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The Causal Effect of Economic Freedom on Female Employment and Education

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Abstract:

While there are decades of evidence that economically free economies grow faster and are more productive than un-free ones, there is less knowledge about the effect of economic freedom on groups that have traditionally been disadvantaged. I study the causal effects of large and sustained jumps in economic freedom on women's labor force participation and primary school enrollment. I find that these jumps have a positive and significant effect in both cases--economic freedom is good for women's labor force opportunities and female education.

1. Introduction

There is overwhelming empirical data that economically free countries are much wealthier on average than less free ones. It is less certain, however, whether the benefits of economic freedom are shared equally amongst men and women.[1] Some critics argue that capitalism fails to recognize the "innate value of individuals as human beings," especially when it comes to women.[2] Others acknowledge that liberalism and economic freedom bring about more work opportunities for women but argue that this only leads to more exploitation. (Safa, 1981). Byron and Thorburn (1998), for example, argue that capitalism succeeds in part by the "subordination of women and their waged and unwaged labor."

Theoretically, one would expect women to benefit substantially from economic freedom. As Hayek (1988) and Friedman (1962) point out, economic freedom leads to increased economic opportunities. As I discuss in detail below, there is more incentive for parents to educate their female children, because there are now more opportunities for those girls to use that education. More competition for labor means that preconceptions and prejudices about hiring women will be more penalized in the marketplace. Companies that hire the best workers no matter what the gender will be more likely to be competitive than ones that cling to old beliefs.[3] Fort and Schipani (2004), for example, show that multinational companies compete for female workers by offering benefits such as childcare as well as training programs to reduce sexual harassment in the workplace.

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[1] Hoover et al. (2015) argue that an economy cannot possibly reach its full potential without the engagement of all citizens. They study economic freedom and the black/white income gap and find that the former is positively and significantly related to white household income but not to black household income.

[2] Stroup (2011), who points to Stiglitz (1996), Stiglitz et. al. (2006), Stiglitz (2002), Posner (2009), and Gibson-Graham, (1996) as prominent critics who make this argument.

[3] While outside the scope of this paper, Fike (2015) argues and finds that economic freedom can lead to a significant change in attitudes about women and work. She cites Berggren and Jordahl (2006, 2013) and Pitlik and Rode (2014) as examples of economic freedom changing other societal beliefs, in those cases more tolerance towards homosexuality, more social trust, and an increased belief that people have control over their life.

Empirically, there seems to be a strong correlation between economic freedom and women's well-being. Stroup (2008), using data from 95 countries in the 1980s and 90s, studies the effect of economic and political freedom on absolute measures of female well-being (life expectancy, literacy, fertility, and birth control use) as well as relative measures (comparing male to female ratios in life expectancy, literacy, high school enrollment, and labor force participation). He concludes that economic freedom more strongly and positively affects women's well-being and societal equality than political freedom. Stroup (2011) finds that higher levels of economic freedom are significantly correlated with 4 of the 5 measures that make up the UN's Gender Inequality Index. More recently, Fike (2015) finds that economic freedom is positively associated with female education. She points out that "women living in societies with institutions more consistent with economic freedom may invest more heavily in education not only because the returns of such investments will be higher, but because they are better able to capture the benefits of such investments."

The empirical literature on this topic has used regression analysis with an index of economic freedom as a linear regressor. This strategy imposes the strong assumption that a change in the index from 1 to 2 is the same as a change from 4 to 5. Regression analysis can extrapolate outside the support of the data, making the results quite dependent on the functional form chosen by the researcher.[4] Lastly, the literature typically does not try to isolate the causal effects of economic freedom on women's well-being.

In this paper, I avoid the problems listed above by estimating the causal effect of jumps in economic freedom on women's labor force participation and early schooling with propensity score

[4] OLS, for instance, is just minimizing the sum of squared predicted errors when it produces an estimate of the treatment effect. It is not making the comparison on units where the covariates are balanced. They could be very unbalanced, causing a potentially serious extrapolation problem.

matching for a sample of 154 countries from 1960 to 2020.[5] I find that large, sustained jumps in economic freedom have a positive and significant effect on female labor participation, measured as the percent of the labor force that is female or as the percentage of females in the labor force.[6] I find similar positive and significant effects when I examine the effect of jumps in economic freedom on the percentage of females that complete primary education (of the relevant age group). These results are also economically significant; jumps in EFW result in more than a 6-percentage point increase in female primary school completion in treated countries relative to the changes in their matched controls. These findings are consistent with the other literature on the topic but are the first to present evidence for a causal link between economic freedom and women's labor participation and schooling.

Section 2 discusses the theoretical reasons for a relationship between economic freedom and female labor force participation and education and provides an overview of the empirical literature on the topic. Section 3 explains how I determine what constitutes a jump in economic freedom. Section 4 presents the data and the methodology, while Section 5 discusses the results. Section 6 concludes.

2. The Relationship between Economic Freedom and Female Employment & Education

2.a. Economic Freedom & Female Employment

[5] Hausmann, Pritchett, and Rodrik (2005) developed this approach. More recently, Grier and Grier (2020) use a similar approach to study the effect of jumps in economic freedom on per-capita income.
[6] One measure of female labor force participation is in relation to men's outcomes (the percentage of the labor force that is female), while the other is amongst females only (the percentage of females that are in the labor force). It is important to note that improvements in women's economic and educational outcomes matter even if men's outcomes are improving too. For instance, if men's opportunities increased by 21% because of more economic freedom and women's opportunities increased by 20%, that would still be a large gain for women (and the gains should not be minimized merely because men gained a bit more).

In the introduction, I discussed some general theoretical reasons why one would expect increases in economic freedom to positively affect women. Economic freedom is comprised of many different types of liberalization, however, and it is worthwhile to investigate the theoretical and empirical effects of some of these types of freedom on female labor force participation.

Mukhopadhyay (2015) argues that trade liberalization can have either a positive or negative effect on female labor participation depending on the type of firms affected by the change. On the positive side, increased globalization may make export-oriented firms more likely to take on female workers, who tend to have lower wages, to increase their competitiveness (Çağatay and Özler (1995), Özler (2000), and Standing (1999)). On the other hand, export-oriented firms that are not labor intensive are likely to require workers with good technical skills. If females are disadvantaged in educational opportunities, they may have less opportunity to secure these jobs (Siegmann 2006).

