

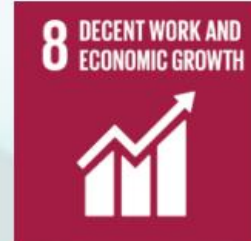


United Nations  
Economic Commission for Africa

# Women's Entrepreneurship Report

EDUCATION AND FINANCE  
FOR SUCCESSFUL ENTREPRENEURSHIP  
IN AFRICA

31 JULY 2019  
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## Executive summary

The Economic Commission for Africa (ECA), through its Gender Equality and Women's Empowerment Section (GEWES), promotes women's entrepreneurship to support women's economic empowerment in Africa in line with its Continent-Wide Initiative for Gender Equality and Women's Empowerment. Recent research carried out by GEWES (ECA, 2017a, 2017b) found that women entrepreneurs in Africa were largely motivated by necessity, or absence of better choices for work, which hinders productive and innovative activities that could transform their livelihoods. This is a costly<sup>1</sup> finding given that women's entrepreneurship has been recognized as a strong driver of economic growth and development (Cuberes and Teignier, 2016; Fetsch, Jackson and Wiens, 2015; Woetzel, and others, 2015), increasing resilience of economies, creating new jobs and influencing future generations, thereby contributing to the transformative agenda for women's economic empowerment. Thus, it is paramount that factors behind women's underrepresentation in opportunity-driven entrepreneurship are explored and innovative and effective policies are designed and implemented.

The *Women's Entrepreneurship Report: Education and Finance for Successful Entrepreneurship in Africa*, is based on the premise that educational attainment and access to finance are two critical and self-reinforcing determinants of successful entrepreneurship for women. Education plays an instrumental role in accessing finance, which is often reported as the most binding constraint by women-owned firms: however, injecting capital alone is unlikely to transform firms' productive capacity, move them along the value chains and transition them into more lucrative sectors. Entrepreneurs must have sufficient education and the skills necessary to identify opportunities and take informed risks (Fayolle and Kyro, 2008; Islam and Amin, 2016; Iversen, Malchow-Møller and Sørensen, 2016; Kobeissi 2010; Van der Sluis, Van Praag and Vijverberg, 2008).

Against this background, the following three questions are explored in the present report:

Does education improve the frequency and quality of women's entrepreneurship?

Does education affect women's access to finance?

Does finance help women to pursue opportunities and improve their productivity?

These are relevant policy questions in the context of the 2030 Agenda for Sustainable Development and Agenda 2063: The Africa We Want, of the African Union, and are strongly interlinked in understanding successful entrepreneurship. Both agendas are also relevant in the context of the Agreement Establishing the African Continental Free Trade Area, which has provisions that are aimed at gender-sensitive trade policies, in particular on the issue of informal female cross-border traders. While they are not new, academic research and policy discussions have mostly focused on developed countries. As such, the main contribution of the *Women's Entrepreneurship Report* is to provide up-to-date empirical evidence from Africa.<sup>2</sup> The empirical study was carried out as follows:

(a) Data from more than 5,000 entrepreneurs were analysed from eight African countries to assess the relationship between education and women's quality of entrepreneurship;

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<sup>1</sup> See appendix one, table A.1 which highlights the importance of women's entrepreneurship for at least 7 of the 15 Goals in the 2030 Agenda for Sustainable Development.

<sup>2</sup> See appendix one, table A.2 for the list of countries under analysis.

(b) Data from more than 44,000 adults in 40 African countries were analysed to measure the impact of education on women's access to finance;

(c) Data from more than 18,000 firms in 35 African countries were analysed to examine linkages between access to finance and access to opportunities and firm productivity with a gender perspective.

To analyse such large data sets and measure point elasticities, the methods used were parsimonious statistical and econometric techniques, probit regressions, dissimilarity index and Shapley decomposition. Results from the study produced three central findings.

First, there is a nonlinear relationship between education and entrepreneurship in Africa. The negative impact of education on entrepreneurship is driven by entrepreneurs who are motivated by necessity and have lower education; however, education has a positive impact for entrepreneurs who are driven by opportunity. More importantly, education boosts female entrepreneurship. Women entrepreneurs with primary education or less are around 27 per cent less likely to be driven by opportunity than tertiary-educated women entrepreneurs. Women entrepreneurs increasingly become less likely to be driven by necessity after secondary schooling. Education is thus a critical factor for productive female entrepreneurship.

One potential channel is that gender gaps in entrepreneurial attitudes decrease as the level of education increases. For example, educated female entrepreneurs have wider networks, believe in their capacity to start businesses and identify opportunities. There are important economic implications. Entrepreneurs driven by opportunities are far more likely to operate in sectors that are more profitable, and they create more jobs. For example, women entrepreneurs driven by opportunities are 52 per cent more likely to operate in the manufacturing sector than women entrepreneurs driven by necessity. Furthermore, opportunity-driven entrepreneurs expect to add on average up to 17 more jobs in the next five years than necessity-driven entrepreneurs.

Second, increasing educational attainment is paramount for tackling financial exclusion. Individuals with secondary and tertiary education are 51 per cent and 113 per cent, respectively, more likely than individuals with primary education or less to have an account at a financial institution. In more than half of 40 African countries, inequality in educational attainment is the main driving force behind inequalities in having accounts. Women with primary education or less are 21 per cent less likely to have accounts than men with primary education or less. Education contributes to narrowing the gender gap in owning and using accounts, particularly for tertiary-educated women.

Education matters for savings patterns, as well. The secondary and tertiary educated are 22 per cent and 49 per cent, respectively, more likely to save relative to primary educated or less. Secondary educated are also more likely to save for business and at formal institutions rather than in informal institutions. Gender gaps are wide in savings by formality: however, women's likelihood of saving at informal institutions decreases as their level of education increases. Lastly, educated adults are more likely to borrow, especially for business purposes and from formal financial institutions. Hence, increasing women's educational attainment can boost their engagement with formal financial institutions which are better equipped to transform their businesses.

Third, having established the importance of education for pursuing opportunities and accessing finance among women entrepreneurs, the results of the research showed a positive relationship between access to finance and women's innovative practices and better business performance. Access to finance plays an indirect role through its effect on a firm's choice of industry and size which matters the most when explaining inequalities in accessing public procurement. While data limitations curtailed the investigation of education of firm owners and their access to government contracts, the results showed strong evidence for the importance of managerial experience, especially for women. The gender gap in access to government contracts disappears after 18 years of experience in business.

Results of the research also showed that firms with access to finance innovate more products and processes. They were more likely to purchase assets and finance them through bank borrowing. Gender gaps emerge in firm performance, in particular for financially constrained firms owned by women. For example, financially unconstrained firms owned by women grew their employment and sales by almost 30 per cent and 20 per cent, respectively, more than financially unconstrained firms owned by men. In addition, women-owned businesses who do not perceive access to finance as a major or severe constraint are 15 per cent more likely to innovate new products than firms owned by men with the same perception.

Informed by the above key results, the following policy recommendations are presented with a view to boosting female entrepreneurship in Africa for women's economic empowerment:

(a) Women's general educational attainment must increase in Africa beyond primary schooling. Secondary-and tertiary-educated women are more likely to pursue opportunities and access financial services;

(b) General education is not sufficient for successful entrepreneurship. There is need for training in soft and hard skills that are relevant to competitive markets, such as business management skills, leadership skills, digital technologies, financial literacy and entrepreneurial skills. This is important for women in vulnerable situations who have not been able to complete formal education. When coupled with capital injections, such trainings prove to be transformative – especially for marginalized women in terms of providing a stable source of income in their escape out of poverty;

(c) Trainings and information campaigns can help women assess returns to investment in sectors which can inspire crossovers from female-dominated to male-dominated sectors;

(d) Digital technologies can help boost women's access to finance, especially in rural areas. There is also a need to innovate financial products that cater to the constraints faced by women. Savings of women entrepreneurs can be boosted and brought to a formal economy with appropriate incentives and commitment mechanisms that instil a habit of regular contributions. A shift away from simple rotating saving clubs towards village-level savings and loan associations, among others, can help women, especially in rural areas, to access loans and earn interest over their savings;

Access to various types of insurance products are highly needed, especially in rural areas and among vulnerable groups where attempting to exit out of poverty is highly sensitive to negative shocks such as environmental or health-related disasters.

## I. Background

Accessing the formal wage market is challenging for men and women in Africa, but gender gaps in human capital formation makes it harder for women to fetch a salaried job that pays on par with men (Ahaibwe, Ssewanyana and Kasirye, 2018). According to the International Labour Organization (ILO) estimates for 2020, there will only be 13 African countries<sup>3</sup> where more than half of employed women will be in wage employment. This figure increases marginally to 18 countries for men (ILO, 2018). This result is influenced by the supply of an educated workforce. According to the World Development Report (World Bank, 2018), only 23 per cent of upper secondary school students completed their secondary education in Africa, excluding the North, and the remaining 77 per cent left school. Job growth is expected in sectors that require tertiary education, particularly in science, technology, engineering and mathematics (STEM) studies.<sup>4</sup> Significant gender gaps in enrolment and graduation from STEM limit women's access to promising sectors in the formal economy. Lastly, the demographic dynamics in Africa have significant consequences for excess labour supply of men and women, in particular the young people.

In Africa, the unemployment rates are higher for women, especially in the youth category. The gender gap in unemployment rates reach a maximum in North Africa where on average women are more educated than in rest of Africa (ILO, 2018). Self-employment therefore has been and will be the dominant form of employment in Africa in near future. Supporting women's and girls' transition into entrepreneurship, which is by now widely considered a pro-poor economic growth strategy along with societal well-being (Kelley, and others, 2013), emerges as the most realistic policy intervention in the short-to-medium term (Adoho, and others, 2014).

Entrepreneurs have different motivations that can be grouped into two categories (Orhan and Scott, 2001; Blanchard and Warnecke, 2010). First, there are those who are driven by necessity as they have no other choices for work. They are pushed into self-employment operating largely in the informal economy and in low growth and low profit sectors within the services sector (Rehman and Roomi, 2012). Entry into such sectors is easy given the lack of fixed entry costs and minimal sunk costs during exit. Second, there are those who are driven by opportunities who aspire for higher independence and higher income. In other words, they are pulled into self-employment, therefore, they are constantly looking for opportunities in sectors that resemble productivity, growth, innovation and profitability.

The majority of working women in Africa are in necessity-driven entrepreneurship as they are in vulnerable self-employment almost exclusively operating in the informal sector in both urban and rural areas. While they work for their own-accounts in wholesale and retail trade or hotels and restaurants in urban areas, they are contributing family workers in subsistence agriculture in rural areas. The share of female contributing family workers is almost five times the share of male contributing family workers in North Africa. This gender gap drops down to twofold in the rest of Africa (ILO, 2018). In addition, there are stories of many African

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<sup>3</sup> ILO modelled estimates ([www.ilo.org/ilostat](http://www.ilo.org/ilostat)) for employment distribution by status of employment and sex. Out of 13 countries, 5 are from the North Africa subregion where women's labour force participation is highly limited.

<sup>4</sup> According to Global Entrepreneurship Monitor data analysed by ECA (2017a), the largest job growth expected by entrepreneurs in Africa were in the knowledge-based services sector, including professional services where the expected job growth is almost three times higher than in the manufacturing sector, and in information and communication technologies where expected job growth is double the job growth expected in the manufacturing sector.

women entrepreneurs who have come from humble origins and are now pursuing opportunities in innovative sectors setting trends and pushing boundaries, thereby becoming role models for future generations. They recognize the importance of education and mentorship in pursuing opportunities and acknowledge that there is a considerable gender gap between opportunity-based and necessity-based entrepreneurship with men dominating the former and women disproportionately represented in the latter (see Allen, Langowitz, and Minniti, 2007; Nichter and Goldmark, 2009). The business case is simple. While the consumer market is divided rather equally, the supply side is heavily unequal with overrepresentation of men whose initiatives and products cannot fully deal with the needs of the female market. The following factors lead to women's overrepresentation in necessity-driven self-employment:

- *Women entrepreneurs have insufficient financial capital.* This applies both to women who own and manage businesses in formal and informal sectors, and women who work for their own accounts. Lack of financial capital has negative impacts on physical capital accumulation and their access to government contracts (see Aterido, Beck and Iacovone, 2011; Asiedu, and others, 2013; Blattman, and others, 2013; Blattman, Fiala and Martinez, 2014; Brixiova and Kangoye, 2015; Demirguc-Kunt, Klapper and Singer, 2013; Dupas and Robinson, 2009).
- *Women entrepreneurs have insufficient physical capital.* Women's access to land, livestock, equipment and machinery is limited. Legal instruments are not enforced, especially for married women's access to inheritance, property and marital assets thereby lowering their ability to pursue credit (see United Nations, 2017; Hallward-Driemeier, 2013; Hallward-Driemeier and Rasteletti, 2010; Hallward-Driemeier and Hasan, 2012).
- *Women entrepreneurs have insufficient social capital.* Entrepreneurs must actively network to identify new opportunities and widen their market outreach. Evidence from the Women, Business and the Law 2018 database (World Bank, 2018) showed that in 15 African countries, married women could not choose where to live in the same way as married men could which restricted their mobility to pursue opportunities. According to the Demographic and Health Surveys (STAT compiler)<sup>5</sup> in Africa, approximately 20 per cent of women were able to decide on their own to visit their family and relatives.
- *Women entrepreneurs have insufficient human capital.* Entrepreneurs should have basic literacy and numeracy. In addition, they should have appropriate skills to create new ideas and opportunities, to solve problems and to make long-term plans. There are severe gender gaps on these educational areas (see Björkman-Nyqvist, 2013; Buvinic and Furst-Nichols, 2014).
- *Women entrepreneurs are time poor.* Time-use surveys show that women spend considerably longer hours on domestic chores and unpaid activities. Evidence from 11 African countries with nationally representative time-use surveys shows that women on average spend between 2 and 11 times more performing unpaid work than men (Charmes, 2015). This situation limits the time to engage in paid activities pushing women for flexible work often hosted in the services sector

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<sup>5</sup> Author's calculations are based on data taken from the Demographic and Health Surveys online database. The average is simply unweighted average of all countries with available data between 2010 and 2017. (STATcompiler; [www.statcompiler.com](http://www.statcompiler.com)). Accessed in March 2019.



within the informal economy (Ahaibwe, Ssewanyana and Kasirye, 2018; Cho, and others, 2013; de Jong, Smits and Longwe , 2017; Folbre, 2018; Nix, Gamberoni and Heath, 2016).

Education is an important determinant that influences factors behind the motivation of entrepreneurship, such as unemployment, entrepreneurial attitudes, knowing entrepreneurs, and having business and entrepreneurial skills, among others. However, the relationship between education and entrepreneurship both theoretically and empirically is ambiguous. On the one hand, as the level of education increases so does the probability to enter wage employment in the private or public sector. Less educated individuals possess limited wage skills and are therefore more likely to be self-employed, providing a basis for necessity-driven entrepreneurship. On the other hand, those who are highly educated often possess better managerial skills and ability to identify emerging market opportunities (Simoes, Crespo and Moreira, 2016). They are also more likely to accumulate capital and are therefore less likely to face liquidity constraints, which makes it easier to pursue opportunity-driven entrepreneurship (Dolinsky and others, 1993).

Recent empirical evidence is intended to tackle this complexity and explore a non-linear relationship between education and entrepreneurship (Von Greiff, 2009; Falk and Leoni, 2009) based on the motivation behind entrepreneurship. Specifically, entrepreneurship is prevalent at lower levels of education due to necessity-driven entrepreneurs. As educational attainment increases, prevalence of entrepreneurship decreases at first as people move to wage employment but then prevalence increases again as entrepreneurs can pursue lucrative opportunities in emerging and profitable sectors thanks to their specialized educational background and skills. For example, the field of study pursued is critical in the choice of the sector and industry that have better opportunities. There has been increasing evidence on the positive correlation between post-secondary education levels and entrepreneurship in specific sectors such as technological start-ups (De Tienne and Chandler, 2007). Alternatively, education increases access to social networks and creates a sense of self efficacy and overall entrepreneurial competency (Bhola, and others, 2006).

Unfortunately, empirical evidence from Africa is not sufficient when it comes to improving the productivity of female entrepreneurs and exploring the quantitative impact of education and finance on entrepreneurship with a gender perspective. To tackle this gap, the Women's Entrepreneurship Report is structured using a three-pronged approach with a gender perspective: investigate the importance of education for prevalence and motivation of entrepreneurship; analyse the relevance of educational background for accessing financial institutions to show the intermediary impact of education on lowering financial constraints; and, moving to firm-level, explore the impact of financial constraint on opportunities and firm performance. These three are interlinked approaches that can provide policy insights for the goal of increasing the productivity of self-employed African women in support of the much-needed structural transformation on the continent. Education and finance, especially in general, skills and capital, emerge as building blocks for women entrepreneurs to improve their productivity within their own sector of work or to transition to other sectors with higher productivity.

## II. Data and methodology

The table below introduces three data sources used in this empirical study. While they are publicly available, there are still challenges against their accessibility, including the need to have access to specific software programmes to open surveys and the need to have statistical knowledge to analyse large data sets. Formulating evidence-based policies, however, require detailed analysis of the latest available and relevant data. An important drawback of such data-driven approach is that the type of questions that can be examined and therefore identification of issues to be tackled are influenced by availability of reliable and high-quality data. In order to fill this gap, the Women’s Entrepreneurship Report contains a comprehensive approach of analysing three different sets of data that complement one another in the absence of a single data set that collects information on all variables of interest.

