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Economic Freedom and Female Entrepreneurship

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Abstract

Economic freedom plays a pivotal role in promoting economic activities for both men and women by creating opportunities and reducing transaction costs. However, the impact of economic freedom on entrepreneurship may differ between genders, with men often benefiting more due to their stronger networks and resources. This study aims to investigate the causal relationship between economic freedom and the ratio of female to male in entrepreneurship. To analyze this relationship, the study employs quasi-experimental methods, specifically the Matching method, to establish a plausible causal link. The treatment is defined based on a sustained and meaningful increase in the Economic Freedom of the World (EFW) index score for a given country during a specific period. Additionally, the study utilizes entrepreneurship measures from the Global Entrepreneurship Monitor (GEM) dataset to examine the outcomes. The study suggests that economic reform has little to no impact on short-term female entrepreneurship. However, in the long run, it reduces the gender gap and promotes opportunity-driven ventures. Larger government and sound money positively influence female entrepreneurship, while regulatory reforms have mixed effects.

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Key Words: Female Entrepreneurship, Economic Freedom, Causal.

1. Introduction

Entrepreneurship is widely recognized as a pivotal driving force for economic growth and development, with its impact on economic growth being substantial (Ken Farr et al., 1998; Hall and Lawson, 2014; Reynolds, Hay, and Camp, 1999; Zacharakis, Shepherd, & Coombs, 2003). Consequently, understanding the factors that influence entrepreneurship has gained significant attention. Economic freedom has been recognized as a crucial factor that accelerates entrepreneurship, fostering increased opportunities and growth (Ovaska and Sobel, 2005; Kreft and Sobel, 2005). Nyström (2008) suggests that economic freedom fosters entrepreneurial intentions and the likelihood of individuals engaging in entrepreneurial activities. Extensive research consistently demonstrates the positive influence of economic freedom on entrepreneurship, with studies revealing a strong correlation between economic freedom and higher rates of entrepreneurial activity (Bjørnskov and Foss, 2008; Bradley and Klein, 2016; Herrera-Echeverri and Estévez-Bretón, 2014; Nyström, 2008). Countries with fewer regulations, lower taxes, and robust property rights exhibit vibrant entrepreneurial ecosystems, leading to increased business creation, innovation, and job opportunities. However, it is important to note that the impact of economic freedom on entrepreneurship may vary between male and female. Thus, this study aims to specifically examine the impact of economic freedom on female entrepreneurship.

The global trend of female entrepreneurship is on the rise, as indicated by a study conducted by the Global Entrepreneurship Monitor (GEM). According to their findings, female-owned businesses make up one-fourth of formal sector businesses worldwide (Minniti et al., 2005). Although female entrepreneurs are still a minority in most countries, there is significant variation observed across different nations (Parker, 2009; Minniti et al., 2005). Although there is variation in the participation of females in entrepreneurial activities across different countries, there have been limited efforts to comprehensively explain this phenomenon both theoretically and empirically.

However, there are notable exceptions, such as Elam and Terjesen and Amorós (2010) and Verheul et al. (2006), who have explored the differences in female and male entrepreneurship using samples from 11 and 29 countries, respectively. A logical starting point is to examine disparities in levels of development and the quality and capacity of institutions. It is widely acknowledged that levels of entrepreneurship vary in accordance with GDP per capita (Wennekers et al., 2005). Furthermore, Minniti (2010) specifically examines the distinct impacts of development levels on male and female entrepreneurship. Insufficient attention has been given to exploring the influence of different institutional and cultural contexts on female entrepreneurship and "high aspiration entrepreneurship." Consequently, we aim to contribute to this understanding by developing novel hypotheses that shed light on how institutional variations may impact male and female entrepreneurship differently.

Beginning with the concept of property rights, strong property rights may benefit both genders equally; men could potentially enjoy greater advantages in countries where property rights are weak. Well-defined and secure property rights facilitate access to essential resources for entrepreneurship, including capital and finance, which are often restricted for female in many institutional contexts (Brush, 2006). This implies that robust property rights will be particularly crucial for female entrepreneurs with high aspirations, as they require greater access to capital. Additionally, weak property rights result in entrepreneurs relying more heavily on informal social networks, often dominated by males, for resource acquisition (Aidis et al., 2008). Furthermore, due to gender-defined social dynamics, men may have a higher effectiveness in dealing with government officials (Bardasi et al., 2011) and addressing corruption-related issues. This effect is likely to be more prominent in countries with weaker rules of law. Corruption, in particular, tends to impact "high aspiration" entrepreneurial projects. Consequently, we predict that female are less inclined than men to engage in entrepreneurial activities in countries with weaker rules of law. This impact

applies to entrepreneurship as a whole, as well as to the realm of "high aspiration" entrepreneurship specifically.

It has been observed that a larger state sector can act as a deterrent to entrepreneurial entry (Verheul et al., 2001; Verheul et al., 2006). The impact of the state sector's size is likely to be more negative for female entrepreneurs compared to their male counterparts. This is due to the fact that female often make occupational decisions within the social context of their households, and their activity rates tend to be lower than those of men due to additional domestic and caregiving responsibilities. The decision for females to engage in entrepreneurship is more sensitive to contextual factors because the perceived opportunity cost is higher for them. Men, on the other hand, may prioritize self-employment or employment to fulfill their household income needs, after which an established "household pecking order" for entrepreneurial entry or employment may be formed. In this context, a larger state sector can demotivate females by offering security, educational services, healthcare, and housing while simultaneously reducing relative rewards. Conversely, a smaller state sector implies limited social security provisions, potentially incentivizing females to become more economically active. This is likely to stimulate female entrepreneurship as a whole and result in impactful outcomes such as employment creation. Moreover, higher levels of state-sector employment may provide alternative options for potential female entrepreneurs, particularly those with high aspirations. Thus, female's economic decisions may be more influenced by the size of the state sector compared to men. Based on these observations, we hypothesize that females are less likely than men to engage in both entrepreneurial activities and high-aspiration entrepreneurial activities in countries where the state sector is larger.

In this paper, our approach aims to leverage the diversity in institutional structures among countries to explain the disparities in (i) the likelihood of females entering entrepreneurial activities and (ii) the aspirations for opportunity-driven female entrepreneurs in different nations. This study

employed a matching method to explore the exogenous effect of economic freedom on female entrepreneurship. Using the Economic Freedom of the World Index by the Fraser Institute, this study defines the treatment as a meaningful and sustained increase in the Index. It uses the Global Entrepreneurship Monitor (GEM) data as a measure of female entrepreneurship.

