WPS7172

Policy Research Working Paper 7172

# Gender Inequality and Growth

## The Case of Rich vs. Poor Countries

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WORLD BANK GROUP
Development Economics
Global Indicators Group
January 2015

Policy Research Working Paper 7172


## Abstract

This paper uses cross-section data for 107 countries to explore the relationship between gender inequality and economic growth. The paper departs from the literature by using a broad measure of gender inequality that goes well beyond gender inequality in education, which has been the focus of most studies. Another novelty of the paper lies in exploring heterogeneity in the growth-gender inequality relationship. The results confirm that greater gender inequality is strongly associated with lower economic growth. However, this negative relationship between gender inequality and growth is entirely due to the relatively poor countries, with the relatively rich countries showing no such relationship. The findings have important implications for the design and targeting of gender-specific policies.


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# Gender Inequality and Growth: The Case of Rich vs. Poor Countries

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*Keywords*: Gender, Growth, Gender Inequality Index, Income
*JEL*: J16, O11, O40

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## 1. Introduction

Promoting gender equality is fast becoming an important aspect of the global agenda. For example, the 2010 Millennium Development Summit lists gender equality as one of its main goals. Gender equality has a direct beneficial effect on the economic status of women, a sufficient reason by itself for pursuing policies aimed at gender parity. In addition, gender equality is believed to contribute to the overall development or growth rate of the economy (World Bank 2012). However, evidence on how much gender equality matters is limited and largely confined to gender equality in education. Also, to the best of our knowledge, there is no systematic effort to understand whether the gender equality and growth relationship is uniform or if it varies depending on, for example, overall the economic development of countries.

The present paper contributes to the literature on gender equality or gender inequality and growth in two important ways. First, it focuses on a broader measure of gender inequality that goes beyond education, which has been the focus of existing studies. Second, it allows for heterogeneity in the gender inequality and growth relationship depending on the overall economic development or income level of the country. Our results confirm a strong negative relationship between growth and gender inequality. However, this negative relationship is far from uniform – it holds at relatively low income levels but not when income level is sufficiently high. These findings have important policy implications that are discussed below.

There are a number of theoretical reasons as well as some empirical evidence to expect lower growth in countries with greater gender inequality. On the theoretical side, one argument for why gender inequality matters for growth is that if one believes that boys and girls have a similar distribution of innate abilities, gender inequality in education must mean less able boys than girls get the chance to be educated, and more importantly, that the average innate ability of

those who get educated is lower than would be the case if boys and girls received equal educational opportunities. With lower overall innate ability, the growth rate is likely to decline. This argument can be easily extended beyond education to for example, gender inequality in business opportunities, access to jobs and governance (Klasen 1999). Going even further, some studies show higher marginal returns to schooling for girls relative to boys (Schultz 2002; DFID 2007). The higher marginal returns here imply higher growth by shifting educational resources from boys to girls for better gender parity in education.

A second possibility is that greater gender parity in the labor market could improve growth via better allocative efficiency. For example, barriers (direct or indirect) to women's employment in certain sectors or jobs prevent the most efficient allocation of labor leading to allocative inefficiency and lower growth. Going beyond labor input, Morrison et al. (2007) note that similar inefficiency and lower growth may also result if land, capital and other productive inputs are allocated on the basis of non-economic criteria that reflect culturally (or legally) sanctioned discrimination against women.

There is also a view in the literature that increase in women's discretionary income and bargaining power raises aggregate household saving rates. Possible reasons for this could be greater bequest motives and intergenerational altruism, greater social insecurity, perceived need to smooth family consumption and more concern about building a home among women relative to men (Seguino and Floro 2003; Stotsky 2006). Greater savings are likely to boost growth especially in the capital scarce developing world.

Another possibility is that there could be complementarity between male and female education and well being. For instance, if there are positive externalities in education between siblings then holding the overall level of education fixed, a more balanced distribution of

education between males and females is likely to boost overall human capital and hence economic growth. It is conceivable that a similar argument may hold for other drivers of economic growth. Further, in many cases, greater gender equality may imply moving resources away from males to females. Such redistribution could have a positive effect on growth if women contribute more to growth than males through for example, investing more in children's education and health.

Last, more often than not, greater gender equality is likely to be associated with better opportunities for women on an absolute scale and irrespective of the level of opportunities for men. An absolute improvement in economic opportunities available to women is likely to improve overall growth as more people are now actively contributing to the economy.