### List of data sources

<i>Organization</i>	<i>Database</i>	<i>Period</i>	<i>Explanation</i>
GEM Consortium	Global Entrepreneurship Monitor	2015–2017	Nationally representative data are available from eight African countries covering <b>20 278</b> individuals (15+ years of age) collecting information over entrepreneurial attitudes as well as activities.
World Bank	Enterprise Surveys	2013–2018	Data are available for 35 African countries and <b>18 707</b> firms across formal enterprises with five or more employees in non-agricultural economy with information on firm characteristics/outcomes.
World Bank	Global Financial Inclusion Database	2017	Nationally representative data are available from 40 African countries and <b>44 129</b> individuals (15+ years of age) collecting information from more than 100 indicators relating to access to finance.

The Report relies on quantitative methods of research, in particular commonly used statistical and econometric models such as estimating the dissimilarity index, Shapely decomposition, ordinary least squares and probit models based on parsimonious empirical specifications.<sup>6</sup>

**Education and entrepreneurship:** The empirical relationship between education and women’s entrepreneurship is estimated based on a probit model in which the dependent variables include prevalence and motivation of entrepreneurship and entrepreneurial attitudes. The independent variables are divided into main variables of interest and control variables. The main variables of interest are educational attainment, sex and their interaction. Naturally, there are many characteristics that affect entrepreneurship which are included in the estimation as control variables, including age of respondent, household size, household income, residence and region of location. Since all outcome variables are binary by nature, a probit model is used regressing the dependent variables separately on main variables of interest controlling for listed covariates. Results are provided in terms of marginal effects following probit estimations. Educational attainment widely varies throughout the eight countries in a similar way to the whole of Africa. Nevertheless, the sample is not representative of Africa and therefore

<sup>6</sup> See annex II for a detailed representation of empirical models and specifications.

empirical estimates need to be updated as the number of countries with available data increases in the future.

**Education and access to finance:** Access to finance is measured in binary form by having accounts at formal financial institutions, borrowing patterns (by purpose and location) and saving patterns (by purpose and location). In addition to probit regressions, this section estimates the dissimilarity index (D-index) to quantify the extent of inequality in access to financial services and decomposes said inequality to show the driving socioeconomic characters (Barros, Molinas, and Saavedra, 2008; Barros, and others, 2009). The D-index compares the average coverage rate of access to financial services in a country, with the coverage rates of various circumstance groups. These circumstance groups often reflect the main contours of inequality along socioeconomic characteristics of households and individuals, including income, education, sex and age. The D-index is therefore a measure of how dissimilar access rates are in each circumstance group relative to the national average and ranges between 0 to 1 (or 0 per cent to 100 per cent). In case of perfect equality D-index equals 0, while in case of perfect inequality it is equal to 1. After the estimation of the D-Index, this section uses the Shapley decomposition a la Shapley (1953) to estimate the marginal/average contribution of each circumstance group to the observed inequality or to decompose the observed inequality in a country to its various socioeconomic components.

**Access to finance and firm performance:** The impact of financial constraint on productivity and access to opportunities for women entrepreneurs is examined using several proxies based on firm-level data. The main reason behind this shift to firm-level data is twofold. First, entrepreneur-level data have no coverage of variables that relate to access to finance. Second, individual-level data does not have sufficient labour market indicators to identify the entrepreneurs or the self-employed. World Bank Enterprise Surveys offer a bridge as it is not difficult to assume that firm owners are inevitably entrepreneurs. The same econometric and statistical methods employed in examining the preceding two questions are used here. While access to opportunities are analysed with D-index and Shapley decomposition, the impact of financial constraints on firm performance is examined in a regression framework. Opportunities are proxied by accessing government contracts and undertaking innovative practices. Firm performance, on the other hand, is assessed based on employment and sales growth, capacity utilization, hours of operation and exporting propensity. Firm-level analysis requires controlling firm characteristics such as sector/industry, age, size, location and year of survey in addition to the key variable of interests, including financial constraint, sex of the owner of the firm and their interaction. The aim is again to estimate the differential impact of financial constraint on firm performance for firms owned by men and women.

It is crucial to note that the empirical methods employed in the *Women's Entrepreneurship Report* do not lead to causal interpretation. In addition, qualitative methods should be employed in future research to complement the quantitative methods.

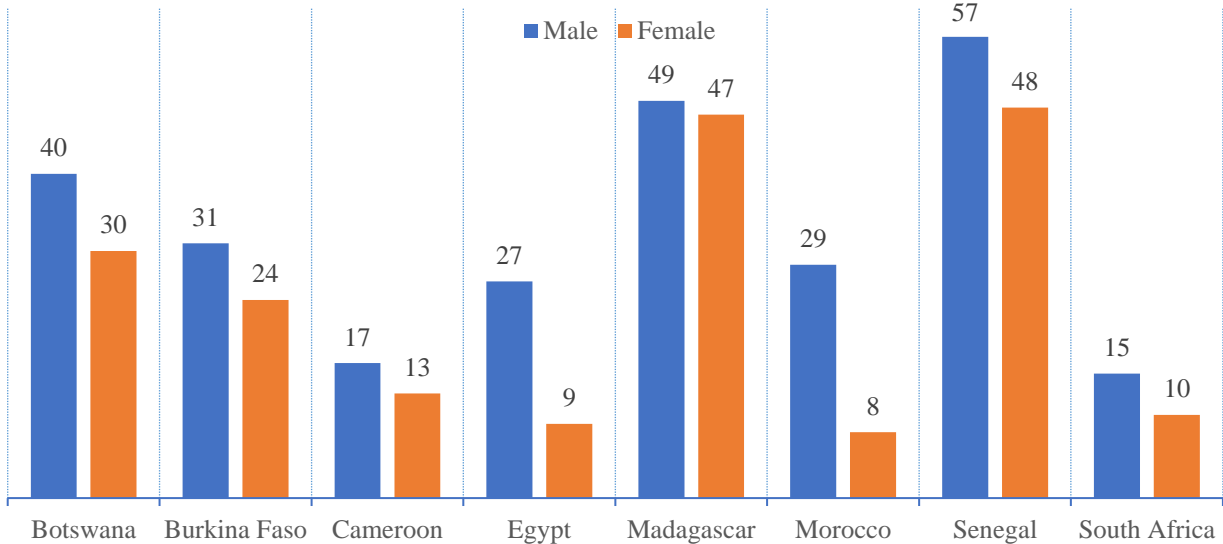
### **III. Key findings**

#### **A. Does education influence women's motivation to engage in entrepreneurship?**

The decision to become an entrepreneur is complex, depending on a variety of factors ranging from basic individual characteristics such as gender, age, marital status and number of children, to family background, time endowment, personality characteristics, human capital

endowment, health condition, nationality and access to financial resources, value chains and market opportunities (Simoes, Crespo and Moreira, 2016). These factors can also shape the motivation of entrepreneurs, which is critical for the transformative power of entrepreneurship. However, the literature on determinants of entrepreneurship – with emphasis on education – has largely focused on developed countries, while self-employment is refuge to millions throughout the developing world. The aim of this section is to provide empirical evidence on the relationship between formal and general educational attainment on the prevalence of and motivation behind entrepreneurship, especially for women in Africa; and explore the potential channels behind this relationship. The empirical analysis is based on Adult Population Surveys collected by the Global Entrepreneurship Monitor Consortium in Botswana, Burkina Faso, Cameroon, Egypt, Madagascar, Morocco, Senegal and South Africa during the period 2015–2017 covering more than 20,000 individuals.

Figure I  
**Prevalence of entrepreneurship by sex (percentage)**



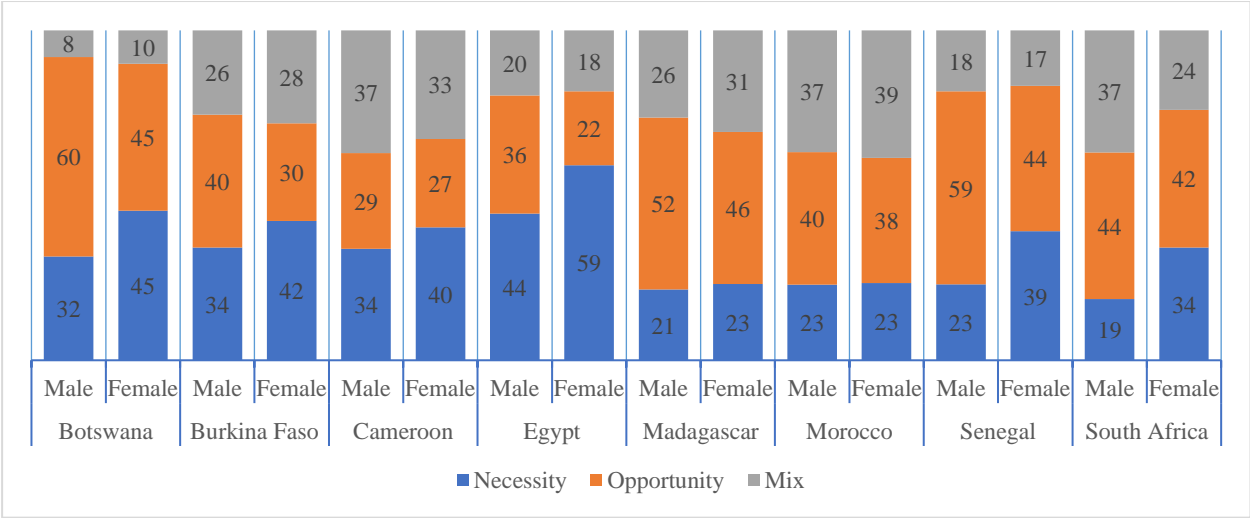
Source: *Adult Population Survey, 2015–2017* (Global Entrepreneurship Monitor (GEM) Consortium; [www.gemconsortium.org/data/key-aps](http://www.gemconsortium.org/data/key-aps)).

Figure I sets the context with an overview of prevalence of entrepreneurship by sex among eight African countries where the height of each bar reflects the share of entrepreneurs in each country by sex. Notably, there are important variations among the selected countries for both men and women. On average, around 10 per cent of surveyed women are identified as entrepreneurs in Cameroon, Egypt, Morocco and South Africa with massive gender gaps, especially in North Africa. In Madagascar and Senegal, female entrepreneurship reaches beyond 40 per cent with minor gender gaps in prevalence rates. In Botswana and Burkina Faso, prevalence rates reach around 30 per cent with moderate gender gaps. It is important to note that GEM identifies entrepreneurs that are at the early stages of business and established business owners. The gender inequalities partly reflect the disparities among early stage entrepreneurs.

Figure II decomposes entrepreneurs by motivation and sex. Entrepreneurs may be motivated by opportunity, necessity or a combination of both. Focusing on male entrepreneurs, there are only two countries, Cameroon and Egypt, where opportunity-driven motivation is not

dominant. Among female entrepreneurs, Morocco follows suit leading to three countries in total. Nevertheless, there are important gender gaps in motivation. Throughout the eight countries, gender gap<sup>7</sup> in necessity entrepreneurship reaches a maximum of 79 per cent in South Africa followed by Senegal at 70 per cent, Botswana at 40 per cent, Egypt at 34 per cent, Burkina Faso at 24 per cent and Cameroon with the smallest gap at 18 per cent. Gender parity is attained in Madagascar and Morocco in the shares of male and female entrepreneurs with necessity motivation. The opposite trend is observed in opportunity-driven entrepreneurship where gender gaps are against women’s favour reaching the widest gap in Egypt at 60 per cent followed by Burkina Faso (36 per cent), Botswana (35 per cent) and Senegal 32 per cent. In Cameroon, Morocco and South Africa, the gap is below 8 per cent. The implication is that women are engaging in entrepreneurship due to reasons that are not conducive for transforming their livelihoods but rather for survival and subsistence.

Figure II  
**Entrepreneurship prevalence by motivation and sex (percentage)**



Source: Adult Population Survey, 2015– 2017 (GEM Consortium, [www.gemconsortium.org/d ata/key-aps](http://www.gemconsortium.org/data/key-aps)).

The finding that female entrepreneurship is less prevalent and more necessity-driven than male entrepreneurship is not specific to Africa. According to GEM,<sup>8</sup> 26 out of 49 countries in 2018 reported gender gaps against women in opportunity-driven entrepreneurship, especially at the early stages of entrepreneurship. Gender gaps against women are manifested in 10 out of 20 industrialized countries in North America and Europe. There may be various factors at play in line with an earlier discussion on women’s overrepresentation in necessity-driven entrepreneurship, including gender differentials in educational attainment, risk preferences for self-employment and access to finance, sector-specific expected returns to investment and access to social networks.

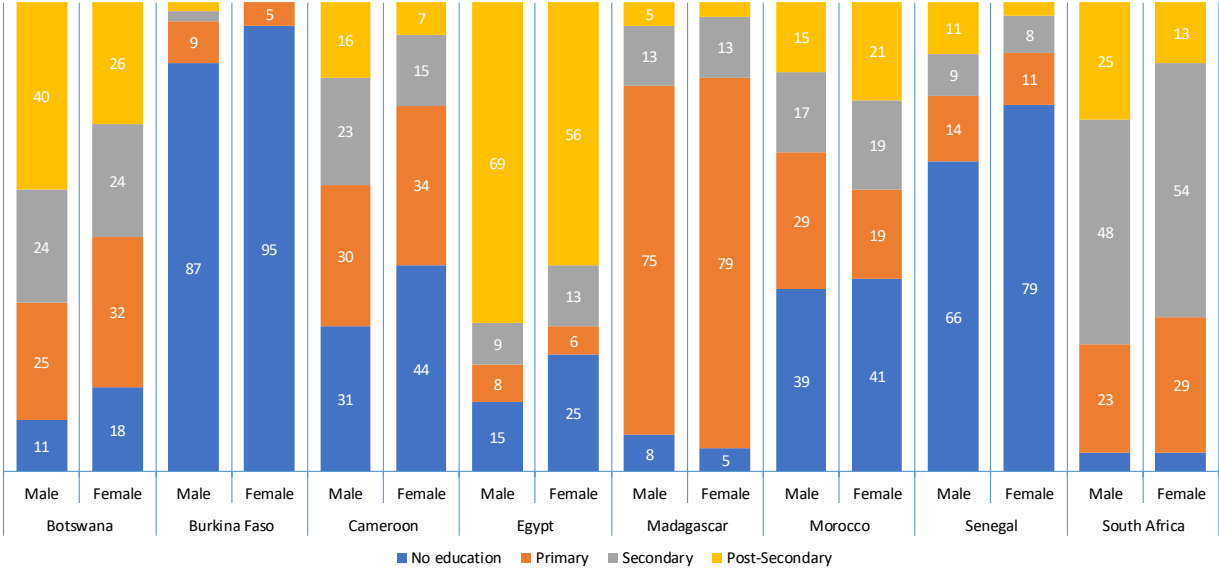
Figure III disaggregates entrepreneurs by their educational attainment and sex. There is some evidence of stark differences between countries and within countries with regard to the

<sup>7</sup> The gender gap is measured based on the following formula:  $[(\text{Male Value} - \text{Female Value}) / \text{Female Value}] * 100$ .

<sup>8</sup> Country level estimates for selected indicators from Adult Population Surveys are available at [www.gemconsortium.org/data/key-aps](http://www.gemconsortium.org/data/key-aps).

educational background of entrepreneurs. In the two countries from Southern Africa, the majority of entrepreneurs have at least secondary education while in West Africa, the majority in Burkina Faso and Senegal have no education at all. Furthermore, analysis confirms gender inequalities in expected directions in that the share of women entrepreneurs with no education exceeds the share of male entrepreneurs with no education in both subregions with wider gender gaps in West Africa relative to Southern Africa.

Figure III  
**Entrepreneurship by education** (percentage)



Source: Adult Population Survey, 2015– 2017 (GEM Consortium, [www.gemconsortium.org/data/key-aps](http://www.gemconsortium.org/data/key-aps)).

In Egypt, more than 50 per cent of female and male entrepreneurs have post-secondary education. Nevertheless, women entrepreneurs in the Egyptian sample have lower educational attainment than male entrepreneurs. This could partly be explained by the fact that despite having lower labour force participation rates among women, more than 50 per cent of working women in Egypt are found in the formal wage and salaried sector driven by employment in the public sector (ECA, 2017b). In Morocco, educational attainment among female entrepreneurs is higher than male entrepreneurs. As aforementioned, there is a sizeable gender gap in prevalence of entrepreneurship with women representing less than 25 per cent of all entrepreneurs in Egypt and Morocco. Madagascar emerges as the only country where gender gap in both prevalence and educational background of entrepreneurs is narrow. In Cameroon, gender gaps in prevalence rate is lower than in countries in West Africa, while female entrepreneurs have slightly lower educational background than male entrepreneurs. Increasing the number of countries under investigation is needed to strengthen the evidence base behind subregional differences.

While the preceding analysis descriptively reviewed the latest entrepreneur-level data in Africa, the question that this section explores requires more rigorous and econometric<sup>9</sup> investigation of the impact of education on the prevalence and type of entrepreneurship with a

<sup>9</sup> The analytical results on the relationship between education and entrepreneurship are drawn from probit regressions. For more information, see the empirical specification and regression tables in annex II.

gender perspective, along with an assessment of potential channels. The key empirical findings are discussed in detail below.

**Entrepreneurial attitudes, which are critical for entry into and motivation behind entrepreneurship, are strongly and positively influenced by education, especially for women.** There are four proxy attitudes for which self-perceptions are reported. First, *knowing someone personally who started a business recently* can help potential entrepreneurs turn their ideas into action, widen their networks and market and be inspired by those around them. This indicator is also a proxy for social capital.<sup>10</sup> Second, *identifying opportunities to start a business in the next six months* is a fundamental ability of potential entrepreneurs to start a business, especially in niche sectors with emerging demand. This indicator is a proxy for both a skill and an entrepreneurial talent. Third, *having the knowledge, skills and experience required to start a new business* is among the most important enabling factors for entrepreneurs and proxies for self-confidence. Last, *fear of failure preventing individuals from starting their own business*. This attitude is closely linked to risk perceptions of individuals and their fall-back options in case of failure.