The initial findings indicate that a significant and lasting increase in economic freedom has a positive impact on female entrepreneurial activities in the long term. It also fosters opportunity-driven entrepreneurship among females. However, two factors that may have a negative influence on female's entrepreneurship are the size of the government and regulatory measures. These findings suggest that while economic freedom can benefit female's entrepreneurial endeavors, certain aspects, such as government size and regulatory constraints, may pose challenges.

The study proceeds as follows. It discusses the methodology in Section 2. Results from the matching method are reported in section 3. Section 4 concludes.

2. Methodology

The study outlines its methodology in six steps. Firstly, it provides an overview of the data structure employed in the analysis. Subsequently, it discusses the matching method utilized in the study. Next, the study defines the treatment variable being examined and the process of generating the outcome variable. The study also provides a detailed description of the covariates considered in the analysis. Lastly, the methodology includes a description of the counterfactual units that were examined.

2.1. Data Structure

The objective of this study is to determine the causal relationship between economic freedom and female entrepreneurship. The data used for assessing economic freedom is derived from the Fraser Institute's Index of Economic Freedom of the World, spanning the years 1970 to 2020. On the other hand, the data on female entrepreneurship is obtained from the Global Entrepreneurship

Monitor (GEM) data, available from 2001 to 2021. Although the GEM data covers 113 countries, it is not consistently available for all time periods. To overcome this limitation, the data is aggregated over five or ten-year intervals and transformed into a cross-country format. From 2005 onwards, the study constructs the outcome variable at the cross-country level. More information on the construction of the outcome variable can be found in the 'outcome variable' section.

To assess the causal impact of economic freedom on the outcome variable, the study employs a matching method. This requires obtaining cross-country data for the treatment variables as well. The treatments are determined based on the availability of EFW index data, either in 1995 or 2000. If a country received treatment in either 1995 or 2000, or both, it is classified as a treated country. A detailed explanation of the treatment definition can be found in the 'defining treatment' section.

2.2. Matching Method

The identification of a causal relationship between economic freedom and female entrepreneurship faces two challenges. Firstly, countries may implement improved institutions specifically designed to support female entrepreneurship, leading to a selection bias. This bias can restrict the ability to establish a causal impact of changes in economic freedom on female entrepreneurship. Secondly, there is a risk of omitted variable bias, whereby unaccounted factors could influence both economic freedom and entrepreneurship. In such cases, exploring the treatment effect on the outcome becomes an option to address this challenge.

In order to address the challenges associated with the two-way fixed-effect (TWFE) model, alternative causal methods can be explored. TWFE relies on the assumption of parallel trends, which is not satisfied in this case given the available data. Additionally, when treatments occur at different times, the parallel trend assumption alone may not provide an unbiased estimator (Goodman-Bacon, 2021). Using TWFE in this study would consider already treated units as controls, which can lead to

bias. Furthermore, Goodman-Bacon (2021) argues that TWFE can generate estimates with an opposite sign. Therefore, alternative causal methods such as synthetic control or matching techniques are more suitable in scenarios where treatments occur at different times. However, this study is unable to utilize the synthetic control method due to the unavailability of the outcome variable for a sufficient number of consecutive time periods before and after the treatment. Instead, this study employs a matching technique, which offers flexibility in selecting control units that are independent of treated units. This method allows for establishing a causal relationship between economic freedom and female entrepreneurship while minimizing potential biases.

In this study, meaningful and sustained increases in the Economic Freedom of the World (EFW) index are identified as treatment episodes. This approach helps address selection bias by carefully selecting control units that closely resemble the treated units. It considers both the likelihood of receiving treatment and the outcome of interest, following the framework proposed by Rosenbaum and Rubin (1983). By doing so, the study aims to mitigate potential biases and ensure a more accurate estimation of the treatment effect.

To determine the average treatment effect on the treated (ATET), the study calculates the difference between the average outcome scores of the treated and control units. This approach allows for a comparison of the outcome variable between the treated and control groups, shedding light on the impact of the treatment on female entrepreneurship.

The matching techniques employed in this study further address treatment-effect heterogeneity by considering individual treatment effects instead of relying on a weighted average. By taking the simple average of the individual treatment effects, the study aims to generate unbiased estimators that capture the nuances of the treatment's impact on female entrepreneurship.

In this study, the model proceeds to estimate the average treatment effect on female entrepreneurship, aiming to obtain an unbiased estimate of the treatment effect. An and Winship

(2017) argue that examining the effects on the difference in outcome helps eliminate the influence of time-invariant factors. By focusing on the difference in outcomes between the treated and untreated units, the study seeks to isolate the causal impact of the treatment.

The matching technique employed in the analysis allows for causal inference by carefully matching treated and untreated units based on a set of covariates. This approach helps address potential confounding variables and allows for a more robust estimation of the treatment effect on female entrepreneurship.

The analysis limits the sample to the area of common support, which means that only units with covariate values that fall within the overlap of the treated and control groups are included. This ensures that the matching does not extrapolate the sample to estimate the treatment effects. Units that cannot find a match within the sample are automatically dropped from the analysis, preventing the creation of control units from outside the sample that could bias the results.

One advantage of the matching method is that it is less sensitive to the functional form since it does not extrapolate. This means that the matching technique is more robust to assumptions about the underlying functional relationship between the covariates and the outcome variable, enhancing the validity of the analysis.

This study employs two types of matching methods: PSM and Mahalanobis distance matching. For PSM, a logit model is estimated using a set of covariates. This logit model estimates the probability of being treated for each country-year observation. These probabilities range from 0 to 1, and they are called propensity scores. Each treated unit is matched with control units that have similar propensity scores. This study refers to a control unit as a "neighbor" to a treated unit based on the differences in the propensity score. The closest neighbor is called "first-nearest neighbor," the second-closest neighbor is referred to as the "second-nearest neighbor," and so on. This study reports the PSM results based on four types of PSM: nearest neighbor, the average of the

two nearest neighbors, the average of the three nearest neighbors, and matching using a normal kernel function. However, normal-kernel-function matching uses all the neighbors, putting higher weights on the closer propensity scores. All the matching techniques use the area of common support.

This study also uses the Mahalanobis distance method, which does not use propensity score to match treated and control units; rather, it matches the covariates directly. This method uses Euclidian distance between the covariate vectors of two observations. To use Mahalanobis distance matching, this study also uses three matching techniques: nearest neighbor, the average of the two nearest neighbors, and the average of the three nearest neighbors.

