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Gender Disparities in Economic Freedom and Human Capital

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Abstract
Economic freedom raises incomes and economic growth, partly through increased human capital investment. When men and women differ in the economic freedom they experience, we expect girls and boys to face different returns to human capital investment. Using country-level panel data and country fixed effects, I estimate how gender disparity in economic freedom affects gender gaps in human capital accumulation. Closing gender disparities in economic freedom raises female literacy rates and may improve female learning outcomes.

JEL Codes: O15, E24, I2

I. Introduction

In high-income countries, gender gaps in educational attainment have closed and even reversed, with women staying in school longer than men (Organisation for Economic Co-operation and Development 2022). In much of the rest of the world, however, women continue to lag behind men in literacy rates, educational attainment, and other measures of human capital (UNESCO 2022). Yet female education is particularly important for economic development, with gender gaps in education significantly slowing economic growth (Klasen and Lamanna 2009; Cuberes and Teignier 2016).

In this paper, I explore how gender disparities in economic freedom affect gender gaps in education. In places where women are afforded less economic freedom than men, we expect the return to investing in human capital to be lower for girls. The empirical analysis uses the Index of Gender Disparity in Legal Rights (GDLR) and sex-specific measures of educational outcomes including the World Bank's globally representative harmonized learning outcomes (HLOs)

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and measures of gender disparity in educational attainment and participation.

I find that as a country reduces gender disparity in economic freedom, literacy rates among women improve. The effect is economically meaningful: A 1 standard deviation increase in the GDLR implies 4.2 percentage point higher female literacy rates, an increase of about 0.2 standard deviations. However, I find few statistically significant differences in gender gaps in other educational outcomes across countries where men and women face varying economic freedom.

These results contribute to our understanding of how, and for whom, economic freedom affects human capital investment. Previous research documents higher rates of return to schooling (King, Montenegro, and Orazem 2012) and more human capital investment (Dawson 1998; Aixalá and Fabro 2009) in areas with more economic freedom. Feldmann (2017) finds that more children enroll in secondary school in countries with higher economic freedom. This investment in human capital likely drives some of the effect of economic freedom on economic growth, labor productivity, and upward income mobility (Dean and Geloso 2022; Boudreaux 2014).

Economic freedom increases female labor force participation (Grier 2023), reduces gender wage gaps (Zweimüller, Winter-Ebmer, and Weichselbaumer b2008), and particularly benefits women (Stroup 2008). In some places, however, economic freedom differs significantly for men and women (Fike 2016). Possibly as a proxy for these differences, some research controls for religious participation in Islam or Catholicism.[1] In 2017 the Fraser Institute's Economic Freedom of the World index began addressing these gender differences empirically. Using data from the World Bank's (2009, 2011, 2013a, 2013b, 2015) *Women, Business, and the Law* reports, the Economic Freedom of the World index's authors created the GDLR. I use this index as a measure of differences in economic freedom by sex.

The evidence in development economics consistently shows that investing in education, and particularly female education, is a strong driver of economic development (Mankiw, Romer, and Weil 1992; Schultz 2002; Hassan and Cooray 2015). My results suggest that

[1] For example, Feldmann (2017) finds that countries with more Islamic adherents have lower educational attainment; other research suggests this negative impact of Islam is stronger for women (Cooray and Potrafke 2011; Feldmann 2016; Norton and Tomal 2009).

closing gender gaps in economic freedom may increase literacy in girls.

II. Economic Freedom and Human Capital Investment

Since the Economic Freedom of the World index's inception in 1996, hundreds of studies have considered how economic freedom affects a variety of outcomes around the world (Hall and Lawson 2014). A small fraction of this research considers the role of economic freedom in human capital investment.

Economic freedom affects human capital investment for a variety of reasons. Individuals invest more in human capital when they expect higher returns from that investment. King, Montenegro, and Orazem (2012) estimate higher returns to schooling in more economically free developing countries. Feldmann (2017) describes a few reasons why the return to schooling may be higher in more economically free countries. For example, intrusions on economic freedom—such as governments' propensity to appropriate one's earnings—limit the potential for returns; some expansions of economic freedom increase the potential for returns, such as capital markets that facilitate investment and more expansive trade that provides educated workers access to wider markets. Further, Feldmann (2021) finds more positive regard for education, as measured by the World Values Survey, in more economically free countries.

Earlier work suggests that enrollment rates in primary and secondary school are positively correlated with economic freedom (Aixalá and Fabro 2009; Dawson 1998). In the paper most similar to this one, Feldmann (2017) uses panel data and a fixed effects estimation to estimate how economic freedom affects educational attainment. Feldmann finds that educational attainment is higher in countries where economic freedom is higher; he finds similar, albeit slightly smaller, effects for female educational attainment. Grier (2023) similarly finds increased female completion of primary school in countries experiencing jumps in economic freedom. Similarly, using historical changes across states in the United States, Geddes, Lueck, and Tennyson (2012) find that as women were granted economic rights, girls' school enrollment as teenagers increased. Doepke, Tertilt, and Voena (2012) summarize the evidence on women's property rights, an important part of economic freedom, and women's human capital attainment with a variety of papers providing country-specific evidence that providing women with new

property rights, such as the ability to own land, leads to increased female human capital.

The current study builds on this research and adds to the literature by examining gender-specific differences in economic freedom and human capital investment. I directly consider how the economic freedom experienced by women affects their human capital investment. Further, given the disconnect between educational attainment and human capital (Angrist et al. 2021), I analyze explicit measures of human capital by sex in the form of literacy rates and the World Bank's HLOs.

III. Empirical Approach and Data

A. Economic Freedom of the World and Gender

The Fraser Institute's Economic Freedom of the World index measures institutional quality at the country level from 1975 to the present (Gwartney et al. 2022). The index scores countries higher when property rights are more secure, trade freer, money and prices more stable, and government spending and regulations lower (Hall and Lawson 2014). The index potentially ranges from 0 to 10, although in practice scores range from about 3 to about 9.