- **Knowing someone personally who started a business in the past two years:** Women on average are 16 per cent less likelihood than men to know someone personally who started a business in the past two years. Education overall is positively associated with this attitude at a progressive pace from primary to tertiary level. For example, tertiary-educated individuals are 31 per cent more likely than those without any education, to know an entrepreneur. The impact of education on this attitude is similar for men and women. Relative to women with no education, women with primary, secondary and tertiary education are 12 per cent, 23 per cent and 28 per cent, respectively, more likely to know an entrepreneur personally. Remaining at school for extended periods, therefore, improves women's social capital in addition to their human capital and narrows down slightly existing gender gaps.
- **Identifying opportunities to start a business in the next six months:** Women on average are 12 per cent less likely than men to report that they can identify opportunities to start a business in the next six months. Education, starting from the primary level, increases this probability reaching a plateau at secondary and tertiary education, making women on average 18 per cent more likelihood to identify opportunities to start a business relative to those with no education. Education helps women to increase their probability to identify opportunities. Women with no education are 11 per cent less likely to identify opportunities relative to men with no education. The gender gap becomes effectively negligible at tertiary-education level showing the importance of higher education for women entrepreneurs.
- **Having the knowledge, skills and experience required to start a business:** Women are 16 per cent less likelihood to report having the knowledge, skills and experience required to start a business relative to men. Tertiary educated have the highest likelihood of responding positively with the largest gap observed between

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<sup>10</sup> Campos, and others (2015) found that women who reported having a male role model when they were younger, were 20–28 per cent more likely to crossover into a male-dominated sector. These role models are important for crossovers as they introduce women to the sectors in which they work or provide them with important contacts or financial support.

tertiary educated and those without education. Focusing on women, there is a significant gap between women with education and women with tertiary education, such that the former is 11 per cent less likely to respond positively to this indicator than the latter. Women with tertiary education are 19 per cent less likely than men with tertiary education to respond positively. Self-confidence thus remains weaker even among highly educated women.

- **Fear of failure preventing individuals from starting a business:** Women on average report 23 per cent more likelihood than men to report that fear of failure would prevent them from starting a business. Education has no direct impact on this statement, except for tertiary-educated individuals who are 11 per cent less likely to agree with it, relative to those without any education. Examining the impact of education and gender, men with tertiary education are 16 per cent less likely than women with tertiary education to agree with this statement. This result is driven by tertiary-educated women who are not part of the labour force even though they have strong potential to become opportunity-driven entrepreneurs. Interestingly, women at lower levels of education are less likely to agree with this indicator. The result is largely driven by the fact that the majority of women entrepreneurs have lower education and are necessity-driven. Accordingly, necessity motivation dominates the fear of failure.

Education plays a significant positive role in shaping the attitudes of potential entrepreneurs. Furthermore, education helps to narrow gender gaps in entrepreneurial attitudes, which not only affect the probability to become an entrepreneur but also the probability to become an opportunity-driven entrepreneur.

**Education, especially tertiary education, is negatively associated with entrepreneurship.** Relative to those with no education, secondary and tertiary-educated individuals are 23 per cent and 28 per cent, respectively, less likely to be entrepreneurs. Individuals with primary education are almost 30 per cent more likely than tertiary-educated individuals to be entrepreneurs. Women are on average 30 per cent less likely than men to be entrepreneurs, but education can help to narrow this gap. While women with secondary education are more than 60 per cent less likely than men with secondary education to be entrepreneurs, this figure drops down to 30 per cent with tertiary-educated individuals.

The relevance of education is evident with statistically significant gender differentials among the countries under investigation. In Morocco, women with no education are 66 per cent less likely to be entrepreneurs relative to men with no education among whom 37 per cent are entrepreneurs. The likelihood of becoming an entrepreneur increases with education for women and men only in Morocco thanks to the large share of opportunity-driven entrepreneurs. In Egypt and Senegal, women with no education are 60 per cent and 10 per cent, respectively, less likely to be entrepreneurs than men with no education. In South Africa, education increases the likelihood of being an entrepreneur but only for men with tertiary education. In Botswana, Burkina Faso, Cameroon and Senegal, education is negatively associated with entrepreneurship but only for men, starting from secondary education.

These are anticipated results given that educated individuals are more likely to prefer the formal wage market to self-employment. An important policy implication, however, is that education is not only boosting female labour force participation but also female



entrepreneurship in Africa as the negative impact of higher education on entrepreneurship does not apply to women.

**Education has a significant and positive impact on opportunity-driven entrepreneurship and can narrow gender gaps in opportunity-driven entrepreneurship.** Entrepreneurs with tertiary education have the highest probability of being driven by opportunities. Relative to entrepreneurs with secondary education, they are 14 per cent more likely to be driven by opportunity, while entrepreneurs with no education and primary education are 22 per cent and 24 per cent, respectively, less likely to be opportunity-driven. In general, women entrepreneurs are 17 per cent less likely than male entrepreneurs to be driven by opportunities: however, this result is largely driven by women entrepreneurs without any education. Post-primary education matters. Women entrepreneurs with primary or no education are between 26 per cent and 28 per cent less likely than tertiary-educated women entrepreneurs to be opportunity-driven. Nevertheless, gender gaps in opportunity-driven entrepreneurship persists even at tertiary education where men are 28 per cent more likely to be opportunity-driven than women.

Country-level estimates show the vulnerabilities experienced by women without any education. Relative to male entrepreneurs without any education, women entrepreneurs without any education are less likely to be driven by opportunities in Burkina Faso (19 per cent), Senegal (26 per cent) and Cameroon (88 per cent). In Burkina Faso, women with secondary education are 40 per cent more likely to be opportunity-driven entrepreneurs relative to men without any education. In all countries, the impact of education on the likelihood of being opportunity-driven entrepreneurs is progressively positive, especially for men. Consequently, education plays a critical role in shaping the motivation behind entrepreneurship and narrowing the gender gaps, in particular for women with secondary education. There are important sectoral implications given that opportunity-driven entrepreneurs are more likely to be in the sectors with high-growth potential.

**While entrepreneurs with no education have the highest probability of being driven by necessity, educational attainment lowers the likelihood of necessity-driven entrepreneurship, especially for women entrepreneurs.** Relative to tertiary educated, entrepreneurs with no education are 75 per cent more likely to be driven by necessity. Entrepreneurs with primary and secondary education are 67 per cent and 22 per cent, respectively, more likely to be driven by necessity relative to entrepreneurs with tertiary education. Consequently, there is a negative relationship between the level of education and the motivation behind entrepreneurship. Focusing on the gender aspect of this relationship, note that women entrepreneurs are on average 22 per cent more likely than male entrepreneurs to be driven by necessity. In Senegal and South Africa, the likelihood of women being driven by necessity is around 50 per cent more than male entrepreneurs. This figure drops down to roughly 27 per cent in Egypt and Botswana. Education plays a critical role in narrowing this gender gap. Women with no education are 47 per cent more likely than women with secondary education to be driven by necessity. This figure drops to 32 per cent for women entrepreneurs with primary education. After secondary schooling, however, the sign changes and thus women with tertiary education have 24 per cent less likelihood to be driven by necessity relative to women with secondary education. While the same holds for male entrepreneurs, there is no significant difference between male entrepreneurs with secondary and tertiary education. Consequently, there is strong evidence for education to support women to transform themselves away from necessity-driven entrepreneurship.

**Given their higher educational background as well as stronger entrepreneurial attitudes, opportunity-driven entrepreneurs are more likely to operate in sectors with high-growth potential, including manufacturing and knowledge-based services sectors.** There is statistically significant empirical evidence suggesting that opportunity-driven entrepreneurs are more (less) likely to operate in the manufacturing (services) sector. This association is economically meaningful as well. Entrepreneurs driven by opportunity are 27 per cent more likely to operate in the manufacturing sector relative to necessity-driven entrepreneurs. The impact is even greater for women. Female entrepreneurs driven by opportunity are 52 per cent more likely than female entrepreneurs driven by necessity to operate in the manufacturing sector. There is no significant relationship for men. Opportunity-driven entrepreneurs are also 4 per cent less likely to operate in the services sector relative to necessity-driven entrepreneurs. There is an interesting nuance – the services sector is comprised of many subsectors with different technological and knowledge requirements. When the analysis excludes wholesale and retail trade and hotels and restaurants, there is strong evidence for opportunity-driven entrepreneurs operating in a relatively more knowledge-based economy covering subsectors such as information and communications technology, financial services, business services and professional services. Specifically, opportunity-driven entrepreneurs are almost 25 per cent more likely to operate in such sectors relative to necessity-driven entrepreneurs.

**Opportunity-driven entrepreneurs expect to create more jobs than necessity-driven entrepreneurs.** Entrepreneurship is critical for the health of an economy not only for competition and innovation but also for job creation. Country-level regression results show that opportunity-driven entrepreneurs expect to create more jobs than necessity-driven entrepreneurs in the coming five years. For example, in Madagascar, opportunity-driven entrepreneurs expect to add 1.2 more jobs than necessity-driven entrepreneurs. In Senegal and South Africa, expected job growth is 7 and 19 more jobs, respectively, among opportunity-driven entrepreneurs relative to necessity-driven entrepreneurs. In addition, educational background of entrepreneurs directly influences the expected job growth. For example, in Botswana, tertiary- and secondary-educated entrepreneurs expect 17.5 and 9.5, respectively, more job creation relative to entrepreneurs with no education. In Madagascar, tertiary-educated entrepreneurs expect to add on average 3.5 more jobs while Cameroon expects to add 6.2 more jobs.

Consequently, the empirical analysis based on eight African countries show that education plays a critical role in boosting female entrepreneurship both in terms of prevalence and motivation. Educational background is a strong determinant behind opportunity-driven entrepreneurship, which is associated with transformative and high value-addition activities thereby empowering women economically. There are various mechanisms behind this result. The results show that education can achieve this transformation by strengthening entrepreneurial attitudes that relate to the fundamental characteristics of successful entrepreneurs. Future research will focus on how public policy on education and finance can help to narrow the gender gaps in transforming intentions into action. In addition, education is a process that may very well end. Further research is needed to understand the factors behind discontinuing entrepreneurial activities and explore if there are any gender differentials and a role for education to avoid discontinuity. Section B explores an additional channel and assesses how education contributes to access to financial products and services for women.

## **B. Does education determine women's access to finance?**

The transformative power of financial inclusion, that is, access to and use of formal financial services, is well established by now, especially when it comes to those who are most credit and liquidity constrained (Demirguc-Kunt, and others, 2017). Individuals or groups with access to financial services can save or borrow and subsequently make short-term and long-term investments in human or physical capital and manage negative shocks and smooth consumption, thereby sustaining their path to prosperity.<sup>11</sup> Digital finance through the expansion of mobile money accounts has recently made financial inclusion a reality even for groups previously disenfranchised, including rural dwellers, women and young people. While mobile money accounts were largely concentrated in Eastern Africa, it has recently spread to West, Central and Southern Africa.

Notwithstanding the digital finance revolution in Africa, there is still evidence for considerable financial exclusion which must be tackled with targeted and country-specific policies to achieve the transformative power of finance for individuals and firms. This section focuses on the importance of formal and general education in accessing financial products and services from financial institutions, including banks, credit unions and microfinance, among others. This focus is based on two premises. First, a certain level of education and literacy, and financial literacy, is required to understand financial products and services and trust in the financial system. Second, while education is an absolute necessity for productive entrepreneurs, it is not sufficient in supporting women entrepreneurs to fully seize the opportunities. An important drawback is the inability to identify entrepreneurs among surveyed individuals. Accordingly, this section looks at linking access to finance to all adults above 15 years of age and control for their labour force participation status only.

Unfortunately, the current level of quantity and quality of education in Africa is not sufficient to support the needed expansion in financial inclusion, especially for women. The share of household population aged 6 years of age and above with no education ranges between 7 per cent in Zimbabwe (STATcompiler, Demographic and Health Surveys for 2015) and 67 per cent in the Niger (Demographic and Health Surveys for 2012) with an average of 30 per cent in Africa. Completion rates are low for primary and secondary education. There is also a crisis in the quality of education as demonstrated in the World Development Report 2018 – that is, less than 15 per cent and 7 per cent of students assessed are proficient in math and reading, respectively, in Africa, excluding the North. In addition, teacher absenteeism is high in Africa with an average of one in five teachers being absent from school on the day of an unannounced visit during surveys undertaken in Kenya, Mozambique, Nigeria, Senegal, Togo, Uganda and the United Republic of Tanzania (World Bank, 2018).

At the regional level, based on 40 African countries and more than 44,000 individuals, results from probit regressions show that account holdership at formal financial institutions is strongly and positively associated with educational attainment. Relative to those who completed primary education or less, individuals with secondary and tertiary education are 18.5 per cent and 40.5 per cent more likely to have an account, respectively. Given that average account holdings stand at 36 per cent among those who have completed primary education or less, the point estimates suggest large differences between education groups reaching 51 per

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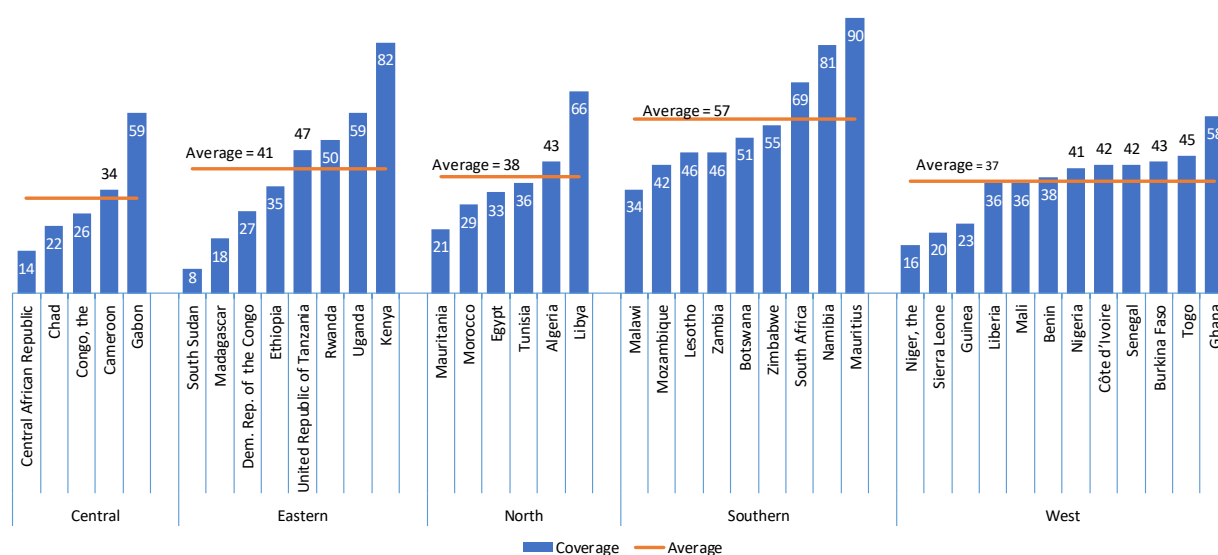
<sup>11</sup> In Kenya, female-headed households increased their savings thanks to mobile money accounts, transitioned from farming to self-employment in retail activities leading to reductions in extreme poverty (Suri and Jack, 2016). Savings accounts also helped women to save at higher rates and invest more in their businesses in Kenya (see Dupas and Robinson, 2013).

cent and 113 per cent, respectively. Borrowing and savings patterns point in the same direction. Secondary and tertiary educated are 12 per cent and 21 per cent, respectively, more likely to borrow relative to primary educated or less. In addition, they are more likely to borrow from formal financial institutions and less likely to borrow from friends and family. Lastly, secondary educated are 7 per cent more likely to borrow for business, relative to primary educated or less.

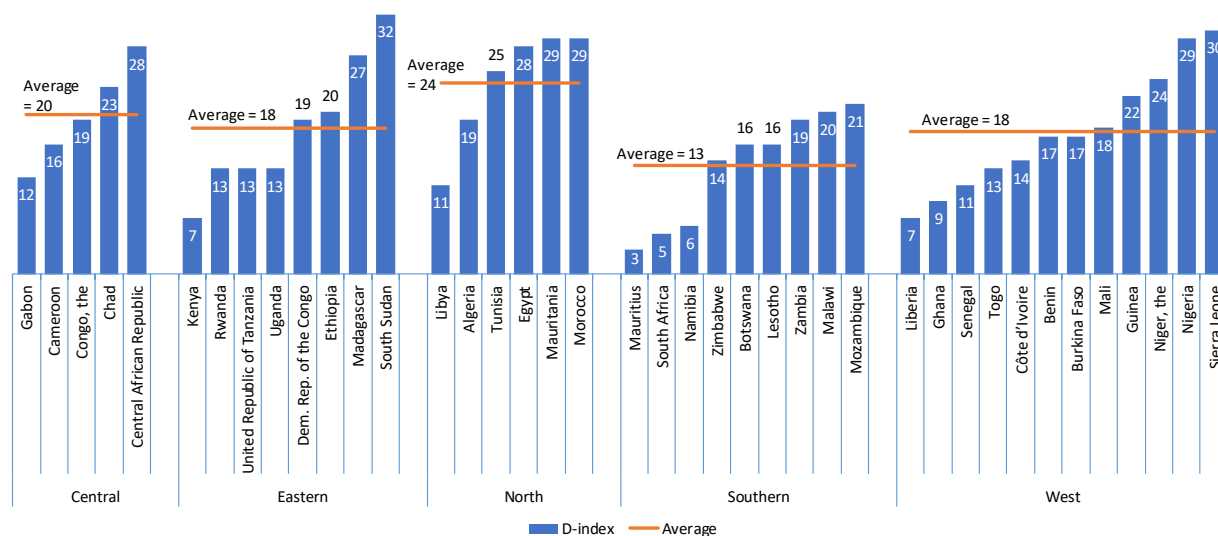
Regarding savings, secondary and tertiary educated are 22 per cent and 49 per cent, respectively, more likely to save relative to primary educated or less. Secondary educated are also more likely to save for business and at formal financial institutions. As such, they are more likely to enjoy the benefits of secure savings and interest on their capital. It is important to note that there are significant inequalities in all three indicators reviewed above with respect to age, sex and income. Women with primary education or less in Africa are 21 per cent less likely to have accounts than men with primary education or less. Education contributes to narrowing this gap, especially for tertiary-educated women. While women are 4.3 per cent more likely to save in Africa, this is largely driven by women with primary education or less who save at informal savings clubs. In fact, they are 39 per cent more likely to save at informal savings clubs, relative to men with primary education or less. As the level of education increases, the likelihood of women saving at informal institutions decrease. Regarding borrowing behaviour, women are less likely to borrow from family and friends but more likely to borrow from informal savings clubs.

