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Explaining the Gender Gap in Profits among Entrepreneurs in Malawi

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ABSTRACT

In this paper, we utilize decomposition methods to document the extent and drivers of the performance gap in Malawi between firms with a female owner and firms with a male owner. We find that, on average, male-owned businesses in Malawi earn profits more than double (120%) those of female-owned businesses. We use Kitagawa-Oaxaca-Blinder (KOB) mean-decomposition techniques and recentered influence function (RIF) regressions applied along the earnings distribution, coupled with data from a novel multi-topic household survey rich in details about entrepreneurship, to identify what proportion of the gender gap in business profits can be attributed to: (i) differences in average characteristics of profit-generating factors (composition effect) and (ii) gender differences in the returns to these factors (structure effect). We find that 59.8% of the mean gender gap is explained by gender differences in the levels of observable attributes, with the remaining 40.2% attributable to the lower returns to observable attributes obtained by female owners, i.e., female structural disadvantage. The composition effect is primarily driven by female owners' role as the primary caregiver in most households and a lack of capital. The female structural disadvantage can largely be attributed to female owners' heightened perception of sexual hostility in the work environment and non-cognitive skills related to entrepreneurship (perseverance in challenging tasks and environments, optimism, and passion for work). When looking along the distribution, capital stock appears to be a primary driver of the composition effect except in the bottom quintile of firms. In contrast, caregiving responsibilities are a driver of the composition effect in the bottom three quintiles only. Differences in the returns to capital appear to be a very significant driver of the female structural disadvantage in the bottom quintile.

Keywords: gender, business productivity, Malawi

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INTRODUCTION

Owning a small business is a common form of employment in sub-Saharan Africa (SSA), particularly for women. Approximately 42% of the non-agricultural labor force in SSA is classified as self-employed or employers (Campos et al. 2019; Campos and Gassier 2017), and approximately 21.8% of working-age women in SSA are in the process of starting or running new businesses, which is the highest rate in the world (Elam et al. 2019). Yet, female entrepreneurs in SSA, and globally, consistently earn lower profits than men and often lack the resources to grow their businesses beyond home-based, small-scale subsistence operations (Kevane and Wydick 2001; Fox and Sohnesen 2012; Gindling and Newhouse 2013; Nix, Gamberoni and Heath 2016).

For countries seeking to maximize the potential of female entrepreneurs, a central question is why female-owned businesses underperform relative to male-owned businesses. In this paper, we draw on newly collected individual- and household-level data in Malawi to better understand the constraints faced by female entrepreneurs. Our analysis aims to identify the key factors that contribute to the gender gap in business profits using a Kitagawa-Oaxaca-Blinder (KOB) decomposition approach and novel data on entrepreneurial attitudes, business practices, health and disability, and sexual hostility, which have not been included in previous studies that aim to decompose gender gaps in earnings. We also present results from recentered influence function (RIF) regressions that analyze differences at different points in the distribution of earnings, originally developed by Firpo, Fortin, and Lemieux (2009; 2018).

There are several key findings from our analysis. We find that, consistent with previous studies, on average, male-owned businesses in Malawi earn profits more than double (120%) those of female owned-businesses. Mean decomposition of the gap reveals that 59.8% of the mean gender gap is explained by gender differences in the levels of observable attributes, with the remaining 40.2% attributable to the lower returns to observable attributes obtained by female owners, i.e., female structural disadvantage. Our analysis points to women's role as the primary caregiver in most households and women's lack of capital as the primary drivers of the composition effect on average, and perceptions of

sexual hostility in the work environment and differences in the levels of non-cognitive skills related to entrepreneurship as primary drivers of the female structural disadvantage on average.

When using RIF methods to examine differences along the distribution of earnings, we find that caregiving responsibilities drive the composition effect for women in the first three quintiles of the earnings distribution but not for those in the top two quintiles of the earnings distribution. In contrast, capital stock plays a stronger role in the composition effect for the top four quintiles of the distribution than for the bottom quintile. Differences in the returns to capital appear to be a significant driver of the female structural disadvantage in the bottom quintile. The effects on the female structural disadvantage associated with sexual hostility and entrepreneurial attitudes do not display consistent patterns by income.

A broad literature exists on gender differentials in self-employment income. Among these studies, several have utilized decomposition approaches (e.g., Nix, Gamberoni, and Heath 2016; Campos et al. 2019). Yet, relatively little is known about the factors that contribute to the gender profit gap. The majority of gender profit gap cannot be explained by observed characteristics, such as industry and owners' marital status, age, education, number of children, and hours worked (Nix, Gamberoni, and Heath 2016). Rather, existing evidence strongly suggests that structural constraints, mostly related to returns to capital, are the driving force behind the gender profit gap (Mel, Mckenzie, and Woodruff 2009; Fafchamps et al. 2014; Dupas and Robinson 2013), although Bernhardt et al (2020) suggest that intrahousehold resource allocation and women's investment in male-owned businesses and related measurement issues may explain this conclusion. Our work broadly supports this conclusion for women higher in the income distribution, although it suggests for the poorest female entrepreneurs, increasing capital stock may not lead to improved outcomes due to large differentials between men and women in the return to capital.

We contribute to this literature by broadening the scope of analysis to include additional structural constraints related to returns to human capital. Potential constraints to female entrepreneurship, such as sexual hostility in the work environment and, to a lesser extent, non-cognitive skills, have not received much attention in the economics literature on this topic, likely due to a lack of available or

appropriate data. In contrast, our work concludes that these factors are among the most significant contributors to differentials in profits.

The rest of the paper is organized as follows. Section 2 presents an overview of the project and country contexts. Section 3 describes the survey and data. Sections 4 and 5 discuss the mean decomposition methodology, the recentered influence function methodology and the results from the mean decomposition and RIF analysis, respectively. Section 6 offers concluding remarks and expands on the policy implications of our findings.

BACKGROUND

Potential drivers of the gender profit gap

The conceptual framework for this study is informed by a policy exercise conducted by the Millennium Challenge Cooperation's (MCC's) Economic Analysis and Gender and Social Inclusion practice groups. This exercise is grounded in the use of growth constraints diagnostics, which are based largely on seminal work by Hausmann, Rodrik, and Velasco (2008) (HRV) and commonly used by development organizations, such as MCC, to identify 'binding' constraints to economic growth within a particular economy and prioritize policy reforms to ease those constraints. Growth diagnostics have been carried out for a wide range of countries around the world. Yet, despite the presence of deep-rooted gender inequalities within societies, gender is largely absent from the discussion in these diagnostics—a fact that is striking given the large and growing body of research that demonstrates how gender inequality can inhibit economic growth (Roncolato, Reksten, and Grown 2017; Revenga and Dooley 2020; World Bank 2012).

Background work by MCC led to the development of a HRV-inspired heuristic tool to describe the gendered nature of unequal access to entrepreneurial opportunities (see Figure 1). The premise of this framing is that if gender-based barriers are not identified and addressed, interventions to mitigate the binding constraints as defined in a growth diagnostic will have limited impact (Ianchovichina and Leipziger 2019; Roncolato et al. 2017; Seguino and Were 2014). Although gender-based barriers could exist for any gender, because women typically have lower returns to entrepreneurship, these nodes describe barriers faced by women. The nodes span social norms, policies, and conditions, as well as both formal and informal institutions. They are organized in three branches: low appropriability of returns to investment, discriminatory access to inputs due to laws and/or norms, and unequal preparation for becoming an entrepreneur.