Fike (2016) criticizes measures of economic freedom that fail to recognize that in some countries, the economic freedom that women and men experience differs. In response, the Fraser Institute's Economic Freedom of the World index addressed gender differences by creating the GDLR. The GDLR is based off a series of questions about whether men and women (or, in some cases, married women) have the same economic freedoms in the country at that time. The bulk of the questions stem from formal legal differences in how men and women are treated. This includes questions about any additional steps required, for example, for women to open a bank account or get a passport as well as restrictions on inheritance, occupational choice, and the like. A small fraction of the questions include expert assessments of social norms and their differential enforcement for men and women. If women and men experience no differences, the index equals 1; if all indicators differ by sex, the index equals 0. The full list of questions appears in appendix A, and Fike (2017) provides more details. Importantly, none of the questions directly ask about access to school.

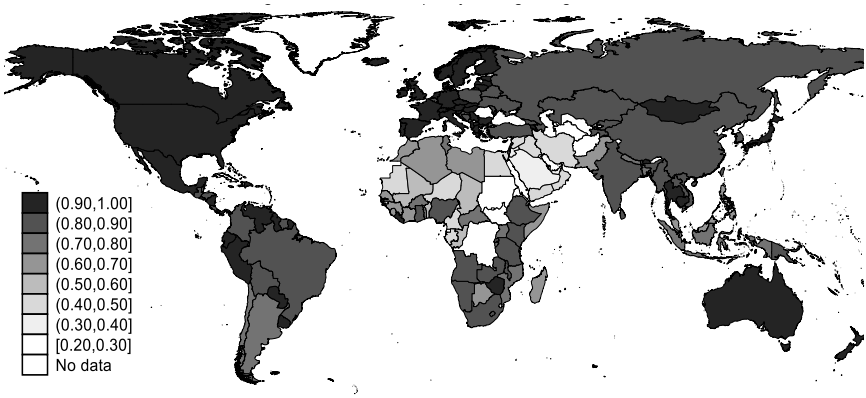
The GDLR addresses two of the three reasons given by Feldmann (2017) for a relationship between economic freedom and education. First, if women face fewer opportunities for market trade,

returns to schooling will be lower, implying less investment in human capital. Second, if women face more obstructions to accessing capital markets, returns to schooling will be lower, implying less investment in human capital.

The Economic Freedom of the World index then uses the GDLR to adjust its Area 2 measure of economic freedom. In the analysis below, I use the historical index of economic freedom, unadjusted by the GDLR. I also use the GDLR. This index equals 1 for countries where men and women experience the same amount of economic freedom. This difference is smaller for country-years where women experience less economic freedom than do men.

Figure 1 maps the country average of this index during the sample period. Kuwait, Oman, Jordan, and Egypt have some of the lowest scores on the GDLR; in most high-income countries, women experience similar economic freedom to men. Overall measures of economic freedom—the unadjusted Economic Freedom of the World index and the GDLR—are highly correlated: the correlation coefficient is 0.4168 (p-value=0.000). Countries with more economic freedom also tend to treat women and men more similarly under the law. There are some exceptions: Chile's Economic Freedom of the World index is typically between 8 and 8.1, well above the median, while its GDLR is 0.82, below the median. Switzerland in 1980 similarly had a high Economic Freedom of the World index (8.39) and relatively low GDLR (0.71).

Figure 1. Gender Disparity in Legal Rights



Twenty-three countries have a GDLR equal to 1 in all the observed years since 2000. In some specifications, I exclude these countries with always-observed gender parity under the law.[2]

B. Measures of Human Capital by Gender

I analyze a wide range of human capital variables by gender. The World Bank's World Development Indicators measure a variety of gender disparities in human capital attainment. The variables I use include the ratio of female to male enrollment in primary school, in secondary school, and in primary and secondary school as well as female literacy rates. Although enrollment may not fully capture eventual educational attainment levels, educational attainment is typically measured for the population aged twenty-five years and older. Given the sample period of the data and the number of years necessary to demonstrate an effect on older populations, I focus on enrollment measures. Further, I use a variety of gender differences in human capital to explore how gender differences in economic freedom affect gender differences in human capital.

Research continues to demonstrate a disconnect between educational attainment and learning (Pritchett 2013). Because of this disconnect, Angrist et al. (2021) developed the Harmonized Learning Outcomes Database. The database provides gender-specific measures of learning that are comparable across countries and time. I analyze below, for primary school students, both the female-specific HLO and the gap between female and male HLO in a country. I calculate the gender gap in HLO by subtracting the male HLO from the female HLO. In this way, higher numbers indicate relatively more female human capital.

C. Empirical Strategy

I estimate for country c in year t the following:

$$female\ human\ capital_{ct} = \beta_1 EFW_{ct-5} + \beta_2 GDLR_{ct-5} + X'\delta + \tau_t + \kappa_c + \varepsilon_{ct}$$

The coefficient of interest is β_2, the coefficient on the GDLR index. The GDLR is higher when women are treated more similarly

[2] The countries are Australia, Canada, Denmark, Ecuador, El Salvador, Finland, Hong Kong, Iceland, Ireland, Liberia, Mexico, Netherlands, New Zealand, Norway, Paraguay, Peru, Singapore, South Africa, Spain, Sweden, the United States of America, and Zimbabwe.

to men; we would expect β_2 to be positive when the dependent variable measures improvements in female human capital. We may also be interested in the direct effect of economic freedom on human capital, β_1, given the results in Feldmann (2017) and other research on how economic freedom affects human capital accumulation.

