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Are there more female managers in the retail sector? Evidence from survey data in developing countries



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## **ARE THERE MORE FEMALE MANAGERS IN THE RETAIL SECTOR? EVIDENCE FROM SURVEY DATA IN DEVELOPING COUNTRIES**

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Using firm-level data for 87 developing countries, the paper analyzes how the likelihood of a firm having female vs. male top manager varies across sectors. The service sector is often considered to be more favorable towards women compared with men vis-à-vis the manufacturing sector. While our exploration of the data confirm a significantly higher presence of female managers in services vs. manufacturing, the finding is entirely driven by the retail firms with little contribution from other service sectors such as wholesale, construction and other services. We also find that the greater presence of female managers in the retail sector vs. manufacturing is much higher among the relatively small firms and firms located in the relatively small cities. These findings could serve as useful inputs for the design of optimal policy measures aimed at promoting gender equality in a country.

*JEL classification codes:* J16, G30

*Key words:* gender, labor market, managers, retail sector

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## I. Introduction

A number of studies have documented gender-based disparities favoring men over women in labor market participation rates and wages (Duflo 2005; Tzannatos Zafiris 1999). Studies have also found that men and women workers and owners tend to be concentrated in different sectors and occupations. In other words, relative to men, certain sectors or jobs seem to be more favorable towards females than other sectors or jobs. For example, one view is that relative to men, women have a comparative advantage in occupations that require less use of brawns and greater use of brains (Rendall 2010). Another view is that in a majority of countries, females are the primary caregivers in the family affecting their labor market participation, wages and also the types of jobs they can undertake (Becker 1985; Bielby and Bielby 1988; Hundley 2000 and Lombard 2001). Of course, in addition to self-selection by females, employer discrimination against females could be another explanation for the observed occupation segregation along gender lines.

The present paper contributes to the above literature by focusing on the gender of the top managers of private firms in developing countries and how the gender composition of the managers varies across sectors. For the sectors, we first compare the services sector as a whole with the manufacturing sector and then single out the retail sector as unique and different from other services sectors. A greater presence of female workers and female entrepreneurs in the services sector compared to manufacturing has been noted in the literature (World Bank 2012; Dolado et al. 2004; ILO 2012). The retail sector has also been singled out as especially important for female entrepreneurs as, for example, in the Sub-Saharan Africa and Eastern Europe and Central Asia regions (Bardasi et al. 2011). Nevertheless, our focus on the gender composition of top managers using cross-country comparable firm-level data across a wide spectrum of 87 developing countries is a rarity in the existing literature.

Presence of female top managers is not uncommon in our sample. Projecting to the private non-agricultural part of the economies that is targeted by the survey, 18.8 percent of the firms have a female top manager. Our exploration of the data confirms that the presence of female vs. male managers is significantly higher in the service sectors relative to manufacturing. However, this difference between service and manufacturing sectors is entirely due to firms in the retail sector with little contribution from the remaining service sectors such as wholesale,

construction services and the residual category of other services. In other words, for gender composition of top managers, the retail sector is special not just vis-à-vis the manufacturing sector but also the rest of the service sectors. For example, our findings show that depending on the specification used, the likelihood of having a female manager is higher for a retail firm compared with a firm in the manufacturing sector by 4.5 to 8.1 percentage points. The difference is statistically significant and also economically large given that in the full sample only 18.8 percent of the firms have a female manager. We also find strong evidence that the proportion of female managers in the retail sector vis-à-vis manufacturing or the rest of the economy is particularly high among the relatively small firms and among firms located in the relatively small cities in our sample. Hence, use of firm-level or micro data is helpful in order to explore heterogeneity across data points within a sector – a possibility that is not available using macro or industry level data.

The findings from this study could be useful from the policy point of view. Given a greater presence of top female managers in the retail sector, policies aimed at improving the livelihood of females may find it attractive and optimal to expand the retail sector through appropriate measures such as reducing entry barriers, providing better access to finance and improving the business climate. Furthermore, policies that benefit small firms and improve public amenities in small cities may also increase female presence in top managerial presence in retail firms.