Unsurprisingly, the empirical evidence is mixed. Mukhopadhyay (2015) uses a comparative static analysis to demonstrate that lower tariffs will tend to raise female labor force participation. Likewise, Pradhan (2006) shows that increased international trade has had a positive effect on female employment in India. Aguayo-Tellez et al. (2014) show that tariff reductions associated with the North American Free Trade Agreement (NAFTA) benefited female workers in sectors that were already female-intensive as well as leading to increased employment of women in blue-collar jobs. Lee (2014) evaluates the effect of export processing zones on women in Jamaica and finds that women are better off because of the liberalization: "women gained increased access to paid employment in both manufacturing and export processing zones."

Siegmann (2006) finds that increased foreign direct investment positively affects female employment in agriculture but not in manufacturing sectors. Kucera and Tejani (2014) study the percent of female labor force participation in manufacturing for 36 countries at varying levels of economic development from 1981 to 2008. They find evidence of both the feminization and

defeminization of manufacturing, with the latter being mostly driven by technological upgrading in labor-intensive industries like textiles and apparel.

There are also reasons to believe that labor market deregulation could significantly affect female labor market participation. Mukhopadhyay (2015) argues that deregulation in the labor market increases overall economic efficiency as it reduces rigidities. It may, however, bring about a reallocation of labor between the formal and informal sectors, which could affect the female labor force participation as women tend to make up more of the informal sectors in developing countries. He performs a comparative static analysis and finds that labor market deregulation is associated with lower female labor force participation. These findings are inconsistent with ones found for US states and metropolitan areas. Cebula and Alexander (2015) find that a 1% increase in labor market freedom results in an almost .3% increase in female labor participation rates across US states, while Wong and Stansel (2016) find an even bigger quantitative effect of labor market freedom at the local level. They show that an increase in labor market freedom by one standard deviation is associated with a 1.2-2.0% increase in female labor force participation, leading them to conclude that government interventions in labor markets may be particularly harmful for women.[7]

Lastly, there is evidence that banking deregulation is positively associated with female labor force participation. Popov and Zaharia (2019) show that intra-state banking deregulation in the United States reduced the male-female gap in labor force participation by a minimum of 7.5%. They argue that the finding is driven by the fact that deregulation spurred job creation and the service sector in general.

2.b. Economic Freedom & Female Education

[7] In a sample of 50 US states from 1981-2009, Heller and Stephenson (2014) show that there is a positive relationship between economic freedom and overall labor force participation.

There are strong theoretical reasons to believe that economic freedom is positively associated with female education rates. Economically free countries tend to be wealthier and more developed than unfree ones, providing citizens with more opportunities to prosper. There is more of a payoff to getting an education in a growing, prosperous economy, and citizens will be better able to capture a share of the investment in economically free societies (Feldman (2017)). As Fike (2015) points out, parents in free societies will be more likely to educate their children, no matter the gender, when it is clear that higher education levels can result in higher standards of living and overall opportunities for their kids. It is also worth noting that education is often expensive. It would be intuitive to expect economically free economies to have better functioning credit markets, which would mean individuals and firms would be better able to take out loans to fund investment in human capital.

Empirically, there seems to be consistent evidence of a positive relationship between economic freedom and education. Dawson (1998) examines 84 countries from 1975 to 1990 and finds a positive relationship between economic freedom and secondary school enrollment rates. Aixalá and Fabro (2009) find a similar result when using primary school enrollment. King et al. (2012) studies 86 countries from 1989 to 2007 and finds that the returns to education are positively associated with economic freedom and that this holds for both men and women. Lastly, Fike (2015) studies more than 100 countries and finds that economic freedom positively affects female tertiary education.

3. Jumps in Economic Freedom

To determine if jumps in economic freedom cause increases in de jure or de facto gender equality, I first must decide how best to measure economic freedom and what constitutes a "jump" in the variable. For economic freedom, I use the Fraser Institute's (2022) measure, called EFW, or

Economic Freedom of the World.[8] It is available every five years from 1970 – 2000 and yearly after that. It is an index that includes 70 different variables measuring a wide range of features, such as government size, type of legal system, the security of property rights, the soundness of money, and how regulated the economy and international trade are.[9] One additional benefit of using this index is that it is based on third party data, which makes it less likely to fall prey to a "halo bias."[10]

The index ranges from a 1 to 10, with larger numbers representing greater amounts of economic freedom. The sample consists of 154 countries from 1960 to 2000.[11] The average EFW score is 6.25 and the standard deviation is 1.3 (See Table 3 for summary statistics of all variables used in the paper). Building on Hausmann et al. (2005) and Grier and Grier (2021), I identify all large and sustained increases in EFW. I define a large jump to be equal to 1.0 over a 5-year period; for a jump to be considered "sustained," the EFW score must not decrease by more than .20 in the subsequent 5 years.[12] Later I experiment with a narrower definition of a jump (1.25-point increase in EFW) and a broader definition (a .75-point increase).

Table 1 lists the cases of countries that had large, sustained jumps of 1.0 or more during the sample period. Amazingly, four countries had jumps greater than 2.0: EFW increased by 2.82 points in Nicaragua, 2.22 points in Uganda, and 2.08 points in El Salvador between 1990 and 1995.

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[8] Gwartney et al. (2021).

[9] The Fraser Institute notes that, "in order to receive a high EFW rating, a country must provide secure protection of privately-owned property, a legal system that treats all equally, even-handed enforcement of contracts, and a stable monetary environment. It also must keep taxes low, refrain from creating barriers to both domestic and international trade and rely more fully on markets rather than government spending and regulation to allocate goods and resources." https://www.fraserinstitute.org/economic-freedom/approach

[10] The Fraser institute website notes that "all variables come from third party sources, such as the International Country Risk Guide, the Global Competitiveness Report, and the World Bank's Doing Business project, so that the subjective judgments of the authors do not influence the index." https://www.fraserinstitute.org/economic-freedom/approach

[11] Table A1 in the Appendix lists the countries in the sample.