These regional results have important policy implications. First, education matters significantly for accessing and using financial services. Educated individuals are more likely to enjoy the benefits of formal financial institutions which can offer more security, more efficiency, lower transaction costs and higher interest for their capital. While women, young people and poorer individuals are often excluded from financial services, education, especially beyond secondary education, can help to close these gaps. Second, women with lower education choose informal sources for financial services which carry higher risks and are less flexible for business purposes. In order to become opportunity-driven entrepreneurs in profitable sectors, women entrepreneurs need to access formal institutions that can cater to their needs for entry, survival and growth in competitive markets.

Figure IV  
**Financial inclusion in Africa: access and inequality by subregion 2017**  
*Panel A: Share of population with access to formal accounts (percentage)*



*Panel B: Inequality in access to accounts (percentage)*



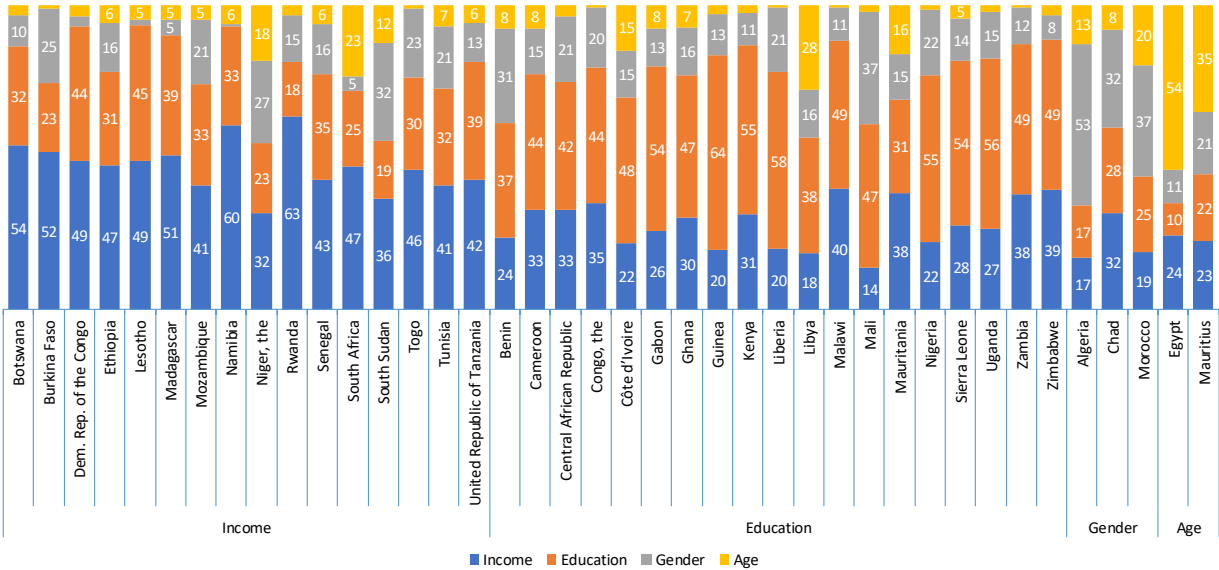
Source: ECA calculations based on the Global Findex Database (Washington, D.C., World Bank Group, 2017).

Moving to the country-level results, figure IV (panels A and B) provides evidence on financial inclusion in Africa based on the most recent data. Panel A shows the share of population having accounts at a financial institution. There is wide variation throughout the continent with a maximum of 90 per cent of the population aged 15+ years having accounts in Mauritius and a minimum of 8 per cent in South Sudan. As a subregion, Southern Africa has the highest unweighted average at 57 per cent followed by Eastern Africa at 41 per cent. North Africa and West Africa have similar averages at around 38 per cent followed by Central Africa with the lowest average at 31 per cent. West Africa is the most uniform subregion in Africa

with the majority of countries having just over one third of their populations having accounts at financial institutions. Panel B focuses on inequality in financial inclusion in each country and reports estimated dissimilarity index (D-index) which measures dissimilarity in accessing accounts by various circumstance groups defined by socioeconomic characteristics, that is, income, educational attainment, gender and age. Computing coverage rates for all circumstance groups and aggregating them into a single index by relating these coverage rates to national averages, Panel B therefore offers a measure of inequality in having accounts in financial institutions. North Africa has the highest inequality driven by Morocco, Mauritania and Egypt followed by Central Africa. Southern Africa on average has the lowest inequality.

Comparing Panels A and B clearly show that countries with wider coverage have lower inequalities. In addition, countries with higher rural populations often report lower coverage rates and higher inequalities in financial inclusion. This could partly be explained by lower educational attainment in rural areas, particularly among women. Promoting women’s entrepreneurship in rural Africa requires not only policy action to increase literacy and numeracy but also targeted and innovative financing solutions that will help rural women to access much needed financial services, including savings, insurance and loans through mobile banking and digital finance. Given that rural women are largely driven by necessity in their paid activities, transformative results can only be obtained with a comprehensive livelihood approach that combines financial capital with human capital.

Figure V  
Drivers of inequality in access to finance



Source: ECA calculations based on the Global Findex Database (Washington, D.C., World Bank Group, 2017).

What are the main drivers of inequality in access to finance observed in figure V? Figure V shows a breakdown of inequality into four factors using the Shapley decomposition and sorts countries into groups based on the main driver of inequality. The key finding is that in half of the 40 countries with available data in Africa, educational attainment is the major driving force behind observed inequalities in having accounts at financial institutions. In addition, half of the top two most unequal countries in every subregion has inequalities in education, driving

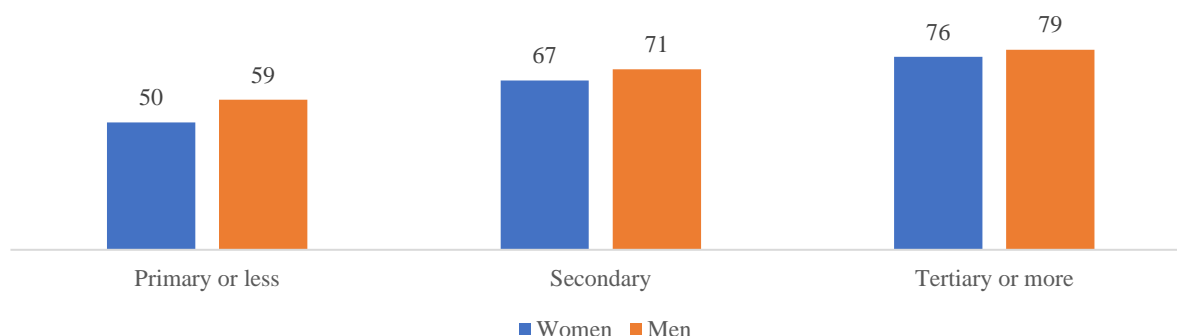
inequalities in financial inclusion. In Guinea, secondary and tertiary-educated men are two and three times, respectively, more likely to have accounts relative to men with primary education or less.

With regard to income, 16 countries have income inequality which drives inequality in access to accounts and explains for more than 50 per cent of the inequality found in Botswana, Burkina Faso, Madagascar, Namibia and Rwanda. Lack of money is the main factor behind not owning accounts on the continent for men and women both with minor gender gaps. Specifically, more than 70 per cent of respondents who do not own accounts explain that lack of income is the reason for their financial exclusion.

There are three countries – Algeria, Chad and Morocco – where gender plays a much larger role than income and educational attainment. Women’s access to financial accounts is therefore highly limited in these countries. For example, in Morocco, while 17 per cent of the female adult population have accounts at financial institutions, this figure increases to 41 per cent for men. Morocco in this regard lags behind Algeria, Egypt, Libya and Tunisia where at least 26 per cent of the adult female population have access to accounts. Lastly, age matters the most in explaining observed inequalities in access to accounts in Egypt and Mauritius. Figure V therefore offers entry points to member States to eliminate inequalities. While Egypt requires targeted incentives to bring their young people to the financial sector, in Rwanda and Namibia the challenge is to offer products and services that can bring poorer households into the formal financial sector.

Focusing on individuals who own accounts, figure VI provides descriptive evidence for the positive role of education in closing the gender gap in use of accounts in the past 12 months (depositing or withdrawing from owned accounts at financial institutions). The sex ratio increases from 85 per cent at primary level to 96 per cent at tertiary level or more. Empirical results from a simple regression analysis, which controls for additional variables such as age, income, labour force participation and mobile phone ownership, indicate that gender gaps do not narrow down when factors other than education are incorporated into the analysis. In other words, other factors work against the positive impact that education has on use of accounts for women. The results confirm, however, that women with primary education or less are 10 per cent less likely than men with primary education or less to use their accounts in Africa. In addition, educational attainment increases the probability of using accounts in the past 12 months for men progressively: men with secondary and tertiary education or more are 19 per cent and 32 per cent more, respectively likely to use their accounts than men with primary education or less.

Figure VI  
**Account use and education by sex (percentage)**



*Source:* ECA calculations based on the Global Findex Database (Washington, D.C., World Bank Group, 2017).

There is an interesting nuance to the results discussed above on the use of accounts. First, gender gap in account use is wider in making deposits into accounts than in making withdrawals from the accounts. Second, educational attainment increases use of accounts by women, especially in making withdrawals. Specifically, the gap is insignificant in making withdrawals but only for women with tertiary education or more.

Financial inclusion is more than owning and using accounts. It implies actual use of accounts for different purposes, including borrowing and saving for a variety of reasons and receiving and sending financial resources between individuals, firms and governments for efficient and formally traceable transactions. When the preceding analysis is repeated for such indicators of financial inclusion,<sup>12</sup> two interesting patterns emerge.

**Borrowing:** The share of population who borrowed in the past year is higher than the share of population with accounts in formal institutions, indicating the prevalence of informal borrowing from several sources including family, friends or informal savings clubs. In addition, inequality in borrowing is less pronounced than having accounts in formal institutions which can be explained again by the prevalence of informal borrowing compensating formal borrowing. Informal borrowing, however, can be costly and risky than formal borrowing. At the same time, the number of countries where gender becomes the major determinant of such inequality doubles in middle-income countries such as Namibia, Tunisia and South Africa, alongside low-income countries such as Guinea, Liberia and Zambia. While education remains important for several countries, income inequality is the main driver of inequality in borrowing. Southern Africa has the highest average D-index in access to savings, but this result is largely driven by only two countries, Botswana and Mauritius, where policy action is highly needed to lower inequalities.

**Saving:** The share of population who saved in the previous year mirrors the share of population who borrowed in the previous year. Propensity to save is higher in Eastern and Southern Africa in line with the opportunities to save in both subregions. North Africa on the other hand, exhibits lowest savings propensity with highest inequalities. Egypt, Morocco and Tunisia have the highest inequalities in savings. Notably, inequality in savings is much more pronounced than inequality in borrowing for the majority of the countries used in the sample. Income inequality by far is the most important factor in explaining such inequalities on the

<sup>12</sup> See tables A.1 and A.2 in annex I.



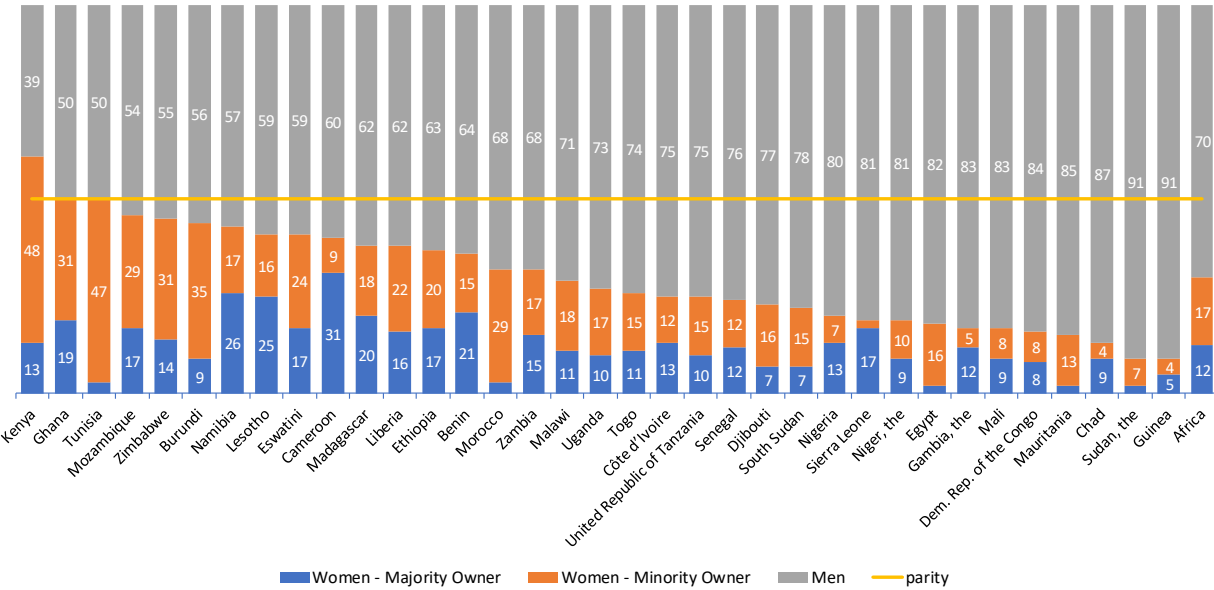
continent, with education following suit as the second most important factor. When asked about why they do not have accounts at financial institutions, people often report not having sufficient money. The same reasoning contributes to the important role played by income inequality in explaining inequality in savings.

Consequently, education beyond primary level is critical for women’s access to finance, which in turn helps women to pursue opportunities and improve their productivity as will be shown in the next section. In addition, education has the potential to protect women from the negative side of access to finance or indebtedness. This potential pitfall of financial inclusion could not be analysed empirically due to lack of data. It is, however, possible that individuals and households may experience indebtedness following access to finance. Ganle, Afiriye and Segbefia (2015) corroborated this finding in Ethiopia where timing of loan disbursement, loan maturity and supervision of how loans are managed, were all critical factors that played a role in rising indebtedness among Ethiopian female entrepreneurs. There is even a risk of increasing gender-based violence in response to access to capital by women (Koenig, and others, 2003). An education can protect women from such pitfalls associated with access to finance. Access to insurance is another solution, however, there are no available data on access to insurance products even though the research undertaken for the present report has identified several successful insurance-related interventions in Africa that are highlighted in the last section.

**C. Does access to finance help women access opportunities and improve their productivity?**

Building on the previous sections, this section comes full circle shedding light on the relationship between access to finance and opportunities and firm productivity with a gender perspective. Given the large sample of 18,707 firms from 35 countries throughout the continent for the period 2013–2018, this section provides a review of the existing gender gaps to set the context.

Figure VII  
**Prevalence of firm-ownership by sex (percentage)**



Source: World Bank Enterprise Surveys, 2013–2018 (Washington, D.C., World Bank).

First, women are underrepresented among firm owners and management in Africa (see figure VII). On average, 28 per cent of firms in Africa have women engaged in firm ownership; 8 per cent of firms are owned by women in majority and 9 per cent of firms have a female top manager.

Second, rampant sectoral segregation is evident with more than 70 per cent of women-owned firms operating in the services sector, specifically in wholesale and retail trade (43.6 per cent) and hotels and restaurants (19.2 per cent).

Third, 78.5 per cent of women-owned firms employ less than 20 workers, while less than 3 per cent of women-owned firms employ 100 workers or more. Firms owned by men are more than three times likely as women-owned firms to be large enterprises.

Fourth, only 14 per cent<sup>13</sup> of women-owned enterprises have secured or attempted to obtain government contracts. Moving to firm performance, cross-country regression results indicate that smaller firms grow 13 per cent less than medium firms, while large firms grow 4 per cent faster than medium firms. Relative to manufacturing, employment growth is observed in the wholesale and retail trade sector, which can partly explain the higher employment growth registered by women-owned businesses despite their smaller size. In Nigeria, for example, employment growth is 21 per cent higher among women-owned firms relative to firms owned by men. This is clear evidence for the revolving door hypothesis whereby women contribute to employment creation and narrowing gender gaps in the labour market. Sales growth is also lower among women-owned firms relative to firms owned by men with significant gaps in Eastern Africa. Capacity utilization is lower among women-owned businesses which on average, record 3 hours less in weekly operations reaching up to 48 hours in Togo, 31 hours in Mauritania and 20 hours in Senegal.