Focusing on the empirical side, in an early empirical attempt, Barro and Lee (1994) and Barro and Sala-i-Martin (1995) estimate the impact on growth (GDP per capita growth rate) of female years of schooling controlling for male years of schooling. They report a 'puzzling' finding that higher female primary and secondary years of schooling (i.e., lower gender inequality in education[1]) is negatively associated with growth. Dollar and Gatti (1999) also estimate the impact of female secondary enrollment rates on growth. Controlling for male secondary enrollment rates, they find that higher female secondary enrollment rate (i.e., lower gender inequality in education) is associated with higher growth rate, but only in countries with relatively high levels of female education to begin with. In another study, Klasen (1999) uses the ratio of female to male total years of schooling as well as the growth rate of this ratio over time as two measures of gender equality in education. Controlling for the overall (male plus female)

[1] Female years of schooling capture gender inequality in education since the study controls for the male years of schooling.

level of total years of schooling and its growth rate over time, the study finds a sharp positive effect of both its gender equality measures on growth rate.

As mentioned above, we depart from the literature mentioned above in two important ways. First, we use a broad measure of gender inequality, the United Nation's Gender Inequality Index. The index measures gender inequality in the areas of health, employment and political empowerment (discussed in more detail below). We note that our main results hold even if we control for gender inequality in education (discussed in detail below). What this suggests is that it is not just about education as highlighted in the existing literature but greater gender inequality in other areas such as political empowerment, health and employment opportunities may also have an adverse effect on economic growth. Exploring these determinants of growth remains an important area for future work.

Second, we check for heterogeneity by allowing the strength of the relationship between gender inequality and growth to vary with the level of income of countries. In other words, we check if gender inequality and overall economic development (income level) are substitutes or compliments for economic growth. With little help coming from the theoretical literature, we treat this heterogeneity as a purely empirical issue. We may speculate that for example, the relatively poor countries face other growth bottlenecks such as poor infrastructure, education, etc., so that greater gender inequality may not be so important at the margin for growth. However, it is also possible that bottlenecks reinforce each other so that greater inequality is much more detrimental to growth precisely in countries that face additional growth bottlenecks.

Our results confirm that greater gender inequality is associated with lower per capita income growth. We also find strong evidence of heterogeneity. That is, lower growth associated with greater gender inequality that we find in our sample of countries is entirely driven by the

relatively low-income countries. At sufficiently high levels of income, there is no statistically significant and robust relationship between gender inequality and growth. Figures 1 and 2 provide a graphical illustration of this result. Below, we show that these results survive even if we control for gender disparity in education and/or its differential impact (if any) on growth across rich vs. poor countries.

We would like to mention here that given the cross section nature of the data, our results should be treated with due caution. That is, we cannot claim with certainty that the results below are safe from endogeneity concerns and are truly causal in nature. Hence, we interpret the results below as robust correlations or associations that are suggestive of a possible underlying causal relationship. With this caveat in mind, we do believe that endogeneity concerns are less severe in our case than is typical of cross country regressions for three reasons. We briefly outline these reasons here and they are discussed in more detail in the following section. First, our main focus below is on the differential impact of gender inequality on growth between rich vs. poor countries. That is, on the interaction term between gender inequality and income level. This is akin to a difference-in-difference estimation exercise that is known to suffer less from the omitted variable bias problem of the "level on level" regressions. Second, we lag all our explanatory variables in order to avoid reverse causality problems. Third, we control for a large number of variables that could be correlated with growth and/or gender inequality to minimize spurious correlation with our main results.

The plan of the remaining sections is as follows. In section 2, we discuss our main variables and data sources. Empirical results are contained in section 3. The concluding section summarizes the main results and suggests scope for future work.

## 2. Data and Main variables

The data we use are a cross-section of 107 countries for which data are available on all our variables. The estimation method used is Ordinary Least Squares (OLS) with Huber-White robust standard errors. A formal definition of all the variables used in the regressions is provided in Table 1 and summary statistics of the variables are provided in Table 2.

### 2.1 *Dependent variable*

The dependent variable is real GDP per capita annual growth rate (*Growth*). To eliminate annual fluctuations, we use average values of growth rates taken over 2006 to 2008. The data source for the variable is World Development Indicators, World Bank. The mean value of the dependent variable equals 3.5 and the standard deviation is 2.6. In our sample, Armenia has the highest growth rate at 11.75 while Bahrain has the lowest growth rate at -1.06 percent per annum.