When the matching is done, this study estimates the average treatment effect by subtracting the treated units' average and the control units' average outcome. The standard errors in PSM are estimated by bootstrapping. For the biasness-corrected matching estimators of Mahalanobis matching, this study follows Abadie and Imbens (2011).

2.3. Defining Treatment

In this study, the Economic Freedom of the World (EFW) index provided by the Fraser Institute is utilized to identify treatments based on meaningful and sustained increases in scores for any country during a specific period. The EFW index evaluates the level of economic freedom in five key domains: Size of Government, Legal System and Security of Property Rights, Sound Money, Freedom to Trade Internationally, and Regulation. The Composite EFW index ranges from 0 to 10, with higher scores indicating a better quality of institutions. To account for potential gender disparities in access to economic rights, the EFW index is adjusted by the Gender Disparity Index (GDI). The GDI assesses the extent to which women worldwide possess the same legal rights as men. While the EFW Index is available from 1970 to 2020, data is aggregated every five years for years prior to 2000. Given the focus on treatment years before 2005, the study considers the period

from 1990 to 2005 to construct the treatment units. This timeframe allows for the identification of countries experiencing significant changes in economic freedom during the specified period.

The definition of treatment used in this study aligns with previous literature that has employed a sustained increase in the EFW index score as a treatment (Hausmann et al., 2005; Grier and Grier, 2021). The primary treatment is characterized by a sustained increase in the composite EFW index. A country is classified as a treated unit if its EFW score exhibits an increase of at least 0.50 points (equivalent to half a standard deviation) over a 5-year period, and if this higher score is maintained for the subsequent 5 years, with a minimum increase of 0.20 points compared to the initial score. For example, if the EFW score for Ghana increased by 0.66 points from 1990 (4.59) to 1995 (5.25), Ghana in 1995 would be considered a treated unit since the increase in EFW score was sustained for the next 5 years. The score in 2000 (5.70) is greater than 5.45 (the score in 1995 plus 0.20), confirming the maintenance of the increased score. However, if a country experienced two treatments within the 1990-2005 period, it is considered as a single unit for the treatment analysis. Based on this definition, the study identifies 39 treated units (as shown in **table 2**), with 5 countries experiencing two treatments within the specified period.

In addition to the treatment definition for the overall EFW measure, the study also considers alternative treatment definitions for each sub-category of the composite EFW index. Each sub-category represents a specific aspect of institutional quality and measures the degree of freedom in that particular domain. The first sub-category focuses on the size of government, which assesses the extent to which a country relies on personal choice and markets rather than government budgets and political decision-making. The components considered in constructing this measure include government consumption, transfers and subsidies, government enterprises and investment, top marginal tax rate, and state ownership of assets.

The second sub-category measures the legal system and property rights, which evaluates a country's protection of individuals and their rightfully acquired property. The components used to construct this measure include judicial independence, impartial courts, protection of property rights, military interference in the rule of law and politics, integrity of the legal system, legal enforcement of contracts, regulatory costs of the sale of real property, reliability of the police, business costs of crime, and adjustment for gender disparity.

The third sub-category measures the soundness of a country's monetary system. The components considered in constructing this measure include money growth, standard deviation of inflation, inflation in the most recent year, and freedom to own foreign currency bank accounts. The fourth sub-category assesses the freedom to trade internationally, considering various restraints that impact on international exchange. The components used in constructing this measure include tariffs, regulatory trade barriers, black-market exchange rates, and controls on the movement of capital and people. The fifth sub-category examines regulatory restraints that limit freedom in credit, labor, and product markets. The components used in constructing this measure include credit market regulations, labor market regulations, and business regulations.

The study provides a summary of each sub-index in **table 2**, including the components considered and their respective weights. The treatment definitions for each sub-category are similar to the overall EFW measure, but the specific jump in score and sustained score requirements may differ based on the average and standard deviation values for each sub-category, as shown in **table 2**. This allows for a nuanced analysis of the treatment effects within each sub-category. The number of treated units for each sub-category is presented in **table 3**, providing insights into the sample distribution and the availability of data for each treatment definition.

2.4. Outcome Variable

The outcome variable utilized in this study is derived from the Global Entrepreneurship Monitor (GEM) data, specifically from the Behavior and Attitudes and Framework and Conditions datasets. Two measures are employed from the behavior and attitude dataset: i) the female to male ratio in Total Early-Stage Entrepreneurial Activity (TEA), and ii) the female to male ratio in opportunity-driven Total Early-Stage Entrepreneurial Activity (OTEA).

The first variable measures the percentage of females aged 18-64 who are either nascent entrepreneurs or owner-managers of a 'new business', divided by the equivalent percentage for their male counterparts. This variable is available from 2001 to 2022. The second variable measures the percentage of females involved in TEA who are driven by opportunity rather than necessity, and who indicate independence or income increase as the main driver for their involvement, divided by the equivalent percentage for their male counterparts. It is important to note that the second measure is only available from 2013 onward. Both measures indicate that higher values correspond to a narrower gender gap in entrepreneurship.

Considering the time lag between changes in economic freedom and their impact on entrepreneurship, this study adopts the average growth five years (and ten years) after the treatment as the outcome variable. The use of growth variables as outcome measures in the matching method helps mitigate bias arising from time-invariant factors. Therefore, changes in entrepreneurship measures are considered to remove the influence of such factors.

For TEA, the outcome measure is constructed by calculating the difference between the average values during the period 2005-2019 and the average values during the period 2010-2014, thereby generating the 5-year change in TEA. A 5-year average is utilized to ensure data availability for all countries, as taking the difference between 2010 and 2005 would result in the loss of numerous observations due to data unavailability. For the 10-year change in TEA, the outcome

variable is constructed by calculating the difference between the average values during the period 2005-2019 and the average values during the period 2015-2019.

As for OTEA, the data is only available from 2013 onward and not for every year. To construct the growth/change measure for OTEA, a similar approach is adopted, but for a 3-year change instead of a 5-year change, due to data availability constraints. Summary statistics for both variables are presented in **table 3**, providing an overview of their distribution and averages.

2.5. Covariates

The selection of appropriate covariates is crucial in matching models, as these variables should be correlated with the outcome and play a role in determining the likelihood of receiving the treatment. In this study, the treatment units are matched with control units using a set of covariates. When the covariates significantly contribute to determining the propensity scores for each observation, the model can identify non-treated units that are similarly likely to receive the treatment. This ensures that any difference in the post-treatment outcome is solely attributable to the treatment effect.