[12] The average change in EFW in the sample over a 5-year period is .166, with a standard deviation of .566.

Similarly, from 1995-2000, Rwanda's EFW score increased by 2.00 points, representing profound changes in these countries' level of economic freedom.

Table 2 reports when and where these jumps occurred. Most of the cases occurred in the 1980s (30.4%) and 1990s (62.5%). The jumps are relatively evenly dispersed across regions, except for Oceania and Asia, which account for only 2 of the 56 cases.

4. Methods and Data

4.a. Methodology

I compare outcomes in treated and control countries using matching to pick controls most similar to the treated. I create a dummy variable called EFW_Reform_{it} that is equal to 1 when a treatment has occurred in country i and time t. Reform took place at different times throughout the sample, referred to as staggered adoption of treatment.

One potential pitfall is the impossibility of matching on unobservables. To deal with this issue, I use the first difference rather than the level of the outcome variable. An & Winship (2017) argue that "using the differenced outcome helps remove the effects of time-invariant factors while matching helps balance covariates and create a more focused causal inference."[13] Thus, the differencing will eliminate time invariant unobservables and produce an unbiased estimate of the actual average treatment effect.

Matching creates a control unit that is close as possible to the treated unit. The average treatment effect is simply the difference between the outcome in the reformed country and the

[13] I prefer matching over traditional regression analysis for several other reasons, including the fact that it does not use extrapolation outside of the common support to estimate the results. Thus, if there are no controls with propensity scores that are close to the country undergoing reform, then that event is not included in the analysis. Regression analysis is also more sensitive to a researcher's choice of functional form than is matching.

average outcome in the matched controls. I use two different types of matching to accomplish this. First, I use propensity score matching that estimates a logit or probit model of the probability that a country undergoes sustained reform. Then, the cases of reform are matched to the control that has the closest propensity score. More specifically, I will estimate 4 different kinds of propensity score matching: matching to a treated unit's nearest neighbor, two nearest neighbors, an average of the three closest neighbors, and kernel matching, where the estimator uses all control units to create a match but weights them according to how similar they are in propensity scores.[14]

Second, I use Mahalanobis matching, which is a type of matching on covariates. The estimator chooses the control that has the smallest weighted average of differences in the covariates as the country undergoing the reform. Here I report results using the nearest neighbor, nearest two neighbors, and nearest three neighbors.

As with Grier and Grier (2021), I am not trying to estimate a linear relationship between sustained economic reform and women's outcomes. Instead, I am modeling which countries are successful in creating lasting increases in economic freedom and the average treatment effect of this jump is the change in women's outcomes in these reformed countries minus the change in women's outcomes in the control units.

4.b. Data

The sample includes 153 countries from 1960 to 2019. Because the EFW data is only available every five years until 2000, and since it would take time before jumps in EFW would show up in outcomes, I measure all variables quinquennially. I use three *de facto* measures of women's

[14] "Nearest neighbor" means the unit that is as similar as possible in all the other observable ways (besides experiencing the actual treatment) to the treated unit.

economic freedom: the percentage of females aged 15-24 that are in the labor force,[15] the percentage of the labor force that is female,[16] and the percent of females (of the relevant age group) that finished primary education.[17] All these data are available on the World Bank's Gender Data Portal. No single variable can reflect women's economic freedom, but these are good measures of women's basic education (which would allow them to participate in the economy more easily), as well as their actual participation. Note that there are myriad other variables reported in the Gender Data Portal, many of which would be excellent proxies of women's economic empowerment. Unfortunately, coverage is often low (both in number of years and countries) and any effect of a jump in economic freedom might materialize over a longer time horizon.[18] The outcome variables are measured five years after any particular jump, allowing the change in economic freedom to affect women's labor participation and schooling.

For matching, it is important to try to choose covariates that increase the probability that a country enacts sustained reforms, help to explain women's economic possibilities, or in some cases do both of those things. I follow Grier and Grier (2021), who study the effects of jumps in EFW on income growth, and match on lagged values of EFW, human capital, real per-capita income, government consumption in GDP, export share, inflation, and democracy scores.[19] The economic data come from the Penn World Table (Feenstra et al. (2015)) except for inflation, which comes

[15] Defined by the International Labour Organization (ILO) as "the proportion of the female population ages 15-24 that is economically active: all people who supply labor for the production of goods and services during a specified period."
[16] Per the ILO, the labor force is defined as "people ages 15 and older who supply labor for the production of goods and services during a specified period."
[17] The World Bank defines this variable as "the percentage of female students completing the last year of primary school. The rate based on completers is calculated by taking the total number of female completers in the last grade of primary school divided by the total number of female children of official graduation age."
[18] There are data on female completion of post-primary education and access to birth control, but the sparse data coverage for both does not leave an adequate number of cases to examine. On the other hand, there are other variables, like fertility, life expectancy, and percent of employers that are female, that one would not expect to change substantially in a 5-year horizon after an increase in economic freedom.
[19] Grier and Grier (2021) note that 'it is common to match on less than 10 covariates" in the macro matching literature.

from World Development Indicators (World Bank (2022)). The democracy variable, which comes from Varieties of Democracy Dataset (Coppedge et al. (2021)), asks: "to what extent is the ideal of electoral democracy in its fullest sense achieved?" The values range from 0 to 1, with higher numbers representing more democracy.[20]

Table 3 presents the summary statistics. There is a wide range of values for all the outcome variables. Female completion of primary school, for example, ranges from an unfortunately low of .78% (Oman in 1975) to 123% (Nepal in 2019).[21] Female labor force participation is lowest on average in the Middle East and Northern Africa. In fact, all the countries with less than 10% female labor participation, with one exception are from those regions: the lowest was Iraq in 2019 at 4.82%.[22] The highest participation rates came from Sub-Saharan Africa and South Asia: Burundi, Rwanda, and Laos all had rates higher than 83% (84.5%, 83.9%, and 83.2%, respectively).[23] The percentage of the labor force that is female also has a large range, from 8.27% in Yemen in 2019 to 55.9% in Mozambique in 2000.[24]

[20] The variable is named *v2x_polyarchy* and it is an "index formed by taking the average of, on the one hand, the weighted average of the indices measuring freedom of association thick (v2x_frassoc_thick), clean elections (v2xel_frefair), freedom of expression (v2x_freexp_altinf), elected officials (v2x_elecoff), and suffrage (v2x_suffr) and, on the other, the five-way multiplicative interaction between those indices." Coppedge et al. (2021).