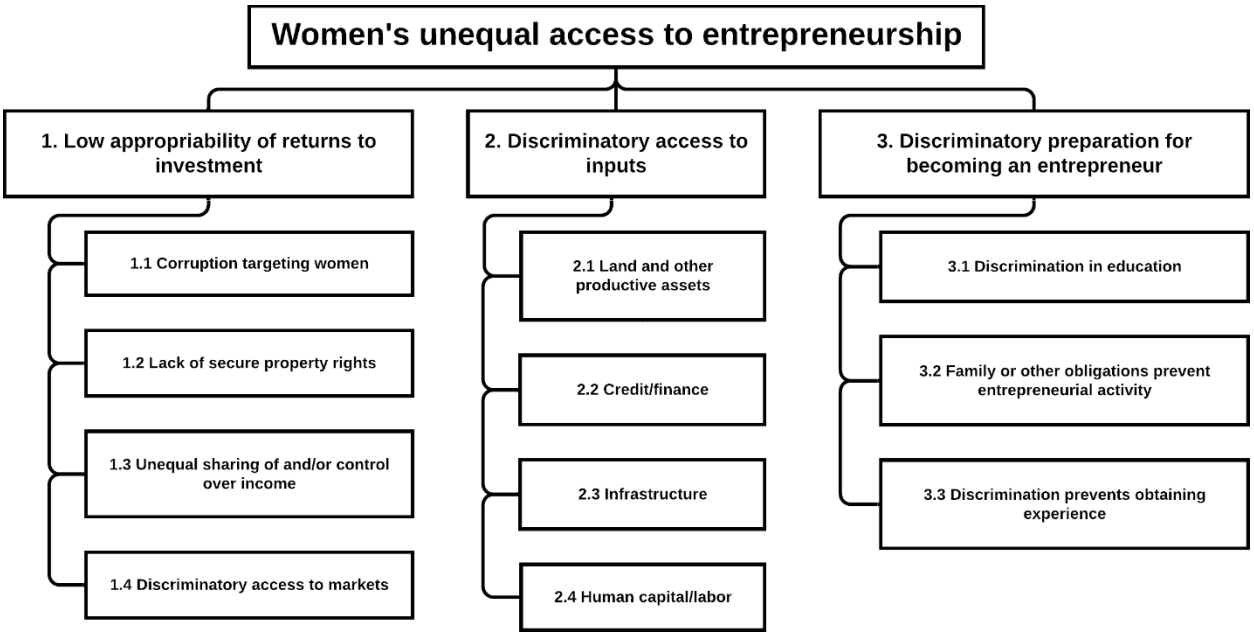

Figure 1. Decision tree framework for women's unequal access to entrepreneurship

The first branch addresses the low appropriability of returns to investments made by women in their businesses. The consequences of these lower returns may mean that women are also less to start business if they expect poor returns. The affiliated nodes address corruption that targets women, such as for tax collection, business licensing, and the unequal enforcement of other regulations (Galie et al, under review); the lack of secure property rights over land, machinery, and vehicles (Islam et al. 2018); the unequal sharing of and/or control over income within the family or community; and discriminatory access to markets and/or unequal prices for goods. Limited access to goods or markets may occur as a consequence of women's limited freedom of movement (Gekoski et al. 2017; Heckert et al 2020).

The second branch covers discriminatory access to inputs due to laws and social norms (Gonzales et al. 2015). The contributing factors include women's lower levels of ownership of land and other productive assets (Kilic et al. 2015; Doss, Kovarik, Peterman, Quisumbing, & van den Bold, 2015; World Bank 2018); access to finance for investments and working capital (Aggarwal and Klapper, 2013); and limited or more costly access to infrastructure, such as electricity, water, transportation, and information and communication technology (Islam et al. 2018)

The final branch covers discriminatory preparation for becoming an entrepreneur. This branch encompasses discrimination in the education system, which may manifest as lower educational attainment

or training that is potentially less applicable to entrepreneurship; family and related obligations that may inhibit entrepreneurship, for example, from the impact of care responsibilities on women's productivity (Donald et al. 2018; Seguino and Were 2014); and discrimination that prevents obtaining needed experience, developing social networks, and having the opportunity to learn from others. Some ways that this node may manifest include experiences or expectations of sexual harassment or hostility in the working environment (Heckert et al 2020) and the development non-cognitive skills, such as entrepreneurial mindset or personal initiative, which may affect entrepreneurial success and account for gaps in productivity, performance or profits (Campos et al. 2017, Campos et al. 2018, Frese 2009).

Project context

The MCC is currently working with the International Food Policy Research Institute (IFPRI) and others to improve the integration of gender into their constraints analysis framework, a diagnostic approach based on HRV that aims to identify key problems within a country that constrain private investment by firms and individuals and thus limit opportunities for economic growth and poverty reduction. As part of this effort, IFPRI designed and piloted (in Malawi) a flexible diagnostic survey to identify potential constraints to women's access to employment and entrepreneurship opportunities. This study, which looks specifically at constraints to entrepreneurship, represents a key output of this engagement.

Country context

Malawi, shown in Figure 2, is a population-dense, land-locked country in Southern Africa, covering 94,552 square kilometers. The 2018 population and annual population growth rate stand at 17.5 million persons and 2.9%, respectively, and 84% of the population reside in rural areas (Malawi National Statistical Office 2018). It is one of the poorest countries in the world. Based on the data from the Third Integrated Household Survey (IHS3) 2010–11 and Fourth Integrated Household Survey (IHS4) 2016–17, the national poverty rate remains steady at 50.7% in 2010–11 and 51.5% in 2016–17. Rural poverty, however, appears to have risen over the same period: from 56.6% in 2010–11 to 59.5% 2016–17. As of 2019, Malawi ranks low in UNDP's Human Development Index and Gender Inequality Index, 172 out of 189 and 149 out of 162 countries, respectively (UNDP 2019).

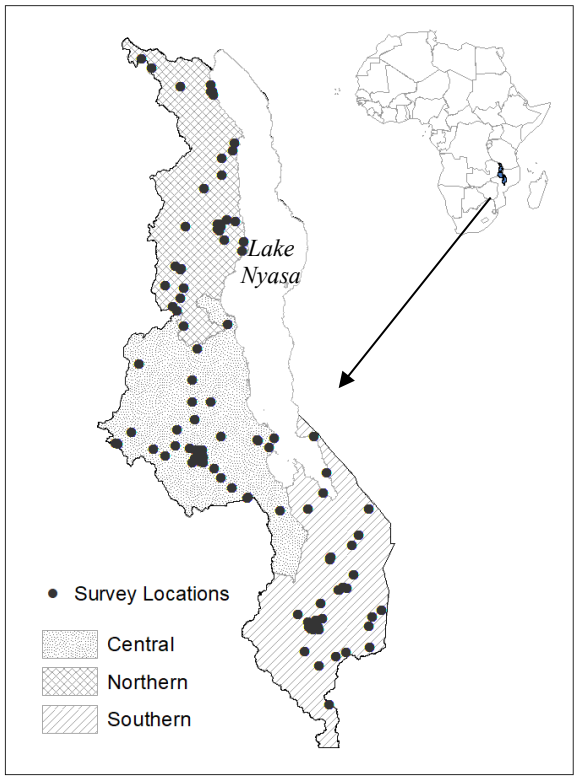

Figure 2. Map of Malawi & survey locations

Agriculture is the backbone of Malawi's economy. The sector accounts for 26% of the Gross Domestic Product (GDP), and 83% of Malawian households engage in agricultural activities (World Bank 2019; Malawi National Statistical Office 2017). In Malawi, as in other parts of SSA, it is common for households to benefit from multiple incomes streams, e.g., farming plus a non-farm business (Asfaw et al. 2019). According to IHS4 data, 27% of Malawian households operate a non-farm business, most prevalently in urban areas (45% in urban vs. 23% in rural areas) and predominantly in male-headed households (30% of male-headed households vs. 21% of female-headed households operate a non-farm business). From an individual-level perspective, our data paints a similar overall picture of entrepreneurship in Malawi but differs in terms of gender. Overall, we find that 26.8% of individuals in our sample operate a non-farm business, 55% of whom are women.

DATA

Survey design

The survey questionnaire was designed to collect information on the experiences of and constraints to employment and entrepreneurship among men and women of working age (18-54 years old) that could explain the gender profit gap. It was designed based on the factors in the conceptual framework presented above that could be examined using a within country study design and addressed in household and individual surveys.[1] It included both a household-level interview, which aims to capture a core set of information (e.g., household roster, housing conditions) necessary for establishing context for analyzing the data, and sex-disaggregated individual interviews, which aims to capture specific information related to individuals' employment and entrepreneurship opportunities.