While having more female managers of firms contributes directly to the cause of gender equality and better opportunities for women, other indirect effects cannot be ruled out. For example, anecdotal evidence suggests that females in top positions tend to serve as role models for other women encouraging them to seek education and jobs; females in top managerial positions are also less likely to discriminate against other females seeking jobs (the so called “Revolving door hypothesis”). In fact, in our sample, we do find that female employment is significantly higher among firms with female managers than male managers.<sup>1</sup> The broader positive effects of gender equality on the economy have been well documented in the literature (Klasen and Lamanna 2009; Dollar and Gatti 1999).

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<sup>1</sup> This result holds with or without controlling for firm-size (total number of employees at the firm).

To summarize, this study contributes to the literature in the following ways: (i) it investigates the relationship between a firm's sector and the likelihood of having a female top manager complementing the literature on female firm ownership and female employment (ii) uses a sample of unique cross-country firm level datasets for developing countries that follow the same sampling methodology and design allowing for cross-country comparisons, and (iii) shows that female presence in top managerial positions is much higher among retail firms when compared with the other sectors and that this difference between retail firms and the rest is magnified among the relatively smaller firms and firms located in the relatively smaller cities. The structure of the remaining sections is as follows. In section II, we introduce the data and discuss the variables along with the estimation method used for the regression analysis. Our main regression results are provided in Section III. In section IV, we discuss some extension of the main results. The concluding section summarizes the main findings of the paper.

## **II. Data and main variables**

The main data source we use consists of firm-level surveys for 87 developing countries conducted by the World Bank's Enterprise Surveys between 2007 and 2009. Table 1 contains the list of countries in our sample along with the sample size (number of firms) for each survey. These surveys were conducted in some cases across the whole region (such as Latin America and Eastern Europe and Central Asia) and sometimes in individual countries. However, a common sampling methodology – stratified random sampling – was followed in all the surveys along with a common questionnaire. The sample for each country was stratified by firm-size, sector of activity and location within the country. Weights are provided in the survey to ensure that the sample is representative of the non-agricultural private sector of the economy. We note that Enterprise Surveys cover manufacturing as well as services sectors but certain services such as education and health are not covered. Also, the primary sector, which encompasses agriculture, mining, forestry, etc., is also excluded from the survey. Finally, the sample we use is a pure cross section of firms with one observation per firm. We also use the latest round of the survey conducted in each country. Enterprise Surveys does provide panel data with more than one observation per firm, but currently these data are limited in size and are available for only a handful of countries.

Table 1. List of countries and sample size

Country	Number of firms	Country	Number of firms
<i>Afghanistan</i>	487	Kyrgyz Republic	227
<i>Angola</i>	172	Latvia	243
<i>Antigua and Barbuda</i>	147	Lesotho	68
<i>Argentina</i>	995	Liberia	29
<i>Armenia</i>	344	Lithuania	236
<i>Azerbaijan</i>	286	Macedonia, FYR	301
<i>Bahamas, The</i>	133	Madagascar	199
<i>Barbados</i>	135	Malawi	136
<i>Belarus</i>	230	Mali	215
<i>Belize</i>	150	Mauritius	120
<i>Benin</i>	74	Mexico	1,420
<i>Bolivia</i>	324	Moldova	336
<i>Bosnia and Herzegovina</i>	300	Mongolia	345
<i>Botswana</i>	252	Montenegro	80
<i>Brazil</i>	1,697	Nepal	363
<i>Bulgaria</i>	249	Nicaragua	308
<i>Burkina Faso</i>	283	Niger	101
<i>Cameroon</i>	339	Panama	318
<i>Cape Verde</i>	85	Paraguay	342
<i>Chad</i>	120	Peru	992
<i>Chile</i>	1,006	Philippines	1,210
<i>Colombia</i>	929	Poland	281
<i>Congo, Dem. Rep.</i>	305	Romania	395
<i>Congo, Rep.</i>	32	Russian Federation	858
<i>Costa Rica</i>	524	Serbia	358
<i>Cote d'Ivoire</i>	144	Sierra Leone	45
<i>Czech Republic</i>	191	Slovak Republic	174
<i>Dominica</i>	150	Slovenia	257
<i>Dominican Republic</i>	325	Sri Lanka	546
<i>Ecuador</i>	358	St. Kitts and Nevis	142
<i>El Salvador</i>	336	St. Lucia	150
<i>Eritrea</i>	117	St. Vincent & the Grenadines	136
<i>Estonia</i>	240	Suriname	152
<i>Gabon</i>	46	Tajikistan	327
<i>Georgia</i>	275	Togo	104
<i>Grenada</i>	146	Trinidad and Tobago	354
<i>Guatemala</i>	566	Turkey	984
<i>Guyana</i>	158	Ukraine	676
<i>Honduras</i>	319	Uruguay	577
<i>Hungary</i>	272	Uzbekistan	355
<i>Indonesia</i>	1,289	Venezuela, RB	287
<i>Jamaica</i>	268	Vietnam	944
<i>Kazakhstan</i>	438	Yemen, Rep.	435
<i>Kosovo</i>	187	Total (all firms)	31,549

