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# Female Top Managers and Perceived Obstacles by Indian Firms: Does Economic Freedom Help?

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**Abstract**

Using firm level data for India, we explore if perceived obstacles by firms (either in the form of corruption or in accessing finance) lower the probability of females being in top management. Our results show strength of perceived obstacles matter. When firms perceive severe or very severe obstacles in the form corruption, the probability of female being a top manager becomes insignificant. Yet, the same probability increases for firms perceiving minor or moderate corruption. For perceived obstacle in accessing finance, the probability is positive for minor perceived obstacles and goes down for stronger perceived obstacles by firms. Our secondary analysis shows that economic freedom affects this relationship. Economic freedom boosts the probability of females being in top management when firms perceive severe or very severe obstacles (either corruption or difficulties in accessing finance).

Keywords: *India; Firm level; perceived obstacles; senior female managers; economic freedom*
JEL Classification: D22; O53; J16; D73; o17

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Development Bank (2015) states that women hold only 17 percent of board directorships in the world's 200 largest companies. Though not an extensive literature but a few studies[1] have stressed supply side explanations regarding the prevalent gender gap in top management. These can be based on lower educational attainment or skill among women, and differences in preferences of females about pursuing management positions (Ayalew, Manian and Sheth, 2021; African Development Bank, 2015; Sandberg and Scovell, 2013; Niederle and Vesterlund, 2011). Other studies (see Bertrand and Duflo, 2016 for example) stress demand side factors like discrimination from "above" in the hiring and promotion processes. Using a lab in the field experiment for Ethiopia, Ayalew, Manian and Sheth (2021) provide evidence for belief- based discrimination showing that discrimination from below (gender discrimination by subordinates) can reduce female performance relative to an otherwise identical male leader. Yet, the findings are not unambiguous in the literature. Using employer-

Our results indeed show that perceived obstacles by firms in terms of facing corruption or barriers in accessing credit do lower the probability of having females in top management. Interestingly, we find that the probability is only lower when firms perceive moderate to severe obstacles. Further, our results also show that firms located in states experiencing rise in economic freedom also benefit in terms of gaining in probability to have a female in top management role. Specifically, the results point out that firms who perceive severe or very severe obstacles ( either in the form or corruption or difficulties in accessing finance) benefit the most when economic freedom rises. For those firms experiencing severe obstacles, rise in economic freedom enhances the probability of having a female in top management.

Our paper is organized as follows. Section 2 describes data, the sample and the variables. In Section 3, we describe the specifications and empirical methodology. Section 4 summarizes our benchmark results. In Section 5, we talk about the role of economic freedom in the context of strength of perceived obstacles. Section 6 concludes.

## 2. DATA DESCRIPTION, THE SAMPLE AND THE VARIABLES

### 2.1.

infrastructure, management policies, business-government relations, regulations and competition are included in the survey. The survey also includes information on firms' perceptions of different kinds of obstacles in terms of accessing finance, corruption, and other infrastructure related obstacles. The Enterprise Survey (ES) methodology employs a consistent definition of the universe of inference along with a uniform methodology of implementation as well as a standard sampling methodology (Islam, Muzi and Meza, 2018). Non-responses are accounted for by sampling weights.

### 2.2. Our sample

The most recent wave of data, 2022, is considered for our empirical analysis that includes firm responses from 22 states and 2 union territories --- Delhi and Jammu and Kashmir. For the year 2022, response rates as share of sample observations are equally distributed among the s

Our main independent variables of interest consist of measures of perceived barriers for firms. The first considered independent variable is a measure of firms' perception of corruption. The specific question asked is " how much of an obstacle is corruption?". The goal of the question is to assess to what extent firms consider corruption as an obstacle to current operations of the establishment. The survey categorizes corruption as an obstacle in five levels. The categories are - no obstacle, minor obstacle, moderate obstacle, major obstacle and very severe obstacle.