The chosen set of covariates includes five indicators representing the economic environment in each country. The lagged five-year level of real GDP per capita at the time of treatment serves as a proxy for the country's average income level, which may influence changes in rights and subsequent income growth. Additionally, consumption, investment, and government spending as a share of GDP are incorporated to reflect the country's economic environment, as these factors can impact future entrepreneurial activities. These variables are constructed using data from the Penn World Table (PWT) by Feenstra, Inklaar, and Timmer (2015).

To capture the influence of the political environment on institutional changes, this study includes the polity2 index from the Polity IV dataset (Marshall, Gurr & Jaggers, 2020) as a covariate. The polity2 index represents the qualities of democratic and autocratic authority in governing institutions, rather than discrete and mutually exclusive forms of governance. It ranges from -10 to

10, with the lowest and highest scores indicating hereditary monarchy and consolidated democracy, respectively.

The variables constructed for this study align with the matching method employed. Thus, the set of covariates includes the 5-year lagged logarithm of GDP per capita, 5-year lagged population growth, 5-year lagged Human Capital Index, 5-year lagged polity, 5-year lagged share of consumption at current purchasing power parities (PPP), 5-year lagged share of gross capital formation at current PPPs, 5-year lagged share of government consumption at current PPPs, and 5-year lagged EFW score. All these variables are averaged over the period 1995-2004. Summary statistics for all variables are presented in **table 3**, providing an overview of their distribution and characteristics.

2.6. Determining Counterfactual

Constructing an appropriate counterfactual group is indeed crucial in the matching model. In this study, the counterfactual units are restricted to include only countries that did not receive any treatment throughout the entire analysis period. This helps ensure a valid comparison between the treated and control units.

For the matching model, a treated unit is compared with a control unit that did not receive any treatment prior to the year 2005, as specified in this analysis. However, it is important to note that some countries that did not receive treatment during the period of 1995-2005 may have received treatment after 2005. Including these countries as control units could contaminate the estimated treatment effect on the outcomes, as their future treatment status may influence the results.

To construct the control units for the treatment, this study initially removes all observations for countries that experienced any treatment from 2004 to 2020. By doing so, the focus is solely on untreated units during the specified period. Following a similar approach, the study identifies control

units for all treatment types under each treatment definition, ensuring that the control group consists only of untreated units. The number of untreated units and the dropped units for each treatment are listed in **table 2**, providing insights into the sample distribution and the treatment status of the countries.

3. Results

This section of the study focuses on presenting the results in two distinct steps. First, it provides the baseline results derived from the analysis of the impact of economic reform on female entrepreneurial activities. This analysis examines the relationship between economic reform and female entrepreneurship using a specific set of covariates and treatment definitions. The findings from this baseline analysis serve as the foundation for assessing the relationship. Second, the study conducts robustness checks to verify the reliability and stability of the initial findings.

Two approaches are employed for these robustness checks. The first approach involves testing different covariate sets. By altering the selection of covariates, the study evaluates whether the results remain consistent and reliable across different sets of variables. This helps assess the robustness of the initial findings and ensures that the observed impact of economic reform on female entrepreneurship is not solely driven by a specific set of covariates. The second approach examines the impact of different treatment definitions. By varying the definition of treatment, the study explores whether the observed effects are consistent and robust under different specifications. This analysis allows for a comprehensive assessment of the relationship between economic reform and female entrepreneurship.

3.1. Baseline Model

The analysis begins with logit estimations of the probability of receiving treatments, and the results are presented in **table 4**. The first column displays the estimations for each covariate, which are used

to calculate the propensity scores for the observations. The second column shows the standard deviation for each covariate. The logit estimation reveals that none of the covariates are statistically significant, except for the lagged economic freedom index. However, when examining the covariate balance in **table 5**, it is evident that the treated units and the matched counterfactual units exhibit reasonably similar covariate values.

The main results of the analysis are presented in **table 6**. This table displays the average treatment effects on three outcome variables. Column 1 presents the average treatment effect on 5-year growth in Total Early-Stage Entrepreneurial Activity (TEA), column 2 presents the average treatment effect on 10-year growth in TEA, and column 3 presents the average treatment effect on 3-year growth in opportunity-driven Total Early-Stage Entrepreneurial Activity (OTEA). The estimates are based on four types of propensity score matching and three types of Mahalanobis matching.

The results consistently indicate a negative impact, although not statistically significant, on 5-year growth in TEA due to sustained economic reform (**table 6, column 1**). This suggests that in the short run, economic freedom does not have a significant effect on female entrepreneurship. There is no immediate difference in entrepreneurial activities between males and females following economic freedom. However, in the long run, the results reveal a positive and significant impact on 10-year growth in TEA (**table 6, column 2**). The Mahalanobis estimates also show a significant and positive impact, indicating that economic reform benefits females in the long run and reduces the gender gap. The substantial and sustained increase in economic freedom enhances opportunities for females over a 10-year period by an average of 0.011 points (approximately one standard deviation).

For opportunity-driven entrepreneurial activities (OTEA), the results from the matching models are mixed (**table 6, column 3**). Propensity score matching suggests a negative impact on OTEA, although not statistically significant. In contrast, Mahalanobis matching yields positive and

significant estimates. Although the outcome variable represents the growth over a 3-year period, the difference in values starts from 2013, making it a long-term outcome. The large and sustained increase in economic freedom enhances opportunities for females in opportunity-driven entrepreneurship by an average of 0.040 points (more than one standard deviation) in the long run.

The interpretation of the results suggests that economic reform initially benefits both male and female individuals equally. However, it appears to encourage females more in the long run. Not only does economic reform increase necessity entrepreneurship among females, but it also promotes their engagement in opportunity-driven and high-quality entrepreneurship.

3.2.1. Robustness Checks: Different Covariates Sets

In this section, different covariate sets are used to estimate the models, while the treatment and outcome variables remain the same as in the baseline models. The purpose is to assess the impact of different covariate specifications on the results.

The first covariate set includes the 5-year lagged log of GDP Per Capita, 5-year lagged Polity, 5-year lagged Human Capital Index, and 5-year lagged EFW. The results, presented in **table 7**, show similar findings for 5-year and 1-year growth in TEA compared to the baseline model. However, there is no significant impact on 3-year growth in opportunity-driven entrepreneurship for females, although a consistent positive estimate is observed.

The second covariate set, consisting of the 5-year lagged log of GDP Per Capita, 5-year lagged Polity, 5-year lagged Human Capital Index, 5-year lagged Share of Consumption, gross capital formation, and government consumption at current PPPs, yields different results. The impact on the 5-year TEA ratio is negative and significant when using propensity score matching (**table 8**). The impact on 10-year growth in TEA ratio is mixed but not significant. However, consistent positive estimates are found for 3-year growth in OTEA ratio, with one Mahalanobis measure being significant.