### 2.2 *Main explanatory variables*

We use lagged values of all our explanatory variables in order to avoid reverse causality from the dependent variable (growth) to the various explanatory variables. That is, all the explanatory variables discussed below are for the year 2005 or prior to that.

Our main explanatory variables are a measure of gender inequality in the country, income level, and most importantly, the interaction term between the gender inequality and the income variable. The interaction term measures how the strength of the relationship between gender inequality and growth varies with the level of income.

For gender inequality, we use year 2005 values of the United Nation's Gender Inequality Index (*GII*). The index quantifies gender inequality in three dimensions – reproductive health, empowerment, and the labor market. The reproductive health dimension is measured by a country's maternal mortality ratio and adolescent fertility rate, while the empowerment dimension combines the share of parliamentary seats held by each sex with female/male attainment levels in secondary and tertiary education. Finally, the labor dimension is calculated from female/male labor market participation rates. The index varies between 0 and 1, with 0 implying no gender inequality and higher values implying greater gender inequality or increasingly less favorable treatment of women vis-à-vis men.[2] In our sample, *GII* varies between .065 (Sweden) and .73 (Niger). The mean value of *GII* equals .39 and the standard deviation is .19.

For income, we use lagged values (year 2005) of (log of) GDP per capita (PPP adjusted and at constant 2005 International $) taken from World Development Indicators, World Bank (*Income*). In our sample, *Income* varies between 6.4 and 11.1. The mean value of *Income* is 8.9 and the standard deviation is 1.3.

The interaction term mentioned above is obtained by multiplying the gender inequality index with the income measure (*GII***Income*).

### 2.3 *Other explanatory variables*

As mentioned above, reverse causality is unlikely to be an issue with our estimation results since we use lagged values of all the explanatory variables. Similarly, spurious correlation or omitted variable bias problem is also a less serious problem for us than is typical of cross country

[2] We note that gender inequality as measure by *GII* never implies that women perform better than men; that is, gender inequality or *GII*>0 implies less favorable treatment of women relative to men.

regressions because our main focus is not on how gender inequality affects or correlates with economic growth but on how the correlation between gender inequality and growth varies with the income level of countries. The interaction term is akin to a difference-in-difference estimation strategy that suffers less from spurious correlation than a cross country regression of levels on levels. For example, one might argue that income inequality may be correlated with certain cultural factors that may also have a direct effect on growth. However, there is little reason to believe why these cultural factors should have an impact on growth that differs between rich and poor countries. Even so, to further raise our confidence against the omitted variable bias problem, we control for a number of variables that are known to be correlated with gender inequality and/or growth. The choice of controls is motivated by existing studies and is as follows.

To begin with, we follow Dollar and Gatti (1999) and control for differences in civil liberty across countries. Civil liberty could be important for economic growth by allowing individuals to freely explore their talent. Civil liberty is also likely to be a useful proxy measure of the broader institutional environment for the protection of property rights against public and private expropriation. That civil liberty could be correlated with gender equality is more likely than not. Countries that value civil liberty are also likely to be particularly concerned about ensuring that females are not disadvantaged in political empowerment, labor market, etc. To rule this source of omitted variable bias with our main results, we control for civil liberty using year 2005 values of Freedom House's civil liberty index (*Civil liberty*) as our first control. The index runs from 1 (most free) to 7 (least free).

Next, cultural diversity or differences along cultural lines within a country are often the source of conflict in a country and this is likely to have an adverse effect on growth (Easterly and

Levine 1997, Bluedorn 2001). If such cultural differences are also correlated with gender inequality then our main empirical results could suffer from spurious correlations. For example, violence and conflict resulting from cultural differences may adversely affect health services in the country and this may be particularly so for women than men since women typically are the underprivileged in society. To guard against this source of spurious correlation, we use three separate variables due to Alesina et al. (2003) that capture the degree of ethnic, linguistic and religious fractionalization in the country.