Our benchmark analysis employs an ordered dummy variable ranging from 0 to 4 with 0 indicating no obstacle and higher numbers representing greater perceived obstacle. The mean for our variable is 1.13. About 5.5 percent of firms in our sample state facing 'very severe obstacle'. Almost 30 percent of our sample respond facing 'moderate' to 'severe corruption'. We have about 44 percent of firms in our sample who respond facing 'no obstacle' in terms of corruption. Interestingly, we find that about 16 percent of small firms respond facing 'no obstacle' in terms of corruption. About 13 percent of small firms perceive 'moderate' to 'severe' to 'very severe' corruption. Our analysis also employs binary dummies based on the perceived corruption variable when we consider granular analysis to delve deeper into our hypothesis. The variable "corrmaj" is a dummy assigned 1 when firms perceive *severe* or

Finally, our other independent variable of interest is a measure of economic institutions for Indian states – in our case, economic freedom. An extensive literature has stressed the beneficial role of economic freedom for varying economic outcomes. These economic outcomes not only include lowering corruption but also generating more entrepreneurial opportunities and higher rates of entrepreneurship (Dutta and Sobel, 2021; Hall and Lawson, 2014; Carden and Verdon, 2010; Sobel (2008, 2015); Hall and Sobel, 2008; Kreft and Sobel, 2005; Shen and Williamson, 2005; Graeff and Mehlkop, 2003; Paldam, 2002; Chafuen and Guzman, 2000; Holcombe, 1998). Factors like secure private-property rights, a non-corrupt and independent judicial system, contract enforcements, free trade, monetary stability and effective limits on government taxation and regulation embody the idea of economic freedom.

For our study, the source for economic freedom data for India comes from the 'Economic Freedom of the States of India 2013' (EFSI) report. This index is based on the Fraser Institute's *Economic Freedom of the World* (EFW) report which that has been used by multiple cross country panel studies like the ones cited above. For 20 states in India, Cato Institute[3] published the EFSI providing information on economic freedom for the years 2005, 2009, 2011, and 2013.Though the original EFW index has five components, EFSI reports data for three categories - size of government, legal structure and property rights, and regulation of labor and business. As mentioned earlier, as a starting point we consider 2009 economic freedom values for our benchmark analysis subsequently considering other years as part of robustness analysis. The data varies from 0 to 1 with higher magnitude indicating greater economic freedom. We rescale the data for our analysis so that it ranges from 0 to 10. The mean is 3.9 for our sample with the maximum being 5.9 and the minimum value being 2.9.

[3] The Cato Institute is an American libertarian think tank headquartered in Washington, D.C. Obtained from https://www.cato.org/economic-freedom-states-india.

For our benchmark analysis, the other controls considered are age of the firm, if the firm has an international quality recognition or not, and percent of ownership of the largest owner of the firm. For the latter, we consider a dummy that is assigned 1 if the largest owner owns 100% of the firm. Firms operating in international markets are more likely to innovate since they face greater market competitiveness ( Pellegrino and Savona, 2017; Narula and Zanfel, 2003). Thus, such firms might also be prone to breaking stereotypes such as gender norms and appoint managers based on merit to maintain their reputation i

$$Femtop_{ijs} = \beta_0 + {}_1 AccFin_{ijs} + \qquad + \rho_i + \epsilon_{it} \qquad (2)$$

where $AccFin_{ijs}$ is the ordered dummy ranging from 0 to 4 assessing perceived obstacle of firms in accessing finance. Again, the interpretation of ${}_1$ will be similar.

The second part of the analysis aims at investigating if economic freedom affects the

## 4. BENCHMARK RESULTS

Table 2 presents our first set of benchmark results. In columns (1), (2) and (3), we consider the impact of perceived corruption on the probability of having a female as the top manager. In column (1), other than perceived difficulty[4] in accessing finance and industry fixed effects, no other controls are added. In column (2), we add the age of the firm and size of the same as well (medium and large). In column (3), we also add if the firm has an international quality recognition or not. Interestingly, based on the sign and significance of the coefficients, we find that when firms perceive minor or moderate, their probability of having female as the top manager goes up relative to perceiving no corruption. Consistent with the literature, women in position of influence have been found to be associated with less corruption and are also associated with lower incidences of bribery (Breen, Gillanders, Mcnulty and Suzuki, 2017). Thus, it is possible when firms perceive some amount of corruption, they have an incentive to appoint a female in the top management.

