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Gender Based Differences in Managerial Experience: The Case of Informal Firms in Rwanda

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Abstract

The paper contributes to the literature on gender-based disparity in human capital by extending existing results on educational attainment to the number of years of experience that female vs. male managers have among informal or unregistered firms. Using the case of Rwanda, results show that the number of years of experience for female managers is significantly lower, equaling 80-88 percent that of male managers. We also find that this gender disparity is higher among the relatively older managers and among firms in the relatively less developed city of Butare compared with the more developed city of Kigali.

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1. Introduction

A number of studies have documented lower levels of schooling or formal education in developing countries among females relative to males (see for example, Dollar and Gatti 1999; Duflo 2005; WDR 2012). Adverse effects of this disparity in education on economic development have also been analyzed (see for example, Barro and Lee, 1994; WDR 2012). However, formal education is only part of human capital and a more holistic approach including, for example, job experience is important. There is some work on gender based differences in job experience among employees in developed countries, but none so for managers (employers) of firms in developing countries. The present paper attempts to fill this gap in the literature by focusing on a developing country, Rwanda, and analyzing how male vs. female managers in the informal sector differ in the number of years of experience they have working in the industry.

The importance of the quantification and analysis of job experience more broadly, and managerial experience, in particular, cannot be denied. This holds in the context of gender inequality in income levels and the overall economic well-being. For example, WDR (2012, page 203) notes that: "Because education and work experience are valuable inputs into production, gender differences along these dimensions contribute to differences in productivity and earnings." Specific to experience at the managerial level, a recent study of executives in German banks covering 1994-2010 found that teams with more female executives tend to take more risky decisions (Berger, Kick and Schaeck, 2012). The study suggests that this finding is most likely due to the fact that female executives have less experience than the male executives.

There are other reasons too for why it is important to focus on managerial experience of men vs. women and on the informal sector of a developing country. Available evidence suggests that a substantial part of economic activity in the developing world occurs in the informal sector

(see for example, La Porta and Shleifer, 2008). Hence, the sector cannot be neglected for any realistic assessment of what is happening on the ground level in the developing world. Further, and more importantly, in most developing countries, women are still the primary caregivers in the family which makes it difficult for them to seek employment outside of their home. Starting a home-based business where a woman is the manager and the owner is attractive to her and especially so in the informal sector where entry barriers and financing needs appear to be low. Hence, a proper understanding of how male vs. female managers (or owners) in the informal sector differ in their characteristics, performance and sorts of problems they face is important for a realistic picture of gender inequality in the economic domain.

We use recently collected data on 240 informal firms in the two cities of Kigali and Butare in Rwanda by the World Bank's Enterprise Surveys in 2011. One advantage of using firm-level data is that it allows us to explore sensible heterogeneities across data points within the country. For example, it is believed that the well-known gender gap in education has been decreasing over time and that women are catching up with men in this respect (WDR 2012, Chapter 5). We are able to check if the same holds for managerial experience in our data.

Our results show a statistically significant and economically large difference in the level of managerial experience between male and female managers. Specifically, the number of years of experience in the industry of a female manager ranges between 80 to 88 percent that of a male manager. Consistent with the discussion in the previous paragraph on gender-based gap in education between young and old workers, our results confirm the same holds for managerial experience. That is, the gender-based gap in managerial experience that we find is much bigger among the relatively older managers compared with the younger ones. As we discuss below, the

result also helps to raise our confidence against possible endogeneity concerns with our estimation results.

We would like to mention here that given the cross-section nature of the data, due caution is necessary in interpreting our results. That is, the results are in the nature of correlations of associations that are at best suggestive of possible underlying causal effects. We control for a number of basic firm characteristics that helps eliminate some sources of spurious correlation and also eliminate some possible explanations for our results. However, we do not explicitly test for the mechanisms driving our results. For example, we cannot rule out (or confirm) the possibility that labor market interruptions faced by women due to child bearing or child rearing reasons could be the causal factor behind our results. Another possibility is that women may self-select in sectors or activities that does not require much managerial experience. Given the data at hand, we can neither confirm nor reject these and other possible explanations as to why we find a difference in the level of managerial experience between male and female managers. A richer dataset than the one used in the present study is required to shed more light on the causality issue.