[21] Other countries that had lower than 5% for this variable included Guinea-Bissau in 1980 (3.98%) and Niger in 1975 (4.66%) Note that the percentage can be greater than 100% because the numerator may consist of students starting school late or older children that have repeated one or more years of primary school but are now graduating.

[22] Other countries with low scores included Yemen (4.82% in 2019), Algeria (6.82%, 2019), Saudi Arabia (7.75%, 2015), Syria (8.07%, 2019), Egypt (8.13%, 2019), Iran (8.17%, 2019), India (8.29%, 2019), Algeria (8.76, 2015), and Jordan (9.10%, 2019).

[23] Only one other country had less than 10% of their labor force being female (Iraq in 1990 at 9.78%). Other countries with rankings higher than 80% include Mozambique (81.27%, 1995), Laos (81.43%, 1995), Myanmar (81.7%, 1990), and Mozambique (82.89%, 1990). Iceland is the only country outside of these regions to experience those levels of participation (81.79% in 2015).

[24] There were 11 countries that had a labor force that was at least 51% female. Nepal was the only other country that had rates higher than 55% (55.42%, 2015).

5. Results

5.a. Logit Results

Table 4 presents the results of estimating the logit model that creates the propensity scores that are used in our matching models. Country years with higher levels of democracy and human capital were more likely to have a sustained increase in EFW, while ones with higher levels of economic freedom were less likely to experience a jump. The coefficients on lagged values of democracy, inflation, per-capita income, and exports were insignificant, meaning that they either did not predict treatment or were not correlated with the outcome (or both).

It is important to note that I am not trying to only include statistically significant variables in the matching equations. I want the treated units and their matched controls to be as close as possible over several different covariates, so using a wide range of them is helpful. The Mahalanobis estimation selects matched controls that are similar to the treated unit by creating a weighted average of the difference between the values of the covariates for the treated unit and the values for the matched controls.

5.b. Main Results

Table 5 presents the results of estimating the effect of sustained increases in EFW on the percentage of the labor force that is female, the percentage of females aged 15-24 that are in the labor force, and the percent of females (of the relevant age group) that finished primary education. There are 40 treated units for the first two outcome variables and 20 for the third. As mentioned above, the propensity score matching (PSM) results does not extrapolate outside of the common

support.[25] Cases for which there are no controls with sufficiently similar propensity scores are dropped for the analysis. Here, two cases were dropped for the labor force variables and three cases were dropped when primary school completion is the outcome variable. The Mahalanobis covariate matching model uses all treated cases.[26]

I find a strong relationship between jumps in EFW and the percentage of the labor force that is female (Column 2 of Table 5). All coefficients are significant at the .01 level, with the exception of the *Mahalanobis: Nearest Neighbor*, which has a significance level of .06. The sizes range between .547 and 1.05, with an average treatment effect of .81. The economic effects, however, are quite small. On average, a jump in EFW results in a .81 percentage point increase in the percentage of the labor force that is female in treated countries relative to the change in the matched controls.

The effect of sustained increases in economic freedom on female labor force participation (the percentage of working aged females in the labor force) is also positive, but less consistently significant. The PSM results are insignificant, while the Mahalanobis results have coefficients significant between the .01 and .09 range. The average treatment effect of the significant coefficients is 1.60, substantially higher than the average for the first outcome variable. This result means that a jump in EFW results in a 1.6 percentage point increase in the female labor force participation rate in the treated countries relative to the change in their matched controls. One thing that is important to keep in mind is that this increase is above and beyond whatever is happening to

[25] In other words, if there are controls with a lower propensity score than any of the treated, they are not used. If there are treated units with a higher propensity score than any of the controls, then they are not used. For instance, if one of the treated units has a propensity score of .9 and the largest propensity score of the untreated is .75, this would be extrapolation and PSM does not make that comparison.

[26] For the propensity score estimations, the standard errors are created with bootstrapping (with 250 iterations). For the Mahalanobis results, I use bias-adjusted standard errors as recommended by Abadie and Imbens (2011).

the control group. It is likely that female participation is increasing in that group as well, and this represents a gain above and beyond that.

Lastly, I also find strong evidence that jumps in EFW have positive and significant effects on female primary schooling. All the Mahalanobis results are significant at least the .05 level, and two of the PSM results are also significant. The average treatment effect of the significant coefficients is 6.39, which means that jumps in EFW result in more than six percentage point increase in the percentage of females completing primary school in the treated countries relative to the change in their matched controls. This is a large increase in female education and even more so when we recognize that this is relative to the control group, which is likely also experiencing big gains in female education in this period.

In sum, I find strong evidence that sustained jumps in economic freedom are positively and significantly associated with women's participation in the labor force and female primary school completion five years after the reform.

5.c. Covariate Balance

It is important when using PSM to test whether the average covariate values of the treated units and their matched controls are sufficiently similar. I tested the null hypothesis that the two sets of values are not significantly different for each PSM estimation and failed to reject the null. Columns 3, 5, and 7 of Table 5 report the results.

Table 6 provides a detailed example of the covariate balance to demonstrate exactly what matching accomplishes. The table reports the covariate balance before and after using Propensity Score Matching: Two Nearest neighbors for equation 1 of Table 5. Before matching, the treated and untreated units were significantly different for all seven of the covariates. After matching, on the other hand, the treated units inside the range of common support and their matched controls are not significantly different for any of the covariates.