Yet, we find this effect disappears when firms perceive severe or very severe obstacles. In that case, the probability of having female as the top manager becomes insignificant. The sign and significance of the levels of perceived corruption remain consistent across the regressions (1), (2) and (3). When perceived corruption becomes a stronger obstacle, firms may not be convinced anymore about appointing females in the top management. Due to the demand and supply arguments clarified above in our theoretical arguments, stronger perceived corruption makes firm believe that women will be incapable of handling bribery related harassments.

[4] It is to be noted that for columns (1), (2) and (3) where we focus on corruption, we consider corruption as a factor variable implying the regressions provide estimates for all levels of corruption on the probability of having female to be the top manager. For columns (4), (5) and (6), we do the same for perceived obstacle in accessing finance.

The magnitude of the effect can only be interpreted through marginal effects. We represent this graphically in Figure 1 considering the specification in column (3). We do find similar interpretations of our findings. The probability of having the female as the top manager is about 4 percent more when firms perceive minor or moderate levels of corruption relative to perceiving no corruption. But the probability becomes insignificant when firms perceive more severe corruption. In terms of controls, we find the large firms (that includes very large firms) have higher probability of having a female as the top manager relative to small firms. Firms that have an international quality recognition also have a higher probability of having female as the top manager. Perceived difficulty in accessing finance is considered as a continuous variable for these set of regressions and the sign is negative and significant. The same is true for firms where the largest owner has 100% ownership – for those firms, the probability of having a female as the top manager goes down.

[Insert Table 2 about here]

Next in columns (4), (5) and (6), we consider perceived obstacle in accessing finance as a factor variable and consider the same set of controls along with considering perceived corruption as an additional control. Here we find that when firms perceive minor obstacle in accessing finance, the pro

the graph, the probabilities consistently go down as firms perceive stronger challenge in accessing finance.

[Insert Fig 1 and 2 about here]

The results are consistent with Dutta and Mallick (2022) who empirically show, based on supply and demand theories related to gendered outcomes, as percent of female ownership goes up for firms, their perceived difficulty in accessing finance rises. Thus, it is reasonable to assume that with stronger perceived obstacles in accessing, the probability of having women in top management will go down.

### 4.1. Interactions with Economic Freedom

In Table 3, we test specification (3) where the interaction term of economic freedom and perceived obstacles are introduced. In column (1), we interact economic freedom with perceived corruption. In column (2), we interact it with perceived difficulty in accessing finance. We find the interaction term is positive and significant in both case which would suggest that economic freedom enhances the probability of having the female in the top management even with rising perceived obstacles.

[Insert Table 3 about here]

Yet, as mentioned before, to fully interpret the findings we must estimate the marginal estimates since with an interaction term, both the interpretations and statistical significance levels are no longer as straightforward. A variable appearing in the interaction term and as a stand-alone variable produces a combined effect that can have a different level of significance than either of

derivative of perceived obstacles on the probability of having a female as the top manager for the entire range of economic freedom values (Dutta and Sobel, 2021).

Figure 3 demonstrates the overall partial derivative for perceived corruption on the probability of having the female as the top manager for all range of values of economic freedom. Initially, for low values of economic freedom, as we can see from the figure the probability of having a female in the top management is insignificant. Even for the median value of economic freedom (which is about 3.8 for the sample), the impact remains insignificant. It is only when economic freedom crosses the median level, we find $\frac{\text{Femtop}_{ijs}}{}_{ijs}$

Our above analysis shows that economic freedom needs to rise above a certain level to be able to have a beneficial impact.

specifications tested are similar to (4). All the results for the specifications are presented in Table 4. We interact economic freedom with all the different perceived obstacle dummies. Based on the results we find that, the interaction terms are positive in all the cases. But they are only significant for the perceived corruption dummies.

