.0332)	(0.0254)			
	z	-4.06	-4.85	-1.34	-10.74	-9.01	-5.94			
	P>z	0.000	0.000	0.180	0.000	0.000	0.000			
Saint Louis		-0.0409***	-0.0541***	-0.0344***	-0.0888***	-0.0818***	-0.0928***	-0.0134*	-0.0316**	-0.0050
	std error	(0.0086)	(0.0150)	(0.0107)	(0.0176)	(0.0271)	(0.0226)	(0.0075)	(0.0155)	(0.0083)
	z	-4.76	-3.60	-3.20	-5.05	-3.02	-4.11	-1.79	-2.04	-0.60
	P>z	0.000	0.000	0.001	0.000	0.003	0.000	0.073	0.042	0.550
Sedhiou		0.0414***	0.0371**	0.0419***				0.0225***	0.0238***	0.0210***
	std error	(0.0109)	(0.0162)	(0.0145)				(0.0058)	(0.0089)	(0.0074)
	z	3.81	2.30	2.89				3.85	2.68	2.83
	P>z	0.000	0.022	0.004				0.000	0.007	0.005
Thies		-0.0446***	-0.0353***	-0.0519***	-0.0669***	-0.0365*	-0.0863***	-0.0299***	-0.0306***	-0.0315***
	std error	(0.0082)	(0.0114)	(0.0114)	(0.0165)	(0.0214)	(0.0229)	(0.0074)	(0.0117)	(0.0096)
	z	-5.46	-3.09	-4.55	-4.07	-1.70	-3.76	-4.05	-2.62	-3.28
	P>z	0.000	0.002	0.000	0.000	0.088	0.000	0.000	0.009	0.001
Pseudo R^2 of the probit model		0.2435	0.2209	0.2588	0.2212	0.2326	0.2159	0.1021	0.0919	0.1218
Number of Observations		47,169	19,367	27,802	19,069	7,583	11,486	28,100	11,783	16,316

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Robustness Check (Sample with All Workers) - Selected Results for Probit with Interactions of Female Variable with Other Variables

Probit regression: **dependent variable: worker is informal (binary)** **independent variables: female (binary); female interacted with no education, primary education, secondary education, tertiary education (all binary variables), number of kids, deciles; age groups; regions.**		**Prob > chi2 0.000** **Pseudo R2 0.2486** **Log likelihood = -1252692.1** **Number of Observations = 47,169**				**Hypothesis testing in selected variables**
Selected interactions ↓		**Coefficient**	**Std. Err.**	**z**	**P>z**	
Gender interacted with "primary education" binary variable	**male with primary education**	-0.617	0.0465	-13.28	0.000	H_0: Female coefficient is larger (in absolute terms) than male's.
	female with primary education	-0.887	0.0695	-12.76	0.000	Chi^2 = 10.49 P-value = 0.0006
Gender interacted with "secondary education" binary variable	**male with secondary education**	-1.612	0.0988	-16.32	0.000	H_0: Female coefficient is larger (in absolute terms) than male's.
	female with secondary education	-1.932	0.1621	-11.92	0.000	Chi^2 = 2.86 P-value = 0.0454
Gender interacted with "married" binary variable	**male . married**	-0.259	0.0442	-5.86	0.000	H_0: "male . married" coefficient is negative (males have a bonus) Chi^2 = 34.31 P-value = 0.0000
	female . married	0.074	0.0545	1.35	0.176	H_0: "female . married" coefficient is positive (females incur a cost) Chi^2 = 1.83 P-value = 0.0882
Gender interacted with "number of kids" variable	**male . number of kids**	-0.036	0.0128	-2.8	0.005	H_0: "male . number of kids" coefficient is negative (males have a bonus) Chi^2 = 7.85 P-value = 0.0025
	female . number of kids	0.031	0.0190	1.63	0.104	H_0: "female . number of kids" coefficient is positive (females incur a cost) Chi^2 = 2.65 P-value = 0.0519
Gender interacted with "decile" variable	**male . decile**	-0.082	0.0070	-11.8	0.000	H_0: Female coefficient is smaller (in absolute terms) than male's.
	female . decile	-0.041	0.0115	-3.61	0.000	Chi^2 = 81.24 P-value = 0.0000

Table 5. Robustness Check (Sample with Urban Workers) - Selected Results for Probit with Interactions of Female Variable with Other Variables