The regression results discussed below are obtained from a logit estimation with Huber-White robust standard errors and clustered on the country level. Marginal effects from the logit estimation discussed below are calculated at the mean value of the all the explanatory variables. We note that all the variables used in the regressions below are taken from Enterprise Surveys. Summary statistics of all the variables used are provided in Table 2. Correlations between the various explanatory variables used are provided in Table 3.

**Table 2. Summary statistics**

Variable	Mean	Standard deviation	Minimum	Maximum
<i>Female</i>	0.19	0.39	0	1
<i>Services</i>	0.71	0.46	0	1
<i>Retail</i>	0.22	0.42	0	1
<i>Wholesale</i>	0.12	0.33	0	1
<i>Construction</i>	0.09	0.28	0	1
<i>Other services</i>	0.27	0.45	0	1
<i>Employment (log)</i>	2.76	1.16	0	11.07
<i>Large city</i>	0.53	0.50	0	1
<i>Age of firm (log)</i>	2.48	0.81	0	5.83
<i>Time tax</i>	12.49	19.07	0	100
<i>Crime</i>	0.25	0.43	0	1
<i>Exports</i>	7.44	21.98	0	100

Number of observations (firms): 31,549.

**Table 3. Correlations between explanatory variables**

	Services	Retail	Wholesale	Construction	Other services	Employment (log)	Large city	Age of firm (log)	Time tax	Crime
<i>Services</i>	1									
<i>Retail</i>	0.345	1								
<i>Wholesale</i>	0.240	-0.200	1							
<i>Construction</i>	0.200	-0.166	-0.116	1						
<i>Other services</i>	0.396	-0.329	-0.229	-0.191	1					
<i>Employment (log)</i>	-0.152	-0.138	-0.042	0.067	-0.038	1				
<i>Large city</i>	-0.016	-0.023	0.080	-0.013	-0.046	0.035	1			
<i>Age of firm (log)</i>	-0.088	-0.015	-0.025	-0.043	-0.031	0.275	-0.046	1		
<i>Time tax</i>	0.001	-0.030	0.049	0.015	-0.016	0.061	0.066	0.023	1	
<i>Crime</i>	0.080	0.068	-0.019	0.044	0.004	0.129	0.032	0.070	0.065	1
<i>Exports</i>	-0.127	-0.121	-0.011	-0.079	0.041	0.181	-0.070	0.019	-0.002	-0.029

Note: Number of observations (firms): 31,549.

### **A. Dependent variable**

Our dependent variable is a dummy variable equal to 1 if the top manager of the firm is female and 0 otherwise (*Female*). In the full sample, 18.8 percent of the firms have a female top manager. The percentage figure varies between 0.16 (Yemen) and 37.1 (St. Vincent and the Grenadines). In the remainder of the paper, we will use the term female managers interchangeably with the likelihood of a firm having a female manager or the proportion of managers that are female for a specified set of firms.

### **B. Main explanatory variable**

Our main explanatory variables include dummy variables indicating the sector to which the firm belongs. We begin by analyzing the presence of female managers in services as a whole vs. manufacturing sector. To this end, we define a dummy variable equal to 1 if the firm belongs to the service sectors and 0 otherwise (*Services*). Next, we analyze how the individual service sectors compare with manufacturing and retail sectors as far as the proportion of female managers are concerned. For this purpose, we introduce a dummy variable equal to 1 if the firm belongs to the retail sector and 0 otherwise (*Retail*), a dummy variable equal to 1 if the firm is engaged in wholesale activity and 0 otherwise (*Wholesale*), a dummy variable equal to 1 if the firm belongs to the construction services sector and 0 otherwise (*Construction*) and a dummy variable equal to 1 if the firm belongs to any of the remaining service sectors (i.e., service sectors other than retail, wholesale and construction) and 0 otherwise (*Other services*). In our sample, about 22.3 percent of the firms belong to the retail sector, 12.2 to the wholesale sector, 8.8 percent to the construction sector, 27.4 percent belong to the other services sector and the remaining 29.3 belong to the manufacturing sector.