Sampling strategy

The sampling strategy for the survey was largely motivated by three concerns. First, understanding how women's constraints to employment and entrepreneurship opportunities compare to those constraints facing men is essential to identifying strategies for effectively overcoming these constraints. Second, the constraints facing women in Malawi are likely to differ drastically between rural and urban environments and regionally; the latter due in part to variation in kinship systems, which are more commonly patrilineal in the north and matrilineal in the south (Berge et al. 2014). Third, studying the constraints to women's participation in employment and entrepreneurship activities based solely on data from women currently engaged in those activities could be problematic due to self-selection—that is, women who are currently engaged in these activities may systematically differ from women who do not (but perhaps did so previously or would like to) participate in these activities.

Households in the sample were identified using a multi-stage stratified random design. The sample covers six strata, rural and urban within each of Malawi's three main regions—Northern, Central, and Southern (see Figure 1). Twenty enumeration areas (EAs) per strata were randomly selected using probability proportional to size based on the sampling frame used in the 2008 Malawi Census. The total

[1] The effects of current laws or characteristics or large sub-national regions, for example, cannot be examined using data from a single country.

sample includes 2,423 women and 2,294 men from 2,776 households. Data collection occurred October through December 2019.

In each household, an initial interview was conducted with the household member most informed about who lived within the household—often but not always the head of household—to collect basic roster and household demographic information. Individual interviews were conducted the following day with one woman and one man, randomly selected from among the adult members of the household, aged 18 to 54, based on the household roster. Enumerators were instructed to interview the woman and man separately, and to match interviewer and respondent on gender. To account for possible attrition from day 1 to day 2 of the interview schedule, household-level interviews were conducted with respondents in five additional households per EA (more households than strictly necessary for achieving the desired overall sample size). Individual interviews with respondents in these households were conducted on an "as needed" basis until the desired number of respondents per EA was reached. This explains the discrepancy between the number of households and number of individuals sampled. The survey was administered on tablets using a computer-assisted personal interviewing (CAPI) software.

Informed consent was obtained verbally from each respondent before beginning the household or individual interviews. Respondents were not compensated for their participation. All study procedures were approved by the Institutional Review Board of IFPRI and the National Committee on Research in the Social Sciences and Humanities of Malawi.

METHODOLOGY

Decomposition methods have been widely used in economics, following the seminal papers of Kitagawa (1955), Blinder (1973), and Oaxaca (1973), to analyze the contribution of different factors to group differences in mean outcomes, notably in analyses of the gender wage gap and gender gap in agricultural productivity (e.g., Aguilar et al. 2015; Kilic, Palacios-López, and Goldstein 2015; Fortin 2008). Despite its widespread use, the KOB method has two limitations. First, it employs a partial equilibrium approach, in which observed outcomes for one group are used to construct counterfactual scenarios for the other group without accounting for ancillary effects. Second, because the regression estimates underlying the KOB method are based on correlations, the decomposition results do not provide information about causal relationships. Nonetheless, to the extent that KOB decompositions allow an examination of the relative quantitative importance of different contributors to an observed gender gap, the results can suggest priorities for further analysis and policy interventions.

In this paper, we utilize a KOB regression-based mean decomposition to document the extent and drivers of the profits gap in Malawi between firms with a female owner (F) and firms with a male owner (M). We consider as the primary performance outcome measure (Y) for our analysis the log of profits, self-reported by the owner for the last month of operation and estimate the following model:

$$Y_g = \beta_{g0} + \sum_{k=1}^{K} X_{gk}\,\beta_{gk} + \varepsilon_g \tag{1}$$

where g indicates the gender of the owner; X is an $n \times (K + 1)$ matrix with K observable owner-, household-, firm-, or community-level explanatory variables; β is the associated vector intercept and slope coefficients; and ε is the error term, assuming $E(\varepsilon_{FF}) = E(\varepsilon_{MF}) = 0$.

The gender gap (D) is expressed as the mean outcome difference:

$$D = E(Y_M) - E(Y_F). \tag{2}$$

Replacing Equation (1) into Equation (2) and taking the expectations, the gender gap becomes:

$$D = \beta_{0,M} - \beta_{0,F} + \sum_{k=1}^{K} E\left(X_{k,M}\right)\beta_{k,M} - \sum_{k=1}^{K} E\left(X_{k,F}\right)\beta_{k,F}. \quad (3)$$

Equation (1) is estimated for a pooled sample of male and female owners, including a gender indicator, i.e., a dummy variable identifying female owners, and β^* is the vector of coefficients obtained from this regression. Rearranging Equation (3) by adding and subtracting the intercept coefficient of the pooled regression (β_0^*) and the return to the observable covariates of each group valued at β^* (i.e., $X_{k,M}\beta_k^*$ and $X_{k,F}\beta_k^*$) leads to:

$$D = \underbrace{\sum_{k=1}^{K} \beta_k^*\left[E\left(X_{k,M}\right) - E\left(X_{k,F}\right)\right]}_{Composition\ effect} + \underbrace{\left(\beta_{0,M} - \beta_0^*\right)\sum_{k=1}^{K} E\left(X_{k,M}\right) + \left(\beta_0^* - \beta_{0,F}\right)\sum_{k=1}^{K} E\left(X_{k,F}\right)}_{Structure\ effect} \quad (4)$$

where $\beta_{0,F}$, $\beta_{0,M}$, β_0^*, $\beta_{k,F}$, $\beta_{k,M}$, and β_k^* *(k=1,…,K)* are the intercept and slope coefficients of each covariate included in the regressions for the male owner, female owner, and pooled samples.

Equation (4) shows the *aggregate decomposition*. The first component is the *composition effect*. It reflects the portion of the gender gap explained by differences in the levels of variables between both groups. The second component is the *structure effect*. It reflects the "unexplained" portion of the gender gap attributable to deviations in each group's return (i.e., slope coefficient) from the corresponding "average" return obtained from the pooled regression.

In practice, we use Ordinary Least Squares (OLS) to estimate Equation (1) for (i) male owners, (ii) female owners, and (iii) a pooled sample including both groups. A dummy variable identifying female owners is included in the pooled regression, which accounts for the possibility that the mean difference in (log) profits is explained by gender of owner and avoids a distortion of the decomposition results because of the residual group difference spilling over into the slope parameters of the pooled model (Jann 2008). We use the estimated coefficients from these regressions ($\hat{\beta}_F$, $\hat{\beta}_M$, and $\hat{\beta}^*$) together with the mean values for each covariate for each group (X_M and X_F) to compute the components of Equation (4). Finally, we

decompose the composition and structure effects into the respective contributions of each observable covariate.

Fortin, Lemieux, and Firpo (2011) detail the four key assumptions necessary for identification in the KOB decomposition. The two most crucial assumptions for the aggregate decomposition are overlapping support and ignorability. Overlapping support implies that no single value of *X* or ε exists to identify female owners. Ignorability refers to the random assignment of female ownership conditional on observable attributes. Two additional assumptions are required to identify the individual contribution of each covariate: additive linearity and zero conditional mean. Additive linearity implies that profits are a linearly separable function of the observable covariates. Zero conditional mean implies that ε is independent of *X*, i.e., there is no unobservable heterogeneity that jointly determines the outcome and observable covariates.

The validity of our findings largely depends on the plausibility of the ignorability and zero conditional mean assumptions, specifically the extent to which the model addresses possible unobservable heterogeneity that jointly determines outcome and observable covariates, including whether a business is owned by a female. To this end, we include an extensive set of owner/individual-, household-, business-, and community-level control variables in the main specification of Equation (1).

Whereas the KOB decomposition above focuses on the profits gap for average female and male owners, the RIF regression method proposed by Firpo, Fortin, and Lemieux (2009; 2018) enables us to decompose the profits gap along the distribution, in a largely similar manner, except that the dependent variable, Y, is replaced by the RIF of the distributional statistic of interest. The approach assumes that the conditional expectation of the $RIF(Y; v)$ can be modeled as a linear function of observable covariates. In the case of mean decomposition, this translates to $E[RIF(Y; v)|X] = X\beta + \varepsilon$, which can be easily estimated by OLS. In the case of quantiles (or other percentiles of choice), the RIF is given by:

$$RIF(Y;\, Q_\tau) \;=\; Q_\tau \;+ \frac{\tau - 1\{Y \le Q_\tau\}}{f_Y(Q_\tau)} \tag{5}$$

where $1\{\cdot\}$ is an indicator function, $f_Y(\cdot)$ is the marginal density of Y, and Q_τ is the population τ-quantile of the unconditional distribution of Y. In practice, RIF regressions can be decomposed in a way analogous

to Equations (1) – (4) but with Y_F and Y_M replaced by the value of the corresponding recentered influence functions at the desired percentile. We estimate and decompose Equation 5 for the 10th, 30th, 50th, 70th, and 90th percentiles. Note that RIF decomposition relies on the same ignorability and overlapping support assumptions as described above.