Last, differentials in innovative practices are not significant except in the Democratic Republic of the Congo, Ghana, Namibia and Tunisia where women-owned enterprises are less likely to innovate a new process for their products. Innovative practices are often observed among firms who participate in international trade. There is positive correlation between importing of equipment and innovating a new process for production. Women-owned firms are less likely to purchase assets. Consequently, firms owned by women are disadvantaged relative to firms owned by men in majority of firm characteristics. Accordingly, gender gaps are prevalent throughout Africa limiting the ability of women-owned firms to survive and grow in the private sector.

Access to finance can help women entrepreneurs to narrow down gender gaps in firm characteristics and firm performance: however, women entrepreneurs face serious limitations in accessing financial products and services. During the period 2013–2018, 24 per cent of women-owned firms had selected access to finance as the most binding constraints, followed by corruption (13 per cent) and electricity (12 per cent). The rankings are markedly different for firms owned by men with 21 per cent reporting political instability as the main obstacle, followed by access to finance (18 per cent) and corruption (8 per cent). On average, the largest gender gaps in perception of access to finance is observed in North Africa driven by Mauritania and the Sudan. West Africa has on average the highest perceptions of access to finance being the biggest obstacle, partly driven by the Gambia, Ghana, Guinea and Senegal. The financial

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<sup>13</sup> Formal regression analysis with an ordinary least squares estimator controlling for firm characteristics suggests that women-owned firms are 11 per cent less likely to secure or attempt to obtain government contracts than men in Africa.

constraint is severely binding in the Sahel region with more than 75 per cent of women-owned firms in the Gambia, Mali and Mauritania reporting access to finance as a major or severe obstacle. Formal statistical analysis shows that gender gaps against women persist in Guinea, Mauritania and Zambia, even after controlling for firm characteristics.<sup>14</sup>

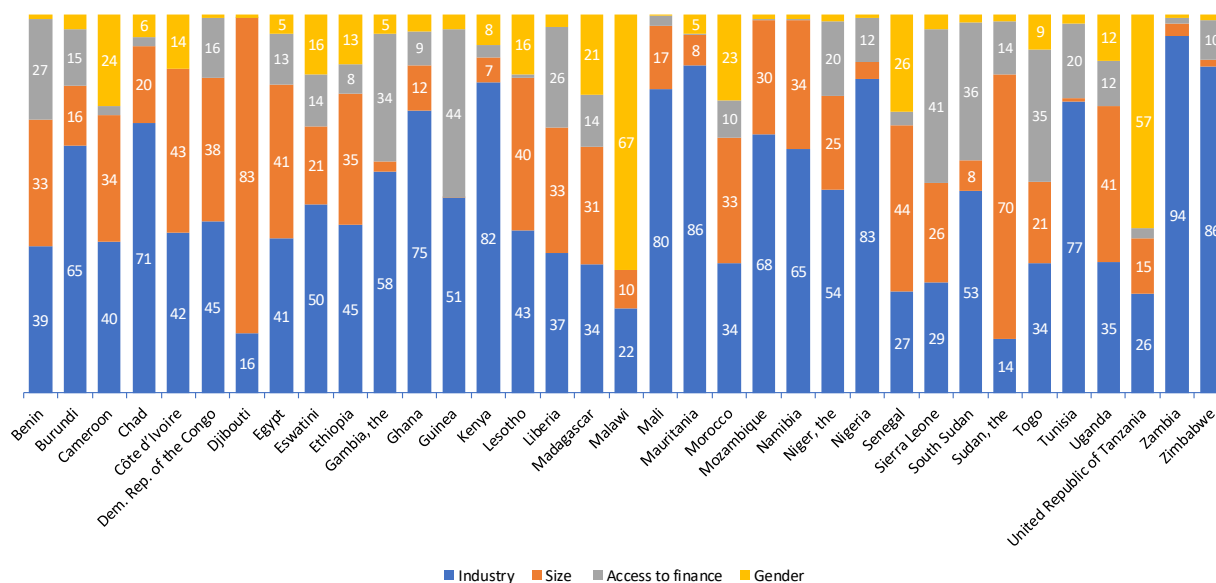
Against this background, the main question is whether access to finance can help women entrepreneurs to improve their productivity and increase their chances to pursue opportunities. Figures VIII and IX present the first set of analytical results. Noting that access to finance may have direct and indirect effects, both figures decompose inequalities in accessing opportunities by firms, that is, proxied by access to government contracts and innovative practices, by industry and size of firms, access to finance perceptions of firms and sex of the owner of the firm. Following the decomposition, each figure groups countries based on the main factor that explains the observed differentials across firms.

Figure VIII focuses on government contracts. According to the International Trade Centre (2017), Governments in developing countries spend up to 30 per cent of their GDP, but only 1 per cent of this market is estimated to be accessed by women entrepreneurs. Figure VIII shows that out of 35 countries with available data, there are 27 countries where the industry in which a firm operates plays a much larger role than other factors in explaining inequalities in access to government contracts. Firms operating in manufacturing, construction and financial intermediation are more likely to access government contracts relative to firms that operate in wholesale and retail trade and hotels and restaurants. Furthermore, firms in the construction sector are 60 per cent more likely to access government contracts than firms in wholesale and retail trade. As women-owned firms are largely in the latter section, this result points towards an indirect impact of sectoral segregation by gender on access to government contracts. While data are missing on the value of government contracts, anecdotal evidence suggests that women tend to access lower-value government contracts.

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<sup>14</sup> Marginal effects are statistically significant only in these three countries, pointing towards a higher likelihood of women-owned firms reporting access to finance as their biggest constraint. The probit model controls for age, industry, size, location, year and exporting status of firms. In Lesotho, however, women-owned firms are less likely to perceive access to finance as the biggest constraint relative to firms owned by men. The rest of the sample has no statistically significant gender differentials.

Figure VIII  
Decomposing inequalities in access to government contracts (percentage)



Source: World Bank Enterprise Surveys, 2013–2018 (Washington, D.C., World Bank Group).

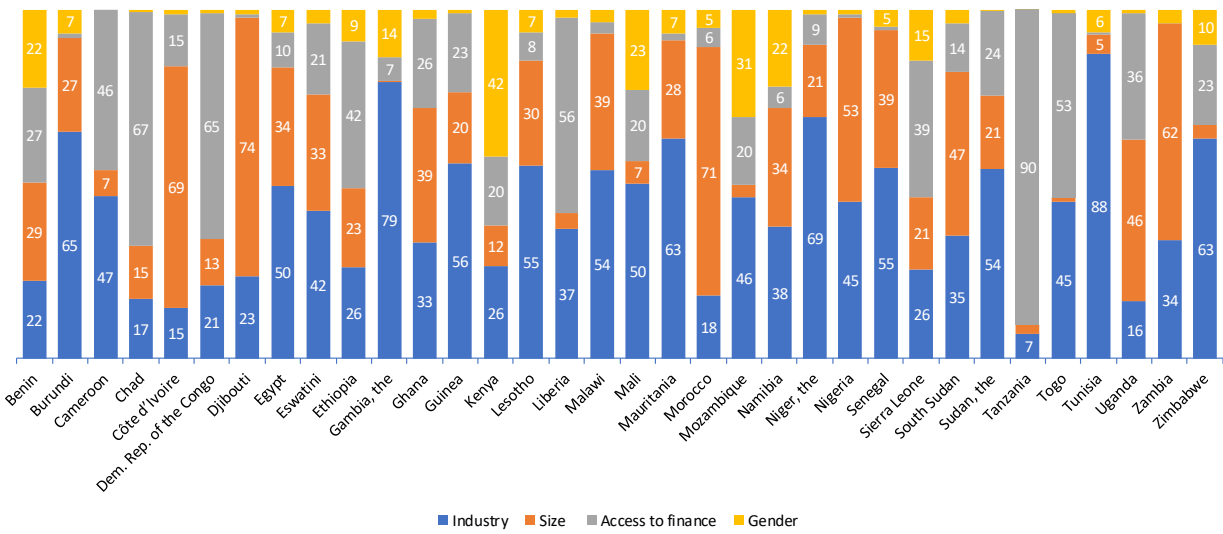
Figure VIII also shows that there are five countries where size of the firm matters more than other factors and that there are two countries, Malawi and the United Republic of Tanzania, where sex of the owner of the firm matters more than other factors in explaining inequalities across firms. Hence, this last result can be taken as preliminary evidence towards gender bias in access to government contracts. Access to finance is the main factor only in Sierra Leone. This relates to a direct impact of access to finance on access to government contracts. Access to finance matters for size of firms and the industry they are operating. For example, firms that operate in the manufacturing sector are more likely to report access to finance as a major constraint relative to firms in the services sector.

While there is no regional strategy or policy in Africa that mainstreams gender equality into public or corporate procurement, there are a few countries where public procurement takes into consideration current structural inequalities. For example, in South Africa, public procurement favours those with disadvantaged backgrounds, which include women who suffered during Apartheid. It is only in Kenya, however, that the Government has set aside for women, young people and persons with disabilities a 30 per cent commitment for all government tenders. Formal regression analysis specific to Kenya for the 2017/2018 period, however, indicates that controlling for firm characteristics, women-owned firms are 13.3 percentage points less likely to have attempted to acquire or secured government contracts relative to male-owned firms among whom 20 per cent have attempted to obtain or secured government contracts. In addition, there is anecdotal evidence from Kenya that women who secured government contracts were not paid in a timely manner, exposing them to indebtedness and loss of property. While the Women’s Entrepreneurship Report could not provide the evidence that links education to access to government contracts, there is evidence for a strong positive impact of managerial experience on attempting or securing government contracts for women. The gender gap in attempting and securing government contracts cease after 18 years of experience.

Figure IX focuses on productivity proxied by innovative practices reported by firms and provides a decomposition of factors that matter for explaining the inequalities across firms. Innovative practices include product and/or process innovation. Again, the industry in which a firm operates matters the most relative to other factors. Unlike figure VIII however, there are more countries where access to finance explains inequalities in propensity of firms to undertake innovative activities. There are various mechanisms at work among which a firm’s ability to purchase assets, such as new machinery and equipment, emerges as an intermediary factor that is significantly influenced by a firm’s access to finance.

Innovating novel processes of production often requires upgrading the current means of production. Access to finance again plays a critical role. First, less than 30 per cent of firms in Africa report having purchased assets in the previous fiscal year. Second, among those who purchased an asset, only a small minority could finance asset purchases through bank borrowing. Retained earnings constitute the main source of financing. There is a significant gender gap in bank borrowing to finance assets. While 2.7 per cent of male-owned firms have used 100 per cent bank financing to purchase their assets, this number declines by half to 1.3 per cent for women. Accordingly, access to finance can lead to gender gaps in innovative practices as well.

Figure IX  
**Factors contributing to differentials in innovative practices (percentage)**



Source: World Bank Enterprise Surveys, 2013–2018 (Washington, D.C., World Bank Group).

Preceding analysis and figures have identified the relative contribution of four factors in accessing opportunities and improving productivity, focusing on only two indicators. There are, however, many other indicators to proxy opportunities and firm productivity.

This section concludes with a review of key empirical results obtained from ordinary least squares and probit regressions that can also identify the sign, size and significance of the impact of access to finance on selected proxies with a gender perspective.

**Firm growth:** Perceiving access to finance as a major constraint plays a critical role in firm’s employment growth in Africa. Firms owned by women that do not consider access to

finance a major constraint, on average grew its employment close to 30 per cent faster than firms owned by men that do not consider access to finance a major constraint. This impact is statistically significant at a conventional significance level. It is also important evidence for the positive contribution of finance to job creation. There is evidence for higher sales growth albeit with lower statistical significance. Cross-country results imply that women-owned firms without financial constraint grew their sales 20 per cent faster than firms owned by men without financial constraint.

**Capacity utilization:** Negatively associated with access to finance, however, this result is driven by firms owned by men. Specifically, firms owned by men that perceive access to finance as a major constraint utilize their capacity 4 per cent less than firms owned by men that do not perceive access to finance as a major constraint. There is no statistically significant evidence that access to finance negatively affects capacity utilization among women-owned firms.

**Hours of operation:** Women-owned firms without financial constraint operate on average 4.6 hours less than firms owned by men without financial constraint, which indicates that gender gaps are present even among firms that have similar perceptions of access to finance. Further analysis finds that women who perceive access to finance as a major constraint operate 3.7 hours less than firms owned by men without financial constraint. In other words, financial constraint is lowering the number of hours that women-owned firms operate relative to firms owned by men, thereby contributing to women's prevailing time poverty due to hours spent on domestic activities.

**Innovation:** Women-owned businesses who do not perceive access to finance as a major constraint are 15 per cent more likely to innovate new products than firms-owned by men with the same perception. Perception of access to finance as a major constraint, however, works against women-owned firms and nullifies the earlier found result that women without financial constraint perceptions being more likely to innovate new products, relative to firms-owned by men with the same perception.

**Exporting:** Access to finance has a negative impact on exporting propensity, however, this result is only driven by firms owned by men perceiving access to finance as a major constraint. Hence, there is no evidence for a direct negative effect of financial constraint on the propensity of women-owned firms to export. Nevertheless, financial constraint may affect exporting propensity indirectly through its impact on firms' choice of industry and specific sector.

Consequently, financial constraint matters in the expected direction for firm's access to opportunities, productivity and performance. This result holds for firms owned by women and men. The results complement earlier evidence on the importance of education for opportunity-driven entrepreneurship and access to financial products and services; and it points towards a clear path for skilled and educated entrepreneurs accessing finance and thereby improving their productivity, sectoral choice and access to opportunities. Women's economic empowerment in Africa can therefore only be materialized with improved educational attainment among women entrepreneurs who can access financial services, manage risks, pursue opportunities, innovate and improve their productivity. Women entrepreneurs who can go through these steps will inevitably transform their lives and the lives of those in their communities and societies.

## IV. Policy recommendations

The objective of the *Women's Entrepreneurship Report* is to support evidence-based policymaking and implementation by African Governments with special emphasis on: increasing the productivity of female entrepreneurs; and supporting women who are currently out of the labour force to enter productive employment. Informed by the key findings of the research and following a review of latest literature of impact evaluations, the policy recommendations set out below are put forward at the regional level, targeting necessity-driven women entrepreneurs.

### A. Education

**The most sustainable way to boost the productivity of female entrepreneurs in Africa is to increase their educational attainment to secondary and tertiary levels.** The Women's Entrepreneurship Report firmly shows that educational attainment at secondary and tertiary levels is critical for successful entrepreneurship. Education helps entrepreneurs to convert their ideas into reality, access finance and enter into sectors that are profitable with growth potential.

- **Public policy must proactively tackle the gender gaps in education, especially on the quality side, to increase the human capital of potential female entrepreneurs and prepare them for the future.** While gender gaps are largely eliminated in enrolment rates for primary schooling, gender inequalities in completion rates start from primary level. Governments should identify gender gaps by location and region of residence and put forward the necessary supply and demand side measures to narrow down such gaps, ensuring that the education system prepares children for new technologies and entrepreneurial activities from earlier ages without missing incentives for lifelong learning. Targeted scholarships for secondary and tertiary education with support for school fees and living expenses should be used, as recently seen in the Niger.
- **Governments must institute policies that curb harmful practices against girls and enforce laws that prevent early marriages and teenage pregnancies.** Women currently out of the labour force in Africa seriously consider becoming entrepreneurs to support their families. Yet, they lack sufficient education, skills and time to enter the labour market and pursue opportunities. One common denominator for these women is the disruption of their education due to early marriages and teenage pregnancies. Life or soft skills trainings can play a critical role in ensuring that girls continue their education, avoid teenage pregnancies and postpone the age at first birth and marriage. Such training programmes should not leave behind girls who are out of school. Introducing successful female entrepreneurs as role models during such training programmes could inspire young girls and widen their vision and network.
- **Vocational education can offer tangible skills to potential female entrepreneurs and help them to cross over to non-traditional sectors.** The youth bulge in Africa leads to massive pressures on general education. Vocational education offers a different path for technical vocations. Information campaigns built into these programmes can help to induce a mindset shift with a positive image around vocational education, and deal with sectoral segregation by

clarifying the returns to vocational education by sector and help potential female entrepreneurs make more informed decisions. Recent evidence from Ethiopia and Uganda shows that male-dominated sectors are more profitable than female-dominated sectors, but women entrepreneurs often assume that earnings in their sector is similar to the sectors dominated by men. Women-owned firms can earn up to 55 per cent more if they cross over to male-dominated sectors (see Campos, and others, 2015; Alibhai, Buehren, and Papineni, 2015).

- **Complementing general or vocational education with targeted courses on business management, information and communications technologies, soft skills entrepreneurial competencies and financial literacy can prepare young women for opportunity-driven and high value-added entrepreneurship in Africa.** Given the gender gaps in formal education, women entrepreneurs need tailor-made skills training and entrepreneurship promotion programmes, especially those in vulnerable situations. Results from recently conducted impact evaluations found that a combination of such programmes can be extremely transformative for women entrepreneurs (Blattman and Dercon, 2018). Integrating life skills and technical skills training into school curricula should also be considered by Governments and specific entrepreneurship programmes, as recently seen in Rwanda (Blimpo and Pugatch, 2018). The Injaz Programme in Morocco is an example of installing entrepreneurial spirit among high school students. Regarding financial education, the International Labour Organization (ILO, 2018) has been actively targeting low-income men and women and providing training materials to countries throughout Africa.
- **Improved educational attainment and capacity-building of women entrepreneurs along with awareness-raising and awareness-building by government agencies can facilitate access to public procurement opportunities.** There is a significant gender bias in attempting and/or securing government contracts against women-owned enterprises in Africa. Lack of information about tender opportunities from a central and accessible source; complicated procedures that require targeted assistance, and difficult qualification requirements are among the main reasons. While public policy must tackle these challenges on the demand side, increased human capital, which comes along with a wider social capital for women on the supply side, can help women to tackle these challenges. There are promising efforts being made in Kenya where banks are working with the United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women) in training women for the application process followed by credit extension; and in South Africa where women are being trained in compliance issues to reach high-value tenders.
- **Governments should spearhead networking and mentorship events for the early-stage and established entrepreneurs and help them to access trade fairs.** Collaboration among entrepreneurs through various networks can lead to higher value additions and expand their market outreach. Such collaborations can also help to tackle challenges regarding access to finance and government contracts, especially for women with lower education. The West African Economic and Monetary Union offers a great example at a subregional level organizing a network of entrepreneurs in eight countries and helping entrepreneurs to reach a market of 60 million consumers. The Senegalese Women Entrepreneurs Network



is a best-practice which formed and financed more than 5,000 women's organizations throughout the country since its inception in 2014. In Uganda, networks of entrepreneurs supported by the Government help entrepreneurs to bridge information gaps and standardize their products to reach higher value chains.