The third covariate set includes the 5-year lagged log of GDP Per Capita, 5-year lagged Polity, 5-year lagged Human Capital Index, 5-year lagged EFW, 5-year lagged Share of government consumption, exports, and imports at current PPPs. The results obtained with this covariate set align closely with the baseline results (**table 9**). The study has also analyzed the results using different sets of covariates which includes ethnic fractionalization from Alesina et al. (2003), Political Risk Services (PRS) corruption index from International Country Risk Guide (ICRG, 2017), political rights and civil liberties come from Freedom House data (2014). The results are presented in **appendix table A1-A3**. Overall, the results from the different covariate sets show some variation but generally support the findings of the baseline models. This suggests that the impact of economic reform on female entrepreneurship remains consistent across different covariate specifications, reinforcing the robustness of the findings.

3.2.2. Robustness Checks: Effect of Sub-Components of EFW

In this section, the impact of reform in the sub-categories of the overall EFW index is explored (**tables 10-15**), following a similar approach as the baseline treatment. The covariate set and outcome variables remain consistent with the baseline model.

The first treatment examines the reform in government size. The results indicate that a reform aimed at reducing the size of the government negatively affects 5-year and 10-year growth in both TEA and OTEA ratios (**table 10**). Although the estimates for TEA are not statistically significant, the study finds negative and significant estimates for the OTEA ratio. This suggests that a smaller government size may have a detrimental effect on female's entrepreneurship. This finding aligns with the existing literature, which suggests that females may require more government support to engage in entrepreneurial activities.

The second treatment investigates the reform in the gender disparity index (GDI) (**table 11**). The results show mixed findings across all outcome measures. The limited number of treatment units for this specific reform may contribute to the difficulty in finding statistically significant results.

The third treatment focuses on the reform in the legal system and property rights (**table 12**). The model does not reveal any significant impact on either outcome variable. However, the results in Table 13 demonstrate a significant positive impact on long-term growth in the TEA ratio for the reform in sound money. This implies that a substantial and sustained increase in the measure of sound money benefits females in the long run, fostering their engagement in entrepreneurial activities. Defining the sound money treatment with higher increase (1.5 points and 0.2 points sustained), the results stay similar (**Appendix table A4**).

The treatment related to the reform of freedom to trade internationally shows no significant impact on the outcome variables (**table 14**). Finally, the treatment regarding the reform in regulation is examined (**table 15**). The results suggest that regulation reform initially benefits females in the short run but discourages them from engaging in opportunity-driven entrepreneurship. This finding aligns with the hypothesis discussed in the study, where men tend to utilize social networks and informal channels more effectively in dealing with government and regulations. Consequently, relaxation of regulations may facilitate females in establishing a business in the initial stages, but in the long run and in high-quality entrepreneurship, men tend to benefit more compared to their female counterparts.

3.2.3. Robustness Checks: Defining Outcome Variable

In this section, the outcome variable, growth is defined by the root of sum of the outcome variables over the years. After taking the root of the sums for two time periods, we take the difference in the measures to generate the growth variable. This outcome variable shows similar results (**Appendix table A5**) as the baseline model, when observing the effect of sustained increase

in economic freedom. Further, the study also explores the impact of the economic reform on the newly generated outcome variable for the countries with higher Gender Disparity Index (GDI) (greater than mean of 0.76). For the availability of data, the study is unable to measure the impact for countries with lower level of Gender Disparity Index (GDI). The results (**Appendix table A6**) shows that the economic reform helps females with opportunity driven entrepreneurship when the country already has a higher level of Gender Disparity Index (GDI).

4. Conclusion

Culture and institutional variations are influential factors in explaining the differences in entrepreneurship across countries. Economic and political freedom play a crucial role in shaping the incentive structure that promotes entrepreneurial efforts in an economy. These freedoms are heavily influenced by economic and political institutions. While there is ample evidence suggesting that economic freedom fosters entrepreneurship in general, there is limited research on its impact specifically on female's entrepreneurship.

This study aims to investigate the causal impact of economic freedom on female entrepreneurship. The relationship between economic freedom and entrepreneurship is complex, as different components of economic freedom may have varying effects on entrepreneurial activities. Additionally, the impact of economic reform on entrepreneurship may differ between men and females.

To examine this relationship, the study employs a matching method and utilizes the Economic Freedom of the World Index provided by the Fraser Institute as the basis for treatment definition. The outcome variables considered are the female-to-male ratios in Total Entrepreneurial Activities (TEA) and Opportunity-Driven Total Entrepreneurial Activities (OTEA) from the Global Entrepreneurship Monitor (GEM) data. The countries experiencing a significant and sustained

increase in the EFW measure between 1995 and 2000 are identified as treatment units. The average short-term and long-term growth in the TEA ratio is used as the outcome measure.

The most robust finding of the study suggests that economic reform has either no impact or a negative impact on the 5-year growth in the TEA ratio. In other words, economic reform does not immediately facilitate female entrepreneurial activities. However, in the long run, it benefits females by reducing the gender gap in entrepreneurial activities and promoting opportunity-driven entrepreneurship. The key components that positively influence female's entrepreneurship are a larger government and sound money. On the other hand, reform in regulations initially benefits females, however, it has a negative impact on overall entrepreneurial activities and opportunity-driven entrepreneurship in the long run.

References

Abadie, Alberto, and Guido W. Imbens. "Bias-corrected matching estimators for average treatment effects." *Journal of business & economic statistics* (2011): 1-11.

Aidis, Ruta, Saul Estrin, and Tomasz Mickiewicz. "Institutions and entrepreneurship development in Russia: A comparative perspective." *Journal of business Venturing* 23, no. 6 (2008): 656-672.

Alesina, Alberto, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat, and Romain Wacziarg. "Fractionalization." *Journal of Economic growth* 8 (2003): 155-194.

An, Weihua, and Christopher Winship. "Causal inference in panel data with application to estimating race-of-interviewer effects in the general social survey." *Sociological Methods & Research* 46, no. 1 (2017): 68-102.

Bardasi, Elena, Shwetlena Sabarwal, and Katherine Terrell. "How do female entrepreneurs perform? Evidence from three developing regions." *Small Business Economics* 37 (2011): 417-441.

Baumol, William J. "Entrepreneurship, management, and the structure of payoffs." *(No Title)* (1993).