Yet, as we know, the coefficients in the table only tell us half the story. We need to estimate the partial derivatives for all range of values of economic freedom. We present the graphs in F

Given the rampant corruption activities as well as barriers in accessing finance, firms might have internalized the presence of barriers to a certain level. What this means is that firms operating in India might be used to experiencing some corruption and perceiving facing obstacles in terms of accessing credit. For example, in the context of accessing credit, only 11 percent[5] of micro small & medium enterprises (MSME) have access to formal credit and almost about 60 percent of all credit demand is unmet. It is only when firms perceive severe or very obstacles in the form of accessing credit or facing corruption, economic freedom helps the probability of having females in top management. With higher economic freedom, even in the face of perceiving severe obstacles, women are willing to take up challenging roles supported by institutions that promote efficient property rights and contract enforcements, and an independent judiciary. Additionally, demand side constraints like reevaluating conventional gender roles might happen too since economic freedom stresses the importance of personal choice.

## 6. IDENTIFICATION

Our main variables of interest, perceived obstacles, can suffer from endogeneity arising out of reverse causality, omitted variable bias or sample selection bias. With more females in top management, it is plausible that perceptions about obstacles might change. Omitted variable bias can arise from not controlling for additional variables that might affect the probability of females being in top management. Finally, models like logit or probit do not allow sufficient heterogeneity of firms (Mallick and Yang, 2013). Such models impose the same behavioral model on all firms ( Webster and Piesse, 2018). Other than perceived obstacles, economic freedom might suffer from endogeneity too. We describe below our strategies to establish identification.

[5] Based on this Forbes article too since

### 6.1. CHALLENGES WITH IV ESTIMATES

Instrumental Variable (IV) estimation is an ideal method to resolve biases arising out of reverse causality. But to have successful IV estimates, we need efficient instruments that should fulfill the externality conditions. In our case, we need to find instruments that are correlated with perceived obstacles as well as economic freedom but should not affect the probability of females being in top management thus, should be independent of the error term. Given that the literature on perceived obstacles about firms is new and upcoming, there are no established instruments mentioned in the literature. This study being specific to one country, India, makes it even more challenging to find credible instruments that meets the exclusion restriction.

Technically, it is extremely hard to find credible instruments for both economic freedom and each perceived obstacle. Instruments for economic freedom like legal origin and cultural variables (power distance index, individualism versus collectivism, uncertainty avoidance, long-term versus short-term orientation, and indulgence versus restraint) cannot be applied for our study since they vary across countries and not across states or regions within a country (Spruk and Kešeljević, 2016; Berggren and Jordahl, 2006). We are unable to employ external instruments for IV estimation in our analysis. It is well-known that finding credible instruments can be very challenging, and in its absence inefficient instruments can exacerbate inconsistencies for estimates and lead to greater bi

100% share of the firm or not – we also control for dummies based on firms responding what their biggest obstacle is and share of the payments that are made informally. Firms' perception of their biggest obstacle helps us separate out the impact of other perceived obstacles resulting out of factors like crime and theft, political instability, tax administration, access to land among others. It is important to make sure that we are capturing effect of perceived obstacles like corruption and accessing finance on females in top management based on our hypothesis and not that of other obstacles as perceived by firms. Share of payments that are made informally might also have implications for women in top management since that might reflect stronger perceived corruption or even affect perceptions about accessing finance.

We control for additional variables to mitigate omitted variable bias further. We control for percent of time that senior management spent recently in dealing with government officials that should have implications for females being in top management. We also control if the firm has an existing line of credit or loan from a financial institution or not. Having a line credit might affect the strength of their perceived obstacles, and, thus the probability of females being in top management. Firms that continue to innovate might have better performance statistics but at the same time they need to maintain their competitiveness in the market. To maintain their competitive edge, they might be more apprehensive of having a female as the top manager. We check if the firm has introduced new products or services in the last three years or not. Finally, we also control if the firm provides childcare facilities provides stipend or avail such facilities. This has crucial implications for females willingness of taking up roles in top management.