I lag the economic-freedom measures and the control variables five years. The lag provides two benefits. First, it reduces problems with reverse causality because women with more human capital cannot influence prior levels of economic freedom. Second, the lags provide time for parents and children to respond to changes in girls' opportunities; a legal change that results in more investment in human capital may present itself quickly, in the form of school enrollment, or more slowly, in the form of learning measured as a teenager. In robustness checks, I present results with the variables lagged one and ten years.

Some specifications include a vector of control variables. These variables are the population who are urban, logged real GDP per capita, the growth rate in GDP per capita, the percentage of the population aged under fifteen, the mortality rate of five- to nine-year-old children, the population growth rate, the percentage of the population who are male, and the percentage of the population who access the internet. The World Bank's World Development Indicators includes these measures. We might expect more urban, higher-income, and faster-growing countries to invest more in education. Places with more young people may find schools overcrowded, reducing human capital attainment. Countries with high mortality rates of young children may limit investment in children, given a lower life expectancy. Higher population growth rates may reflect optimism for the future, increasing human capital, or lead to capacity-constrained schools, reducing human capital. When boys are overrepresented, families may invest more in girls (because they are scarce) or less in girls (because they are easier to marry off). The internet provides additional opportunities for people to access educational resources, potentially without leaving their homes; greater internet access may increase human capital investment, although research suggests that internet access typically leads young people to substitute away from schoolwork with null or negative effects on academics (Malamud 2019).

Year fixed effects account for global changes in human capital over time. Country fixed effects control for any time-invariant characteristics of countries that influence human capital such as

unchanging social norms around schooling or gender roles, general characteristics of the school system, and the like. Woessman (2016), for example, documents that the relative performance of educational systems across countries is "consistent over time" (p. 8). Cooray and Potrafke (2011) find that religion and social norms affect gender disparities in education; they find that Muslim countries, in particular, have lower relative rates of female school enrollment. State fixed effects account for whether a country is a Muslim country. Any changes in the extent to which a country practices Islam that affect how much economic freedom women experience are likely picked up in the GDLR.

D. Sample of Countries and Years

The samples of country-years available for the analysis differ by outcome measure. Table 1 describes those samples. I focus on 2005 through 2020 because many outcomes are available on an annual basis for these years. I observe more countries' literacy rates and enrollment ratios than their HLO measures. The number of countries included ranges from 69 to 153. None of these samples are balanced panels.

Table 1. Sample composition by outcome variable

	Girls/boys enrollment		
	primary	secondary	primary & secondary
years	2005–20	2005–20	2005–20
N countries	153	144	144

	HLO gender gap (female–male) and female scores		
	reading	math	science
years	2006–17	2006, 2007, 2011, 2013, 2015	2006, 2007, 2011, 2013, 2015
N countries	105	79	69

	literacy rate for girls	literacy rate for girls (not high income)
years	2005–20	2005–20
N countries	125	113

Most of the results presented below are null results. One outcome consistently demonstrates a statistically significant relationship with the GDLR: female literacy. Because it is the primary result, I describe its sample in more detail here. In this sample of 125 countries, I observe 32 countries only once; because of the included country fixed effects, these observations do not help identify the relationship between the GDLR and female literacy. The sample includes 28 countries with two observations; 22 with three observations; 6 with four observations; 6 with five observations; 7 with six observations; and another 24 countries with seven to fifteen observations. The sample draws from countries across the globe with 8 percent of observations in East Asia and the Pacific; 16 percent in Europe and central Asia; 33 percent in Latin America and the Caribbean; 13 percent in the Middle East and North Africa; 6 percent in South Asia; and 23 percent in sub-Saharan Africa.

E. Summary Statistics

Table 2 presents summary statistics of the measures of human capital. The first set of outcomes is girl–boy ratios of enrollment. The average gender ratio of enrollment is close to 1, indicating parity. For primary school enrollment, for example, the values range from 0.63 to 1.16. In most country-years in the sample, 68.5 percent, girls enroll in primary school much less often than do boys; in the other 31 percent, girls outnumber boys in primary school.

Table 2. Summary statistics of human capital measures and economic freedom

Variable	Obs	Mean	Std dev	Min	Max
Female enrollment/ male enrollment					
primary	1,796	0.98	0.05	0.63	1.16
secondary	1,566	0.99	0.12	0.35	1.39
both	1,526	0.99	0.06	0.61	1.15
HLO female − HLO male					
reading	228	11.28	15.09	-31.62	67.02
math	158	0.18	11.05	-20.33	42.91
science	139	1.42	13.97	-15.44	79.34
Female human capital measures					
HLO reading	228	444.50	100.38	226.36	588.15
HLO math	158	464.07	76.51	297.85	619.52
HLO science	139	481.18	65.47	268.25	590.62
literacy rate	507	81.49	20.79	13.93	99.96
Economic Freedom of the World measures					
EFW (unadjusted)	1,796	6.92	0.90	3.21	9.09
GDLR	1,796	0.84	0.18	0.29	1.00

Notes: EFW=*Economic Freedom of the World*

The HLO variables provide measures of learning comparable across countries and time. I explore measures in three subjects: reading, math, and science. The average difference in all three subjects is positive; on average, girls have learned more than boys. This average masks significant differences across countries. In some country-years—22 percent of the sample—girls have learned less than boys; in the other 78 percent of the sample, girls have learned more than boys.

These reverse gender gaps are well known in many countries, especially high-income countries (Welmond and Gregory 2022). One potential explanation for women investing more in human capital than observationally equivalent men is the statistical discrimination women face in the labor market. Lang and Manove (2011) model how Blacks, facing statistical discrimination, invest more in human capital than do whites of similar ability; the additional education strengthens Black workers' labor market signal of productivity.

Nielsson and Steingrimsdottir (2018) empirically demonstrate similar overeducation for women in the United States.[3] Outcomes for only girls are also examined. Girls' learning outcomes average in the mid-400s with standard deviations between sixty-five and ninety-seven.