Similarly, the results presented in this paper are for the informal sector and due caution is necessary in extending these to the formal sector. One reason is that skill requirements in the informal sector tend to be much lower than in the formal sector; also, the informal sector also allows combining work with household responsibilities easily, which is particularly attractive for women. For these reasons, women may self-select themselves into the informal sector more than men and especially women with low skills and experience. A rigorous analysis, beyond the scope of the present paper is required to ascertain the extent to which gender specific results for the informal sector are representative of the broader economy. We leave this for future work.

Our findings are related to the broader literature on gender-based inequality along a number of dimensions. Gender-based inequality is neither unique to human capital nor restricted to a handful of countries. It will be safe to argue that presently there is no country in the world that has reached equality between women and men in critical areas such as economic participation, income and wage levels, education, health and political empowerment (Hausmann et al., 2006). Gender-based inequality in education (or formal schooling) has received the most attention by economists. Some of the studies that highlight gender-based gap in education and its impact on economic development and growth include for example, Sen (1989), Klasen (1994, 1999), Barro and Lee (1994), Barro and Sala-i-Martin (1995), Dollar and Gatti (1999) and Schultz (1993). In addition, a number of micro or household-level studies show how parents prefer boys over girls for the provision of education and the impact that this disparity has on incomes, overall economic development and the well-being of women relative to men.

The roadmap to the remaining sections is as follows. In section 2, we describe the data and introduce the variables used in the regressions. Our main empirical results are contained in section 3. Some extensions of the main results are discussed in section 4 and the concluding section summarizes the main findings of the paper.

2. Data and main variables

The data we use comes from a random survey of 240 informal firms in the two cities of Kigali and Butare in Rwanda. The survey was conducted by the World Bank's Enterprise Surveys covering the time period 2010-2011.[1] For the purpose of this survey, informal firms are defined as those firms that are not registered with the Rwanda Development Board. After excluding

[1] Due to lack of adequate information on the census of informal firms in the country, the survey is not necessarily representative of the informal sectors in Kigali, Butare or all of Rwanda. More information on the sampling methodology and the raw data are available at www.enterprisesurveys.org.

firms with missing data, we are left with a sample of 219 firms. Of these 219 firms, 146 are manufacturing and the remaining 73 are service sector firms. Across cities, 118 firms are located in Kigali and the remaining 101 are located in Butare. All regression results below are based on Ordinary Least Squares (OLS) estimation method with Huber-White robust standard errors. Significant level is denoted by *** (1 percent), ** (5 percent) and * (10 percent). Summary statistics of the variables used in the regressions are provided in Table 1.

2.1 *Dependent variable*

The dependent variable is the (log of) number of years of experience the top manager of the firm has working in the sector (*Experience*). In our sample, *Experience* varies (in log values) between 0 and 3.7 with a mean value of 1.9 and standard deviation of 0.7.

2.2 *Explanatory variables*

Our main explanatory variable is a dummy variable equal to 1 if the firm has a female top manager and 0 otherwise (*Female*). In our sample, 33.8 percent of the firms have a female top manager and the remaining 66.2 percent have a male top manager. We note that without exception, the top manager (henceforth, manager) of the firm is also the main decision maker and also the largest owner of the firm.

It is possible that *Experience* and *Female* are both correlated with a third variable. This may lead to omitted variable bias problem with the estimation of our main results (that is, with the estimated relationship between *Experience* and *Female*). To guard against this possibility, we take two approaches. First, we control for a number of firm characteristics that are discussed in detail below. Second, we make two assumption or conjectures that have a direct implication for

how the relationship between *Female* and *Experience* should differ between young and old managers. The two assumptions are: (a) managerial experience is acquired over time so that ceteris paribus, managers who are more recently born are likely to have less experience than managers born earlier (confirmed in our sample below); (b) either due to more education among females or more favorable social attitudes towards female employment or for other reasons, female participation in the labor market is increasing over time. The two assumptions together predict that the gender-based gap in the level of managerial experience is likely to be bigger among the relatively older (age wise) managers than among the relatively younger managers. Using data on the age of the manager provided in the survey, we can test for this prediction. We note that if the relationship between *Experience* and *Female* is spuriously driven by some correlated third factor then there is no reason to expect the stated prediction to hold. Hence, testing for the stated prediction is helpful for raising our confidence against the omitted variable bias problem (against our man result).

For the controls to guard against omitted variable bias problem, we begin with controlling for the (log of) age of the manager. We note that this control for the age of the manager (the *level* impact) is different from what is proposed in the previous paragraph (the *differential* impact) which is the interaction term between *Female* and the (log of) age of the manager. As mentioned above, female participation in the labor market has been increasing over time. Hence, it is likely that the female workers and managers are on average younger than their male counterparts (confirmed below). It is natural to expect younger individuals to be less experienced than older individuals. We filter out this possible source of omitted variable bias problem by controlling for the age of the manager.