Bjørnskov, Christian, and Nicolai J. Foss. "Economic freedom and entrepreneurial activity: Some cross-country evidence." *Public Choice* 134 (2008): 307-328.

Bradley, Steven W., and Peter Klein. "Institutions, economic freedom, and entrepreneurship: The contribution of management scholarship." *Academy of Management Perspectives* 30, no. 3 (2016): 211-221.

Brush, Candida G. "Women entrepreneurs: A research overview." (2008).

Estrin, Saul, Julia Korosteleva, and Tomasz Mickiewicz. "Schumpeterian entry: innovation, exporting, and growth aspirations of entrepreneurs." *Entrepreneurship Theory and Practice* 46, no. 2 (2022): 269-296.

Feenstra, Robert C., Robert Inklaar, and Marcel P. Timmer. "The next generation of the Penn World Table." *American economic review* 105, no. 10 (2015): 3150-3182.

House, Freedom. *Freedom in the world 2014: The annual survey of political rights and civil liberties*. Rowman & Littlefield, 2014

Goodman-Bacon, Andrew. "Difference-in-differences with variation in treatment timing." *Journal of Econometrics* 225, no. 2 (2021): 254-277.

Grier, Kevin B., and Robin M. Grier. "The Washington consensus works: Causal effects of reform, 1970-2015." *Journal of Comparative Economics* 49, no. 1 (2021): 59-72.

Gwartney, James, Robert Lawson, Joshua Hall, Ryan Murphy, Simeon Djankov, and Fred McMahon. "Economic freedom of the world: 2022 annual report." *Fraser Institute* (2022).

Hall, Joshua C., and Robert A. Lawson. "Economic freedom of the world: An accounting of the literature." *Contemporary Economic Policy* 32, no. 1 (2014): 1-19.

Hausmann, Ricardo, Lant Pritchett, and Dani Rodrik. "Growth accelerations." *Journal of economic growth* 10 (2005): 303-329.

Herrera-Echeverri, Hernán, Jerry Haar, and Juan Benavides Estévez-Bretón. "Foreign direct investment, institutional quality, economic freedom and entrepreneurship in emerging markets." *Journal of Business Research* 67, no. 9 (2014): 1921-1932.

Hill, Stephen, Aileen Ionescu-Somers, Alicia Coduras, Maribel Guerrero, Muhammad Azam Roomi, Niels Bosma, Sreevas Sahasranamam, and Jeffrey Shay. "Global entrepreneurship monitor 2021/2022 global report: opportunity amid disruption." In *Expo 2020 Dubai*. 2022.

Ken Farr, W., Richard A. Lord, and J. Larry Wolfenbarger. "Economic freedom, political freedom, and economic well-being: a causality analysis." *Cato J.* 18 (1998): 247.

Kreft, Steven F., and Russell S. Sobel. "Public policy, entrepreneurship, and economic freedom." *Cato J.* 25 (2005): 595.

Minniti, Maria. "Entrepreneurship and network externalities." *Journal of Economic Behavior & Organization* 57, no. 1 (2005): 1-27.

Minniti, Maria. "Female entrepreneurship and economic activity." *The European Journal of Development Research* 22 (2010): 294-312.

North, Douglass C. "Economic performance through time." *The American economic review* 84, no. 3 (1994): 359-368.

Nyström, Kristina. "The institutions of economic freedom and entrepreneurship: evidence from panel data." *Public choice* 136 (2008): 269-282.

Ovaska, Tomi, and Russell S. Sobel. "Entrepreneurship in post-socialist economies." *Journal of Private Enterprise* 21, no. 1 (2005): 8-28.

Parker, Simon C. "Why do small firms produce the entrepreneurs?." *The Journal of Socio-Economics* 38, no. 3 (2009): 484-494.

Reynolds, Paul D., Michael Hay, and S. Michael Camp. "Global entrepreneurship monitor." *Kansas City, Missouri: Kauffman Center for Entrepreneurial Leadership* (1999).

Terjesen, Siri, and José Ernesto Amorós. "Female entrepreneurship in Latin America and the Caribbean: Characteristics, drivers and relationship to economic development." *The European Journal of Development Research* 22 (2010): 313-330.

Verheul, Ingrid, André Van Stel, and Roy Thurik. "Explaining female and male entrepreneurship at the country level." *Entrepreneurship and regional development* 18, no. 2 (2006): 151-183.

Thurik, Roy, Sander Wennekers, Ingrid Verheul, and David Audretsch. *An eclectic theory of entrepreneurship: policies, institutions and culture*. No. H200012. EIM Business and Policy Research, 2001.

Wennekers, Sander, André Van Wennekers, Roy Thurik, and Paul Reynolds. "Nascent entrepreneurship and the level of economic development." *Small business economics* 24 (2005): 293-309.

Xie, Zhimin, Xia Wang, Lingmin Xie, Shuai Dun, and Jiaxin Li. "Institutional context and female entrepreneurship: A country-based comparison using fsQCA." *Journal of Business Research* 132 (2021): 470-480.

Zacharakis, Andrew L., Dean A. Shepherd, and Joseph E. Coombs. "The development of venture-capital-backed internet companies: An ecosystem perspective." *Journal of Business Venturing* 18, no. 2 (2003): 217-231.

TABLES

TABLE 1: Summary Statistics of Economic Freedom of the World (EFW) Measures

Variable	Obs	Mean	Std. Dev.	Min	Max
Economic Freedom of the World (EFW)	130	6.59	1.07	3.43	8.87
EFW Size of Government	158	6.43	1.40	0.69	8.83
EFW Gender Disparity Index (GDI)	165	0.79	0.20	0.29	1.00
EFW Legal System and Property Rights	162	5.00	1.65	1.85	8.83
EFW Sound Money	130	7.61	1.66	2.90	9.82
EFW Freedom to Trade Internationally	130	7.04	1.60	1.06	9.63
EFW Regulation	130	6.46	1.04	3.81	9.02

TABLE 2: Definition of Treatments

Treatment: Sustained Increase in EFW Measures	Increase in Score	Sustained	Number of Treated Unit	Number of Untreated Unit	Number of Dropped Units
Economic Freedom of the World (EFW)	1.00	0.20	39	126	11
EFW Size of Government	0.50	0.20	59	106	66
EFW Gender Disparity Index (GDI)	0.08	0.04	14	151	28
EFW Legal System and Property Rights	0.50	0.20	35	130	54
EFW Sound Money	0.50	0.20	70	95	51
EFW Freedom to Trade Internationally	0.50	0.20	60	105	50
EFW Regulation	0.50	0.20	80	85	88