In addition to differences within a country, social, cultural and religious differences across countries can also spuriously affect our results (see for example, Dollar and Gatti 1999). For example, culturally motivated or sanctioned attitudes towards women are likely to influence gender inequality in the labor market, health, etc. Also, the same social, cultural and religious factors contribute to social capital through for example, the social values they inculcate among individuals, emphasis on honesty, hard work, and creativity, etc. (see for example, Knack and Keefer 1997, Rose 2000). We follow the literature and guard against the implied omitted variable bias here by controlling for the percentage of population that is Catholic, Muslim and Protestant. The data source for the variable is La Porta et al. (1999).

Geography and trade openness have also been linked to economic growth. For example, a number of studies have shown that landlocked countries and countries that are closed to international trade tend to have lower growth than others (see for example, Frankel and Romer 1999, Mackellar et al. 2002). If gender inequality also happens to vary systematically with trade openness and geography then our main estimation results could suffer from spurious correlation. To this end, we control for a dummy variable equal to 1 if the country is landlocked and 0 otherwise (*Landlocked*), country size as measured by (log of) population of the country in 2005

(*Population*) and exports plus imports in 2005 expressed as a percentage of GDP per capita (*Trade*). The data source for population and the trade-to-GDP ratio is World Development Indicators, World Bank. Data on landlocked countries are collected individually for each country through various website searches.

The quality of the overall macroeconomic and business environment is likely to have a direct effect on the growth rate of a country and it could also have an indirect effect by serving as a proxy for the quality of the overall institutional environment. If gender inequality also happens to be systematically correlated with the macroeconomic and business environment then our main estimation results could be biased. To check for this possibility, we control for overall macroeconomic and business climate measures that include year 2005 values of consumer price inflation (*Inflation*) taken from World Development Indicators, World Bank; and Heritage Foundation's sub-indices on fiscal and financial freedoms (2005 values).

Our last set of controls focus on human capital or the level of education in the country. We use two separate controls here. First, the overall level of human capital in the country is widely considered to be an important determinant of growth (see for example, Lucas 1988, Krueger and Lindahl 2001). If gender inequality and the level of human capital happen to be systematically correlated then our main estimation results could be biased. To guard against this possibility, we control for overall level of gross enrollment rates (for males and females) in primary, secondary and tertiary education in 2005 (*Education*). The data source for the variable is the United Nations. Second, as discussed above, we check if our results for the gender inequality and growth relationship are due to gender inequality in education or other factors. To this end, we control for the gender gap in education and its interaction term with *Income*. The gender gap in education is measured by year 2005 values of the ratio of the female-to-male

overall gross enrollment rate in primary, secondary and tertiary education (*Education gap*). The data source for the variable is the United Nations.

Before proceeding to the empirical results, we would like to mention that some of the controls discussed above show somewhat high correlation with our main variable, *GII*. However, these correlations are not too large to pose any significant estimation problems. The only exception is the level of education (*Education*) which has a correlation coefficient of -0.807 with *GII*. While this may not be much of a problem given that our focus is on the interaction term (GII*Income) rather than on the level term (GII), nevertheless, we check all the results discussed below completely excluding the *Education* variable form the analysis. Our main results are slightly stronger compared to the ones discussed below when we exclude the *Education* variable from the regressions.

## 3. Estimation

As mentioned above, our main result concerns how the relationship between growth and gender inequality differs between high vs. low income countries. That is, the estimation of the interaction term between gender inequality and income level. Before proceeding to the results for this interaction term, we briefly discuss how growth correlates with gender inequality and income level without the interaction term. This helps to juxtapose our results against existing ones in the literature on gender inequality and growth and also to see how the results change when we add the interaction term to the specification.

The regression results provided in Table 3 show how gender inequality and income correlate with growth with and without the various controls discussed above. Briefly, regressing growth on the gender inequality index without any other controls, we find no significant