Next, we control for the (log of) age of the firm. Since the largest owner is also the manager of the firm, managers of older firms will have accumulated more experience running the firm than managers of the younger firms (confirmed below). At the same time, it is possible that gender of the manager (or largest owner) may be correlated with firm's age if, for example, female participation in labor market has been increasing over time. We control for the implied spurious correlation by controlling for firm's age.

Anecdotal evidence suggests that service sectors are more women friendly than the manufacturing sectors. One reason for this could be lower entry barriers and small initial capital required in service than manufacturing sectors. If managerial experience also varies systematically between manufacturing and service sectors, then our main results could suffer from the omitted variable bias problem. Similarly, regional differences in the level of economic development or attitudes towards females can also lead to a similar problem. We eliminate these possible sources of omitted variable bias by controlling for a dummy equal to 1 if a firm operates in the manufacturing sector and 0 otherwise (*Manufacturing*), and a regional dummy equal to 1 if the firm is located in Kigali and 0 if it is located in Butare (*Kigali*).

Firm-size is often an important proxy for a number of firm characteristics such as efficiency level, difficulty in accessing finance, etc. Hence, it is possible that firm-size could be correlated with the gender of the manager as well as managerial experience either directly or through some other firm characteristic that it may proxy for. For example, a number of studies (for the formal sector firms) have shown that female owned or run firms are typically smaller in size than male owned or run firms. At the same time, firm-size could also be correlated with managerial experience if, for example, the more experienced managers are better able to run the firm and grow faster than the rest. We control for the implied omitted variable bias problem by

adding firm-size as measured by the (log of) total number of workers in a typical month during the last year (*Employment*).

As mentioned in the introduction, a number of studies have documented lower education level among females relative to males. It is also possible that education level and managerial experience may be correlated with each other. For example, the more educated individuals may find jobs more easily and therefore may accumulate more experience than the less educated. We filter the potential spurious correlation problem here by controlling for a dummy variable equal to 1 if the manager has completed secondary or higher education and 0 otherwise (*Educated manager*).

Marital status could have an effect on the experience accumulated in the past. Unmarried or single individuals may have more time than the married individuals, accumulating more work experience. If there is a significant difference in the proportion of single vs. non-single female and male managers in our sample, then our results could suffer from spurious correlation. To guard against this possibility, we control for a dummy variable equal to 1 if the manger is single and 0 if the manager is either married or widowed/divorced.

Last, we control for some firm characteristics to further raise our confidence against omitted variable bias problem. These controls include a dummy variable equal to 1 if the firm has more than 1 owner and 0 otherwise, a dummy variable equal to 1 if the firm has a physical location and 0 otherwise (i.e., the firm is not a street vendor), a dummy variable equal to 1 if the firm operates from outside household premises and 0 otherwise, and a dummy variable equal to 1 if the firm uses machines for its operations and 0 otherwise.

3. Estimation results

Our base regression results are provided in Table 2. Without any other controls, moving from a firm with a male to a female top manager reduces the value of *Experience* by .224 log points, significant at less than the 5 percent level (column 1). This decrease is large in magnitude given that the mean value of *Experience* is 1.85 in our sample. In level (i.e., non-log terms), the estimate implies that the number of years of managerial experience for a female top manager is about 80 percent that of a male top manager.

Controlling for the age of the manager, the estimated coefficient value of *Female* becomes larger in magnitude but only marginally so. That is, the estimated coefficient value increases (in absolute value) from -.224 above to -.239, significant at less than the 1 percent level (column 2). As expected, age of the manager is significantly positively correlated with the years of managerial experience.

Next, we control for the age of the firm. Controlling for the age of the firm causes the estimated coefficient value of *Female* to decrease (in absolute value) sharply from -.239 above to -.124, but it is still significant at less than the 5 percent level (column 3). The coefficient implies that the number of years (without logs) of managerial experience for a female top manager is about 88 percent that of a male top manager. Age of the firm is significantly positively correlated with the dependent variable. The significant positive correlation we found above between age of the manager and the dependent variable continues to hold but the magnitude or the strength of the relationship is much smaller now – the estimated coefficient value of the (log of) age of the owner decreases sharply from 1.25 above (column 2) to 0.42 (column 3).