TABLE 3: Summary Statistics of Outcome Variables and Covariates

Variable	Obs	Mean	Std.	Min	Max
Outcome Variable					
5-year growth in Female/Male TEA	77	0.010	0.021	-0.040	0.085
10-year growth in Female/Male TEA	57	0.008	0.016	-0.028	0.072
3-year growth in Female/Male Opportunity-Driven TEA	62	0.000	0.031	-0.092	0.067
Covariates					
5-year lagged log of GDP Per Capita	163	8.581	1.180	6.025	11.378
5-year lagged Population Growth	163	0.015	0.013	-0.026	0.053
5-year lagged Human Capital Index	138	2.222	0.673	1.047	3.507
5-year lagged Polity	154	2.174	6.599	-10.000	10.000
5-year lagged Share of Consumption at current PPPs	163	0.636	0.162	0.164	1.210
5-year lagged Share of gross capital formation at current PPPs	163	0.198	0.095	0.016	0.555
5-year lagged Share of government consumption at current PPPs	163	0.206	0.101	0.017	0.524

Table 4: Logit estimation (Baseline)

VARIABLES	(1) 5-year growth in Female/Male TEA	(2) 10-year growth in Female/Male TEA	(3) 3-year growth in Female/Male Opportunity-Driven TEA
5-year lagged log of GDP Per Capita	0.607	0.766	1.581
	(0.993)	(1.332)	(1.453)
5-year lagged Polity	-0.059	-0.054	0.016
	(0.094)	(0.117)	(0.116)
5-year lagged Human Capital Index	0.405	0.717	-1.351
	(1.314)	(1.942)	(1.837)
5-year lagged Share of government consumption at current PPPs	8.185	17.084	18.005
	(7.616)	(10.472)	(11.144)
5-year lagged Share of gross capital formation at current PPPs	-3.423	-1.258	-10.991
	(10.111)	(12.754)	(12.617)
5-year lagged EFW	-2.210***	-2.904**	-2.521**
	(0.778)	(1.235)	(1.080)
Constant	5.109	5.104	1.913
	(6.469)	(10.141)	(9.500)
Observations	65	51	52

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

TABLE 5: Covariate Balance Achieved by Matching

Variable	Unmatched / Matched	Mean: Treated	Mean: Control	t-test: t	t-test: p>t
5-year lagged log of GDP Per Capita	U	8.819	9.537	-2.94	0.005
	M	8.992	9.325	-1.15	0.268
5-year lagged Polity	U	2.912	7.290	-3.10	0.003
	M	5.500	8.360	-1.64	0.120
5-year lagged Human Capital Index	U	2.324	2.625	-1.86	0.067
	M	2.399	2.473	-0.27	0.79
5-year lagged Share of government consumption at current PPPs	U	0.225	0.161	3.91	0.000
	M	0.207	0.230	-0.61	0.548
5-year lagged Share of gross capital formation at current PPPs	U	0.203	0.253	-2.22	0.030
	M	0.195	0.218	-0.82	0.424
5-year lagged EFW	U	5.068	6.882	-6.80	0.000
	M	5.781	5.847	-0.23	0.821

TABLE 6: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **overall Economic Freedom of the World**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.004	.005	-.023
Propensity Score: Nearest 2 Neighbors	-.010	.003	-.018
Propensity Score: Nearest 3 Neighbors	-.012	.004	-.009
Propensity Score: Normal Kernel	-.009	.002	-.021
Mahalanobis: Nearest Neighbor	-.008	.015***	.046*
Mahalanobis: Nearest 2 Neighbors	-.005	.009**	.039**
Mahalanobis: Nearest 3 Neighbors	-.006	.009*	.041**

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 7: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **overall Economic Freedom of the World**) (New Covariate Set 1)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.018*	.003	.030
Propensity Score: Nearest 2 Neighbors	-.009	.003	.011
Propensity Score: Nearest 3 Neighbors	-.011	-.001	.013
Propensity Score: Normal Kernel	-.013	-.000	.017
Mahalanobis: Nearest Neighbor	-.008	.007	.010
Mahalanobis: Nearest 2 Neighbors	-.001	.014**	.022
Mahalanobis: Nearest 3 Neighbors	-.001	.013*	.022

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 8: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **overall Economic Freedom of the World**) (New Covariate Set 2)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.026**	.006	.014
Propensity Score: Nearest 2 Neighbors	-.016	.006	.014
Propensity Score: Nearest 3 Neighbors	-.016	.003	.012
Propensity Score: Normal Kernel	-.019*	.000	.001
Mahalanobis: Nearest Neighbor	-.017	-.000	.012
Mahalanobis: Nearest 2 Neighbors	-.010	-.001	.022
Mahalanobis: Nearest 3 Neighbors	-.009	-.002	.026*

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 9: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **overall Economic Freedom of the World**) (New Covariate Set 3)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.018*	.014*	-.013
Propensity Score: Nearest 2 Neighbors	-.011	.010	-.013
Propensity Score: Nearest 3 Neighbors	-.012	.007	-.023
Propensity Score: Normal Kernel	-.012	.009	-.023
Mahalanobis: Nearest Neighbor	.002	.045***	.109***
Mahalanobis: Nearest 2 Neighbors	-.002	.010*	.031*
Mahalanobis: Nearest 3 Neighbors	.001	.006	.030*

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 10: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **Size of Government Measure of EFW**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.008	-.012	-.035*
Propensity Score: Nearest 2 Neighbors	-.007	-.009	-.025
Propensity Score: Nearest 3 Neighbors	-.007	-.006	-.025*
Propensity Score: Normal Kernel	-.007	-.008	-.028
Mahalanobis: Nearest Neighbor	-.000	.005	-.017
Mahalanobis: Nearest 2 Neighbors	-.002	-.002	-.016
Mahalanobis: Nearest 3 Neighbors	.003	-.004	-.019

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 11: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **Gender Disparity Index Measure of EFW**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	.010	.008	.003
Propensity Score: Nearest 2 Neighbors	.004	.007	.003
Propensity Score: Nearest 3 Neighbors	.009	.008	.001
Propensity Score: Normal Kernel	.010	.008	.001
Mahalanobis: Nearest Neighbor	.106**	.105**	-.512**
Mahalanobis: Nearest 2 Neighbors	-.012**	-.008	-.042
Mahalanobis: Nearest 3 Neighbors	-.013**	-.006	-.046*