relationship (at the 10 percent level or less) between the two (not shown). The estimated coefficient value of *GII* is positive, equaling 0.71. Controlling for income, the estimated coefficient value of *GII* becomes negative and is significant at less than the 5 percent level (column 1); the coefficient value equals -5.97 implying that moving from the country with the lowest to highest gender inequality is associated with a decrease in growth rate of about 4 percentage points. This is an economically large correlation given that the mean value of the growth rate in our sample equals 3.5 percent. As expected, income level and growth rate are inversely correlated, implying strong convergence, significant at less than the 1 percent level. We add the various controls discussed above one by one in columns 2-8 and all the controls simultaneously in column 9. The estimated coefficient value of *GII* in all the specifications (columns 2-9) is negative and economically large, ranging between -4.17 (controlling for religious affiliation, column 4) and -9.9 (controlling for fiscal and financial freedom, column 7). In two of the nine specifications in Table 3, where we control for the religious affiliation of countries (column 4) and *Education* (column 8), the estimated coefficient value of *GII* is statistically insignificant at the 10 percent level (p-values of .115 and .103, respectively); in one specification where we control for population, landlocked dummy and the trade-to-GDP ratio (column 6), the coefficient value of *GII* is significant at less than the 10 percent level (p-value of .063). In the remaining specifications, including when we control for all the controls simultaneously (column 9), the coefficient value of *GII* is significant at less than the 5 percent level. For income, its coefficient value is always negative and significant at less than the 5 percent level in all the specifications. For the remaining variables, we find that greater fiscal freedom is associated with higher growth, significant at less than the 1 percent level (columns 7, 9). Religious affiliation is also significantly associated with growth with a higher percentage of

Muslim and Catholics relative to Protestants implying a significantly higher (at less than the 5 percent level) growth rate; also, a higher percentage of all other religions relative to Muslims, Catholics and Protestants is correlated with higher growth, significant at less than the 5 percent level (columns 4 and 9). Last, growth tends to be higher among countries that are relatively larger in terms of population and this relationship is significant at close to the 5 percent level (columns 6 and 9).

One might wonder how the results discussed above change for *GII* if we control for gender inequality in education. Regression results controlling for the education gap in each of the specifications discussed above are provided in Table 4. These results clearly show that controlling for the education gap does not alter our results for *GII* much from the ones discussed above. In fact, in some of the specifications, the estimated coefficient value of *GII* becomes larger (more negative) after controlling for the education gap. For example, with all the controls discussed above included in the specification, the estimated coefficient value of *GII* increases marginally in absolute value from -5.3 (column 9, Table 3) to -5.4 (column 10, Table 4) when we add the control for the education gap. As expected, higher values of the education gap, implying a more favorable ratio of enrollment for females relative to males, is associated with a higher growth rate, significant at less than the 5 percent level in all the specifications discussed above (see columns 2-10, Table 4).[3] There is not much change from above in the results for the remaining variables.

*Regression results for the interaction term*

[3] The estimated coefficient value of education gap variable remains positive, large and significant at close to the 5 percent level even if we do not control for income and the gender inequality index (not shown in Table 4).

We now introduce our interaction term in the specifications discussed above. Neglecting the education gap for the time being, we replicate the regression results in Table 3 above but with the interaction term between *GII* and *Income* added to all the specifications. The results are provided in Table 5. These results show that irrespective of the set of controls in place, the estimated coefficient value of the interaction term is always positive, economically large and statistically significant at less than the 1 percent level. The positive and significant interaction term implies that the negative relationship between gender inequality and economic growth is much stronger at low income levels than at high income levels. To get a sense of the magnitude involved, consider the specification with just *GII*, *Income* and *GII*Income* terms (column 2). The estimated coefficient value of the interaction term here equals 6.47 and it implies a one standard deviation increase in the gender inequality index is associated with a decrease in growth rate of 3.2 percentage points or 1.25 standard deviation units of growth rate at the $25^{th}$ percentile value of income, and this decrease is significant at less than the 1 percent level. In contrast, the corresponding change at the $75^{th}$ percentile value of income is a decrease in growth rate of a mere 0.4 percentage points or .15 standard deviation units of growth rate, insignificant at the 10 percent level or less. The qualitative nature of these results holds even when we add the various controls discussed above to the specification. For the most conservative estimate of the interaction term obtained when we control for fiscal and financial freedom controls alone (column 8, Table 5), a one standard deviation increase in gender inequality is associated with a decrease in growth rate of 1.2 standard deviation units of growth rate (significant at less than the 1 percent level) at the $25^{th}$ percentile value of income and a decrease of .38 standard deviation units of growth rate at the $75^{th}$ percentile value of income (significant at close to the 5 percent level). Similarly, with all the controls discussed above included in the specification (column 10),

a one standard deviation increase in the gender inequality index is associated with a decrease in the growth rate by .87 standard deviation units of growth rate (or 2.3 percentage points) at the $25^{th}$ percentile value of income and by .08 standard deviation units (or 0.2 percentage points) at the $75^{th}$ percentile value of income. The former decrease is significant at less than the 1 percent level and the latter is insignificant at the 10 percent level or less.