Probit regression: **dependent variable: worker is informal (binary)** **independent variables: female (binary); female interacted with no education, primary education, secondary education, tertiary education (all binary variables), number of kids, deciles; age groups;**		**Prob > chi2 0.000** **Pseudo R2 0.2248** **Log likelihood = -720720.94** **Number of Observations = 19,069**				**Hypothesis testing in selected variables**
Selected Independent Variables ↓		**Coefficient**	**Std. Err.**	**z**	**P>z**	
Gender interacted with "primary education" binary variable	**male with primary education**	-0.621	0.0590	-10.54	0.000	H_0: Female coefficient is larger (in absolute terms) than male's.
	female with primary education	-0.988	0.0840	-11.75	0.000	Chi^2 = 12.74 P-value = 0.0002
Gender interacted with "secondary education" binary variable	**male with secondary education**	-1.586	0.1188	-13.35	0.000	H_0: Female coefficient is larger (in absolute terms) than male's.
	female with secondary education	-1.912	0.1725	-11.09	0.000	Chi^2 = 2.45 P-value = 0.0588
Gender interacted with "married" binary variable	**male . married**	-0.346	0.0593	-5.84	0.000	H_0: "male . married" coefficient is negative (males have a bonus) Chi^2 = 34.12 P-value = 0.0000
	female . married	0.090	0.0641	1.4	0.161	H_0: "female . married" coefficient is positive (females incur a cost) Chi^2 = 1.97 P-value = 0.0804
Gender interacted with "number of kids" variable	**male . number of kids**	-0.028	0.0189	-1.5	0.135	H_0: "male . number of kids" coefficient is negative (males have a bonus) Chi^2 = 2.24 P-value = 0.0673
	female . number of kids	0.053	0.0271	1.94	0.052	H_0: "female . number of kids" coefficient is positive (females incur a cost) Chi^2 = 3.77 P-value = 0.0261
Gender interacted with "decile" variable	**male . decile**	-0.100	0.0121	-8.23	0.000	H_0: Female coefficient is smaller (in absolute terms) than male's.
	female . decile	-0.063	0.0155	-4.04	0.000	Chi^2 = 64.90 P-value = 0.0000

Table 6. Robustness Check (Sample with Rural Workers) - Selected Results for Probit with Interactions of Female Variable with Other Variables

Probit regression: **dependent variable: worker is informal (binary)** **independent variables: female (binary); female interacted with no education, primary education, secondary education, tertiary education (all binary variables), number of kids, deciles; age groups;**		**Prob > chi2 0.000** **Pseudo R2 0.1052** **Log likelihood = -517337.67** **Number of Observations = 28,099**				**Hypothesis testing in selected variables**
Selected Independent Variables ↓		**Coefficient**	**Std. Err.**	**z**	**P>z**	
Gender interacted with "primary education" binary variable	**male with primary education**	-0.481	0.0687	-7	0.000	H_0: Female coefficient is larger (in absolute terms) than male's.
	female with primary education	-0.398	0.1207	-3.3	0.001	Chi^2 = 0.37 P-value = 0.7277
Gender interacted with "secondary education" binary variable	**male with secondary education**	-1.568	0.1727	-9.08	0.000	H_0: Female coefficient is larger (in absolute terms) than male's.
	female with secondary education	-2.156	0.4162	-5.18	0.000	Chi^2 = 1.71 P-value = 0.0958
Gender interacted with "married" binary variable	**male . married**	-0.111	0.0636	-1.75	0.080	H_0: "male . married" coefficient is negative (males have a bonus) Chi^2 = 3.06 P-value = 0.0401
	female . married	0.127	0.0929	1.37	0.172	H_0: "female . married" coefficient is positive (females incur a cost) Chi2 = 1.87 P-value = 0 .0860
Gender interacted with "number of kids" variable	**male . number of kids**	-0.052	0.0165	-3.15	0.002	H_0: "male . number of kids" coefficient is negative (males have a bonus) Chi^2 = 9.90 P-value = 0.0008
	female . number of kids	0.000	0.0261	-0.01	0.994	H_0: "female . number of kids" coefficient is positive (females incur a cost) Chi^2 = 0.00 P-value = 0.5030
Gender interacted with "decile" variable	**male . decile**	-0.070	0.0083	-8.43	0.000	H_0: Female coefficient is smaller (in absolute terms) than male's.
	female . decile	-0.026	0.0170	-1.52	0.128	Chi^2 = 24.89 P-value = 0.0000