5.d. Robustness

I defined a jump as a sustained increase in EFW of at least 1.0 points over a 5-year period. Here I relax this definition to determine if jumps are still associated with women's economic and educational outcomes. Table 7 presents the results of defining a jump to be an increase in EFW of at least .75 over a 5-year period. When I do that, I obviously capture a lot more jumps in the sample. There are now 66 cases for the first two outcome variables on labor participation. 63 of the 66 cases are in the region of common support and are thus used in the PSM estimations; the Mahalanobis equations use all 66 cases. Seven of the nine coefficients for column 2 (the percentage of the labor force that is female) are positive and significant at least the .10 level. The size of the coefficient, which was already small in the main results, is substantially smaller, meaning the economic effect is negligible. Only three of the nine coefficients on female labor force participation are significant, which means there is only minor evidence that jumps in EFW increase this variable when I expand the definition of what constitutes a jump.

There are now 31 cases in the last equation (28 that have common support), where I examine the effect of jumps on female primary school completion. Here I find mixed evidence that jumps significantly effect completion rates. Five of the nine coefficients are statistically significant, although coefficients are smaller on average than the ones reported in Table 5.

Table 8 reports the results when I define a jump in EFW to be greater than or equal to 1.25 points. When I use this narrower definition, there are 25 cases for the labor force participation equations (21 with common support). All nine coefficients on the percentage of the labor force that is female are positive and strongly significant. The average treatment effect is 1.05, which is higher than what I found in Table 5. Five of the nine coefficients on female participation in the labor force are statistically significant and economically more important as well. The average treatment effect for this outcome variable is 2.04, meaning that jumps in EFW result in a two-percentage point increase

in the percentage of the labor force that is female in treated countries relative to changes in their matched controls.

There are unfortunately few cases when I study the effect of jumps on female primary school completion: a total of 11 and only 7 on common support. Only three of the nine coefficients are significant, though several others are relatively close to significance. In the case of the first equation (PSM-nearest neighbor), I am unable to match effectively.

In sum there is strong support that jumps in EFW have a consistently significant effect on the percentage of the labor force that is female and relatively good support for its effect on female labor participation, though the economic significance of these results are small. In the main results, there is also strong support for the argument that jumps in EFW increases female completion of primary school in a statistically and economically significant way.

6. Conclusion

There is abundant evidence in the last 50 years that economically free economies grow faster, and are significantly richer, than un-free ones. Less is known about the effect of economic freedom on women, who have traditionally been disadvantaged economically. There has been empirical work on the topic, but it has not gotten at the causal effect of changes in economic freedom on women's welfare. Studies have traditionally used indices of economic freedom as an independent variable, which assumes that the index is cardinal and that an increase in economic freedom from 1 to 2, say, has an identical effect on women as a change from 5 to 6.

In this paper, I avoid those problems and attempt to get at the causal effects of economic freedom on women by using propensity score matching. I estimate the effect on changes in economic freedom on women's labor force participation and primary school enrollment and find that large, sustained jumps in economic freedom have a positive and significant effect on female

labor participation and the percentage of females that complete primary education. The quantitative effects of these results are not large in the first two outcome variables, but much higher in the case of female primary school completion. This is encouraging evidence against criticisms that capitalism significantly hurts women. Economically free societies are not only more efficient and productive, but they also offer more employment and educational opportunities to women.

References

Abadie, A. and Imbens, G.W., 2011. Bias-corrected matching estimators for average treatment effects. *Journal of Business and Economic Statistics*, 29(1), 1-11.

Aguayo-Tellez, E., Airola, J., Juhn, C. and Villegas-Sanchez, C., 2014. Did trade liberalization help women? The case of Mexico in the 1990s. In *New analyses of worker well-being*. Emerald Group Publishing Limited.

Aixalá, J. and Fabro, G. (2009), 'Economic Freedom, Civil Liberties, Political Rights and Growth: A Causality Analysis', *Spanish Economic Review*, 11 (3): 165–178.

An, W. and Winship, C., 2017. Causal inference in panel data with application to estimating race-of-interviewer effects in the general social survey. *Sociological Methods & Research*, *46*(1), 68-102.

Beneria, L., 1999. Globalization, gender and the Davos Man. *Feminist Economics*, *5*(3), pp.61-83.

Besley, T. (1995), 'Property Rights and Investment Incentives: Theory and Evidence from Ghana', *Journal of Political Economy*, 103 (5): 903–937.

Byron, J. and Thorburn, D., 1998. Gender and international relations: A global perspective and issues for the Caribbean. *Feminist Review*, *59*(1), 211-232.

Çağatay, N. and Özler, Ş., 1995. Feminization of the labor force: The effects of long-term development and structural adjustment. *World Development*, *23*(11), 1883-1894.

Cebula, R.J. and Alexander, G., 2015. An exploratory empirical note on the impact of labour market freedom on the female labour force participation rate in the US. *Applied Economics Letters*, *22*(8), 632-636.

Cipollone, A., Patacchini, E. and Vallanti, G., 2014. Female labour market participation in Europe: novel evidence on trends and shaping factors. *IZA Journal of European Labor Studies*, *3*(1), 1-40.

Coppedge, Michael, John Gerring, Carl Henrik Knutsen, Staffan I. Lindberg, Jan Teorell, Nazifa Alizada, David Altman, et al. 2021. V-Dem [Country–Year/Country–Date] Dataset v11. Varieties of Democracy (V-Dem) Project.

Dawson, J. W. (1998), 'Institutions, Investment, and Growth: New Cross-Country and Panel Data Evidence', *Economic Inquiry*, 36 (4): 603–619.

Feenstra, R.C., Inklaar, R. and Timmer, M.P., 2015. The next generation of the Penn World Table. *American Economic Review*, 105(10), 3150-82.

Feldmann, H., 2017. Economic freedom and human capital investment. *Journal of Institutional Economics*, *13*(2), 421-445.

Fike, R., 2015. *Economic Freedom and the Lives of Women: An Empirical Analysis* (Doctoral dissertation, The Florida State University).

Fort, T.L. and Schipani, C.A., 2004. *The role of business in fostering peaceful societies*. Cambridge University Press.

Fraser Institute, 2021, https://www.fraserinstitute.org/economic-freedom/approach

Friedman, M., 1962. *Capitalism and freedom: With the assistance of Rose D. Friedman*. University of Chicago Press.