## **B. Access to finance**

**Access to financial products and services is critical for supporting women to become opportunity-driven entrepreneurs.** The Women's Entrepreneurship Report strongly shows that financially constrained firms are less likely to innovate and access opportunities with weaker performance. Severe inequalities in access to finance are also shown along with the importance of education to lower inequalities. Public policy should intervene to improve women's access to formal finance, including credit, savings and insurance.

- **Digital technologies can address information asymmetries that lead to the financial exclusion of women entrepreneurs, especially in rural areas.** Identification by fingerprinting has helped reduce perceived risk of credit extension in rural Malawi by financial institutions and disciplined borrowers for timely repayment of their loans (Gine, Goldberg and Yang, 2012). Mobile banking can also tackle physical barriers against opening accounts, but the digital gender gap must be dealt with first. In 2017, women were 14 per cent less likely to own a mobile phone in Africa. Differences in age, education, income and the labour force participation status between men and women, only explain half of this digital gender gap leading to a statistically significant 7 per cent gender gap.
- **Innovative financial products are needed to tackle financial exclusion of women entrepreneurs, especially at the lower end of the value chain.** Extending maturities of loans can be more effective than subsidizing interest rates. In South Africa, a one-month maturity increase had approximately the same effect as a 436-bases-point interest rate decrease (Karlan and Zinman, 2008). There is also evidence for maturity extensions leading to higher investment rates. In addition, demand for credit increases when financial institutions consider the nature of borrowers' activity. In Mali, agricultural lending that takes into consideration farmers' seasonal cash flow has helped women to access credit, thereby cultivating more land and higher investment in inputs (Beaman, Karlan and Thusybaert, 2015).
- **Female entrepreneurship can be supported and incentivized through the expansion of alternative sources of financing,** including crowdfunding and venture/angel capital that targets young female entrepreneurs. The creation of the Youth and Women Economic Empowerment Programme and the Women's Remuneration Support Fund in Burkina Faso are important policy examples whose impact must be evaluated. The peer-to-peer platforms in Kenya and Rwanda are highly welcomed in this area. The potential for diaspora-led capital transfers and equipment finance by Governments is vast, especially towards ensuring that entrepreneurs take the necessary steps in shifting to more productive sectors. There is a need to revise current regulatory frameworks by Central Banks to allow for innovative financing instruments to flourish and to reach those who were previously left behind.

- **Government regulation of the financial system with affirmative action can also help to tackle the financial exclusion of women.** As per regulatory requirements, 70 per cent of the portfolio of microfinance institutions is reserved for women in the Sudan. Among women's portfolio, 30 per cent are women in rural areas. Given that formal banks can easily fail necessity-driven entrepreneurs, microfinance institutions stand out as the main actor in supporting the transformation of women entrepreneurs. Microfinance institutions need support for their eventual growth into meso-finance along with the entrepreneurs they are supporting, whose needs are also expected to change. Public and private partnerships are encouraged to create initiatives for women's funds or to guarantee funds while at the same time consolidating the current schemes. For example, the National Credit Fund for Women and the National Fund for Promoting Women's Entrepreneurship in Senegal have been extending credit to women, reinforcing their managerial capacities and creating business incubators for their growth. Another best-practice from Rwanda is that those who apply for loans are covered up to 75 per cent with a government guarantee. Non-collateral loans are also extended to women in business in Zimbabwe. Nevertheless, both programmes are suffering from a low up-take of women which justifies an intensive outreach campaign. The government credit guarantee funds for women in Morocco is a good initiative for lowering women's financial exclusion.
  
- **For many women entrepreneurs, access to savings accounts with incentives can be more transformative than access to loans.** Having savings accounts can help women entrepreneurs to not only invest during booms but also survive during busts. Savings accounts with incentives can help in the following ways:
  - **Temporary incentives such as transient interest rate subsidies in savings accounts can enhance savings and investment.** Those who received the highest interest subsidy on their individual account were 11 percentage points more likely to be entrepreneurs in Kenya and had significantly more business profits and capital two and a half years after the subsidy ended (Dupas and Robinson, 2013). Commitment savings accounts are also increasingly used in Africa with positive results to boost savings;
  
  - **Digital technologies can help instil a habit of saving among women entrepreneurs.** Commitment savings accounts are also increasingly used in Africa with seemingly positive results in the short term. Nevertheless, the digital gender gap must be tackled to ensure that women can make efficient savings decisions;
  
  - **Offers for saving accounts must be complemented with financial training programmes to improve saving behaviour among women entrepreneurs.** A one-day financial training programme in South Africa had a significantly positive impact on the number of trainees who saved and their average amount of deposits. (Cole, and others, 2014). In rural Uganda, offering savings accounts with financial education had a large impact on savings relative to offering only a savings account: savings increased up to \$9 (Jamison, Karlan, and Zinman, 2014).

- **Access to insurance is critical for the survival and growth of women entrepreneurs in rural areas in the face of negative weather and price shocks.** Subscribing to insurance can have a positive effect on the investment behaviour of farmers. They can change the type of crop they produce, cut the middlemen out and move along the value chain as observed in Ghana (Karlan, and others, 2011). It is important however, that insurance products consider the farmers' willingness to pay and seasonal cash flow as observed in Kenya where sugarcane farmers opted in for insurance products which allowed post-harvest payments (Casaburi and Willis, 2018).
- **Legal provisions must be enacted to prohibit discrimination by creditors based on sex, gender and marital status in access to credit.** According to the Women, Business and the Law 2018 database (World Bank, 2018), there were only 10 countries in Africa where the law prohibits discrimination by creditors based on sex or gender in access to finance. These countries are Angola, Cabo Verde, the Democratic Republic of the Congo, Djibouti, Guinea, Mauritius, Morocco, South Africa, Zambia and Zimbabwe. Regarding discrimination based on marital status, the above countries also prohibit discrimination based on marital status, except for Angola, the Democratic Republic of the Congo and Zimbabwe.
- **Legal reforms to improve women's access to inheritance and property is critical in tackling the collateral requirements of the formal financial system.** While many countries in Africa have joint titling schemes, the extent to which such schemes truly empower women, especially in rural areas, is not well known. Default property regimes are increasingly valuing women's contributions, but women are often not aware of their rights. According to the Women, Business and the Law 2018 database, unmarried women and men have equal ownership rights to property in 52 countries in Africa, but only 42 countries ensure that married men and women have equal ownership rights. In 35 countries, sons and daughters have equal rights to inherit assets from their parents and in 34 countries, female and male surviving spouses have equal rights to inherit assets. In addition, widening the definition of collateral can help the banking sector to reach women, especially when movable assets of women entrepreneurs (particularly in rural areas) are recognized.

## Glossary

**Entrepreneurship:** The *Report* adopts the definition coined by the Global Entrepreneurship Monitor (GEM) which defines entrepreneurship as “any attempt at new business or new venture creation such as self-employment, a new business organization, or the expansion of an existing business, by an individual or a team of individuals or an established business”. GEM monitors entrepreneurs through their entrepreneurial life cycle from being a potential entrepreneur till activities are discontinued. [See www.gemconsortium.org/about/wiki](http://www.gemconsortium.org/about/wiki).

**Opportunity-driven entrepreneurship:** According to GEM, entrepreneurs who are motivated by opportunities they perceive and ultimately wish to increase their independence and income are engaged in opportunity-driven entrepreneurship.

**Necessity-driven entrepreneurship:** According to GEM, entrepreneurs who are pushed to entrepreneurship out of necessity and that they have no other choices for work or that they only wish to maintain their existing income, are engaged in necessity-driven entrepreneurship.

**Financial institution account:** According to the Global Financial Inclusion Database, financial institution accounts include accounts “at a bank or at another type of financial institution such as credit union, a microfinance institution, a cooperative, or the post office (if applicable or having a debit card in their own name. It includes an additional 3.93 per cent of respondents in 2017 who report receiving wages, government transfers, a public sector pension (included in 2017 data), or payments for agricultural products into a financial institution account in the past 12 months; paying utility bills or school fees from a financial institution account in the past 12 months; or receiving wages or government transfers into a card in the past 12 months.” Available at <https://globalfindex.worldbank.org/sites/globalfindex/files/databank/Glossary2017.pdf>.

**Mobile money account:** According to the Global Financial Inclusion Database, mobile money accounts represent “services included in the GSM Association’s Mobile Money for the Unbanked (GSMA MMU) database to pay bills or to send or receive money in the past 12 months. It also includes an additional 0.60 per cent of respondents in 2017 who report receiving wages, government transfers, a public sector pension (included in 2017 data), or payments for agricultural products through a mobile phone in the past 12 months.” Available at <https://globalfindex.worldbank.org/sites/globalfindex/files/databank/Glossary2017.pdf>.

**Women-owned business:** Firm ownership is defined on the basis of shareholdings. If women own more than 50 per cent of the shares of the firm, then it is considered a women-owned firm where women are the majority decision makers.

## Annex I

Table A.1

### Linking Sustainable Development Goals to women's entrepreneurship

Goals	Indicators	Links to women's entrepreneurship
<i>Goal 1: End poverty in all its forms everywhere</i>	<ul style="list-style-type: none"> <li>By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.</li> </ul>	<ul style="list-style-type: none"> <li>Women entrepreneurs lack physical and financial capital to engage in productive and innovative economic activities. There is also evidence of female-owned enterprises having lower access to basic services such as electricity and water. Transforming women entrepreneurs require significant advance over this Goal and indicator.</li> </ul>
<i>Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture</i>	<ul style="list-style-type: none"> <li>By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.</li> </ul>	<ul style="list-style-type: none"> <li>The majority of self-employed women in Africa are in subsistence farming working as contributing family workers. While they are not always entrepreneurs, they often diversify their activities to make a living. Improving their productive capacity could help such women to diversify their activities at higher nodes of the value chain.</li> </ul>
<i>Goal 3: Ensure healthy lives and promote well-being for all at all ages.</i>	<ul style="list-style-type: none"> <li>By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births.</li> <li>By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes.</li> </ul>	<ul style="list-style-type: none"> <li>Time poverty is a critical impediment behind female-entrepreneurs. Improving women's access to sexual and reproductive health services can ensure that women know about the health implications of early age at first pregnancy and minimal birth spacing. These health implications also have economic implications as time to be spent outside home for work gets under pressure.</li> </ul>
<i>Goal 4: Ensure inclusive and quality education for all and promote lifelong learning</i>	<ul style="list-style-type: none"> <li>By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education.</li> <li>By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.</li> <li>By 2030, substantially increase the number of young people and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.</li> <li>By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including</li> </ul>	<ul style="list-style-type: none"> <li>The longer children, boys and girls, stay at school, the more successful they become in the labour market in the future. Narrowing gender gaps in educational attainment starting from early childhood development is crucial for skill formation and human capital accumulation. Vocational training offers second chances to those who dropped out of school for one reason or another. In the absence of strong demand from the formal wage market, entrepreneurship is the main mode of economic activity for young people in their transition from school to work. Entrepreneurs need at least basic literacy and numeracy.</li> </ul>

	<p>persons with disabilities, indigenous peoples and children in vulnerable situations.</p> <ul style="list-style-type: none"> <li>• By 2030, ensure that all young people and a substantial proportion of adults, both men and women, achieve literacy and numeracy.</li> </ul>	<p>Their knowledge of business skills from early on is a major advantage. Consequently, narrowing gender gaps in educational attainment will improve women's labour market prospects, including the status of employment.</p>
<p><i>Goal 5: Achieve gender equality and empower all women and girls</i></p>	<ul style="list-style-type: none"> <li>• Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation.</li> <li>• Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.</li> <li>• Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.</li> <li>• Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences.</li> <li>• Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.</li> <li>• Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels.</li> </ul>	<ul style="list-style-type: none"> <li>• Boosting female entrepreneurship with an aim to make them transition to opportunity-driven entrepreneurship implies that women's earnings and capital will increase thereby improving women's bargaining power vis-à-vis their male partners or family members, and along their communities and societies. Equipped with economic and financial strength, women then can find it easier to be involved in leadership positions in political and economic domains.</li> <li>• Recognizing and valuing women's time poverty is crucial for women's success in the labour market, including self-employment.</li> <li>• Women's access to sexual and reproductive rights, particularly while they are young, is critical for skill formation, human capital accumulation and transition to quality employment.</li> <li>• Women's access to finance and land is much lower than men's access. This is a major disadvantage in competitive markets. Undertaking reforms in legal codes, which must be followed with successful implementation and enforcement, can help women to access a level playing field. There are still several laws with negative implications for women's access to economic opportunities.</li> </ul>
<p><i>Goal 8: Promote inclusive and sustainable economic growth, employment and decent work for all</i></p>	<ul style="list-style-type: none"> <li>• Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product (GDP) growth annually in the least developed countries.</li> <li>• Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.</li> </ul>	<ul style="list-style-type: none"> <li>• There is emerging evidence of the positive impact of gender equality on economic growth in Africa. There is also evidence for high opportunity costs associated with women's inactivity.</li> <li>• Boosting women's entrepreneurship could be defined by this second indicator. They need access to productive activities, create jobs for other women, engage in creative and innovative activities, especially in the formal sector.</li> </ul>

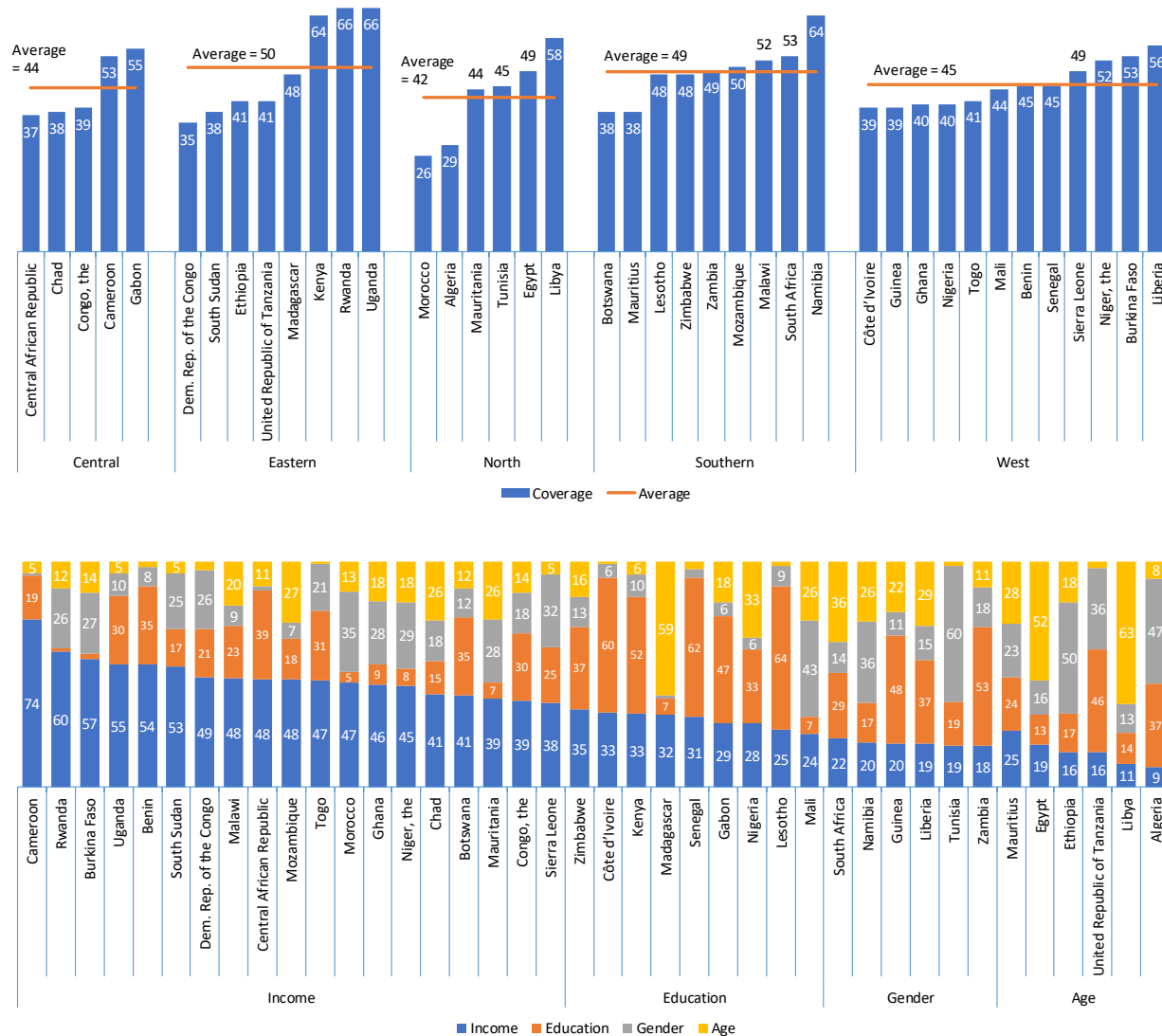
	<ul style="list-style-type: none"> <li>• By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.</li> <li>• By 2020, substantially reduce the proportion of young people not in employment, education or training.</li> <li>• Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.</li> <li>• Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all.</li> <li>• By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization.</li> </ul>	<ul style="list-style-type: none"> <li>• While gender gaps are not particularly large in Africa, excluding the North Africa, women are overrepresented among the vulnerably employed with lower wages, income, benefits and job security.</li> <li>• Young females are overrepresented in this indicator and their involvement in entrepreneurship could help to achieve this target.</li> <li>• Women face more occupational restrictions than men, which limits their access to economic opportunities.</li> <li>• Accessing financial services is critical for entrepreneurs. Female business owners, however, mainly report that they do not need any loans which is partly because they are in the service sector that doesn't bring high costs to asset purchases.</li> </ul>
<p><i>Goal 10: Reduce inequality within and among countries</i></p>	<ul style="list-style-type: none"> <li>• Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices, and promoting appropriate legislation, policies and action in this regard.</li> </ul>	<ul style="list-style-type: none"> <li>• Women business owners throughout Africa on average are married and over 30 years of age. Married women, however, are at a major disadvantage relative to married men in terms of rights for accessing economic opportunities.</li> </ul>
<p><b>Note:</b> For empirical evidence on these linkages, see the Report of the Secretary-General's High-Level Panel on Women's Economic Empowerment (United Nations, 2017); <i>ECA Female Economy at a Glance in Africa report</i> (ECA, 2017a); and <i>Women's Economic Empowerment in Africa: Boosting Female Entrepreneurship Report</i> (ECA, 2017b) prepared by the ACG. The subject matter of this research is directly relevant for Sustainable Development Goal 4 and Goal 8 as elaborated above.</p>		