Regression results for the remaining variables are not too different from what we found above in Tables 4 and 5. That is, religious affiliation, fiscal freedom and country size as measured by total population seem to matter for growth in the sense discussed above. However, we do find one anomaly here, which is that the growth rate is higher among landlocked countries than the rest, significant at less than the 5 percent level (columns 7 and 10, Table 5). It is possible that the dummy for landlocked countries could be spuriously picking up the effect of some other covariate which could introduce a bias with the estimation of our main results. Hence, we checked all our results throughout the paper by excluding the landlocked dummy variable from the regressions. However, our main results discussed above and later in the paper do not change much whether we include the landlocked country dummy in our specification or not.

Summarizing, irrespective of the set of controls, the estimated relationship between gender inequality and growth varies sharply and significantly (at less than the 1 percent level) with the level of income; it is much more negative at lower than at higher income levels. Further, in all the specifications considered above, gender inequality and growth are negatively correlated and this negative correlation is significant (at less than the 5 percent level) at sufficiently low levels of income. In contrast, at sufficiently high income levels, the growth-gender inequality relationship is negative in some specifications and positive in others. We note that the negative relationships at sufficiently high income levels are significant (at the 5 or 10 percent level or

less) in some cases and insignificant in others; similarly, the positive relationships found in some of the specifications at sufficiently high income levels are insignificant (at the 10 percent level or less) in some cases and significant (at less than the 5 and 10 percent level) in other cases. However, we note that the positive and significant gender inequality and growth relationship here at sufficiently high income levels is not robust at it holds for less than 2 percent of the countries in our sample that have very high income levels.

We now check if the results discussed above for the interaction term between gender inequality and income survive controlling for the education gap variable. In Table 6, we provide regression results for all the specifications discussed above with education gap variable added to the specifications. One concern here could be that the relationship between the education gap and growth may not be linear and it may vary with the income level of countries. Hence, the difference in the strength of the relationship between gender inequality and growth across rich vs. poor countries that we found above could be spuriously driven by the differential impact of the education gap on growth between rich vs. poor countries. To rule out this possibility, in Table 7 we provide all the regression results discussed above and controlling for the education gap and the interaction term between the education gap and income level.

Regression results in Tables 6 and 7 confirm that controlling for the education gap and/or its interaction term with income level does not have any significant impact on the qualitative nature of the results discussed above for the gender inequality and growth relationship. The estimated coefficient value of *GII*Income* does become smaller when we control for the education gap and further when we control for the interaction term between the education gap and income level, but it is still large and significant at less than the 1 percent level. For example, with just income, the gender inequality index and the interaction term between the two included

in the specification, the estimated coefficient value of *GII*Income* equals 6.47 (column 1, Table 5); adding the education gap variable causes the coefficient value of *GII*Income* to decrease to 5.58 (column 2, Table 6), significant at less than the 1 percent level; and to 5.19 (column 2, Table 7), significant at less than the 1 percent level, when we also include the interaction term between the education gap and income in the specification. There is not much change from above in the results for the various controls used in Tables 6 and 7. Also, as Table 7 reveals, the interaction term between income and the education gap is statistically insignificant at the 10 percent level or less in all the specifications.

## 4. Conclusion

Existing studies suggest that gender inequality in education has an adverse impact on growth. We use a broader measure of gender inequality that covers gender disparity in health, political empowerment and labor market opportunities. We find two results. First, the negative relationship between gender inequality and growth goes beyond education and it holds for the broader measure of gender inequality that we use. Second, the strong negative relationship between gender inequality and growth is far from uniform – it holds among the relatively low-income countries, but not among high-income countries. Both these results are robust to controls for gender disparity in education. Hence, there is a strong need to look beyond education as far as the gender inequality and economic performance relationship is concerned.

Our findings are important from the policy point of view and also for properly sequencing gender specific reforms and the broader overall development efforts. For example, the results above suggest that gender equality and overall economic development (income level) are substitutes for economic growth. This is good news for policy makers since the relatively

poor countries are most in need of higher growth (to eliminate poverty) and these countries are also the ones that typically have higher gender inequality. Hence, reducing gender inequality in the relatively poorer countries serves the dual purpose of reducing the gender gap where it is most glaring and also bringing in growth where it is most needed. We hope that the present paper inspires more work along similar lines.