We consider Table 4 specifications and rerun the regressions including the additional controls. Keeping space constraint in mind, we do not report the findings in the form of a table. We present the graphs that show the overall partial derivatives for all range of values of economic

freedom in Figures 7 and 8. We do find, in support of our previous findings, that economic freedom does help more when firms perceive obstacles to be severe. But we do also find that for new results, the marginal plots show that economic freedom help to some extent even when the perceived

[Insert Figures 7A and 7B about here]

obstacles are minor or moderate in both cases. The difference is that faced with severe perceived obstacles, economic freedom helps to not only enhance the probability of having females in top

treatment status of observational data cannot be randomized either due to cost, ethical issues or impossibility of the situation like in our case. A counter-factual can be created employing matching models that are similar in all characteristics among treatment and control groups except the specific treatment effect we are interested in. As Webster and Piesse (2018) mention, matching techniques aid us in replicating experimental random sampling by employing non-experimental observed data.

Just comparing means of the treated firms with untreated firms will result in biases both observable and unobservable variables. The latter bias – bias from selecta unobserva0(both )] TJETQq0.000

weight (IPW) estimation, the parameters of the treatment model are estimated in the first step followed by computing the estimated inverse probability weights. The weighted averages of the outcomes for each treatment level are computed in the second step using the estimated inverse probability weights (Stata, 2022). The weight attached to a firm receiving the treatment is the inverse of the estimated probability. The other popular matching models are *nearest-neighbor matching* and *propensity-score matching* (Dutta, Kar and Stivers, 2024; Webster and Piesse, 2018; Mallick and Yang, 2013). For nearest-neighbor matching (NNM), 'matching' is achieved for each subject based on comparable observations that are closest to it. The word 'nearest' is determined based on a weighted function of the covariates for each observation. We ensure that the NNM estimator is augmented with a bias correction term (Stata, 2013). Mahalanobis distance is used for the estimates. For propensity score matching (PSM), the matching is achieved on the estimated predicted probabilities of treatment that are called propensity scores.

The dependent variable needs to be binary for the matching models. Thus, we construct a dummy variable taking the value 1 if the ratio of opportunity to necessity entrepreneurship is above the sample mean value, and 0 otherwise, following standard procedure used in the literature (Dutta and Sobel, 2023; Dutta and Mallick, 2022). The treatment groups, as mentioned above, are firms perceiving severe or very severe corruption or difficulties in accessing finance, and experiencing. Overall, treatment effect refers to the causal effect of linguistic traits on the ratio of opportunity to necessity entrepreneurship. We report the ATET, which gives the effect of the linguistic traits on the entrepreneurship ratio for the treated group, for all the models in Table 5. The controls are included in all the models.

[Insert Table 5 about here]

Results for IPW, PSM and NNM for perceived corruption are presented in columns (1), (2) and (3) respectively. Likewise, the estimates for the three matching models for perceived finance difficulties are presented in columns (4), (5) and (6) respectively. Based on the results in columns (1), (2) and (3), we find that coefficient is positive and significant for all three matching models. In terms of economic significance, the magnitude is similar – treated firms have about 3 percent higher probability of having females in top management relative to firms in control group. Thus, the results support our findings that firms who perceive stronger corruption as obstacle but experiences higher economic freedom benefit in terms of having women in top management.

In the case of perceived difficulties in accessing finance, we find that the magnitudes are similar for IPW and PSM estimates as evident in columns (4) and (5). Treated firms have about 5 percent higher probability of having females in top management relative to firms in control group. The magnitude is a little higher in the case of NNM estimates (column 6). The probability is about 8 percent higher.

Thus, overall our matching estimates agree with our benchmark findings. Firms perceiving stronger perceived obstacles

7.