Table A.2  
**List of countries analysed**

Algeria	Gabon	Namibia
Benin	Gambia	Niger
Botswana	Ghana	Nigeria
Burkina Faso	Guinea	Rwanda
Burundi	Kenya	Senegal
Cameroon	Lesotho	Sierra Leone
Central African Republic	Liberia	South Africa
Chad	Libya	South Sudan
Congo	Madagascar	Sudan
Democratic Republic of the Congo	Malawi	Togo
Côte d'Ivoire	Mali	Tunisia
Djibouti	Mauritania	Uganda
Egypt	Mauritius	United Republic of Tanzania
Eswatini	Morocco	Zambia
Ethiopia	Mozambique	Zimbabwe

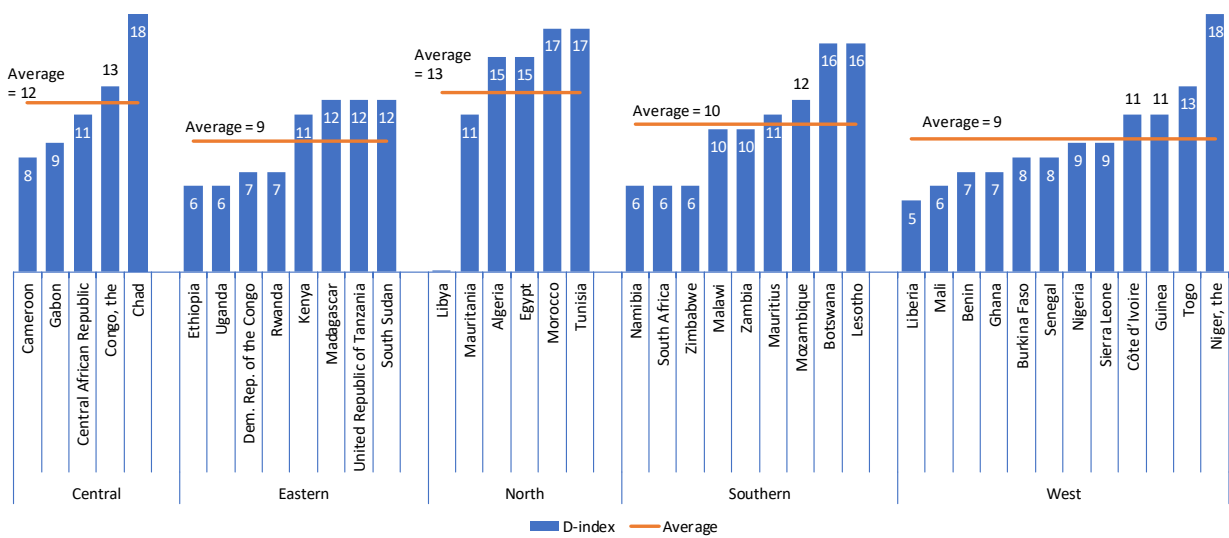
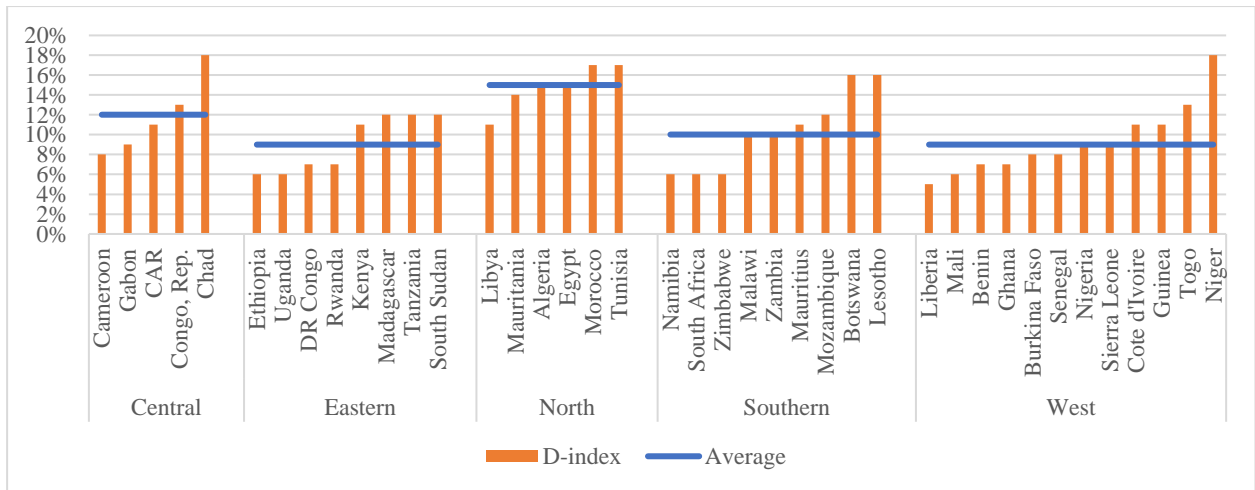
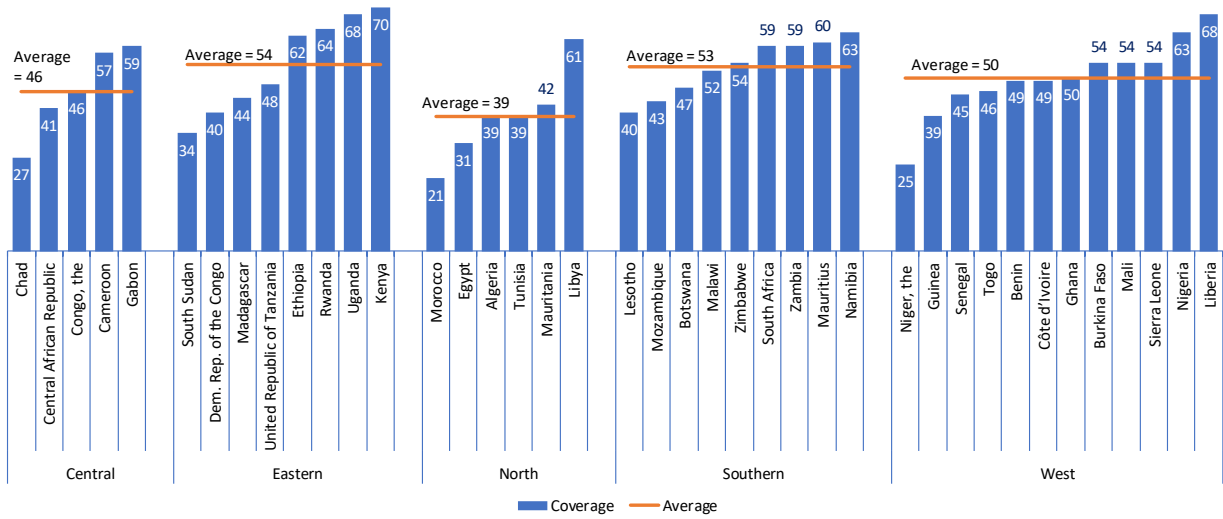


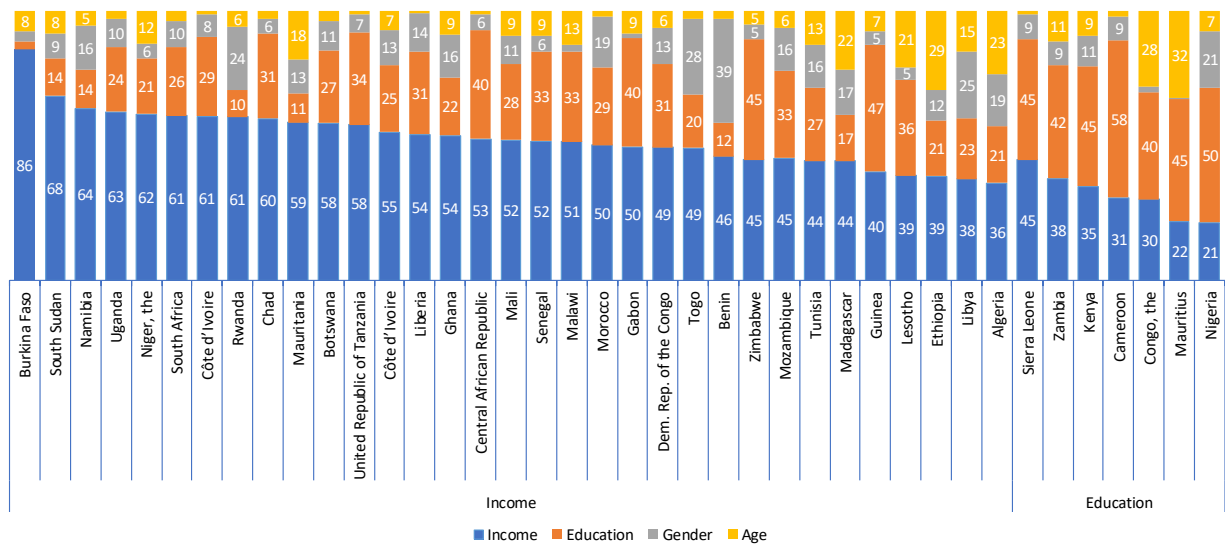
Figure A.I  
**Access and inequality: borrowed in the past year**



Source: ECA calculations based on the Global Findex Database (Washington, D.C., World Bank Group, 2017).

Figure A.II  
 Access and inequality: saved in the past year





Source: ECA calculations based on the Global Findex Database (Washington, D.C., World Bank Group, 2017).

## Annex II

### Methodology for D-index and Shapley decomposition

Estimating inequality of accessing any products or services requires a robust quantitative method that can help analyse large micro-level data containing information for individuals and households of the sample, ranked by living standards, beginning with the poorest, and ending with the richest (x-axis). Based on recent studies undertaken by international organizations such as the World Bank, the Asian Development Bank and the Economic and Social Commission for Asia and the Pacific, the Women's Entrepreneurship Report relies on the dissimilarity index (D-index) (Barros, Molinas, and Barros, 2008; Barros, and others, 2009). The comparative advantage of the D-index relative to the concentrative curve method is that it can be estimated based on several dimensions while the latter can be visualized on one dimension at a time.

The D-index compares average coverage rate of access to a service based on a nationally representative sample in a country, with the coverage rates of various circumstance groups in the same sample. These circumstance groups often reflect the main contours of inequality along socioeconomic characteristics of households and individuals, including location of residence, sex of the household head, the highest level of female educational attainment and household wealth. The D-index is therefore a measure of how dissimilar access rates are in each circumstance group relative to the national sample and ranges between 0 to 1 (or 0 per cent to 100 per cent). In case of perfect equality D-index equals 0, while in case of perfect inequality it is equal to 1. Qualitatively, the D-index measures the percentage of total available opportunities to be reallocated from better-off groups to worse-off groups to eliminate all differences across defined circumstance groups for perfect equality. For example, D-index being 10 per cent or 0.1 for opportunity Y in country A indicates that 10 per cent of all total available opportunities, say access to bank accounts or mobile money accounts, should be reallocated to eliminate dissimilarity among groups and to achieve equality. In other words, 10 per cent of all individuals with access to bank accounts need to be redistributed across circumstance groups to achieve equality. A different interpretation is that better-off and worse-off groups are 10 per cent above or below the national average of a specific opportunity.

Technically, estimating the D-index is straightforward with statistical software packages. Once the outcome variables are determined along with the circumstance groups, one can estimate the national coverage rates and the D-index along with a decomposition of circumstance groups representing the marginal/average contribution of each circumstance to inequality in accessing a specific opportunity. The process involves the estimation of the equation below in formal regression framework, where  $Y$  represents a limited dependent variable as a function of  $X$  representing the circumstance groups and  $Z$  representing a set of control variables conditioning comparability of outcomes across households and individuals.

$$Y = \Phi(X\beta + Z\gamma + \varepsilon) \quad (1)$$

Specifically,  $Y$  represents access to services (i.e., bank accounts, borrowing, saving or government contracts) that are equal to 1 if individuals have access to such a service and 0 otherwise.  $X$  is the vector of four circumstance groups as alluded to above including, sex, education, age and income level of the household.  $Z$  represents several control variables that ensure a healthy dose of comparability across households in the sample including the region of residence, location of residence (urban or rural) and household size. Lastly,  $\varepsilon$  represents unobserved household or individual characteristics. Given the limited nature of the dependent

variable, probit or logistic models are often employed. After estimating the above – estimation is undertaken with Stata 15.0 using the “hoishapley” command (Hoyos, 2013) – the formula below is used to compute the D-index for each access to health care proxy for a given country at a given time.

$$D = \frac{1}{2\pi} \sum_{i=1}^n \omega_i |\hat{\pi}_i - \bar{\pi}| \quad (2)$$

In the equation 2 above, D represents the dissimilarity index, n represents number of households in the sample,  $\omega_i$  represents the population weight for  $i^{\text{th}}$  household,  $\pi$  represents the coverage rate in terms of the proportion of the population with access to a given opportunity and  $\hat{\pi}_i$  represents the proportion of the group including the household i. The different groups are formed by the circumstances. While the D-index measures inequality between circumstance groups in accessing to products and services, it cannot inform which circumstance contributes exactly by how much to said inequality.

Shapley decomposition allows to resolve this problem and estimates the marginal/average contribution of each circumstance group to the observed inequality. It dates to Shorrocks (1999) in cooperate game theory literature, based on the Value for n-Persons Games introduced by Shapley (1953). It is undertaken based on variables stacked in  $\mathbf{X}$ , while controlling for variables stacked in  $\mathbf{Z}$ . The estimated Shapley contributions indicate in percentage terms the contribution of each four-circumstance group to observed inequality and satisfy the property of adding up to 100 per cent in explaining the D-index.

In order to determine the contribution of a circumstance A, we estimate at first the Shapley value  $Sh(A)$  of A that is the impact of adding a circumstance A and that is given by the sum of the differences between the D-index of possible combinations of sets including A and those not including A.

$$Sh(A) = \sum_{S \subset W \setminus A} \frac{s!(w-s-1)!}{w!} [D(S \cup A) - D(S)] \quad (3)$$

Where W is the set of circumstances, w the number of sets of circumstances, S is a subset of circumstances obtained after omitting the circumstance A and s is its cardinal.  $D(S)$  is the D-index estimated with the subset of circumstances S with equation (2).  $D(S \cup A)$  is the D-index estimated with the subset of circumstances S and the circumstance A. An alternative formula of the Shapley value  $Sh(A)$  of A is to consider S being a subset of all the circumstances (including A) and  $Sh(A)$  is given by:

$$Sh(A) = \sum_{S \subset W} \frac{(s-1)!(w-1)!}{w!} [D(S) - D(S \setminus A)] \quad (4)$$

Sastre and Trannoy (2002) showed that the equations (3) and (4) give the same values and the D-index D of the population is the sum of Shapley values of circumstances. Therefore, the Shapley contribution of the circumstance A in the D-index is:  $Sh(A)/D$ .

While Shapley decomposition combined with the D-index provides a useful visual on inequalities in access to services and opportunities in Africa by countries in the sample, it does not indicate statistical significance and magnitude of the results. Therefore, marginal effects estimated from Probit regressions are also included as the final step to ensure completeness of the analysis.

## Methodology for regression analysis

The Women's Entrepreneurship Report relies on a formal regression framework to estimate the gender gaps in all three questions raised. Depending on the question and also the nature of the left-hand side outcome variable, ordinary least squares and probit models are employed.

### 1. Does education influence prevalence and motivation behind entrepreneurship? Are there any gendered differences in this relationship?