Our main focus in this paper is to document how the presence of female managers differs across sectors and not to explain why this is so. That is, the paper is descriptive rather than analytical, an approach dictated by data limitations rather than by choice. Nevertheless, we control for some important firm and country level characteristics which helps in two ways. First, the controls help eliminate some possible sources of omitted variable bias problem. That is, some firm or country level covariates of the likelihood of a firm having a female manager may happen to vary systematically across the various sectors listed above even though these characteristics cannot be given a sector specific interpretation. For example, it is



possible that richer countries have a more developed and larger service sector; at the same time, richer countries may have better education opportunities for females and therefore more female managers relative to males. The structure of the arguments here implies a positive correlation between the service sector and the presence of female managers spuriously driven by differences in income levels across countries. Second, the controls help to eliminate and therefore narrow down some of the possible explanations or channels through which sector specific features may affect the presence of female managers. For example, controlling for firm-size (as we do below) implies that the sector specific differences, if any, in the proportion of female managers is not due to differences in firm-size across sectors. The search for the underlying causal factors for our main results can now focus on factors other than firm-size.

For country characteristics, we control for all country specific factors using country fixed effects or dummy variables indicating the country to which a firm belongs. We note that country fixed effects filter out all country specific factors that are common to all firms within a country but vary across countries such as the level of overall development, quality of institutions, socio-cultural factors affecting female employment, etc. With country fixed effects in place, the identification of our result (likelihood of a firm having a female manager) comes from differences across sectors within a country rather than from differences across countries. This is helpful in that cross-country differences are known to be particularly sensitive to the omitted variable bias problem.

For firm-level variables that vary within a country, we control for basic firm characteristics, known to be important for various aspects of the firm's structure and conduct. We also control for some proxy measures of the quality of the business environment as experienced by the firms. For example, concerns about crime and security could deter female participation in labor markets and more so than for men. If the level and severity of crime is localized or varies within a country, as it appears to be the case, the country fixed effects are not enough to eliminate crime from spuriously affecting our results. Briefly, the firm-level controls we use are as follows: the (log of) number of permanent full-time employees at the end of the fiscal year prior to the survey (*Employment*); (log of) age of the firm; and a dummy variable equal to 1 if the city where the firm is located is the capital city or has a population of 1 million or more and 0 otherwise (*Large city*), percentage of firm's output during the last year that was exported either directly or indirectly through a third party (*Exports*), a dummy variable equal to 1 if the firm experienced

losses due to crime during the last year and 0 otherwise (*Crime*), and a measure of the regulatory burden at the firm level captured by the percentage of senior management's time spent in dealing with government regulations (*Time tax*).

### III. Estimation

Our baseline regression results are provided in Table 4. These results pertain to the linear model and hence exclude any interaction terms. The estimates shown in the table are the log odds ratios obtained using a logit specification with *Female* as the dependent variable. We focus on the results in log odds ratios rather than marginal effects; the marginal effects are discussed but only briefly. We do so to be consistent with the non-linear specification that we consider in the next section. As is well known, computing marginal effects in a non-linear model is complicated and the plethora of the estimates available can easily become unwieldy (Ai and Norton 2003; Puhani 2004).

To begin with, we check how the likelihood of having a female manager varies between the service and manufacturing sectors without any additional controls. As shown in column (1) of table 4, moving from the manufacturing to the service sector increases the likelihood of a firm having a female manager in a statistically significant way. The log odds ratio is 0.176, significant at less than the 5 percent level. The associated marginal effect is an increase of 2.6 percentage points against the sample mean value of 18.8 percent of the dependent variable.