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**Figure**

**Figure 3: Marginal Plots Probability of Female being a Top Manager, Perceived Corruption and Economic Freedom**

The graphs plot the probability of female being a top manager for rise in perceived corruption for different levels of economic freedom

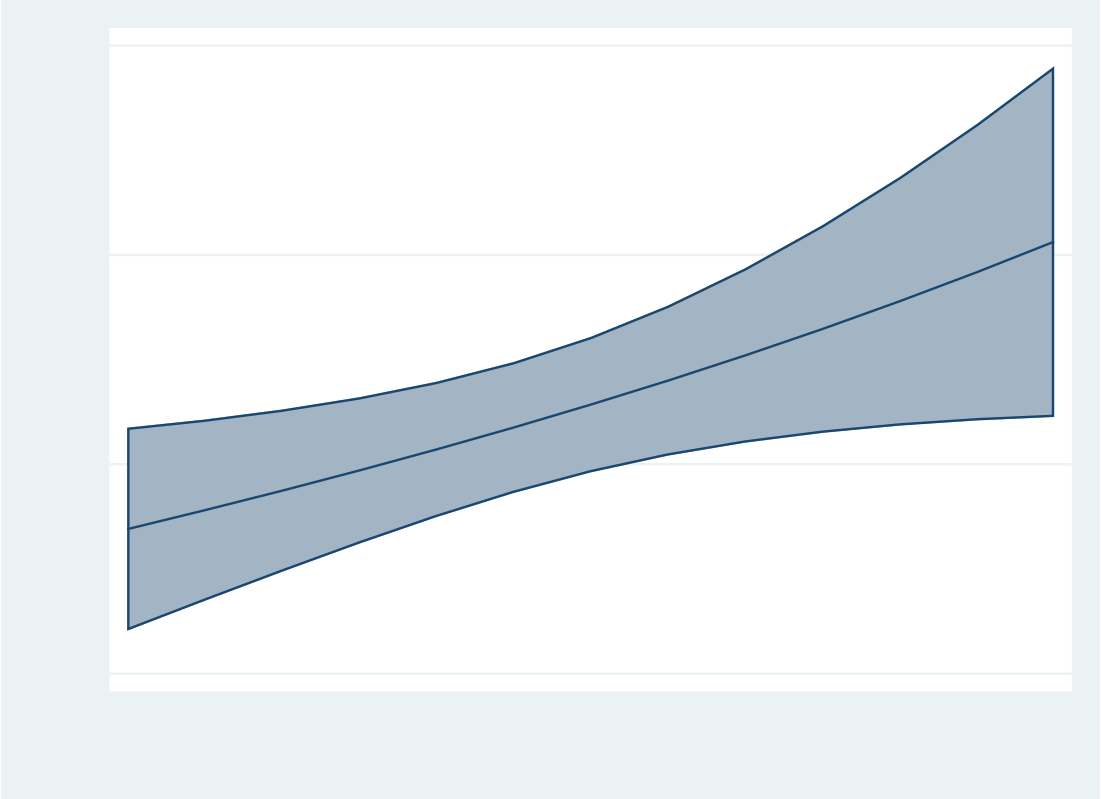

**Figure 4: Marginal Plots Probability of Female being a Top Manager, Perceived Obstacle in Accessing Finance and Economic Freedom**

The graphs plot the probability of female being a top manager for rise in perceived obstacle in accessing finance for different levels of economic freedom