The full list of covariates is as follows: owner's age in years; categorical variable indicating owner's relationship to the head of household; owner's education in years; categorical variable identifying owner's marital status; dummy variable indicating the owner is the primary caregiver for a child aged 5 or younger; number of people (friends, family, and others) owner can go to for business-related information or advice; dummy variable indicating the owner solely or jointly owns land; index reflecting owner's perceived security of property rights[2]; dummy variable indicating the owner has a bank account in his/her own name or in the name of his/her business; index reflecting owner's perceptions of sexual hostility in the local work environment[3]; index reflecting owner's health status and ability to perform basic tasks[4]; dummy variable indicating that owner reports a high-level of non-cognitive skills related to entrepreneurship[5]; number of children aged 6 to 14; number of adults aged 18 to 54; age of business in years; dummy variable indicating business is registered with a formal authority; dummy variable indicating business operates out of home; (log) value of capital stock (including land and other business assets, raw materials, and inventory/purchase goods for sale; MWK); (log) total hours worked by family and non-family members in business during the last month in operation; an index reflecting

[2] Index based on whether the owner has never been concerned that (i) the government, (ii) a business, (iii) a family member, or (iv) someone else in the community might dispute his/her rights to land or buildings; nor has the owner ever lost land or buildings due to eviction and/or expropriation by (v) traditional or formal authorities or (vi) family or community members. Higher index values indicate a greater level of perceived security of property rights.

[3] Index based on whether the owner believes individuals in his/her community such as him/herself have while at their place of work ever experienced being: (i) treated "differently" because of their sex (e.g., mistreated, slighted, or ignored); (ii) touched in a sexual way without permission; (iii) made to feel like they were being bribed to engage in sexual behavior; or (iv) made afraid they will be treated poorly (e.g., not given work, ignored, etc.) if they did not cooperate sexually. Higher index values indicate a higher level of perceived sexual hostility.

[4] Index based on the WHO disability assessment schedule 2.0, which measures an individual's functioning with respect to the following domains: cognition, mobility, self-care, interacting with others, life activities, and community participation (World Health Organization 2016). Higher index values indicate a greater level of disability.

[5] Dummy variable based on owner's agreement with 10 questions capturing mental attitudes related to perseverance in challenging tasks and environments, optimism, and passion for work, where responses are rated on a 5-point scale, with 1 indicating "strongly disagree" and 5 indicating "strongly agree." The variable takes a value of 1 if the owner's aggregate score across the 10 questions is higher than the median value for other of the same sex. The questions were originally developed by entrepreneurial psychologists (Frese and Gielnik 2014), but were adapted by us based on cognitive interviewing carried out by IFPRI.

owner's adherence to good business and accounting practices[6]; dummy variable indicating that business took out a loan during the past 12 months; dummy variable indicating that business has access to electricity; dummy variable indicating that business experienced losses due to crime during past 12 months; categorical variable indicating type of business; dummy variable indicating rural community; and categorical variable the main type of road within community (a proxy for community infrastructure). In addition, all specifications include fixed effects controlling for region and last month of operation.[7] All indices are normalized to range from 0 to 1.

[6] Index based on whether the owner: (i) keeps financial records; (ii) records every purchase and sale made by business; (iii) is able easily assess based on records how much cash business has on hand; (iv) has determined the cost to you of each product sold by business; (v) is aware of which goods have the highest profit margin; (vi) keeps a written budget, detailing monthly costs of the business; and (vii) could produce records in support of business's ability to repay a prospective loan. Higher index values indicate stronger adherence to good business and accounting practices.

[7] Dummy variables indicating that the last month of operation was (i) less than 1 month ago, (ii) 1-3 months ago, (iii) 4-6 months ago, or (iv) greater than 4 months ago.

RESULTS

Descriptive statistics

The unit of observation for our analysis is the business owner. Broadly speaking, the owner was the person responsible for managing the business and making important decisions regarding business operations. Each owner was asked to report the total profits of his/her business during the last month of operation, and the gender gap in profits is estimated based on these reports.

Table 1 provides descriptive statistics for the variables included in the analysis.[8] Male owners reported more than double (120%) the profits of female owners. The mean gender difference in profits is the basis for the composition effect, one of the two main components of the mean decomposition presented below. It is worth noting that the gender gap in profits we observe is considerably larger than the average gender gaps reported for several SSA countries by Campos et al. (2019). This discrepancy is likely because their estimates are based on average monthly profits, whereas ours are based on profits from the most recent month of operation. An advantage of focusing on the most recent month of operation is that it reduces the possibility that reported profits are inflated or deflated due to recall bias, i.e., owners should be able to more accurately recall recent profits compared to those further in the past. A disadvantage is that a business's performance over the most recent month of operation may not be reflective of how the firm performed over the course of the previous year. We control for this possibility by including a set of dummy variables in the main specification indicating the last month the business was in operation. For the majority of businesses in the sample (75%), the reported profits correspond to the previous month. Nevertheless, we acknowledge that our estimate may overstate the gender gap in profits that would have been observed had information been collected on the full 12-month period. The fact remains, however, that a sizable gender gap exists in profits, which speaks to the seriousness of the constraints faced by female entrepreneurs.

[8] When interpreting these findings, it is important to note that the existence of a significant mean difference does not by itself indicate that a variable contributes to explaining the endowment effect—whether this is true depends on whether the variable's impact on business profits is statistically significant in a pooled OLS estimation.

Compared to male owners, female owners are less likely to be household heads; younger; more likely to be widowed, divorced, or separated, though most (men and women) are married in monogamous unions; more likely to experience health-related difficulties in their day-to-day activities; and more likely to rank in the upper half of the distribution on entrepreneurial attitudes. Despite being more than twice as likely as men to be the primary caregiver for a young child, female owners live in households with, on average, fewer young children (aged 5 years or younger) and more adolescent children (aged 6 to 14 years). Further, female owners are more likely to live in wealthier households but are no more or less likely than men to have experienced food insecurity in the past 12 months. The disparity in household wealth can be attributed to the rural-urban divide in the sample. Due to difficulty scheduling (and completing) interviews with men in urban areas, men in the sample hail disproportionately from rural areas. Female owners have smaller networks of people they can go to for business advice and perceive a greater risk of sexual hostility in the working environment. We find no gender differences in terms of business practices, security of property rights, or in the likelihood of the owner having a personal or business bank account.

In terms of business characteristics, female-owned businesses tend to have been in operation for nearly two years less than male-owned businesses; more likely to be informal (unregistered), though the vast majority of both male- and female-owned businesses are unregistered; more likely to be home-based; less likely to have access to electricity; less likely to have experienced losses due to crime in the past 12 months. Gender gaps, favoring men, exist for both capital and labor, with female-owned businesses relying relatively more heavily on household members for labor, as opposed to non-household members. We find no gender differences in terms of the business having taken out a loan during the past 12 months. We find some gender differences in terms of regional and matrilineal-patrilineal divides, but we caution against attributing too much to these differences as they may be partially driven by sampling.