There are three sets of questions explored in this section. Firstly, does education affect the probability of being an entrepreneur and if so are there evidence for gender differentials? Secondly, does education affect the motivation behind entrepreneurship and if so are there gender differentials? Thirdly, probing into the potential channel of how education may influence motivation and probability of being an entrepreneur, does education influence entrepreneurial attitudes and if so are there gender differentials? All three sets of questions are empirically analysed using Adult Population Surveys collected by the Global Entrepreneurship Monitor (GEM) Consortium. The focus period is 2015–2017 for two reasons: this period is more up-to-date than previous years; and, several control variables are found in this later period compared with earlier periods such as respondents' location of residence and region of residence. Omitting such variables could bias the results. The sample includes more than 20,000 adults from eight African countries. All three questions are measured by proxies that take binary form in the sense that they equal 1 for an affirmative answer and 0 otherwise. As such, the probit model is employed to estimate the equation below:

$$Y_{ij} = \alpha + \beta_1 \text{gender}_{ij} + \beta_2 \text{education}_{ij} + \beta_3 \text{gender}_{ij} \times \text{education} + \beta \mathbf{X}_{ij} + \mu_i + \varepsilon_{ij}$$

Where  $Y_{ij}$  represents entrepreneurial indicators including a binary variable that equals 1 for entrepreneurs and 0 otherwise; motivation of entrepreneurs measured in three forms, specifically opportunity-driven, necessity-driven and both motivations; entrepreneurial attitudes are measured by four proxies, including knowing personally other entrepreneurs, identifying opportunities to start a business, knowledge skill and experience to start a business, and whether fear of failure would prevent them from starting a business. While the sample consisting of all adults with a response to these questions, the motivational questions are only answered by existing entrepreneurs. Each proxy equals 1 if the respondent has an affirmative answer and 0 otherwise. Gender represents the sex of the respondent and equals 1 for women and 0 for men. Education represents educational attainment in four categories: no education; completion of primary education and some secondary education; completion of secondary education; and completion of post-secondary education or more. In order to avoid multicollinearity, the education variable enters with three dummy variables leaving no education or less as the base category. The interaction term between gender and education allow the estimation of the differential impact of gender with education on entrepreneurship. The coefficient of gender in equation above therefore represents the effect of being a woman and having no education on a particular proxy for entrepreneurship. The coefficients on education variables measure the impact of being a man and having completed primary, secondary or tertiary education on financial inclusion. For women with secondary and tertiary education, all relevant coefficients,  $\beta_1$ – $\beta_3$ , are combined.  $\mathbf{X}$  represents a vector of control variables, including age of the respondent, age squared to capture the non-linearity, income quintile of the household, household size, region of residence (see tables A.3 and A.4). Country and year dummies are also included in the equation.

Table A.3  
**Marginal effects from probit regression on education-entrepreneurship nexus**

	<i>Entrepreneur</i>	<i>Motivated by opportunity</i>	<i>Motivated by necessity</i>	<i>Motivated by both opportunity and necessity</i>
Women	-0.0845*** (0.0123)	-0.0767*** (0.0215)	0.0693*** (0.0190)	-0.0026 (0.0183)
No education	0.0441*** (0.0154)	-0.0881*** (0.0293)	0.1480*** (0.0295)	-0.0536** (0.0247)
Primary education	0.0317** (0.0154)	-0.0940*** (0.0288)	0.1272*** (0.0300)	-0.0210 (0.0244)
Secondary education	-0.0376** (0.0154)			
Tertiary education		0.1082*** (0.0320)	-0.0432 (0.0307)	-0.0659** (0.0263)
Women x no education	0.0089 (0.0186)	0.0277 (0.0337)	-0.0221 (0.0297)	0.0058 (0.0283)
Women x primary education	0.0025 (0.0209)	0.0646 (0.0411)	0.0104 (0.0384)	-0.0562* (0.0335)
Women x secondary education	-0.0619*** (0.0200)	-0.0447 (0.0435)	-0.0173 (0.0402)	0.0825** (0.0415)
Age	0.0300*** (0.0019)	-0.0073** (0.0032)	0.0002 (0.0030)	0.0064** (0.0027)
Age squared	-0.0003*** (0.0000)	0.0001** (0.0000)	-0.0000 (0.0000)	-0.0001** (0.0000)
Household size	0.0026*** (0.0009)	-0.0031** (0.0015)	0.0012 (0.0013)	0.0020 (0.0012)
Household income Q1	-0.1187*** (0.0096)	-0.0434** (0.0182)	0.0901*** (0.0165)	-0.0491*** (0.0152)
Household income Q2	-0.0516*** (0.0093)			
Household income Q3		0.1187*** (0.0177)	-0.0910*** (0.0162)	-0.0275* (0.0148)
Observations	15 954	5 690	5 690	5 690

*Note:* Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A.4

**Marginal effects from probit regression on education and entrepreneurial attitudes**

	<i>Know someone personally who started a business in the past 2 years</i>	<i>Will there be good opportunities for starting a business in the next 6 months</i>	<i>Do you have the knowledge, skill and experience required to start a new business?</i>	<i>Would fear of failure prevent you from starting a business?</i>
Women	-0.0791*** (0.0150)	-0.0589*** (0.0161)	-0.1313*** (0.0147)	0.0774*** (0.0142)
No education			-0.0545*** (0.0182)	-0.0137 (0.0168)
Primary education	0.0692*** (0.0176)	0.0785*** (0.0186)	-0.0501*** (0.0175)	0.0282* (0.0164)
Secondary education	0.0998*** (0.0184)	0.0989*** (0.0192)	-0.0472*** (0.0174)	-0.0186 (0.0164)
Tertiary education	0.1659*** (0.0186)	0.1011*** (0.0192)		
Women x no education	-0.0086 (0.0222)	-0.0032 (0.0237)	0.0445** (0.0208)	-0.0432** (0.0200)
Women x primary education	0.0163 (0.0230)	-0.0112 (0.0244)	0.0297 (0.0216)	-0.0109 (0.0214)
Women x secondary education	-0.0262 (0.0239)	-0.0113 (0.0251)	0.0033 (0.0226)	0.0154 (0.0220)
Age	0.0140*** (0.0018)	0.0096*** (0.0019)	0.0230*** (0.0018)	-0.0017 (0.0015)
Age squared	-0.0002*** (0.0000)	-0.0001*** (0.0000)	-0.0003*** (0.0000)	0.0000 (0.0000)
Household size	0.0017 (0.0011)	0.0010 (0.0011)	-0.0009 (0.0011)	0.0009 (0.0010)
Household income Q1	-0.0690*** (0.0113)	-0.0177 (0.0113)	-0.1130*** (0.0109)	0.0337*** (0.0099)
Household income Q2	-0.0351*** (0.0109)		-0.0487*** (0.0105)	
Household income Q3		-0.0045 (0.0116)		-0.0027 (0.0101)
Observations	15 929	13 893	15 827	15 716

*Note:* Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



## 2. Does education help improve access to finance? Are there any gendered differentials in this relationship?

Given that all outcome variables that measure financial inclusion are measured in binary form, the empirical strategy is based on estimation of the below equation with probit model and then computing the marginal effects for interpretation.

$$Y_{ij} = \alpha + \beta_1 \text{gender}_{ij} + \beta_2 \text{education}_{ij} + \beta_3 \text{gender}_{ij} \times \text{education} + \beta \mathbf{X}_{ij} + \mu_i + \varepsilon_{ij}$$

Where  $Y_{ij}$  represents financial inclusion, indicators including account ownership at financial institutions, saving in the last 12 months, borrowing in the last 12 months, saving for business purposes, saving at financial institutions, saving at informal savings clubs, borrowing for business purposes, borrowing from financial institutions, borrowing from family and friends and borrowing from informal savings clubs. Each proxy equals 1 if the respondent has an affirmative answer and 0 otherwise. Gender represents the sex of the respondent and equals 1 for women and 0 for men. Education represents educational attainment in three categories: completion of primary education or less, completion of secondary and completion of tertiary education or more. In order to avoid multicollinearity, education variable enters with two dummy variables for completion of secondary and tertiary education leaving the completion of primary education or less as the base category. The interaction term between gender and education allows for the estimation of the differential impact of gender with education on financial inclusion. The coefficient of gender therefore represents the effect of being a woman and having completed primary education or less on a particular proxy for financial inclusion. The coefficient on education measures the impact of being a man and having completed secondary or tertiary education on financial inclusion. For women with secondary and tertiary education, all relevant coefficients,  $\beta_1 - \beta_3$ , are combined.  $\mathbf{X}$  represents a vector of control variables including age of the respondent, age squared to capture the non-linearity, income quintile of the household, status of labour force participation and ownership of mobile phone. Country dummies are included in the equation as well (see table A.5). All data are from 2017. Unfortunately, location of residence and region of residence within the country are not available in the data set.

Table A.5  
Regression results on gender, education and access to finance

<b>Panel A. Account ownership, savings, gender and education</b>						
	<i>Owns</i>	<i>Saved in</i>	<i>Saved for</i>	<i>Saved at</i>	<i>Saved at</i>	
	<i>account at</i>	<i>the last 12</i>	<i>business</i>	<i>financial</i>	<i>informal</i>	
	<i>financial</i>	<i>months</i>		<i>institution</i>	<i>savings clubs</i>	
	<i>institution</i>					
Gender	-0.0735*** (0.0078)	0.0148** (0.0073)	-0.0509*** (0.0107)	-0.0511*** (0.0105)	0.1545*** (0.0111)	
Completed secondary educated	0.1852*** (0.0083)	0.0945*** (0.0081)	-0.0291*** (0.0108)	0.0938*** (0.0098)	-0.0125 (0.0116)	
Completed tertiary education	0.4051*** (0.0154)	0.2017*** (0.0144)	-0.0087 (0.0172)	0.2541*** (0.0171)	-0.0904*** (0.0203)	
Gender X completed SE	0.0153 (0.0111)	-0.0093 (0.0107)	-0.0035 (0.0144)	0.0075 (0.0135)	-0.0392*** (0.0152)	
Gender X completed TE	-0.0422* (0.0240)	-0.0357 (0.0218)	-0.0021 (0.0256)	0.0444** (0.0225)	-0.0094 (0.0306)	

Age	0.0104*** (0.0008)	0.0062*** (0.0008)	0.0042*** (0.0012)	0.0068*** (0.0010)	0.0096*** (0.0012)
Age squared	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
Income - second 20%	0.0642*** (0.0096)	0.0572*** (0.0088)	-0.0019 (0.0133)	0.0291** (0.0135)	0.0063 (0.0141)
Income - middle 20%	0.0942*** (0.0094)	0.0818*** (0.0086)	0.0121 (0.0129)	0.0449*** (0.0131)	0.0028 (0.0137)
Income - fourth 20%	0.1359*** (0.0091)	0.1313*** (0.0084)	0.0145 (0.0124)	0.0977*** (0.0127)	0.0072 (0.0132)
Income - richest 20%	0.2381*** (0.0089)	0.2044*** (0.0083)	0.0432*** (0.0121)	0.1768*** (0.0122)	-0.0312** (0.0129)
Labour force participation	0.1318*** (0.0061)	0.1736*** (0.0057)	0.1676*** (0.0084)	0.0509*** (0.0076)	0.0569*** (0.0090)
Mobile phone ownership	0.2547*** (0.0066)	0.1320*** (0.0063)	0.0596*** (0.0092)	0.1033*** (0.0087)	-0.0018 (0.0097)
Observations	43 564	43 564	21 396	21 400	20 082

**Panel B: Borrowing patterns, gender and education**

	<i>Borrowed in the last 12 months</i>	<i>Borrowed for business</i>	<i>Borrowed from a financial institution</i>	<i>Borrower from family and friends</i>	<i>Borrowed from an informal savings club</i>
Gender	-0.0057 (0.0071)	-0.0049 (0.0084)	-0.0014 (0.0076)	-0.0257** (0.0102)	0.0553*** (0.0191)
Completed secondary educated	0.0499*** (0.0078)	-0.0197** (0.0088)	0.0499*** (0.0077)	-0.0172 (0.0109)	0.0101 (0.0208)
Completed tertiary education	0.0842*** (0.0140)	-0.0199 (0.0150)	0.1340*** (0.0147)	-0.0601*** (0.0186)	-0.0514 (0.0418)
Gender X completed SE	-0.0331*** (0.0103)	-0.0111 (0.0119)	-0.0131 (0.0101)	-0.0078 (0.0145)	-0.0358 (0.0266)
Gender X completed TE	-0.0046 (0.0207)	-0.0103 (0.0234)	-0.0269* (0.0163)	0.0165 (0.0267)	0.0188 (0.0573)
Age	0.0083*** (0.0008)	0.0058*** (0.0010)	0.0091*** (0.0009)	-0.0070*** (0.0011)	0.0060*** (0.0021)
Age squared	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	0.0001*** (0.0000)	-0.0000* (0.0000)
Income - second 20%	0.0281*** (0.0085)	-0.0103 (0.0102)	0.0084 (0.0096)	0.0015 (0.0123)	-0.0249 (0.0242)
Income - middle 20%	0.0331*** (0.0084)	-0.0155 (0.0100)	0.0202** (0.0094)	0.0028 (0.0120)	-0.0398* (0.0239)
Income - fourth 20%	0.0408*** (0.0082)	-0.0017 (0.0098)	0.0445*** (0.0093)	-0.0086 (0.0118)	-0.0128 (0.0229)
Income - richest 20%	0.0345*** (0.0081)	0.0135 (0.0098)	0.0695*** (0.0091)	-0.0422*** (0.0117)	-0.0480** (0.0227)
Labour force participation	0.1245*** (0.0056)	0.0908*** (0.0069)	0.0350*** (0.0059)	-0.0019 (0.0083)	0.0309* (0.0168)
Mobile phone ownership	0.0706***	0.0274***	0.0368***	-0.0072	0.0001

	(0.0061)	(0.0072)	(0.0064)	(0.0088)	(0.0165)
Observations	43 564	19 887	19 858	19 904	6 476

Notes: Robust standard errors in parentheses, country dummies are not shown due to space brevity, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

### 3. Does finance help firms to pursue opportunities and improve their productivity. Are there any gendered differences in this relationship?

The sample includes only formal enterprises in urban non-agricultural economy that employ at least five employees and thus leaving out microenterprises and firms of all sizes in rural, agricultural and informal economies. Depending on the nature of the left-hand side outcome variable, ordinary least squares or probit models are used to estimate the below equation with robust standard errors.

$$\theta_{ij} = \alpha + \beta_1 \text{gender}_{ij} + \beta_2 \text{financial\_constraint}_{ij} + \beta_3 \text{gender}_{ij} \times \text{financial\_constraint}_{ij} + \beta \mathbf{X}_{ij} + \mu_i + \varepsilon_{ij}, \quad (1)$$

Where  $\theta_{ij}$  represents firm performance and access to opportunity indicators in country  $i$  and firm  $j$  measured either as continuous variables (1) or binary variables (2). Annual average employment growth, annual real sales growth, capacity utilization and number of weekly operating hours constitute the first set with continuous variables. Product innovation, process innovation, use of information and communication technologies and having secured or attempted government contracts are measured as binary variables. While the ordinary least squares model is employed for the continuous variables, the probit model is employed for the binary variables as the former estimator yields inconsistent estimates with limited dependent variables. Following probit estimations, marginal effects are estimated and presented. *Gender* is a dummy variable that equals 1 if largest owner of the firm is a female and 0 otherwise; *financial constraint* represents the subjective measure of access to finance and equals 1 if access to finance is a major or severe constraint and zero otherwise (see table A.6). The interaction term between gender and financial constraint allows for the estimation of the differential impact of financial constraint by owner of the firm. For example, when gender equals 0, the variable gender and the interaction term drops out leaving only the coefficient of the financial constraint to be estimated which represents the firms that are owned by men who report access to finance as a major or severe constraint.  $\mathbf{X}$  is a matrix of standard control variables for firm-level analysis, including age, size and industry of firms, exporting status of firms and region and asset purchase status of firms. Country and year dummies are also included in the equation. This baseline regression equation is estimated both at regional level (with firms from all 35 countries merged into one sample) and at the country level (in which case country dummies are not used but year dummies are still kept due to the possibility of multi-year sampling).

Table A.6  
Regression results for finance, gender and productivity

	<i>Sales growth</i>	<i>Employment growth</i>	<i>Capacity utilization</i>	<i>Hours</i>
Gender	17.310* (10.186)	7.517** (3.350)	0.399 (1.421)	-4.560*** (1.668)
Financial constraint	5.985 (4.941)	1.270 (1.661)	-2.703*** (0.670)	-3.769*** (0.941)
Gender x financial constraint	-7.391	-7.402	3.272	4.556*

	(15.480)	(4.790)	(2.124)	(2.714)
Observations	11 598	14 680	6 370	7 181
Adjusted R-squared	0.102	0.067	0.111	0.100
	<i>Product innovation</i>	<i>Process innovation</i>	<i>Government contracts</i>	<i>ICT</i>
Gender	0.058*** (0.019)	0.005 (0.016)	-0.033** (0.014)	-0.035* (0.019)
Financial constraint	0.022** (0.010)	-0.006 (0.008)	0.027*** (0.007)	-0.039*** (0.010)
Gender x financial constraint	-0.072*** (0.028)	-0.030 (0.024)	0.024 (0.023)	-0.005 (0.030)
Observations	14 647	14 603	14 920	14 531
Pseudo R-squared	0.142	0.154	0.097	0.268

*Note:* Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

This empirical inquiry with the simplest quantitative methods is only the first stage of inquiry into the relationship between gender, access to finance and firm productivity and access to opportunities in Africa. Identifying a causal relationship with ES is beyond the scope of this report as it is unlikely that any valid instrumental variable can be found among the indicators to capture the exogenous variation in financial constraint proxies across firms and countries. Evaluation of exogenous policy changes in African countries, with respect to financial inclusion, may offer a way forward in capturing the causal effect of corruption on firm performance with a gender dimension. Future work will identify such policy changes, if any, and estimate the relationship at the country level.

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