As discussed in the introduction, we would like to check if the higher presence of female managers in the service sector is common to all the service sub-sectors or is it just due to a particular sector such as retailing. To this end, in column (2), we provide results for the proportion of female managers in the retail sector vs. the rest of the economy. The estimated log odds ratio of *Retail* is positive, statistically significant at less than the 1 percent level. Specifically, a move from the rest of the economy to the retail sector is associated with an increase in the estimated log odds ratio from 0.176 for *Services* (column 1) to 0.494 for *Retail* (column 2). The associated marginal effect implies a large 8.1 percentage point increase in the likelihood of a firm having a female manager when we move from the rest of the economy to the retail sector. In fact, the statistically significant effect we mentioned above for the *Services* dummy (column 1) disappears completely (becomes insignificant and small in magnitude) once we control for the *Retail*

dummy (not shown). What this suggests is that much of the difference in the proportion of female managers between manufacturing and service sectors as a whole is driven by firms in the retail sector with little contribution from the remaining service sectors. We confirm this hypothesis below.

**Table 4. Base regression results (logit specification, log odds ratios)**

Dependent variable: Female	(1)	(2)	(3)	(4)	(5)
<i>Services</i>	0.176** (0.080)				
<i>Retail</i>		0.494*** (0.081)	0.497*** (0.092)	0.341*** (0.093)	0.324*** (0.092)
<i>Wholesale</i>			-0.093 (0.149)	-0.182 (0.155)	-0.201 (0.160)
<i>Construction</i>			-0.545*** (0.153)	-0.581*** (0.158)	-0.649*** (0.161)
<i>Other services</i>			0.182* (0.103)	0.080 (0.099)	0.077 (0.092)
<i>Employment (log)</i>				-0.260*** (0.035)	-0.288*** (0.034)
<i>Large city</i>				-0.192** (0.096)	0.079 (0.089)
<i>Age of firm (log)</i>				-0.021 (0.049)	-0.052 (0.048)
<i>Time tax</i>				0.001 (0.002)	0.001 (0.002)
<i>Crime</i>				0.129* (0.074)	0.082 (0.073)
<i>Exports</i>				0.000 (0.002)	-0.001 (0.002)
<i>Country fixed effects</i>					Yes
<i>Pseudo R-squared</i>	0.001	0.007	0.012	0.025	0.078
<i>Observations</i>	31,549	31,549	31,549	31,549	31549

Note: Brackets contain standard errors that are Huber-White robust and clustered on the country. Significance level is denoted by \*\*\* (1%), \*\* (5 percent) and \* (10%). Estimates shown are log odds ratios obtained from Logit estimation. All regressions use a constant term (not shown).

We now proceed to add the dummy variables for the remaining sub-sectors within services (column 3). We note that the omitted category here is the manufacturing sector so the results shown for the various service sectors are relative to the omitted manufacturing sector. Column (3) reveals two sets of results. First, the estimated log odds ratio of *Retail* remains positive and statistically significant at less than the 1 percent level. This magnitude of *Retail* relative to the rest of the economy is almost unchanged from the estimated log odds ratio in column (2) discussed above. Second, relative to the manufacturing sector, the probability of a firm having a female manager is significantly lower in construction services, not too different (statistically) in the wholesale sector and only weakly higher (at the 10 percent level) in the other services sector. However, this weak result for the other services sector is not robust as it disappears (becomes statistically insignificant) when we control for factors such as firm-size (discussed below). In short, the higher proportion of female managers we found above for the services as a whole relative to manufacturing appears to be entirely driven by the retail sector; the remaining service sectors do not show any robust and significantly higher proportion of female managers when compared with the manufacturing sector. Below, we argue that retail is special for female managers not just when compared with manufacturing but also when compared with the remaining service sectors.

The various firm-level controls mentioned above are added to the specification in column (4). Adding these controls causes the estimated log odds ratio of *Retail* to decrease from 0.497 in column 3 to 0.341 in column (4). The decrease is largely due to the control for firm-size. However, it is still positive, economically large and statistically significant at less than the 1 percent level. The associated marginal effect here implies an increase of 5.3 percentage points in the likelihood of a firm having a female manager when we move from manufacturing to the retail sector. This is a large effect even though it is lower than the 8.1 percentage point increase we found above in column (3).

There is not much change from above in the results for the remaining service sectors except that the estimated log odds ratio of other services sector dummy is now statistically insignificant (at the 10 percent level or less) and much smaller in magnitude than what we found above (0.182 in column 3 versus 0.080 in column 4). For the firm-level controls, we find two significant results. First, the likelihood of a firm having a female manager is significantly lower among the relatively large firms (log odds ratio of -0.260) and among firms in the relatively large cities (log

odds ratio of -0.192). There is also a weak (significant at the 10 percent level) positive correlation between the incidence of crime and *Female* but this correlation is not too robust as it disappears when we control for country specific factors (see below).