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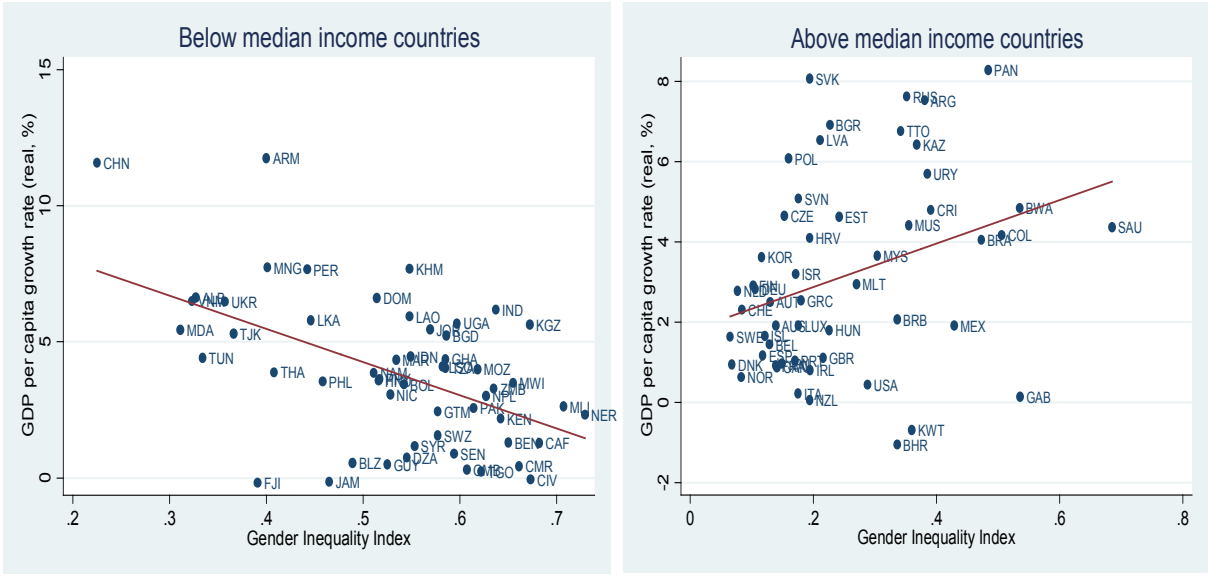
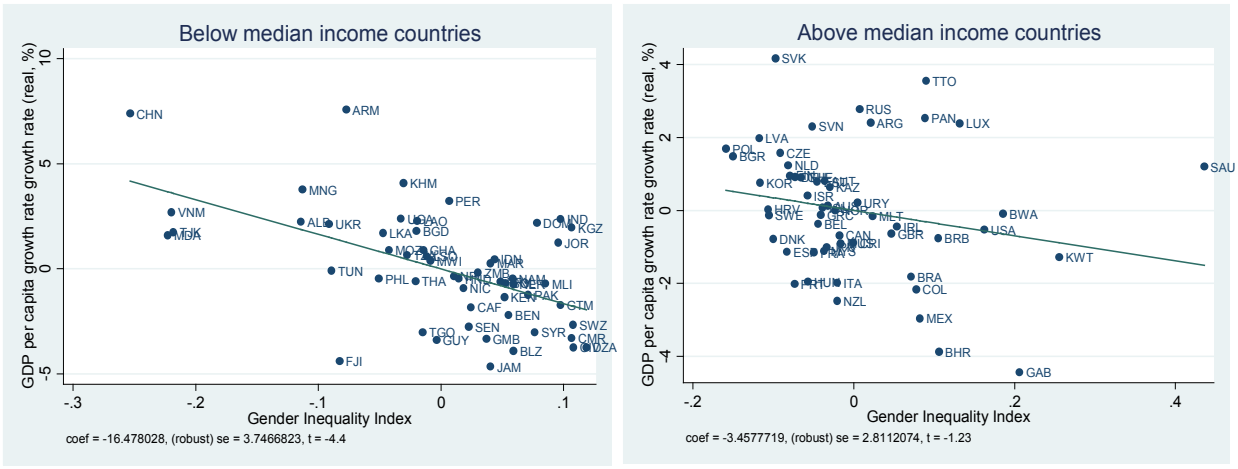
**Figure 1: GDP per capita growth rate and GII index**




*Source*: World Development Indicators, World Bank and United Nations.
Note: Low income countries are all countries that are below the median level of GDP per capita (PPP, constant 2005 USD) in our sample and high income countries include the rest that are above the median level of income.