The final outcome I consider is female literacy rates. The range of female literacy rates in the sample is quite wide: from countries where fewer than one in seven women are literate to countries where female literacy is almost 100 percent.

IV. Results

I estimate a two-way fixed effects regression for each measure of educational attainment on the Economic Freedom of the World index and the GDLR index. Table 3 presents results for the gender gaps in human capital. For each outcome, I present results for three specifications: the full sample without controls, the full sample with controls, and the sample excluding countries that experience gender parity in legal rights during the entire sample period. Estimates with and without controls allow some consideration of how controls, and thus potential omitted-variables bias, may affect point estimates on the GDLR. As a robustness check, I exclude countries that display no within-country variation in the GDLR during the sample period.

[3] In results available upon request, I separately consider countries that begin the sample period with gender gaps favoring men or favoring women. If anything, the effect of the GDLR is more positive for countries with gaps favoring women, although estimates do not statistically differ from zero or each other.

Table 3. Economic freedom, gender differences in economic freedom, and human capital gender gaps

	Primary girls/boys			Secondary girls/boys		
	no controls	controls	not all parity	no controls	controls	not all parity
$Summary_{t-5}$	0.003	0.001	-0.000	0.023***	0.011*	0.011
	(0.004)	(0.004)	(0.004)	(0.008)	(0.007)	(0.008)
$GDLR_{t-5}$	0.044	0.032	0.030	0.047	0.039	0.040
	(0.029)	(0.025)	(0.025)	(0.056)	(0.039)	(0.039)
N	1,796	1,745	1,650	1,566	1,521	1,426
R-squared	0.881	0.900	0.902	0.906	0.943	0.947
	Primary & secondary girls/boys			HLO reading gap (FM)		
	no controls	controls	not all parity	no controls	controls	not all parity
$Summary_{t-5}$	0.008**	0.005	0.004	2.528	3.472	3.685
	(0.004)	(0.004)	(0.005)	(5.772)	(4.965)	(5.215)
$GDLR_{t-5}$	0.025	0.026	0.025	16.569	16.218	17.527
	(0.027)	(0.022)	(0.022)	(32.009)	(31.929)	(32.280)
N	1,526	1,488	1,393	228	224	211
R-squared	0.912	0.936	0.940	0.836	0.851	0.851
	HLO math gap (FM)			HLO science gap (FM)		
	no controls	controls	not all parity	no controls	controls	not all parity
$Summary_{t-5}$	2.181	2.040	1.056	5.606	7.391	7.260
	(6.763)	(7.838)	(8.605)	(7.755)	(9.318)	(10.517)
$GDLR_{t-5}$	24.546	24.481	24.658	-13.998	3.587	3.817
	(27.747)	(22.314)	(22.702)	(22.016)	(23.123)	(24.104)
N	158	154	140	139	135	121
R-squared	0.847	0.879	0.879	0.927	0.947	0.948

Notes: FM = female minus male. All regressions include year and country fixed effects. The control variables are percentage of the population who are urban, logged real GDP per capita, the percentage of the population aged under fifteen, the mortality rate of five- to nine-year-old children, the growth rate in GDP per capita, population growth rate, percentage of the population who are male, and the percentage of the population using the internet. Standard errors are clustered by country. *** p<0.01, ** p<0.05, * p<0.1

The top panel displays results for the ratio of enrollment by gender. Larger values of the dependent variable reflect more girls enrolling in that level of schooling compared to boys. Changes in the Economic Freedom of the World index have no effect on gender differences in primary school enrollment. We observe some relative

increase in female secondary school enrollment when economic freedom is higher. The third set of results (in the top panel) consider enrollment combined across primary and secondary school, with coefficient estimates that lie between the primary and secondary school estimates. The general pattern suggests that economic freedom may increase relative female secondary school enrollment but has a positive and statistically insignificant effect on relative primary school enrollment.

A positive coefficient on the GDLR implies that more gender equality correlates with a higher ratio of female to male enrollment. The coefficients on the GDLR are all positive and statistically insignificant. Adding control variables to the model only modestly changes, if at all, the estimates on the GDLR.

The bottom panel presents results for the gender gaps in learning by subject area. Larger values of the dependent variable imply that girls have more human capital than boys. The results imply that girls learn more than boys in more economically free countries. Increased gender parity is followed by relatively more female learning. None of these effects are statistically significant.

In table 4, I present results for female levels of human capital, instead of measures relative to male outcomes in the same country. The outcomes are girls' HLO measures by subject and female literacy rates. More economically free countries show more female learning in math and science but less in reading; note that the coefficient on the Economic Freedom of the World index is only statistically significant for math when control variables are not included. Countries with more gender parity tend to show more female learning in reading, with a large but statistically insignificant effect.

Table 4. Economic freedom, gender differences in economic freedom, and female human capital

	Girls' HLO reading			Girls' HLO math		
	no controls	controls	not all parity	no controls	controls	not all parity
$Summary_{t-5}$	-12.044	-11.264	-11.500	20.444*	17.989	18.601
	(15.181)	(15.577)	(16.341)	(11.010)	(13.632)	(15.261)
$GDLR_{t-5}$	80.327	66.016	68.610	1.105	-7.361	-5.742
	(54.013)	(61.635)	(62.417)	(24.648)	(31.396)	(34.715)
N	228	224	211	158	154	140
R-squared	0.978	0.980	0.979	0.988	0.989	0.989
	Girls' HLO science			Girls' literacy		
	no controls	controls	not all parity	no controls	controls	not all parity
$Summary_{t-5}$	23.494	8.556	11.111	2.171**	1.292	1.288
	(15.226)	(14.643)	(16.277)	(1.070)	(1.131)	(1.135)
$GDLR_{t-5}$	15.695	-19.503	-17.819	25.208**	23.295**	23.265**
	(49.041)	(81.793)	(86.636)	(11.267)	(11.588)	(11.537)
N	139	135	121	507	492	485
R-squared	0.979	0.984	0.984	0.979	0.982	0.982