Gibson-Graham, J.K., 1997. The end of capitalism (as we knew it): A feminist critique of political economy. *Capital & Class*, *21*(2), 186-188.

Grier, K.B. and Grier, R.M., 2021. The Washington consensus works: Causal effects of reform, 1970-2015. *Journal of Comparative Economics*, *49*(1), pp.59-72.

Gwartney, J., R. Lawson, J. Hall, and R. Murphy, 2021. 2021 Economic Freedom Dataset, in *Economic Freedom of the World: 2021 Annual Report* (Fraser Institute).

Hayek, F., 1988. *The Fatal Conceit. The Collected Works of Friedrich August Hayek*

Hausmann, R., Pritchett, L. and Rodrik, D., 2005. Growth accelerations. *Journal of Economic Growth*, 10(4), 303-329.

Heller, Lauren R., and E. Frank Stephenson, 2014. Economic freedom and labor market conditions: evidence from the states. *Contemporary Economic Policy* 32 (1): 56-66.

Hoover, G.A., Compton, R.A. and Giedeman, D.C., 2015. The impact of economic freedom on the black/white income gap. *American Economic Review*, *105*(5), 587-592.

King, E. M., Montenegro, C. E., and Orazem, P. F. (2012), 'Economic Freedom, Human Rights, and the Returns to Human Capital: An Evaluation of the Schultz Hypothesis', *Economic Development and Cultural Change*, 61 (1): 39–72.

Kucera, D. and Tejani, S., 2014. Feminization, defeminization, and structural change in manufacturing. *World Development*, *64*, 569-582.

International Labour Organization (ILO). Data retrieved from World Bank Gender Data Portal.

Lee, D., 2014. The Status of Women under Neoliberal Reform; A test of two theories. Ph.D. dissertation. CUNY.

Mukhopadhyay, U., 2015. Economic liberalization and gender inequality in the labor market: A theoretical approach. *Review of Urban & Regional Development Studies*, *27*(1), 68-87.

Ozler, S., 2000. Export orientation and female share of employment: Evidence from Turkey. *World Development*, *28*(7), 1239-1248.

Popov, A. and Zaharia, S., 2019. Credit market competition and the gender gap in labor force participation: Evidence from local markets. *European Economic Review*, *115*, 25-59.

Posner, Richard (2009). *A Failure of Capitalism: The Crisis of '08 and the Descent into Depression.* Harvard University Press.

Schultz, T. W. (1975), 'The Value of the Ability to Deal with Disequilibria', *Journal of Economic Literature*, 13 (3): 827–846.

Siegmann K.A. 2006. 'Globalisation, Gender and Equity–Effects of Foreign Direct Investment on Labour Markets in Rural Indonesia', *Journal of Economics* 3(1), 113–130.
Standing, G., 1999. Global feminization through flexible labor: A theme revisited. *World Development*, *27*(3), 583-602.

Stiglitz, Joseph (1996). *Whither Socialism?* MIT Press.

Stiglitz, Joseph, Jose Antonio Ocampo, Shari Spiegel, Ricardo French-Davis, and Deepak Nayyar (2006). *Stability with Growth: Macroeconomics, Liberalization and Development*. Oxford University Press.

Stroup, M.D., 2008. Separating the influence of capitalism and democracy on women's well-being. *Journal of Economic Behavior & Organization*, *67*(3-4), 60-572.

Stroup, M., 2011. Does Economic Freedom Promote Women's Well-being? *Economic Freedom of the World: 2011 Annual Report*.

UNESCO Institute for Statistics (http://uis.unesco.org/). Data retrieved from World Bank Gender Data Portal.

Wong, C. and Stansel, D., 2016. An exploratory empirical note on the relationship between local labor market freedom and the female labor force participation rate in US metropolitan areas. *Empirical Economics Letters*, *15*(11), 1095-1100.

World Bank, 2022. *World Development Indicators*, Retrieved July 2, 2022 from http://databank.worldbank.org.

Table 1.
Onsets of Sustained, Generalized Reform w/ a jump of 1.00 or more

Country	Years	Jump	Country	Years	Jump
Nicaragua	1990-1995	2.82	Chile	1985-1990	1.29
Uganda	1990-1995	2.22	New Zealand	1985-1990	1.29
El Salvador	1990-1995	2.08	Mauritius	1980-1985	1.27
Rwanda	1995-2000	2.00	Mexico	1985-1990	1.25
Croatia	1995-2000	1.89	Tanzania	1990-1995	1.25
Dom. Rep.	1990-1995	1.77	Ukraine	1995-2000	1.25
Bolivia	1985-1990	1.75	Philippines	1985-1990	1.24
Estonia	1990-1995	1.71	Portugal	1990-1995	1.22
Latvia	1995-2000	1.68	Chile	1975-1980	1.19
Poland	1990-1995	1.55	China	1990-1995	1.19
Kuwait	1980-1985	1.51	Jordan	1995-2000	1.18
Madagascar	1995-2000	1.49	Russia	1990-1995	1.18
Oman	1980-1985	1.49	Syria	1995-2000	1.18
Bulgaria	2000-2005	1.48	Portugal	1975-1980	1.14
Guyana	1995-2000	1.48	Botswana	1995-2000	1.13
Ghana	1985-1990	1.47	Slovenia	1995-2000	1.13
Hungary	1990-1995	1.43	Israel	1990-1995	1.12
Nigeria	1995-2000	1.43	Benin	1995-2000	1.11
Lithuania	1995-2000	1.42	Turkey	1980-1985	1.11
Albania	1995-2000	1.35	Italy	1985-1990	1.10
Iceland	1985-1990	1.35	Mauritius	1990-1995	1.10
Romania	1995-2000	1.35	UK	1980-1985	1.10
Brazil	1995-2000	1.33	Algeria	1995-2000	1.06
Zambia	1990-1995	1.33	Brazil	1985-1990	1.01
Costa Rica	1985-1990	1.32	Indonesia	1980-1985	1.01
Trin. & Tob.	1990-1995	1.32	Malta	1990-1995	1.01
Peru	1985-1990	1.31	Cyprus	2000-2005	1.00
Paraguay	1990-1995	1.3	Egypt	1990-1995	1.00

Table 2.
Frequency of Reform.