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 12: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **Legal System and Property Rights Measure of EFW**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.003	-.005	.011
Propensity Score: Nearest 2 Neighbors	-.001	-.005	.008
Propensity Score: Nearest 3 Neighbors	-.001	-.004	-.008
Propensity Score: Normal Kernel	-.001	-.005	-.006
Mahalanobis: Nearest Neighbor	-.000	.006	-.008
Mahalanobis: Nearest 2 Neighbors	.000	.004	-.009
Mahalanobis: Nearest 3 Neighbors	.000	.006	-.007

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 13: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **Sound Money Measure of EFW**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.003	.001	.025
Propensity Score: Nearest 2 Neighbors	.001	.005	.018
Propensity Score: Nearest 3 Neighbors	.004	.003	.010
Propensity Score: Normal Kernel	.002	.004	.034
Mahalanobis: Nearest Neighbor	.002	.091***	-.006
Mahalanobis: Nearest 2 Neighbors	.004	.078***	.011
Mahalanobis: Nearest 3 Neighbors	.006	.009	.009

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 14: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **Freedom to Trade Internationally Measure of EFW**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	.001	.006	.019
Propensity Score: Nearest 2 Neighbors	-.002	-.001	.010
Propensity Score: Nearest 3 Neighbors	-.003	-.003	.010
Propensity Score: Normal Kernel	-.004	-.001	.019
Mahalanobis: Nearest Neighbor	-.004	-.003	-.016
Mahalanobis: Nearest 2 Neighbors	-.005	-.006**	-.004
Mahalanobis: Nearest 3 Neighbors	-.003	-.005	-.002

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

TABLE 15: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **Regulation Measure of EFW**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.001	-.002	-.026
Propensity Score: Nearest 2 Neighbors	.001	-.002	-.028**
Propensity Score: Nearest 3 Neighbors	.001	-.002	-.028
Propensity Score: Normal Kernel	.001	-.004	-.037*
Mahalanobis: Nearest Neighbor	.045**	.013***	-.011
Mahalanobis: Nearest 2 Neighbors	.045*	-.029***	.002
Mahalanobis: Nearest 3 Neighbors	.017*	-.029***	.002

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

Appendix A

Table A1: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **overall Economic Freedom of the World**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.008	.006	.014
Propensity Score: Nearest 2 Neighbors	-.009	.009	.010
Propensity Score: Nearest 3 Neighbors	-.010	.010	-.0003
Propensity Score: Normal Kernel	-.009	.001	.005
Mahalanobis: Nearest Neighbor	.001	.005	.014
Mahalanobis: Nearest 2 Neighbors	.002	.015***	.007
Mahalanobis: Nearest 3 Neighbors	.001	.006	.011

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.
Covariates: 5-year lagged log of GDP Per Capita, 5-year lagged political rights, 5-year lagged civil liberties, 5-year lagged Human Capital Index, and 5-year lagged EFW.

Table A2: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **overall Economic Freedom of the World**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.0001	.015**	.023
Propensity Score: Nearest 2 Neighbors	-.002	.015***	.028
Propensity Score: Nearest 3 Neighbors	-.004	.015***	.027
Propensity Score: Normal Kernel	-.004	.018*	.014
Mahalanobis: Nearest Neighbor	-.002	.031***	.002
Mahalanobis: Nearest 2 Neighbors	.002	.015***	.024
Mahalanobis: Nearest 3 Neighbors	.002	.009**	.019

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.
Covariates: 5-year lagged log of GDP Per Capita, 5-year lagged political rights, 5-year lagged civil liberties, 5-year lagged Human Capital Index, 5-year lagged EFW, and 5-year lagged Corruption index.

Table A3: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in overall **Economic Freedom of the World**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.013	.009	.010
Propensity Score: Nearest 2 Neighbors	-.010	.007	-.006
Propensity Score: Nearest 3 Neighbors	-.011	.004	-.007
Propensity Score: Normal Kernel	-.012	.005	-.004
Mahalanobis: Nearest Neighbor	-.002	.012*	.046**
Mahalanobis: Nearest 2 Neighbors	-.003	.006	.035**
Mahalanobis: Nearest 3 Neighbors	-.006	-.00007	.036**

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.
Covariates: l5_lngdppc l5_polity l5_efw l5_hc ethnic l5_corr
5-year lagged log of GDP Per Capita, 5-year lagged Polity, 5-year lagged Human Capital Index, 5-year lagged EFW, Ethnic fractionalization and 5-year lagged Corruption index.

Table A4: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a (Higher increase of 1.5 points increase with 0.2 points sustained) sustained increase in **Sound Money Measure of EFW**)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	-.005	.005	.005
Propensity Score: Nearest 2 Neighbors	-.001	.004	-.011
Propensity Score: Nearest 3 Neighbors	.001	.005	.0001
Propensity Score: Normal Kernel	-.003	.004	.002
Mahalanobis: Nearest Neighbor	.004	.005	-.024
Mahalanobis: Nearest 2 Neighbors	.006	.011**	-.039***
Mahalanobis: Nearest 3 Neighbors	.006	.011**	-.048***

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

Table A5: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **overall Economic Freedom of the World**) (Second definition for the measures of outcome variable)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	.014	.009	-.046
Propensity Score: Nearest 2 Neighbors	.006	.008	-.048
Propensity Score: Nearest 3 Neighbors	.005	.009	-.085
Propensity Score: Normal Kernel	.025	.023	-.066
Mahalanobis: Nearest Neighbor	-.034*	.021*	.025
Mahalanobis: Nearest 2 Neighbors	-.033	.025**	-.004
Mahalanobis: Nearest 3 Neighbors	-.034*	.010	-.008

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.

Table A6: Effects of Economic Freedom on average growth of Female Entrepreneurship (Treatment: a sustained increase in **overall Economic Freedom of the World (EFW**) (Second definition for the measures of outcome variable) (countries with High GDI Measure pre-treatment)

	Female/Male TEA		Female/Male Opportunity-Driven TEA
	5-year growth	10-year growth	3-year growth
Propensity Score: Nearest Neighbor	.033	.008	-.057
Propensity Score: Nearest 2 Neighbors	.038	.002	-.048
Propensity Score: Nearest 3 Neighbors	.040	.001	-.052
Propensity Score: Normal Kernel	.034	.003	-.062
Mahalanobis: Nearest Neighbor	.001	-.003	.116**
Mahalanobis: Nearest 2 Neighbors	-.001	-.003	.096**
Mahalanobis: Nearest 3 Neighbors	.012	-.004	.080**

Notes: ***, **, & * indicate significance at the .01, .05, and .10 levels, respectively. Bootstrapped standard errors are in parentheses using 200 replications for propensity score matching only.