Notes: All regressions include year and country fixed effects. The control variables are percentage of the population who are urban, logged real GDP per capita, the percentage of the population aged under fifteen, the mortality rate of five- to nine-year-old children, the growth rate in GDP per capita, population growth rate, percentage of the population who are male, and the percentage of the population using the internet. Standard errors are clustered by country. *** p<0.01, ** p<0.05, * p<0.1

Countries with more gender parity show *less* female learning in math and science once the control variables are included. Recent news stories highlight the unusually large numbers of female scientists in the Middle East. Ripley (2017) reports that Middle Eastern women, presented with few occupational choices, work hard in science because if they score well on the end-of-school exam, they can attend university as a path toward a reputable occupation instead of promptly marrying. And, indeed, Middle Eastern countries appear to drive the science result. When I exclude these countries from the sample, as with the results in appendix table 1, the estimates on the GDLR for science turn positive and statistically insignificant.

The most robust results arise with female literacy rates. Here, we observe that countries with more gender parity in economic freedom have much higher female literacy rates. A 1 standard deviation increase

in the GDLR implies 4.2 percentage point higher female literacy rates, an increase of about 0.2 standard deviations. These results imply economically important and statistically significant increases in human capital investment for girls when economic freedom is provided more equally for men and women. Adding the control variables to the regression results in slight changes to the point estimates on the economic-freedom index and the gender-parity index, suggesting that omitted variables are unlikely to be driving this result.

We may observe effects of the GDLR on female literacy rates and not on other measures for a variety of reasons. One is mechanical: there is more variation in literacy rates and a larger sample size, increasing the power of the analysis. Second, the research on statistical discrimination and overinvestment in education (Lang and Manove 2011; Nielsson and Steingrimsdottir 2018) shows that some loosening of restrictions on women may result in high-ability women staying in school longer, learning more, and pursuing the limited professional opportunities available. Tables 5 and 6 present results allowing the effect of GDLR to be quadratic. These results imply that the effects of GDLR are nonlinear for the gender ratios of school enrollment and for girls' math learning. Initial increases in the GDLR may improve girls' math and increase girls' enrollment, but these effects quickly taper off.

Table 5. Economic freedom, gender differences in economic freedom, and human capital gender gaps allowing for nonlinearity in GDLR

	Primary girls/boys		Secondary girls/boys		Primary & secondary girls/boys	
	controls	not all parity	controls	not all parity	controls	not all parity
$Summary_{t-5}$	0.002	0.000	0.012*	0.011	0.005	0.004
	(0.004)	(0.004)	(0.007)	(0.008)	(0.004)	(0.004)
$GDLR_{t-5}$	0.320**	0.316**	0.374	0.371	0.292*	0.291*
	(0.126)	(0.127)	(0.283)	(0.284)	(0.172)	(0.174)
$GDLR^2_{t-5}$	-0.196**	-0.195**	-0.214	-0.212	-0.169	-0.170
	(0.080)	(0.080)	(0.170)	(0.171)	(0.104)	(0.105)
N	1,745	1,650	1,521	1,426	1,488	1,393
R-squared	0.902	0.903	0.943	0.947	0.936	0.941
	HLO reading gap (FM)		HLO math gap (FM)		HLO science gap (FM)	
	controls	not all parity	controls	not all parity	controls	not all parity
$Summary_{t-5}$	3.267	3.473	3.370	2.515	7.062	6.860
	(4.746)	(5.026)	(8.018)	(8.896)	(9.720)	(11.047)
$GDLR_{t-5}$	111.413	106.793	193.924	189.890	-50.610	-57.680
	(145.849)	(148.063)	(126.732)	(138.633)	(198.619)	(215.682)
$GDLR^2_{t-5}$	-66.965	-62.899	-109.715	-106.904	31.792	36.079
	(91.044)	(93.092)	(88.862)	(96.207)	(116.784)	(127.004)
N	224	211	154	140	135	121
R-squared	0.852	0.852	0.885	0.884	0.947	0.948

Notes: FM = female minus male. All regressions include year and country fixed effects. The control variables are percentage of the population who are urban, logged real GDP per capita, the percentage of the population aged under fifteen, the mortality rate of five- to nine-year-old children, the growth rate in GDP per capita, population growth rate, percentage of the population who are male, and the percentage of the population using the internet. Standard errors are clustered by country. *** p<0.01, ** p<0.05, * p<0.1

Table 6. Economic freedom, gender differences in economic freedom, and female human capital allowing for nonlinearity in GDLR

	Girls' HLO reading		Girls' HLO math	
	controls	not all parity	controls	not all parity
$Summary_{t-5}$	-11.748	-12.024	20.316	21.472
	(16.122)	(16.863)	(13.481)	(15.160)
$GDLR_{t-5}$	290.780	289.641	289.130*	319.305*
	(232.809)	(233.965)	(161.661)	(170.413)
$GDLR^2_{t-5}$	-158.111	-155.744	-191.979*	-210.303*
	(150.280)	(151.359)	(113.578)	(119.505)
N	224	211	154	140
R-squared	0.980	0.979	0.989	0.989
	Girls' HLO science		Girls' literacy	
	controls	not all parity	controls	not all parity
$Summary_{t-5}$	7.552	9.726	1.410	1.407
	(14.944)	(16.573)	(1.136)	(1.139)
$GDLR_{t-5}$	-184.979	-230.408	78.696	78.964
	(393.823)	(434.309)	(79.253)	(79.300)
$GDLR^2_{t-5}$	97.069	124.722	-37.552	-37.760
	(211.188)	(240.462)	(47.309)	(47.359)
N	135	121	492	485
R-squared	0.984	0.985	0.982	0.982