Table 1. Descriptive statistics for the pooled sample and by gender of the business owner

	Pooled	Women	Men	Difference
Outcome variables				
(log) Self-reported profits (MWK)	8.531	7.993	9.188	1.195***
Owner characteristics				
Head of household†	0.441	0.102	0.854	0.751***
Spouse†	0.453	0.821	0.004	-0.817***
Son/daughter†	0.071	0.043	0.105	0.062***
Other relation†	0.035	0.034	0.037	0.004
Age	33.3	32.7	34.1	1.357**
Years of education	8.083	7.672	8.584	0.912***
Monogamous union†	0.798	0.810	0.783	-0.026
Polygynous union†	0.054	0.042	0.068	0.027**
Widowed/divorced/separated†	0.062	0.104	0.010	-0.094***
Never married†	0.087	0.045	0.139	0.094***
Primary caregiver for young child†	0.414	0.582	0.209	-0.373***
Number of people can go to for business advice	6.301	5.786	6.930	1.144***
Solely or jointly owns land†	0.474	0.438	0.518	0.079***
Perceived security of property rights index	0.581	0.585	0.576	-0.008
Has bank account†	0.355	0.341	0.373	0.032
Sexual hostility index	0.272	0.292	0.248	-0.044***
Health and disability index	0.059	0.065	0.051	-0.014**
Entrepreneurial attitudes†	0.539	0.582	0.486	-0.096***
Business practices index	0.306	0.297	0.317	0.020
Food insecurity index	0.565	0.558	0.574	0.016
Household characteristics				
Number of children aged 5 or younger	0.833	0.770	0.910	0.141***
Number of children aged 6 to 14	1.410	1.477	1.328	-0.149**
Number of adults aged 18 to 54	2.572	2.600	2.537	-0.063
Wealth index score	0.386	0.635	0.083	-0.551***
Wealth index: 1st quintile (lowest)†	0.134	0.101	0.174	0.073***
Wealth index: 2nd quintile†	0.179	0.168	0.191	0.023
Wealth index: 3rd quintile†	0.209	0.202	0.219	0.017
Wealth index: 4th quintile†	0.248	0.280	0.209	-0.071***
Wealth index: 5th quintile (highest)†	0.230	0.250	0.207	-0.043*
Business characteristics				
Age of business (years)	5.014	4.128	6.096	1.968***
Business is co-owned or -managed†	0.292	0.251	0.342	0.091***
Business is registered†	0.069	0.035	0.109	0.074***
Business operates out of home†	0.509	0.586	0.416	-0.170***
(log) Value of capital stock (MWK)	10.254	9.733	10.890	1.157***
(log) Total labor hours	4.182	3.832	4.609	0.776***
Number of household members who worked for business	0.722	0.707	0.740	0.033
Number of non-household members who worked for business	0.352	0.240	0.496	0.256***
Business took out loan†	0.247	0.266	0.225	-0.041
Business has access to electricity†	0.103	0.062	0.152	0.090***
Business experienced losses due to crime†	0.095	0.078	0.115	0.037**
Type of business: Wholesale and retail trade†	0.315	0.352	0.270	-0.082***
Type of business: Accommodation and food service†	0.194	0.203	0.184	-0.020
Type of business: Manufacturing†	0.057	0.062	0.051	-0.012
Type of business: Construction†	0.023	0.003	0.047	0.044***
Type of business: Professional services	0.023	0.006	0.043	0.037***
Type of business: Transportation†	0.021	0.003	0.043	0.040***
Type of business: Other†	0.367	0.370	0.363	-0.006
Community characteristics				
Rural†	0.434	0.389	0.488	0.099***
Matrilineal†	0.297	0.272	0.328	0.056**
Main type of road: Tar/asphalt†	0.101	0.117	0.082	-0.035*
Main type of road: Graded gravel†	0.093	0.101	0.084	-0.017
Main type of road: Maintained dirt road†	0.527	0.515	0.541	0.026
Main type of road: Dirt track†	0.279	0.267	0.293	0.026
Northern region†	0.373	0.403	0.336	-0.067**
Central region†	0.389	0.349	0.438	0.089***
Southern region†	0.238	0.248	0.227	-0.021
Observations	1137	625	512	

Source: Primary data collection
Notes: † Dummy variable

Mean decomposition

We use the aforementioned KOB decomposition methods to identify what proportion of the baseline gender gap in business profits can be attributed to: (i) differences in average characteristics of profit-generating factors (composition effect) and (ii) gender differences in the returns to these factors (structure effect).

Regression results

The first step in the mean decomposition is the estimation of Equation (1). We do this separately for the pooled, female owner, and male owner samples and report the results in Table 2, Columns 1–3, respectively.

Being the primary caregiver for a young child is negatively associated with (log) profits, irrespective of the sample. While the coefficients in the male and female samples are themselves statistically significant, at 10% and 1% levels, respectively, the difference is not statistically significant. This is consistent with the idea that caring for children is a significant constraint to running a business, regardless of whether the owner is male or female. The security of property rights index is positively associated with (log) profits in the pooled sample at the 5% level and in female sample at the 5% level. The corresponding estimate in the male sample is, however, not statistically significant nor are the coefficients in the male and female samples statistically different from one another. The sexual hostility index is positively associated with (log) profits in the male sample at the 5% level but is not statistically significant in the female sample. The difference between coefficients in the male and female samples is statistically significant at the 1% level. A possible explanation for the positive association in the male sample is that sexual hostility, if manifested, represents less of a risk to men than women, i.e., men may be more able than women to fend off sexual hostility. This, in turn, may allow men the freedom to take advantage of business opportunities unavailable to women. Entrepreneurial attitudes are positively associated with (log) profits at the 1% level in the male sample but is not statistically significant in the female sample. The difference between coefficients in the male and female samples is statistically

significant at the 1% level. The business practices index is positively associated with (log) profits and statistically significant at the 5% level in female sample but is not statistically significant in the male sample. The difference between coefficients in the male and female samples is statistically significant at the 5% level. This suggests that the return to good business practices is higher for women, compared to men, which may be indicative of the relatively greater adversity faced by women entrepreneurs.

The number of children in the household aged 6 to 14 years is positively associated with (log) profits at the 10% level in the female sample but is not statistically significant in the male sample. The difference between coefficients in the male and female samples is statistically significant at the 5% level. This is consistent with the notion that having more adolescent children in the household, particularly girls, allows mother to shift some of their household responsibilities to the children, possibly freeing up time for business opportunities.

The age of the business is positively associated with (log) profits and statistically significant at the 5% level in pooled sample but is not statistically significant in the male or female sample. The (log) value of capital stock is positively associated with (log) profits and statistically significant at the 1% level, irrespective of sample. The (log) total labor hours is positively associated with (log) profits and statistically significant at the 1% level in the pooled and male samples but is not statistically significant in the female sample. The coefficients for the (log) value of capital stock and (log) total labor hours in the male and female samples are not statistically different from one another. Access to electricity is positively associated with (log) profits and statistically significant at the 5% level in female sample but is not statistically significant in the pooled or male samples. The difference between coefficients in the male and female samples is statistically significant at the 5% level.

Table 2. OLS regression results underlying the mean decomposition

Dependent variable: (log) Self-reported profits (MWK)			
	Pooled	Women	Men
Owner characteristics			
Female†	-0.500**		
	(0.234)		
Age	-0.103	-0.053	-0.162
	(0.081)	(0.118)	(0.119)
Age-squared	0.001	0.000	0.002
	(0.001)	(0.002)	(0.002)
Years of education	0.052*	0.036	0.037
	(0.029)	(0.043)	(0.041)
Marital status (omitted: monogamous union)			
Polygynous union†	0.199	0.820	0.107
	(0.427)	(0.679)	(0.541)
Widowed/divorced/separated†	-0.720*	-0.545	-2.152
	(0.406)	(0.453)	(1.370)
Never married†	-0.720*	-2.138***	0.169
	(0.423)	(0.745)	(0.545)
Primary caregiver for young child†	-0.845***	-1.141***	-0.587*
	(0.220)	(0.303)	(0.348)
Number of people can go to for business advice	0.032*	0.035	0.017
	(0.019)	(0.028)	(0.027)
Solely or jointly owns land†	-0.264	-0.305	-0.069
	(0.204)	(0.293)	(0.287)
Security of property rights index	0.519**	0.665**	0.383
	(0.216)	(0.299)	(0.321)
Has bank account†	-0.054	-0.261	0.048
	(0.215)	(0.304)	(0.305)
Sexual hostility index	0.135	-0.575	1.425**
	(0.385)	(0.536)	(0.575)
Health and disability index	0.860	0.794	0.035
	(0.974)	(1.310)	(1.482)
Entrepreneurial attitudes†	0.139	-0.385	0.730***
	(0.193)	(0.279)	(0.273)
Business practices index	0.180	1.125**	-0.450
	(0.308)	(0.453)	(0.421)
Household characteristics			
Number of children aged 6 to 14	0.109	0.214*	-0.054
	(0.083)	(0.117)	(0.122)
Number of adults aged 18 to 54	0.065	0.073	0.038
	(0.107)	(0.142)	(0.165)
Business characteristics			
Age of business (years)	0.039**	0.036	0.026
	(0.018)	(0.031)	(0.022)
Business is co-owned or -managed†	0.214	0.068	0.349
	(0.215)	(0.324)	(0.291)
Business is registered†	0.219	-0.552	0.610
	(0.400)	(0.778)	(0.464)
Business operates out of home†	-0.156	-0.258	-0.114
	(0.198)	(0.283)	(0.284)
(log) Value of capital stock (MWK)	0.246***	0.247***	0.311***
	(0.044)	(0.064)	(0.061)
(log) Total labor hours	0.095***	0.136***	0.059
	(0.035)	(0.052)	(0.049)
Business took out loan†	0.072	0.078	0.074
	(0.228)	(0.310)	(0.339)
Business has access to electricity†	0.307	1.310**	-0.266
	(0.336)	(0.572)	(0.414)
Business experienced losses due to crime†	-0.011	-0.614	0.227
	(0.329)	(0.507)	(0.431)
Type of business (omitted: wholesale and retail trade)			
Accommodation and food service†	-0.054	-0.181	0.322
	(0.283)	(0.392)	(0.424)