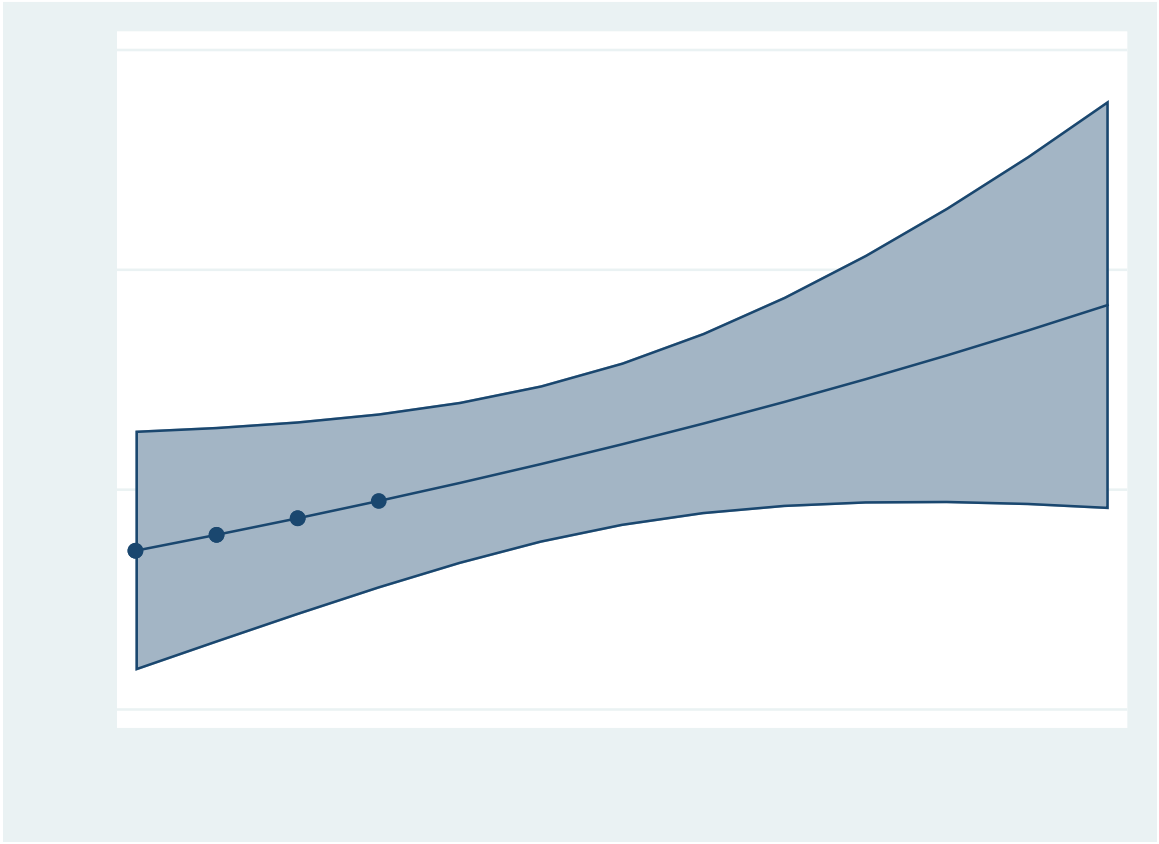

**Figure 5A: Marginal Plots Probability of Female being a Top Manager, Perceived Corruption (Severe and Very Severe) and Economic Freedom**

The graph plots the probability of female being a top Severe and Very Severe)

**Figure 6A: Marginal Plots Probability of Female being a Top Manager, Perceived Obstacle in Accessing Credit (Severe and Very Severe) and Economic Freedom**

The graph plots the probability of female being a top manager for rise in perceived corruption for different levels of economic freedom. The considered levels of perceived obstacle in accessing credit are *severe* and *very severe*.

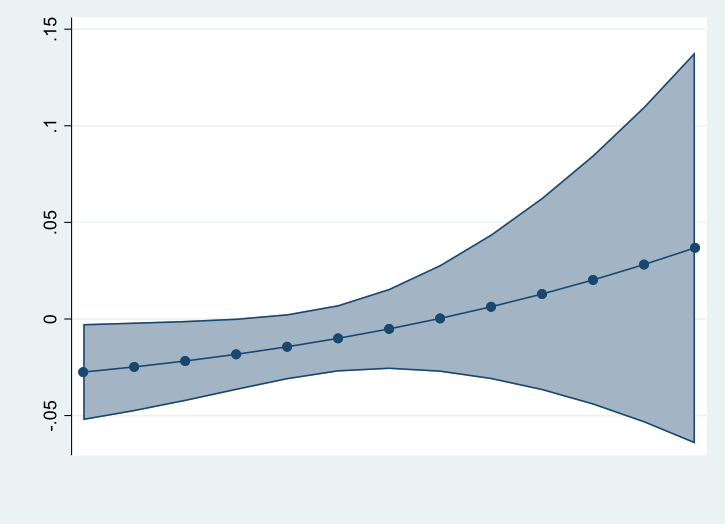


**Figure 6B: Marginal Plots Probability of Female being a Top Manager, Perceived Obstacle in Accessing Credit (Minor and Moderate) and Economic Freedom**