Notes: All regressions include year and country fixed effects. The control variables are percentage of the population who are urban, logged real GDP per capita, the percentage of the population aged under fifteen, the mortality rate of five- to nine-year-old children, the growth rate in GDP per capita, population growth rate, percentage of the population who are male, and the percentage of the population using the internet. Standard errors are clustered by country. *** p<0.01, ** p<0.05, * p<0.1

In the above, the measures of economic freedom and the control variables are lagged five years. Tables 7 and 8 present results for the full sample, with controls, with the right-hand side variables lagged one, five, or ten years. The coefficients on the GDLR remain statistically insignificant in most cases. The exception is again for female literacy, which increases after women experience more parity in legal rights.

Table 7. Economic freedom, gender differences in economic freedom, and human capital gender gaps

	Primary girls/boys			Secondary girls/boys		
	one year	5 years	10 years	one year	5 years	10 years
$Summary_{t-5}$	-0.001	0.001	0.003	-0.002	0.011*	0.005
	(0.004)	(0.004)	(0.003)	(0.008)	(0.007)	(0.006)
$GDLR_{t-5}$	0.053	0.032	-0.001	0.081*	0.039	-0.016
	(0.045)	(0.025)	(0.016)	(0.043)	(0.039)	(0.060)
N	2,242	1,745	1,194	1,933	1,521	1,057
R-squared	0.878	0.900	0.896	0.929	0.943	0.934
	Primary & secondary girls/boys			HLO reading gap (FM)		
	one year	5 years	10 years	one year	5 years	10 years
$Summary_{t-5}$	-0.003	0.005	0.004	-1.062	3.472	4.664
	(0.005)	(0.004)	(0.003)	(3.570)	(4.965)	(9.620)
$GDLR_{t-5}$	0.057	0.026	-0.015	4.254	16.218	-13.620
	(0.038)	(0.022)	(0.031)	(22.541)	(31.929)	(60.448)
N	1,894	1,488	1,033	266	224	143
R-squared	0.916	0.936	0.925	0.864	0.851	0.928
	HLO math gap (FM)			HLO science gap (FM)		
	one year	5 years	10 years	one year	5 years	10 years
$Summary_{t-5}$	2.966	2.040	4.532	2.416	7.391	6.153
	(5.701)	(7.838)	(19.054)	(5.765)	(9.318)	(18.471)
$GDLR_{t-5}$	-14.076	24.481	-61.908	-18.511	3.587	-25.737
	(19.043)	(22.314)	(75.336)	(32.211)	(23.123)	(61.616)
N	179	154	96	158	135	94
R-squared	0.862	0.879	0.942	0.905	0.947	0.947

Notes: All regressions include year and country fixed effects. The control variables are percentage of the population who are urban, logged real GDP per capita, the percentage of the population aged under fifteen, the mortality rate of five- to nine-year-old children, the growth rate in GDP per capita, population growth rate, percentage of the population who are male, and the percentage of the population using the internet. Standard errors are clustered by country. *** p<0.01, ** p<0.05, * p<0.1

Table 8. Economic freedom, gender differences in economic freedom, and female human capital

	Girls' HLO reading			Girls' HLO math		
	one year	5 years	10 years	one year	5 years	10 years
$Summary_{t-5}$	-5.605	-11.264	21.129	5.089	17.989	-6.682
	(8.697)	(15.577)	(30.187)	(9.154)	(13.632)	(33.258)
$GDLR_{t-5}$	-78.071	66.016	144.253	-47.867	-7.361	-132.972
	(72.794)	(61.635)	(164.567)	(58.275)	(31.396)	(160.926)
N	266	224	143	179	154	96
R-squared	0.978	0.980	0.991	0.983	0.989	0.994
	Girls' HLO science			Girls' literacy		
	one year	5 years	10 years	one year	5 years	10 years
$Summary_{t-5}$	12.910	8.556	-6.189	-0.085	1.292	2.092*
	(13.954)	(14.643)	(45.057)	(0.836)	(1.131)	(1.140)
$GDLR_{t-5}$	-109.216**	-19.503	8.700	6.226	23.295**	10.607**
	(48.975)	(81.793)	(211.567)	(7.295)	(11.588)	(4.854)
N	158	135	94	568	492	367
R-squared	0.977	0.984	0.990	0.982	0.982	0.984

Notes: All regressions include year and country fixed effects. The control variables are percentage of the population who are urban, logged real GDP per capita, the percentage of the population aged under fifteen, the mortality rate of five- to nine-year-old children, the growth rate in GDP per capita, population growth rate, percentage of the population who are male, and the percentage of the population using the internet. Standard errors are clustered by country. *** p<0.01, ** p<0.05, * p<0.1

V. Discussion

Economic freedom consistently and positively relates to a wide variety of outcomes including economic growth and income (Hall and Lawson 2014). One potential mechanism for these relationships is that people invest more in human capital when they experience more economic freedom. This investment may occur because of higher expected returns due to access to wider trading markets, more specialization, and stronger private property rights. Rosemarie Fike (2016) notes, however, that in some countries, men and women experience different degrees of economic freedom.

I considered whether these gender differences in economic freedom affect investment in girls' human capital. Using country fixed effects and country-level panel data, I estimated how gender gaps in learning and enrollment differ in places where women face less economic freedom than men. Most results are null, suggesting that gender differences in economic freedom do not lead to gender

differences in human capital. There is one exception: Female literacy rates are higher when women experience more similar economic freedom to men.