Dependent variable: (log) Self-reported profits (MWK)			
	Pooled	Women	Men
Manufacturing†	-0.252	-0.456	0.378
	(0.432)	(0.587)	(0.655)
Construction†	0.563	1.316	0.742
	(0.659)	(2.468)	(0.674)
Professional services†	-1.499**	1.581	-1.994***
	(0.659)	(1.681)	(0.706)
Transportation†	-0.468	-2.400	-0.447
	(0.688)	(2.417)	(0.704)
Other†	-0.000	-0.062	0.208
	(0.240)	(0.328)	(0.356)
Community characteristics			
Rural†	-0.437*	-0.247	-0.670**
	(0.223)	(0.314)	(0.320)
Matrilineal†	-0.422	-0.583	-0.060
	(0.277)	(0.433)	(0.368)
Main type of road (omitted: tar/asphalt)			
Graded gravel†	0.798*	0.619	0.773
	(0.435)	(0.593)	(0.658)
Maintained dirt road†	-0.058	-0.300	0.180
	(0.329)	(0.443)	(0.506)
Dirt track†	-0.175	-0.616	0.117
	(0.353)	(0.485)	(0.531)
Constant	7.378***	6.996***	7.101***
	(1.526)	(2.141)	(2.293)
Adjusted R^2	0.160	0.149	0.155
Observations	1137	625	512

Source: Primary data collection
Notes: All specifications include fixed effects controlling for region and last month of operation. Standard errors clustered at the EA-level.
† Dummy variable
* Statistical significance at the 10% level
** Statistical significance at the 5% level
*** Statistical significance at the 1% level

Aggregate decomposition

The decomposition of the mean gender gap is presented in Table 3. Panel A presents the aggregate decomposition components, namely the endowment and structure effects.

The aggregate decomposition results reveal that 59.8% (71.5 percentage points) of the mean gender gap is explained by gender differences in the levels of observable attributes. The structure effect accounts for the remaining 40.2% (48.0 percentage points) of the mean gender gap, which may reflect the lower returns to observable attributes obtained by female owners, for example, due to lower levels of demand for female-owned businesses' products and services, as well as measurement issues. Our findings are in the same range as KOB decompositions from other studies in Africa, which find that roughly half of the gender gap in business performance is often unexplained by extensive firm- and owner-level characteristics (Campos et al. 2019; Hardy and Kagy 2018), despite the fact that the current study was able to account for a larger number of factors than previous studies.

Detailed decomposition

Panel B of Table 3 shows the results from the detailed decomposition. A positive coefficient suggests the variable contributes to widening the gender gap. The percentage contributions noted below should be understood as correlations, rather than causal parameters, and are obtained by dividing the coefficient in question by the gender gap (1.195), the composition effect (0.715), or structure effect (0.480).

The two factors that contribute the most to the composition effect are being the primary caregiver for a young child and (log) value of capital stock. These covariates explain 45.5% and 41.0% of the composition effect and account for 27.2% and 24.6% of the gender gap, respectively. Both findings align with existing evidence. On average, women spend at least three times as much time as men on unpaid and care work, a percentage which is mirrored in Malawi (United Nations 2015; Valverde 2016). Likewise, women are often at a disadvantage relative to men with regard to ownership and control over land and other productive assets (Deere and Doss 2006). Our findings are consistent with the notion that disparities in both time use and asset ownership impose several constraints on women's well-being and livelihoods, including reducing women's ability to invest time or capital into their businesses

Other factors contribute to explaining the composition effect (gender gap) as follows: the number of people the owner can go to for business advice contributes 5.3% (3.2%), the age of the business contributes 11.5% (6.9%), and (log) labor hours contributes 10.2% (6.1%). Access to mentoring and business advice has been documented as an important element of the success of female entrepreneurs (McKenzie and Puerto 2017; Brooks et al 2018). These factors are slightly offset by a negative contribution by location in a rural community of -6.2% (-3.7%).

The detailed decomposition of structure effect is also presented in Panel B of Table 3. The two factors that contribute the most to explaining the structure effect are entrepreneurial attitudes and sexual hostility. These covariates contribute 132.2% (53.2%) and 122.1% (49.1%) to the structure effect, respectively. This is offset by negative contributions from three factors, as follows: the business practices index contributes -109.2% (-43.9%), number of children 6–14 contributes -78.5% (-31.6%) and access to electricity contributes -33.5% (-13.5%).

While we would normally expect the greater adversity faced by female owners to result in higher returns to entrepreneurial attitudes, our findings suggest the opposite: female owners obtain lower than "average" returns to entrepreneurial attitudes. Interestingly, this result contrasts with our finding regarding business practices, which is among the largest contributors to reducing the structure effect (i.e., closing the gender gap). This suggests that there are unobserved factors that lead entrepreneurially minded women to be less able than men to translate this mindset into business success, but that these same factors do not negate the relatively high returns experienced by women to good business practices. Intrahousehold dynamics and social norms that minimize the amount of support a spouse may provide to a female entrepreneur may contribute to lower levels of business success experienced by entrepreneurially minded women. Vadnjal and Vadnjal's (2013) study indicates that when spouses provide emotional and material support by taking on more of care responsibilities, women are more willing to enter and succeed at entrepreneurship.

With respect to sexual hostility and the number children aged 6 to 14, our findings are wholly consistent with our earlier explanations. Women's greater vulnerability to sexual hostility may lead them to forego business opportunities they would otherwise pursue, and thus contributes to increasing women's structural disadvantage. Having more adolescent children, particularly girls, to share domestic responsibilities, may allow mother greater opportunity to pursue business opportunities, and thus contributes to decreasing women's structural disadvantage.

Finally, with respect to access to electricity, at least two possible explanations exist that may explain why access to electricity might contribute to decreasing women's structural disadvantage. First, it may be attributable to the higher relative utility of electricity to the types of businesses women tend to operate relative to men, e.g., textiles, handicraft production, etc. Second, being able to extend business operations after dark may be relatively more important to female owners, due to their household and care responsibilities.