The graph plots the probability of female being a top manager for rise in perceived corruption for different levels of economic freedom. The considered levels of perceived obstacle in accessing credit are *minor* and *moderate.*

**Figure 7A: Marginal Plots  Probability of Female being a Top Manager, Perceived Corruption (Severe and Very Severe) and Economic Freedom  Additional Controls**

The graph plots the probability of female being a top manager for rise in perceived corruption for different levels of economic freedom. The considered levels of perceived corruption are *severe*

## Table 2: Female Manager and Perceived Obstacles (Corruption and Accessing Credit)

Probit Specifications: All data are considered from World Bank Enterprise Surveys 2022 wave. *Fem Top* is the dependent variable that indicates a dummy assigned 1 if a firm has a female as the top manager, 0 otherwise. *Corruption* is one of the independent variable assessing perceived levels of corruption by the firms. The variable is an

## Table 3: Female Manager, Perceived Obstacles (Corruption and Accessing Credit) and Economic Freedom

Probit Specifications: All data are considered from World Bank Enterprise Surveys 2022 wave. *Fem Top* is the dependent variable that indicates a dummy assigned 1 if a firm has a female as the top manager, 0 otherwise. *Corruption* is one of the independent variables assessing perceived levels of corruption by the firms. The variable is an ordered dummy variable ranging from 0 to 4 with higher numbers indicating corruption as a stronger perceived obstacle. 0 is considered to be the baseline. Credit is the second independent variable of interest constructed similar to corruption. It indicates perceived obstacles of firms in terms of accessing credit. Economic Freedom are for the year 2009 and is interacted with both corruption perceptions and perceptions about obstacles in accessing credit. The controls are *firm size* (medium and large with small as the baseline), age of the firm, if the firm has an international quality recognition or not, dummy indicating 100% ownership by the largest owner of the firm, percent of annual sales paid in informal payments and dummies indicating percent of firms stating their major perceived obstacle. We control for industry fixed effects. Robust standard errors are reported in parentheses. ***, ** and * denote significance at 1%, 5%, and 10%, respectively.

| | (1) | (2) |
|---|---|---|
| Corruption | -0.253** | 0.050 |
| | (0.124) | (0.035) |
| Economic Freedom (EF) | -0.051 | -0.027 |
| | (0.047) | (0.047) |
| Corr*EF | 0.076** | --- |
| | (0.030) | |
| Credit | 0.033 | -0.211 |
| | (0.040) | (0.140) |
| Credit*EF | --- | 0.062* |
| | | (0.034) |
| Medium (size) | -0.171** | -0.235*** |
| | (0.080) | (0.076) |
| Large (size) | -0.120 | -0.187** |
| | (0.084) | (0.080) |
| Age | -0.001 | -0.002 |
| | (0.002) | (0.002) |
| International | 0.135* | 0.145** |
| | (0.072) | (0.071) |
| Per own (100%) | -0.399*** | -0.395*** |
| | (0.072) | (0.071) |
| All obstacles (dummies) | | |

**Table 4: Female Manager, Perceived Obstacles (Corruption and Accessing Credit) and Economic Freedom**

Probit Specifications: All data are considered from World Bank Enterprise Surveys 2022 wave. *Corr 1* implies dummy indicating severe and very severe perceived corruption by firms. *Corr 2* implies dummy indicating minor and moderate

**Table 5: Female Manager, Perceived Obstacles (Corruption and Accessing Credit) and Economic Freedom - Matching Estimates**

We consider IPW, PSM and NNM estimates for both perceived obstacles ( corruption and difficulty in accessing finance). Treatment groups for corruption(perceived) in columns (1), (2) and (3) are firms perceiving severe or very severe corruption and experiencing above sample average economic freedom. Treatment groups for difficulties in accessing finance (perceived) in columns (4), (5) and (6) are firms perceiving severe or very severe difficulties in