Research in development economics consistently finds that female human capital investment has large spillovers by increasing the health and human capital of their children (Schultz 2002). My results suggest that affording men and women the same economic freedom may be one mechanism to encourage more human capital investment in girls. The results are more robust for female literacy than other measures, perhaps in part because the larger sample size increases the power of the analysis. Other results are more suggestive but support the conclusion that as men and women experience similar degrees of economic freedom, female human capital increases.

References

Aixalá, J., and G. Fabro. 2009. "Economic Freedom, Civil Liberties, Political Rights and Growth: A Causality Analysis." *Spanish Economic Review,* 11(3): 165–78.

Angrist, N., S. Djankov, P. K. Goldberg, and H. A. Patrinos. 2021. "Measuring Human Capital Using Global Learning Data." *Nature,* 592: 403–8.

Boudreaux, C. J. 2014. "Jumping Off of the Great Gatsby Curve: How Institutions Facilitate Entrepreneurship and Intergenerational Mobility." *Journal of Institutional Economics,* 10(2): 231–55.

Cooray, Arusha, and Niklas Potrafke. 2011. "Gender Inequality in Education: Political Institutions or Culture and Religion?" *European Journal of Political Economy,* 27: 268–80.

Cuberes, David, and Marc Teignier. 2016. "Aggregate Effects of Gender Gaps in the Labor Market: A Quantitative Estimate." *Journal of Human Capital,* 10(1): 1–32.

Dawson, J. W. 1998. "Institutions, Investment, and Growth: New Cross-Country and Panel Data Evidence." *Economic Inquiry,* 36(4): 603–19.

Dean, James, and Vincent Geloso. 2022. "Economic Freedom Improves Income Mobility: Evidence from Canadian Provinces, 1982–2018." *Journal of Institutional Economics,* 18(5):807–26.

Doepke, Matthias, Michèle Tertilt, and Alessandra Voena. 2012. "The Economics and Politics of Women's Rights." *Annual Review of Economics,* 4: 339–72.

Feldmann, Horst. 2016. "Which Religions Still Affect Schooling? A Study of 143 Countries." *Comparative Sociology,* 15(4): 439–84.

Feldmann, Horst. 2017. "Economic Freedom and Human Capital Investment." *Journal of Institutional Economics,* 13(2): 421–45.

Feldmann, Horst. 2021. "Economic Freedom and People's Regard for Education." *Social Indicators Research,* 154: 235–56.

Fike, Rosemarie. 2016. "Gender Disparity in Legal Rights and Its Effect on Economic Freedom." In *Economic Freedom of the World: 2016 Annual Report*, eds. James Gwartney, Robert Lawson, and Joshua Hall. Fraser Institute.

Fike, Rosemarie. 2017. "Adjusting for Gender Disparity in Economic Freedom and Why It Matters." In *Economic Freedom of the World: 2017 Annual Report*, eds. James Gwartney, Robert Lawson, and Joshua Hall. Fraser Institute.

Geddes, Rick, Dean Lueck, and Sharon Tennyson. 2012. "Human Capital Accumulation and the Expansion of Women's Economic Rights." *Journal of Law & Economics,* 55(4): 839–67.

Grier, Robin. 2023. "The Causal Effect of Economic Freedom on Female Employment & Education." Free Market Institute, Rochester, NY.

Gwartney, James, Joshua Hall, Robert Lawson, Ryan Murphy, Simeon Djankov, and Fred McMahon. 2022. *Economics Freedom of the World: 2022 Annual Report*. Fraser Institute

Hall, Joshua, and Robert A. Lawson. 2014. "Economic Freedom of the World: An Accounting of the Literature." *Contemporary Economic Policy,* 32(1): 1–19.

Hassan, Gazi, and Arusha Cooray. 2015. "Effects of Male and Female Education on Economic Growth: Some Evidence from Asia." *Journal of Asian Economics* 36: 97–109.

King, E. M., C. E. Montenegro, and P. F. Orazem. 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.

Klasen, Stephan, and Francesca Lamanna. 2009. "The Impact of Gender Inequality in Education and Employment on Economic Growth: New Evidence for a Panel of Countries." *Feminist Economics,* 15(3): 91–132.

Lang, Kevin, and Michael Manove. 2011. "Education and Labor Market Discrimination." *American Economic Review,* 101: 1467–96.

Malamud, Ofer. 2019. "The Effect of Home Computers and the Internet on Children's Human Capital Development." ifo DICE Report, ISSN 2511-7823, ifo Institut - Leibniz-Institut für Wirtschaftsforschung an der Universität München, 17(2): 34–40.

Mankiw, N., D. Romer, and D. Weil. 1992. "A Contribution to the Empirics of Economic Growth." *Quarterly Journal of Economics,* 107: 407–37.

Nielsson, U., and H. Steingrimsdottir. 2018. "The Signalling Value of Education across Genders." *Empirical Economics* 54: 1827–54.

Norton, S. W., and A. Tomal. 2009. "Religion and Female Educational Attainment," *Journal of Money, Credit and Banking,* 41(5): 961–86.

Organisation for Economic Co-operation and Development. 2022. *Education at a Glance 2022: OECD Indicators*. OECD Publishing.

Pritchett, Lance. 2013. *The Rebirth of Education: Schooling ain't Learning*. CGD Books.

Ripley, Amanda. 2017. "Boys Are Not Defective." *Atlantic*, September 21.

Schultz, T. 2002. "Why Governments Should Invest More to Educate Girls." *World Development,* 30: 207–25.

Stroup, M. D. 2008. "Separating the Influence of Capitalism and Democracy on Women's Well-Being." *Journal of Economic Behavior & Organization,* 67: 560–72.

UNESCO. 2022. *Global Education Monitoring Report—Gender Report: Deepening the Debate on Those Still Left Behind*. Paris: United Nations Educational, Scientific and Cultural Organization.

Welmond, Michel J., and Laura Gregory. 2022. "Educational Underachievement among Boys and Men (English)." World Bank Group.