Region	1970s	1980s	1990s	2000s	% of Total	Episodes
Asia	0	2	1	0	*5.4*	*3*
Sub-Saharan Africa	0	2	9	0	*19.6*	*11*
Latin America	1	6	7	0	*25.0*	*14*
Western Europe	1	3	2	1	*12.5*	*7*
Eastern Europe	0	0	11	1	*21.4*	*12*
Middle East/N. Africa	0	3	5	0	*14.3*	*8*
Oceania	0	1	0	0	*1.8*	*1*
% of Total	*3.6*	*30.4*	*62.5*	*3.6*	*100.0*	
Episodes	*2*	*17*	*35*	*2*		*56*

Table 3. Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Economic Freedom Score (EFW)	6.3	1.3	2.5	9.1
Female Labor Force Participation (%)	40.1	17.1	4.8	84.5
% Labor Force that is female	40.5	9.9	8.27	55.93
Female Primary School Completion (%)	79.5	27.5	0.78	123.2
Human Capital	2.0	0.71	1.0	3.7
Export Share (% of GDP)	22.00	26.0	4.31E-06	350.0
Real per-capita income	13002.9	19232.6	251.3	283541.2
Gov. Consumption (% of GDP)	19.0	10.0	1.00	99.0
Inflation Rate	36.0	396.3	-30.2	12339

Table 4. Determinants of the Initiation of Reform

Variable	Coefficient	p-values	elasticity
Lagged Real Per-Capita Income	-0.00003	0.21	-0.43
Lagged EFW	-1.35***	0.01	-7.75
Lagged Democracy Score	1.79***	0.01	1.17
Lagged Human Capital Index	1.14***	0.01	2.27
Lagged Government Share of GDP	0.15	0.92	0.023
Lagged Export Share of GDP	0.026	0.98	0.006
Lagged Inflation	0.0001	0.55	0.002
Intercept	1.79**	0.02	n.a.

N=934; Pseudo R^2 = .225
p-values are in parentheses. ***, **, and * indicate significance at the .01, .05, and .10 levels, respectively. Estimates are obtained using a Logit model. Elasticities are calculated at the means of the covariates.

Table 5.
The Effects of Reform on Gender Equality Outcomes (jump of 1.0)

Matching Method	Labor Force % Coeff.	X^2 covar. balance	Labor Force Part Coeff.	X^2 covar. balance	Primary Sch. Coeff.	X^2 covar. balance
PS: Nearest Neighbor	1.04***	4.98	0.638	4.98	4.40	1.39
	[.01]	[.66]	[.53]	[.66]	[.25]	[.99]
PS: Nearest 2 Neighbors	1.05***	2.61	0.977	2.61	5.73	1.85
	[.01]	[.92]	[.28]	[.92]	[.16]	[.97]
PS: Nearest 3 Neighbors	.944***	3.56	0.736	3.56	5.98	2.43
	[.01]	[.83]	[.42]	[.83]	[.14]	[.93]
PS: Nearest 4 Neighbors	0.929***	3.96	0.599	3.96	5.96*	1.01
	[.01]	[.78]	[.47]	[.78]	[.07]	[.99]
PS: Normal Kernel	.761***	1.39	0.991	1.39	5.65**	1.31
	[.01]	[.99]	[.15]	[.99]	[.05]	[.99]
Mahalanobis: Nearest Neighbor	.547*	n.a.	1.29*	n.a.	8.09***	n.a.
	[.06]		[.09]		[.01]	
Mahalanobis: Nearest 2	.689***	n.a.	1.77***	n.a.	6.56**	n.a.
	[.01]		[.01]		[.03]	
Mahalanobis: Nearest 3	.622***	n.a.	1.58**	n.a.	5.81**	n.a.
	[.01]		[.02]		[.05]	
Mahalanobis: Nearest 4	.660***	n.a.	1.76***	n.a.	6.29**	n.a.
	[.01]		[.01]		[.02]	

p-values are in parentheses. ***, **, and * indicate significance at the .01, .05, and .10 levels, respectively.

Propensity score matching uses 38 of the 40 treated cases for the first two outcome variables (and 17 of the 20 treated cases with primary schooling). The other one lies outside the region of common support. The Mahalanobis matching uses all 40 treated cases.

Columns 3 and 5 report the Chi-square statistic testing the null hypothesis that the covariates are, on average, balanced between the treated cases and their matched controls.

Table 6. Example of Covariate Balance Achieved by Matching

Lagged Values of:	Unmatched/ Matched	Mean Treated	Mean Control	t-test t	t-test p-value
Per-Capita Income	U	6966.1	14368	-2.67***	0.01
	M	7064.4	5218.0	1.34	0.18
Democracy	U	0.454	0.543	-1.97**	0.05
	M	0.445	0.394	0.87	0.39
Economic Freedom	U	4.63	6.31	-7.91***	0.01
	M	4.71	4.56	0.6	0.55
Human Capital Index	U	2.06	2.26	-1.84*	0.07
	M	2.03	1.92	0.89	0.37
Govt. Consumption	U	0.203	0.173	2.39**	0.02
	M	0.196	0.196	0.01	0.99
Exports	U	0.141	0.250	-2.43**	0.02
	M	0.144	0.135	0.33	0.74
Inflation	U	478.9	40.3	4.16***	0.01
	M	488.8	232.8	0.67	0.51

***, **, and * indicate significance at the .01, .05, and .10 levels, respectively.
Results are from the PSM nearest 2 neighbors equation presented in Table 5 for the first outcome variable (Percentage of Labor Force that is female).