Country fixed effects are added to the specification above in column (5). The estimated log odds ratio of *Retail* decreases only slightly from 0.341 (column 4) to 0.324 (column 5), still significant at less than the 1 percent level. The associated marginal effect is an increase of 4.5 percentage points in the likelihood of a firm having a female manager when we move from manufacturing to the retail sector. This is a large effect even though it is lower than the corresponding marginal effect of 5.3 percentage point we found in column (4).

As above, the construction services dummy and *Employment* continue to show a statistically significant negative correlation with the likelihood of having a female manager; however, none of the service sectors or the firm-level controls, including city size, show any significant correlation with the dependent variable.

We also checked for any significant difference in the proportion of female managers between retail and the remaining service sectors. We find that for all the specifications discussed above, the likelihood of having a female manager is much higher, economically and statistically (significant at less than the 1 percent level) among retail firms compared with any of the remaining service sectors (not shown), and this holds irrespective of the set of controls used above. Hence, retail is special not just vis-à-vis manufacturing but also when compared with the other services sectors.

#### **IV. Extensions**

In this section, we explore how the strength of the relationship between *Retail* and *Female* varies, if at all, across firms of different types. Specifically, we consider how the strength of the relationship varies between small vs. large firms (that is, with *Employment*) and for firms located in small vs. large cities (that is, with *Large city*). To this end, we interact *Retail* with *Employment* and *Retail* with *Large city* and add these interaction terms to the specifications discussed above.

**Table 5. Results using Interaction terms (logit specification, log odds ratios)**

Dependent variable: Female	(1)	(2)	(3)	(4)	(5)	(6)
<i>Retail</i>	0.781*** (0.228)	0.815*** (0.212)	0.552*** (0.105)	0.501*** (0.113)	0.979*** (0.205)	1.281*** (0.259)
<i>Wholesale</i>	-0.198 (0.388)	-0.158 (0.427)	-0.082 (0.185)	-0.141 (0.200)	-0.095 (0.374)	-0.610 (0.441)
<i>Construction</i>	-0.888** (0.437)	-0.947** (0.452)	-0.699*** (0.245)	-0.764*** (0.234)	-1.051** (0.479)	-1.185** (0.599)
<i>Other services</i>	0.207 (0.302)	0.167 (0.270)	0.342*** (0.117)	0.259** (0.125)	0.329 (0.252)	0.260 (0.293)
<i>Employment (log)</i>	-0.217*** (0.044)	-0.242*** (0.039)	-0.257*** (0.035)	-0.285*** (0.034)	-0.242*** (0.039)	-0.197*** (0.048)
<i>Large city</i>	-0.191** (0.096)	0.083 (0.089)	0.083 (0.117)	0.269** (0.118)	0.270** (0.117)	0.503* (0.291)
<i>Retail*Employment</i>	-0.183** (0.074)	-0.204*** (0.071)			-0.201*** (0.071)	-0.324*** (0.093)
<i>Wholesale*Employment</i>	0.012 (0.112)	-0.011 (0.126)			-0.011 (0.130)	0.203 (0.128)
<i>Construction*Employment</i>	0.108 (0.121)	0.104 (0.131)			0.102 (0.128)	0.147 (0.152)
<i>Other services*Employment</i>	-0.045 (0.096)	-0.031 (0.087)			-0.023 (0.088)	0.012 (0.094)
<i>Retail*Large city</i>			-0.410*** (0.146)	-0.350** (0.155)	-0.343** (0.157)	-0.915** (0.424)
<i>Wholesale*Large city</i>			-0.197 (0.265)	-0.127 (0.279)	-0.132 (0.286)	0.841 (0.843)
<i>Construction*Large city</i>			0.236 (0.312)	0.222 (0.315)	0.213 (0.310)	0.427 (0.893)
<i>Other services*Large city</i>			-0.539*** (0.206)	-0.376* (0.204)	-0.378* (0.207)	-0.135 (0.512)
<i>Employment*Large city</i>						-0.082 (0.079)
<i>Retail*Employment*Large city</i>						0.232 (0.145)
<i>Wholesale*Employment*Large city</i>						-0.404 (0.269)
<i>Construction*Employment*Large city</i>						-0.073 (0.266)
<i>Other services*Employment*Large city</i>						-0.107 (0.150)
<i>Age of firm (log)</i>	-0.020 (0.049)	-0.052 (0.047)	-0.024 (0.048)	-0.054 (0.047)	-0.054 (0.047)	-0.053 (0.046)
<i>Time tax</i>	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
<i>Crime</i>	0.129* (0.075)	0.082 (0.074)	0.133* (0.074)	0.083 (0.073)	0.083 (0.074)	0.087 (0.073)
<i>Exports</i>	-0.000 (0.002)	-0.001 (0.002)	0.000 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
<i>Country fixed effects</i>		Yes		Yes	Yes	Yes
<i>Pseudo R-squared</i>	0.026	0.079	0.028	0.08	0.08	0.082