In column 4 of Table 1, we control for the manufacturing dummy, dummy for Kigali and firm-size. These controls do not cause much change to our main results. That is, the estimated

coefficient value of *Female* increases (in absolute value) marginally from -.124 above to -.131, significant at less than the 5 percent level. Managerial experience is significantly higher in manufacturing than service sector but there is no significant correlation between managerial experience and firm-size and location (*Kigali*). There is no change in the results for the remaining variables from above.

Controlling for the education level and the marital status of the manager makes no difference to the estimated coefficient value of *Female* – it remains almost unchanged from above in magnitude as well as significance level (column 5). Neither the education dummy nor the dummy for the marital status shows any significant relationship with the dependent variable. Further, there is no change from above in the results for the remaining variables.

The remaining controls are added to the specification in column 6. These controls include a dummy for a firm having more than one owner, dummy for firm having a fixed location, dummy for firm operating from outside vs. inside household premises and the dummy for use of machines by the firm. These controls cause the estimated coefficient value of *Female* to increase (in absolute value) from -.131 above to -.150, significant at less than the 5 percent level. Firms that use machines have managers with significantly more experience than firms that do not use machines. Further, there is no change from above in the results for the remaining controls.

Summarizing, estimation results show a statistically significant difference in managerial experience between male and female managers of informal firms in Rwanda. Specifically, the number of years of experience in the industry of a female manager ranges between 80 to 88 percent that of a male manager. This gender based difference in managerial experience is statistically significant and robust to a number of controls for firm as well as manager characteristics.

4. Some extensions of the results

As discussed above, we hypothesize that the gender based gap in managerial experience should be less pronounced (in absolute level) for the relatively younger managers. To test for this, we interact *Female* with the (log of) age of the manager and add the resulting interaction term to the specifications discussed above. We also include in our specification the interaction term between Female and Kigali to check if there is regional variation in the estimated relationship between managerial experience and the gender of the manager.

Regression results with the interaction terms included in the specification are provided in Table 3. These results show that the interaction term between *Female* and age of the manager is negative and significant at less than the 5 percent level and this holds irrespective of the set of controls shown. That is, the estimated relationship between *Female* and managerial experience is much more negative among the relatively older managers than the younger ones. For example, with all the controls in Table 3 in place and for the city of Kigali,[2] a move from a male to female manager implies that managerial experience (in log terms) decreases by .655 log points among firms with the oldest managers and this decrease is significant at the less than the 1 percent level. In contrast, there is almost no difference in managerial experience between female and male managers among the youngest managers in our sample. Note that the specification in Table 3 also includes the interaction term between *Kigali* and *Female*; however, excluding this interaction term does not cause any qualitative change to our results for the interaction term between *Female* and age of the manager (and vice versa).

[2] Note that the specification in column 6 of Table 3 includes the interaction term between Female and Kigali. So, the results discussed in this paragraph for the relationship between Female and the dependent variable varies between Kigali and Butare. However, the qualitative nature of the results discussed here is same whether we consider Kigali or Butaire.

We also experimented by checking if the strength of the relationship between *Female* and manager experience varies across different firm-types such as manufacturing vs. service sector firms, young vs. old firms and Kigali vs. Butare. We do find the regional dimension is significant here. That is, the relationship between *Female* and managerial experience is significantly negative in Butare but positive and insignificant in Kigali, and that this difference between Butare and Kigali is statistically significant at less than the 5 percent level. For example, evaluated at the median age of the managers in our sample, a move from male to female manager is associated with a decrease of .30 log points in managerial experience in Butaire, significant at less than the 1 percent level. In contrast, the corresponding change in Kigali is an increase of .016 log points, statistically insignificant at the 10 percent level or less. The finding suggests that it might be a fruitful idea to explore gender based differences in human capital at the sub-national rather than the national level.

5. Conclusion

Lower level of education or formal schooling among women relative to men in developing countries is a well known fact. However, schooling is only one dimension of human capital. There is substantial contribution of learning on the job or work experience to human capital. The present paper extends the literature on gender-based gap in education to gender-based gap in the number of years of experience that firm managers have working in the industry. Using the case of informal firms in Rwanda, our results confirm gender-based disparity in managerial experience; that is, female managers have on average fewer years of experience working in the industry than male managers. We also confirm that this gender based gap is much larger among

the relatively older managers and also among firms in the less developed city of Butare than in the more developed city of Kigali.