Table 3. Mean decomposition of the gender differential in business profits

Mean gender differential in (log) profits (MWK):	1.195*** (0.226)	
A. Aggregate decomposition	Composition effect	Structure effect
Total	0.715***	0.480*
	(0.172)	(0.245
Share of gender differential	59.8%	40.2%
B. Detailed decomposition		
Owner characteristics		
Age	-0.152	-4.554
	(0.133)	(6.131)
Age-squared	0.147	3.036
	(0.139)	(3.113)
Years of education	0.046	0.015
	(0.029)	(0.425)
Marital status‡	0.008	0.125
	(0.067)	(0.569)
Primary caregiver for young child†	0.325***	0.244
	(0.081)	(0.175)
Number of people can go to for business advice	0.038*	-0.146
	(0.021)	(0.189)
Solely or jointly owns land†	-0.022	0.142
	(0.019)	(0.209)
Security of property rights index	-0.004	-0.145
	(0.019)	(0.331)
Has bank account†	-0.002	0.118
	(0.008)	(0.150)
Sexual hostility index	-0.005	0.586***
	(0.018)	(0.224)
Health and disability index	-0.012	-0.047
	(0.014)	(0.104)
Entrepreneurial attitudes†	-0.016	0.635***
	(0.021)	(0.211)
Business practices index	0.004	-0.524**
	(0.007)	(0.208)
Household characteristics		
Number of children aged 6 to 14	-0.017	-0.377**
	(0.014)	(0.191)
Number of adults aged 18 to 54	-0.003	-0.035
	(0.008)	(0.526)
Business characteristics		
Age of business (years)	0.082**	-0.052
	(0.032)	(0.162)
Business is co-owned or -managed†	0.021	0.120
	(0.022)	(0.133)
Business is registered†	0.018	0.076
	(0.033)	(0.052)
Business operates out of home†	0.024	0.088
	(0.034)	(0.210)
(log) Value of capital stock (MWK)	0.294***	0.608
	(0.075)	(1.022)
(log) Total labor hours	0.073**	-0.322
	(0.034)	(0.316)
Business took out loan†	-0.003	-0.001
	(0.007)	(0.096)
Business has access to electricity†	0.025	-0.161**
	(0.038)	(0.078)
Business experienced losses due to crime†	-0.001	0.072
	(0.013)	(0.067)
Type of business‡	-0.038	0.277
	(0.056)	(0.407)
Community characteristics		
Rural†	-0.044*	-0.201

	(0.026)	(0.226)
Matrilineal†	-0.026	0.131
	(0.023)	(0.185)
Main type of road‡	-0.020	0.115
	(0.017)	(0.126)
Observations	1137	

Source: Primary data collection
Notes: All specifications include fixed effects controlling for region and last month of operation. Deviation contrast transform applied to all categorical variables to avoid distorting the decomposition effects due to the choice of the omitted base category (Yun 2005; Jann 2008). Standard errors clustered at the EA-level.
† Dummy variable
‡ Categorical variable
* Statistical significance at the 10% level
** Statistical significance at the 5% level
*** Statistical significance at the 1% level

RIF decomposition

The RIF results suggest that these effects differ across the earnings distribution (Table 4). Looking at the aggregate decomposition, at the bottom of the earnings distribution, in the first quantile, the composition effect accounts for only a small fraction of the total difference in earnings, while in the top quintile, the difference between male and female earnings is almost completely explained by differences in covariates, specifically capital stock. This pattern is closest to what is seen for Rwanda in the data analyzed by Nix, Gamberoni, and Heath (2016), where the structure effect becomes relatively less important across increasing earnings quintiles, and is in contrast to what is observed for the Democratic Republic of Congo, Tanzania and Ghana in that paper.

Turning to the detailed decomposition, we see that when looking along the distribution, capital stock appears to be a primary driver of the composition effect except in the bottom quintile of firms. In contrast, caregiving responsibilities are a driver of the composition effect in the bottom three quintiles only. Differences in the returns to capital appear to be a very significant driver of the female structural disadvantage in the bottom quintile. The effects on the female structural disadvantage associated with sexual hostility and entrepreneurial attitudes do not display consistent patterns by income.

Table 4. RIF decomposition of the gender differential in business profits

	10th percentile		30th percentile		50th percentile		70th percentile		90th percentile	
A. Aggregate decomposition	Composition effect	Structure effect	Composition effect	Structure effect	Composition effect	Structure effect	Composition effect	Structure effect	Composition effect	Structure effect
Total	0.189***	6.583***	0.452***	0.632***	0.606***	0.411**	0.564****	0.198	0.781***	-0.015
	(0.073)	(0.222)	(0.149)	(0.172)	(0.143)	(0.162)	(0.133)	(0.158)	(0.195)	(0.246)
B. Detailed decomposition										
Owner characteristics										
Age	-0.009	-4.588	-0.035	3.138	0.117	-2.958	0.056	-1.407	-0.001	0.153
	(0.079)	(6.946)	(0.116)	(3.885)	(0.111)	(3.338)	(0.091)	(3.321)	(0.126)	(4.508)
Age-squared	0.002	2.622	0.0148	-1.038	-0.119	1.890	-0.050	1.120	-0.013	0.462
	(0.085)	(3.379)	(0.122)	(1.973)	(0.117)	(1.708)	(0.098)	(1.734)	(0.136)	(2.320)
Years of education	-0.010	0.701	0.0175	-0.033	0.045*	-0.240	0.056**	-0.313	0.034	0.119
	(0.011)	(0.607)	(0.028)	(0.339)	(0.026)	(0.292)	(0.025)	(0.291)	(0.032)	(0.375)
Marital status‡	0.026	0.781	-0.095	-0.155	-0.014	0.169	-0.061	-0.066	-0.041	-0.227
	(0.021)	(0.859)	(0.061)	(0.310)	(0.053)	(0.259)	(0.046)	(0.247)	(0.061)	(0.345)
Primary caregiver for young child†	0.071**	-0.218	0.215***	0.056	0.144**	-0.002	0.066	-0.027	0.148	0.056
	(0.032)	(0.138)	(0.080)	(0.064)	(0.073)	(0.056)	(0.068)	(0.054)	(0.095)	(0.071)
Number of people can go to for business advice	0.021*	-0.063	0.022	-0.194	0.007	0.176	0.006	0.053	-0.004	0.083
	(0.013)	(0.222)	(0.019)	(0.146)	(0.021)	(0.153)	(0.016)	(0.142)	(0.021)	(0.205)
Solely or jointly owns land†	-0.008	-0.054	0.001	-0.016	0.003	-0.091	0.014	-0.183	0.017	-0.184
	(0.010)	(0.253)	(0.016)	(0.142)	(0.014)	(0.122)	(0.014)	(0.119)	(0.019)	(0.159)
Security of property rights index	-0.000	0.302	-0.003	-0.156	-0.003	-0.191	-0.001	-0.069	-0.004	-0.163
	(0.002)	(0.337)	(0.009)	(0.169)	(0.009)	(0.148)	(0.004)	(0.146)	(0.012)	(0.176)
Has bank account†	-0.003	0.029	0.002	0.036	0.008	-0.044	-0.005	-0.002	0.002	-0.146
	(0.006)	(0.208)	(0.007)	(0.105)	(0.009)	(0.094)	(0.007)	0.091	(0.008)	(0.119)
Sexual hostility index	0.022	0.552***	0.017	0.097	0.021	0.219*	0.035**	0.392***	0.026	0.242
	(0.016)	(0.204)	(0.017)	(0.125)	(0.016)	(0.112)	(0.018)	(0.116)	(0.020)	(0.150)
Health and disability index	-0.006	0.010	-0.010	-0.008	-0.010	-0.097*	-0.004	0.016	-0.003	0.110
	(0.006)	(0.098)	(0.013)	(0.062)	(0.011)	(0.054)	(0.010)	(0.055)	(0.014)	(0.084)
Entrepreneurial attitudes†	-0.008	0.400*	0.037*	0.275**	0.014	0.098	0.011	0.223**	-0.015	0.068
	(0.010)	(0.221)	(0.022)	(0.127)	(0.017)	(0.111)	(0.015)	(0.108)	(0.020)	(0.134)
Business practices index	0.007	-0.041*	0.008	-0.089	0.012	-0.109	0.019	-0.170	0.018	-0.159
	(0.008)	(0.215)	(0.010)	(0.123)	(0.013)	(0.115)	(0.020)	(0.115)	(0.020)	(0.168)
Household characteristics										
Number of children aged 6 to 14	-0.008	-0.020	-0.011	-0.207	-0.014	-0.152	-0.010	-0.140	0.009	0.023
	(0.006)	(0.249)	(0.013)	(0.143)	(0.013)	(0.134)	(0.011	(0.138)	(0.014)	(0.159)
Number of adults aged 18 to 54	0.003	-0.044	0.004	0.468	-0.001	-0.159	-0.009	-0.091	-0.005	0.006
	(0.005)	(0.655)	(0.007)	(0.338)	(0.006)	(0.309)	(0.010)	(0.328)	(0.009)	(0.435)
Business characteristics										
Age of business (years)	0.015	0.210	0.064	-0.130	0.091**	-0.148	0.060	-0.140	0.061	-0.185
	(0.011)	(0.171)	(0.040)	(0.146)	0.041	(0.142)	(0.049)	(0.150)	(0.054)	(0.189)
Business is co-owned or -managed†	-0.013	0.006	0.014	0.042	0.042*	-0.129	0.059**	-0.135	0.031	0.022
	(0.012)	(0.174)	(0.020)	(0.094)	(0.022)	(0.088)	(0.025)	(0.092)	0.028	(0.128)
Business is registered†	0.000	0.009	-0.042	0.061	-0.025	0.076	0.031	0.013	0.052	0.025
	(0.008)	(0.077)	(0.036)	(0.059)	(0.034)	(0.056)	(0.036)	(0.062)	(0.062)	(0.103)
Business operates out of home†	-0.006	-0.066	0.061*	0.071	0.063**	0.021	0.062**	0.062	0.058	0.100
	(0.017)	(0.192)	(0.035)	(0.011)	(0.032)	0.098	(0.029)	(0.097)	(0.039)	(0.122)
	0.038	3.354**	0.200***	0.140	0.207***	-0.205	0.234***	-0.362	0.243***	-0.253