Woessman, Ludger. 2016. "The Importance of School Systems: Evidence from International Differences in Student Achievement." *Journal of Economic Literature,* 30(3): 3–32.

World Bank. 2009. *Women, Business and the Law 2010: Measuring Legal Gender Parity for Entrepreneurs and Workers*. World Bank.

World Bank. 2011. *Women, Business and the Law 2012: Removing Barriers to Economic Inclusion*. World Bank.

World Bank. 2013a. *50 Years of Women's Legal Rights*. World Bank.

World Bank. 2013b. *Women, Business and the Law 2014: Removing Restrictions to Enhance Gender Equality*. World Bank.

World Bank. 2015. *Women, Business and the Law 2016: Getting to Equal*. World Bank. .

Zweimüller, Martina, Rudolph Winter-Ebmer, and Doris Weichselbaumer. 2008. "Market Orientation and Gender Wage Gaps: An International Study." *Kyklos,* 61(4): 615–35.

Appendix Table 1. Economic freedom, gender differences in economic freedom, and human capital, excluding the Middle East

	(1)	(2)	(3)	(4)	(5)	(6)
	Primary girls/boys	Secondary girls/boys	Primary & secondary girls/boys	HLO reading gap (FM)	HLO math gap (FM)	HLO science gap (FM)
$Summary_{t-5}$	0.004	0.009	0.005	5.686	0.921	8.144
	(0.004)	(0.007)	(0.004)	(5.748)	(7.395)	(7.025)
$GDLR_{t-5}$	0.028	0.045	0.026	14.106	20.498	1.772
	(0.025)	(0.041)	(0.022)	(33.444)	(23.674)	(28.330)
N	1,564	1,380	1,350	199	132	114
R-squared	0.916	0.946	0.942	0.824	0.834	0.782
	Girls' HLO reading	Girls' HLO math	Girls' HLO science	Girls' literacy		
$Summary_{t-5}$	-16.652	29.018*	9.468	1.171		
	(14.759)	(16.679)	(17.223)	(1.274)		
$GDLR_{t-5}$	74.243	-6.040	21.098	23.472*		
	(60.186)	(32.070)	(68.096)	(12.881)		
N	199	132	114	430		
R-squared	0.982	0.989	0.983	0.983		

Notes: All regressions include year and country fixed effects. The control variables are percentage of the population who are urban, logged real GDP per capita, the percentage of the population aged under fifteen, the mortality rate of five- to nine-year-old children, the growth rate in GDP per capita, population growth rate, percentage of the population who are male, and the percentage of the population using the internet. Standard errors are clustered by country. *** p<0.01, ** p<0.05, * p<0.1

Appendix A:

List of questions constituting the Gender Disparity in Legal Rights from Fike (2017, p. 193). The index added questions to the index over time with the full list of questions reproduced below.

Can an unmarried woman apply for a passport in the same way as an unmarried man?

Can a married woman apply for a passport in the same way as a married man?

Can an unmarried woman obtain a national ID card in the same way as an unmarried man?

Can a married woman obtain a national ID card in the same way as a married man?

Can an unmarried woman travel outside the country in the same way as an unmarried man?

Can a married woman travel outside the country in the same way as a married man?

Can an unmarried woman travel outside her home in the same way as an unmarried man?

Can a married woman travel outside her home in the same way as a married man?

Can an unmarried woman get a job or pursue a trade or profession in the same way as an unmarried man?

Can a married woman get a job or pursue a trade or profession in the same way as a married man?

Can an unmarried woman sign a contract in the same way as an unmarried man?

Can a married woman sign a contract in the same way as a married man?

Can an unmarried woman register a business in the same way as an unmarried man?

Can a married woman register a business in the same way as a married man?

Can an unmarried woman open a bank account in the same way as an unmarried man?

Can a married woman open a bank account in the same way as a married man?

Can an unmarried woman choose where to live in the same way as an unmarried man?

Can a married woman choose where to live in the same way as a married man?

Can an unmarried woman confer citizenship on her children in the same way as an unmarried man?

Can a married woman confer citizenship on her children in the same way as a married man?

Can an unmarried woman be "head of household" or "head of family" in the same way as an unmarried man?

Can a married woman be "head of household" or "head of family" in the same way as a married man?

Do unmarried men and unmarried women have equal ownership rights to property?

Do married men and married women have equal ownership rights to property?

Can a married woman confer citizenship to a non-national spouse in the same way as a man?

Are married women required by law to obey their husbands?

Do sons and daughters have equal rights to inherit assets from their parents?

Do female and male surviving spouses have equal rights to inherit assets?

Can a married woman initiate legal proceedings without a husband's permission?

Does a woman's testimony carry the same evidentiary weight in court as a man's?

Can nonpregnant and nonnursing women work the same night hours as men?

Can nonpregnant and nonnursing women do the same jobs as men?

Can nonpregnant and nonnursing women work in jobs deemed hazardous in the same way as men?

Can nonpregnant and nonnursing women work in jobs deemed morally or socially inappropriate in the same way as men?

Can nonpregnant and nonnursing women work in jobs deemed arduous in the same way as men?

Can nonpregnant and nonnursing women work in mining in the same way as men?

Can nonpregnant and nonnursing women work in factories in the same way as men?

Can nonpregnant and nonnursing women work in construction in the same way as men?

Can nonpregnant and nonnursing women work in the same occupations as men?

Can nonpregnant and nonnursing women work in metalworking in the same way as men?

Can nonpregnant and nonnursing women engage in jobs requiring lifting weights above a threshold in the same way as men?

Can nonpregnant and nonnursing women do the same job-related tasks as men?

jobs requiring lifting weights above a threshold in the same way as men?

Can nonpregnant and nonnursing women do the same job-related tasks as men?