There is substantial scope for future work along the lines of the present paper. For example, it will be useful to understand the consequences as well as determinants of gender-based gap in manager's experience level. Comparing the impact of gender-based gap in formal education with the gap in manager's experience can shed important light on how to prioritize policies aimed at bridging the gender-based gap in income level and job opportunities.

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Table 1: Summary statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Experience (logs)	1.85	0.71	0	3.71
Female	0.34	0.47	0	1
Age of the manager (logs)	3.52	0.27	2.83	4.28
Age of the firm (logs)	1.58	0.79	0	3.71
Kigali (dummy)	0.54	0.50	0	1
Manufacturing (dummy)	0.67	0.47	0	1
Employment (logs)	0.62	0.69	0	3.26
Educated manager (dummy)	0.36	0.48	0	1
Manager is single (dummy)	0.28	0.45	0	1
Firm has more than 1 owner (dummy)	0.17	0.38	0	1
Firm has a physical location (dummy)	0.83	0.38	0	1
Firm operates from outside household premises (dummy)	0.80	0.40	0	1
Firm uses machines (dummy)	0.43	0.50	0	1

Table 2: Base regression results

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: *Experience*						
Female	-0.224**	-0.239***	-0.124**	-0.131**	-0.131**	-0.150**
	(0.020)	(0.008)	(0.049)	(0.037)	(0.035)	(0.018)
Age of the manager (logs)		1.254***	0.420***	0.445***	0.448***	0.507***
		(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Age of the firm (logs)			0.610***	0.563***	0.561***	0.557***
			(0.000)	(0.000)	(0.000)	(0.000)
Kigali (dummy)				-0.106	-0.101	-0.104
				(0.115)	(0.156)	(0.159)
Manufacturing (dummy)				0.172**	0.172**	0.141**
				(0.012)	(0.012)	(0.041)
Employment (logs)				0.087	0.090*	0.043
				(0.108)	(0.100)	(0.437)
Educated manager (dummy)					-0.028	-0.052
					(0.688)	(0.436)
Manager is single (dummy)					-0.003	0.007
					(0.974)	(0.932)
Firm has more than 1 owner (dummy)						0.148
						(0.108)
Firm has a physical location (dummy)						0.047
						(0.553)
Firm operates from outside household premises (dummy)						-0.040
						(0.588)
Firm uses machinery (dummy)						0.193***
						(0.004)
Observations	219	219	219	219	219	219
R-squared	0.022	0.243	0.602	0.632	0.633	0.657

p-values in brackets. Significance level is denoted by *** (1%), ** (5%) and * (10%). Standard errors used are Huber-White robust and the estimation method used in OLS.

Table 3: Results with interaction terms

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: *Experience*						
***Female* * Age of the manager (logs)**	**-0.914****		**-0.924****	**-0.449****	**-0.475****	**-0.452****
	(0.017)		**(0.013)**	**(0.030)**	**(0.029)**	**(0.042)**
Female * Kigali		**0.394****	**0.403****	**0.306****	**0.302****	**0.316****
		(0.041)	**(0.022)**	**(0.011)**	**(0.013)**	**(0.010)**
Female	2.983**	-0.444***	2.790**	1.288*	1.385*	1.280
	(0.026)	(0.008)	(0.036)	(0.076)	(0.071)	(0.101)
Age of the manager (logs)	1.516***		1.525***	0.596***	0.631***	0.688***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
Kigali (dummy)		-0.476***	-0.485***	-0.219**	-0.210**	-0.222**
		(0.000)	(0.000)	(0.012)	(0.020)	(0.016)
Age of the firm (logs)				0.543***	0.540***	0.538***
				(0.000)	(0.000)	(0.000)
Manufacturing (dummy)				0.163**	0.165**	0.144**
				(0.015)	(0.014)	(0.036)
Employment (logs)				0.108**	0.113**	0.062
				(0.039)	(0.033)	(0.247)
Educated manager (dummy)					-0.030	-0.052
					(0.665)	(0.438)
Manager is single (dummy)					0.022	0.032
					(0.779)	(0.686)
Firm has more than 1 owner (dummy)						0.169*
						(0.071)
Firm has a physical location (dummy)						0.073
						(0.373)
Firm operates from outside household premises (dummy)						-0.040
						(0.599)
Firm uses machinery (dummy)						0.176***
						(0.008)
Observations	219	219	219	219	219	219
R-squared	0.267	0.097	0.345	0.648	0.648	0.673

p-values in brackets. Significance level is denoted by *** (1%), ** (5%) and * (10%). Standard errors used are Huber-White robust and the estimation method used in OLS.