(log) Value of capital stock (MWK)	(0.044)	(1.516)	(0.058)	(0.721)	(0.059)	(0.669)	(0.055)	(0.691)	(0.076)	(0.842)
(log) Total labor hours	0.015	0.402	0.044	0.029	0.034	-0.093	0.008	0.204	0.006	0.034
	(0.015)	(0.363)	(0.030)	(0.212)	(0.027)	(0.194)	(0.024)	0.194	(0.035)	(0.270)
Business took out loan†	0.000	-0.022	0.002	0.062	0.006	0.051	0.004	-0.023	0.013	0.029
	(0.004)	(0.123)	(0.009)	(0.068)	(0.009)	(0.061)	(0.007)	(0.060)	(0.013)	(0.077)
Business has access to electricity†	0.012	-0.078	0.066**	-0.126*	0.077**	-0.113*	0.099***	-0.163**	0.057	-0.138
	(0.009)	(0.105)	(0.033)	(0.066)	(0.033)	(0.048)	(0.027)	(0.066)	(0.054)	(0.107)
Business experienced losses due to crime†	-0.005	0.035	-0.016	0.110**	-0.017	0.111**	-0.012	0.074	-0.004	0.096
	(0.009)	(0.084)	(0.015)	(0.052)	(0.015)	(0.048)	(0.133)	(0.049)	(0.017)	(0.070)
Type of business‡	0.013	0.440	-0.009	-0.067	0.027	0.019	0.009	-0.102	0.164	0.334
	(0.022)	(0.277)	(0.080)	(0.210)	(0.075)	(0.203)	(0.054)	(0.157)	(0.127)	(0.318)
Community characteristics										
Rural†	0.016	-0.443*	-0.041	-0.121	-0.036	0.038	-0.030	0.116	0.008	-0.033
	(0.013)	(0.261)	(0.026)	(0.151)	(0.022)	(0.129)	(0.020)	(0.122)	(0.023)	0.152
Matrilineal†	0.005	0.068	-0.022	0.103	-0.013	0.080	-0.14	0.249**	-0.039	0.164
	(0.004)	(0.203)	(0.020)	(0.127)	(0.015)	(0.108)	(0.013)	(0.108)	(0.028)	(0.146)
Main type of road‡	-0.003	-0.059	-0.027	0.185*	-0.044*	0.121	-0.032	0.153	-0.027	0.244*
	(0.005)	(0.171)	(0.022)	(0.102)	(0.023)	(0.099)	(0.023)	(0.104)	(0.020)	(0.137)
Observations	1137									

Source: Primary data collection

Notes: All specifications include fixed effects controlling for region and last month of operation. Deviation contrast transform applied to all categorical variables to avoid distorting the decomposition effects due to the choice of the omitted base category (Yun 2005; Jann 2008). Standard errors clustered at the EA-level.

† Dummy variable

‡ Categorical variable

* Statistical significance at the 10% level

** Statistical significance at the 5% level

*** Statistical significance at the 1% level

CONCLUSION

This study offers a new perspective on gender differences in business productivity in SSA. We find that, on average, male-owned businesses in Malawi earn profits more than double (120%) those of female owned-businesses. This finding aligns with other estimates of the gender gap in business performance from the region and supports the view that women face significant constraints in growing successful businesses. We apply KOB mean-decomposition techniques, coupled with data from a multi-topic household survey rich in details about entrepreneurship, to identify what proportion of the baseline gender gap in business profits can be attributed to: (i) differences in average characteristics of profit-generating factors (composition effect) and (ii) gender differences in the returns to these factors (structure effect). We find that 59.8% of the mean gender gap is explained by gender differences in the levels of observable attributes, with the remaining 40.2% attributable to the lower returns to observable attributes obtained by female owners, i.e., female structural disadvantage.

Further detailed decomposition of these results pinpoints the specific factors driving these two effects. We find that the composition effect is primarily driven by women's role as the primary caregiver most households and women's lack of capital. Both findings are consistent with existing evidence on global gender disparities in time use and asset ownership. The female structural disadvantage can largely be attributed to female owners' heightened perception of sexual hostility in the work environment and non-cognitive skills related to entrepreneurship (perseverance in challenging tasks and environments, optimism, and passion for work). The former result is easily explained in terms of women's increased vulnerability to sexual hostility compared to men, which may force them to forego business opportunities they would otherwise pursue. The latter result is puzzling and, moreover, contrasts with our findings with regard to good business practices, which we find to be a large contributor to reducing female structural disadvantage (i.e., closing the gender gap). This may suggest that there are unobserved factors that prevent women from being as able as men to capitalize on non-cognitive skills, but that these same factors do not negate the relatively higher returns experienced by women to good business practices. Further study is needed to understand this relationship. More broadly, however, our findings align with existing

evidence on the importance of non-cognitive skills for achieving business success (Campos et al. 2017; Montalvao et al. 2017).

Considered together, our findings point to gender differentials in non-cognitive skills, time constraints/care responsibilities, access to land and other productive assets, and experiences of sexual hostility as the primary constraints to women's business performance in Malawi. Policies that address these constraints, e.g., by promoting better education and business skills development or attenuating gender norms, have potential for increasing female owners' business productivity. These policies and programs, however, will only fulfill their potential if they are designed to address the specific social contexts and intrahousehold dynamics that influence the composition effect as well as the structural barriers that limit access to capital and inputs (Revenga and Dooley 2020).

It is also important to reflect on the value-added of this decomposition method for integrating gender into HRV-style growth diagnostics and constraints analysis. Although previous work has developed a theoretical framework for engendering growth diagnostics (Roncolato, Reksten, and Grown 2017) and has used existing data to examine a limited set of proposed constraints (Revenga and Dooley 2020), this is the first study to collect data with a the specific intent of applying them to gender-sensitive growth diagnostics and, thus, able to cover a wide range of potentially limiting factors. The ability to empirically compare the influence of different factors on gender differentials in outcomes of interest can be a powerful tool for guiding programming and investments decisions. The methodology is, however, data intensive. Ideally, it requires gender-disaggregated data on all factors affecting the outcome of interest. In addition, the sample size must be large enough to allow partitioning of the data according to gender without undermining statistical power (McKenzie and Woodruff 2014). For many countries, gender-disaggregated data of this scale and level of detail are simply not available. Given that primary data collection may be too costly in many situations, this limits the applicability of the methodology. Nonetheless, the number of countries for which high-quality, gender-disaggregated data exists is on the rise, thanks to efforts such as World Bank's Living Standards and Measurement Study Integrated Surveys on Agricultural (LSMS-ISA) and the 50x2030 Initiative, which seeks significant improvements in the

quality of country-level data collection across low- and middle-income countries. Such data sources may make the application of gender-sensitive growth diagnostics that identify the constraints that limit the profitability of women-owned business more feasible.

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