Table 7.
The Effects of Reform on Gender Equality Outcomes (jump of .75)

Matching Method	Labor Force % Coeff.	X^2 covar. balance	Labor Force Part Coeff.	X^2 covar. balance	Primary Sch. Coeff.	X^2 covar. balance
PS: Nearest Neighbor	0.275	6.90	0.240	6.90	2.27	1.12
	[.33]	[.44]	[.76]	[.44]	[.49]	[.99]
PS: Nearest 2 Neighbors	0.379	2.06	0.452	2.06	2.23	0.72
	[.15]	[.96]	[.57]	[.96]	[.49]	[.99]
PS: Nearest 3 Neighbors	0.442*	1.24	0.488	1.24	3.57	0.77
	[.09]	[.99]	[.48]	[.99]	[.20]	[.99]
PS: Nearest 4 Neighbors	.432*	1.02	0.396	1.02	3.03	0.91
	[.09]	[.99]	[.56]	[.99]	[.22]	[.99]
PS: Normal Kernel	.404**	1.74	0.281	1.74	4.27**	1.10
	[.03]	[.97]	[.61]	[.97]	[.04]	[.99]
Mahalanobis: N. Neighbor	.418*	n.a.	1.09	n.a.	3.85*	n.a.
	[.09]		[.14]		[.07]	
Mahalanobis: Nearest 2	.379*	n.a.	1.19*	n.a.	4.79**	n.a.
	[.06]		[.06]		[.03]	
Mahalanobis: Nearest 3	.359*	n.a.	.958*	n.a.	4.26**	n.a.
	[.06]		[.10]		[.04]	
Mahalanobis: Nearest 4	.358*	n.a.	.955*	n.a.	4.59**	n.a.
	[.06]		[.09]		[.02]	

p-values are in parentheses. ***, **, and * indicate significance at the .01, .05, and .10 levels, respectively.

Propensity score matching uses 63 of the 66 treated cases (28 of the 31 in the primary schooling case). The other one lies outside the region of common support. The Mahalanobis matching uses all 31 treated cases.

Columns 3 and 5 report the Chi-square statistic testing the null hypothesis that the covariates are, on average, balanced between the treated cases and their matched controls.

Table 8.
The Effects of Reform on Gender Equality Outcomes (jump of 1.25)

Matching Method	Labor Force % Coeff.	X^2 covar. balance	Labor Force Part Coeff.	X^2 covar. balance	Primary Sch. Coeff.	X^2 covar. balance
PS: Nearest Neighbor	1.10**	8.92	0.717	8.92	9.44	19.4
	[.02]	[.26]	[.61]	[.26]	[.16]	--
PS: Nearest 2 Neighbors	1.42***	9.57	1.09	9.57	8.75	1.44
	[.01]	[.21]	[.34]	[.21]	[.16]	[.98]
PS: Nearest 3 Neighbors	1.26***	6.59	1.37	6.59	8.40	1.14
	[.01]	[.47]	[.23]	[.47]	[.15]	[.99]
PS: Nearest 4 Neighbors	1.17***	3.52	1.46	3.52	10.2*	1.21
	[.01]	[.83]	[.18]	[.83]	[.06]	[.99]
PS: Normal Kernel	0.948***	1.17	1.71**	2.11	6.94	0.61
	[.01]	[.95]	[.05]	[.95]	[.18]	[.99]
Mahalanobis: N. Neighbor	0.792**	n.a.	1.82**	n.a.	7.82*	n.a.
	[.04]		[.04]		[.06]	
Mahalanobis: Nearest 2	0.999***	n.a.	2.23***	n.a.	8.85**	n.a.
	[.01]		[.01]		[.02]	
Mahalanobis: Nearest 3	0.879***	n.a.	2.13***	n.a.	4.89	n.a.
	[.01]		[.01]		[.30]	
Mahalanobis: Nearest 4	0.857***	n.a.	2.31***	n.a.	6.61	n.a.
	[.01]		[.01]		[.13]	

p-values are in parentheses. ***, **, and * indicate significance at the .01, .05, and .10 levels, respectively. Propensity score matching uses 21 of the 25 treated cases (7 of the 11 cases for primary schooling). The other one lies outside the region of common support. The Mahalanobis matching uses all 25 (11) treated cases. Columns 3 and 5 report the Chi-square statistic testing the null hypothesis that the covariates are, on average, balanced between the treated cases and their matched controls.

Table A1 - Countries in the Sample

Albania	Djibouti	Kuwait	Romania
Algeria	Dominican Rep.	Kyrgyz Rep.	Russia
Angola	Ecuador	Laos	Rwanda
Argentina	Egypt	Latvia	Saudi Arabia
Armenia	El Salvador	Lebanon	Senegal
Australia	Estonia	Lesotho	Serbia
Austria	Eswatini	Liberia	Sierra Leone
Azerbaijan	Ethiopia	Lithuania	Singapore
Bahrain	Fiji	Luxembourg	Slovak Republic
Bangladesh	Finland	Madagascar	Slovenia
Barbados	France	Malawi	South Africa
Belarus	Gabon	Malaysia	Spain
Belgium	Gambia	Mali	Sri Lanka
Benin	Georgia	Malta	Sudan
Bhutan	Germany	Mauritania	Suriname
Bolivia	Ghana	Mauritius	Sweden
Bosnia & Herz.	Greece	Mexico	Switzerland
Botswana	Guatemala	Moldova	Syria
Brazil	Guinea	Mongolia	Tajikistan
Bulgaria	Guinea-Bissau	Morocco	Tanzania
Burkina Faso	Guyana	Mozambique	Thailand
Burundi	Haiti	Myanmar	Togo
Cambodia	Honduras	Namibia	Trinidad & Tobago
Cameroon	Hong Kong	Nepal	Tunisia
Canada	Hungary	Netherlands	Turkey
C. African Rep.	Iceland	New Zealand	Uganda
Chad	India	Nicaragua	Ukraine
Chile	Indonesia	Niger	United Arab Emir.
China	Iran	Nigeria	United Kingdom
Colombia	Iraq	Norway	United States
Comoros	Ireland	Oman	Uruguay
Congo, Dem. Rep.	Israel	Pakistan	Venezuela
Congo, Rep.	Italy	Panama	Vietnam
Costa Rica	Jamaica	Paraguay	Yemen
Cote d'Ivoire	Japan	Peru	Zambia
Croatia	Jordan	Philippines	Zimbabwe
Cyprus	Kazakhstan	Poland	
Czech Republic	Kenya	Portugal	
Denmark	Korea	Qatar	