Note: See the note at the bottom of Table 4. Sample size for all the regressions is 31,549.

Regression results with the interaction terms are provided in Table 5. These results are the estimated log odds ratios obtained using a logit specification. Results for the interaction term with firm-size are provided in columns (1) and (2) and for city size in columns (3) and (4); column (5) contains the results controlling for both the interaction terms simultaneously. In column (6) we add a triple interaction term between firm-size, employment and retail dummy to check if the difference in the proportion of female managers between retail and other sectors is stronger among smaller firms and more so when the firm is located in a large or small city.<sup>2</sup> These results show that both the interaction terms of the retail dummy with firm-size and location are negative and statistically significant at less than the 5 percent level. In other words, the estimated positive relationship between *Retail* and *Female* we found above is significantly stronger (more positive) among the relatively smaller firms (lower values of *Employment*) and in the relatively smaller cities (lower value of *Large city*). For example, the estimated log odds ratio equals a large 0.815 at the smallest value of *Employment* but it declines sharply by 0.58 for each standard deviation increase in the value of *Employment* (based on results in column 2). Similarly, based on the estimates in column (4), the estimated log odds ratio between *Female* and *Retail* equals 0.501 in the relatively smaller cities and a much lower 0.151 in the relatively larger cities. The stated heterogeneity is important not just for academic reasons but also for the appropriate design and targeting of policies aimed at improving female participation in top managerial positions. We note that the above results for the interaction term continue to hold even if we include the interaction terms for employment and large firm simultaneously in the specification (column 5). The same holds when we add the triple interaction term to the specification above (column 6). The log odds ratio for the triple interaction term is positive but statistically weak and insignificant at the 10 percent level or less (p-value of .109).

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<sup>2</sup> We would like to thank an anonymous referee for suggesting the triple interaction term.

## V. Conclusion

Using firm-level data for 87 developing countries and focusing on the proportion of female top managers of firms, we find that the percentage of female managers is much higher in the service sector than manufacturing sector. However, this result is entirely due to firms in the retail sector which has more female managers when compared with the manufacturing sector and also when compared with the remaining service sectors. We also find that the higher percentage of female managers in the retail sector vis-à-vis manufacturing is not uniform - it is much larger for the relatively smaller firms and for firms located in the relatively smaller cities.

As previously mentioned, we do not identify any causal relationships that would explain the differences in female participation in management across sectors. However, we can hypothesize potential reasons for such sector differentials. One possibility could be that the retail sector does not require much technical expertise unlike some of the other services and this is advantageous to women who tend to lag behind men in education in developing economies. At the same time, the retail sector is considered less intensive in “brawn” and more intensive in “brains” than manufacturing and this is attractive for women since they enjoy comparative advantage in brains vs. brawns when compared with men (Rendall 2010). Another possibility is that retail activity is often operated on a small scale and in residential areas or safe localities within cities or towns. Women managers may find these features attractive due to safety concerns and the need to balance family responsibilities with work life. It is also possible that more than men, women may prefer to be self-employed as this offers maximum flexibility in terms of working hours, location of work and protection from possible harassment. Furthermore, given that women have greater difficulty in accessing finance than men, the small scale nature of the retail sector, as well as the relatively small initial investment required for retail as opposed to manufacturing, does make the retail sector more accessible for women given their prevailing financial constraints. We hope that the present paper provides ample motivation for future work to explore these or other factors that would explain female participation in top management of private firms in the developing world.



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