**Figure 2: GDP per capita growth rate and GII index after controlling for convergence**




*Source*: World Development Indicators, World Bank and United Nations.
Note: 1) Low income countries are all countries that are below the median level of GDP per capita (PPP, constant 2005 USD) in our sample and high income countries include the rest that are above the median level of income.
2) Figure 2 is a partial scatter plot of GDP per capita growth rate against *GII* after controlling for the initial level of GDP per capita (*Income*) level of the countries.

**Table 1: Description of variables**

| Variable | Description |
|---|---|
| *Growth* | Real GDP per capita growth rate (%, annual). Average values of the growth rate over 2006 to 2008 are used. Source: World Development Indicators, World bank. |
| *GII* | Gender Inequality Index values for the year 2005. The index is a composite measure based on gender inequality in areas including labor market, political empowerment and health. Source: United Nations. |
| *Income* | GDP per capita in 2005 (PPP, constant 2005 International $). Source: World Development Indicators, World Bank. |
| *Inflation* | Consumer price inflation in 2005 (%, annual). Source: World Development Indicators, World Bank. |
| *Landlocked* | Dummy variable equal to 1 if the country if landlocked and 0 otherwise. Source: Various country reports and website searches. |
| *Civil Liberty* | Civil freedom index from Freedom House; 2005 values. Higher values of the index imply less freedom. Source: Freedom House. |
| *Ethnic fractionalization* | A measure of ethnic fractionalization in the country. Source: Alesina et al. (2003). |
| *Linguistic fractionalization* | A measure of linguistic fractionalization in the country. Source: Alesina et al. (2003). |
| *Religious fractionalization* | A measure of religious fractionalization in the country. Source: Alesina et al. (2003). |
| *Population (logs)* | Total population of the country in 2005 (log values). Source: World Development Indicators, World Bank. |
| *Trade* | Exports plus imports as a percentage of GDP in 2005. Source: World Development Indicators, World Bank. |
| *Muslim* | Percentage of population that is Muslim. Source: La Porta et al. (1999). |
| *Catholic* | Percentage of population that is Catholic. Source: La Porta et al. (1999). |
| *Protestant* | Percentage of population that is Protestant. Source: La Porta et al. (1999). |
| *Fiscal freedom* | Heritage Foundation's sub-index on the level of government involvement or fiscal freedom in the country in 2005. Source: Heritage Foundation. |
| *Financial freedom* | Heritage Foundation's sub-index on the level of financial development or freedom in the country in 2005. Source: Heritage Foundation. |
| *Education* | Combined gross enrollment rate in primary, secondary and tertiary education in 2005. Source: Human Development Indicators, United Nations. |
| *Education gap* | Combined ratio of female to male gross enrollment rate in primary, secondary and tertiary education in 2005. Source: Human Development Indicators, United Nations. |

**Table 2: Summary Statistics**

| Variable | Mean | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|
| *Growth* | 3.5 | 2.6 | -1.1 | 11.8 |
| *GII* | 0.4 | 0.2 | 0.1 | 0.7 |
| *Income* | 8.9 | 1.3 | 6.4 | 11.1 |
| *Inflation* | 5.2 | 3.8 | -0.3 | 18.3 |
| *Landlocked* | 0.2 | 0.4 | 0.0 | 1.0 |
| *Civil* | 2.8 | 1.6 | 1.0 | 7.0 |
| *Ethnic fractionalization* | 0.4 | 0.3 | 0.0 | 0.9 |
| *Linguistic fractionalization* | 0.4 | 0.3 | 0.0 | 0.9 |
| *Religious fractionalization* | 0.4 | 0.2 | 0.0 | 0.8 |
| *Population (logs)* | 16.2 | 1.7 | 12.5 | 21.0 |
| *Trade* | 91.0 | 43.8 | 26.5 | 286.2 |
| *Muslim* | 17.8 | 32.1 | 0.0 | 99.4 |
| *Catholic* | 33.4 | 36.5 | 0.0 | 97.3 |
| *Protestant* | 14.0 | 23.2 | 0.0 | 97.8 |
| *Fiscal freedom* | 71.8 | 13.4 | 33.7 | 99.9 |
| *Financial freedom* | 55.9 | 21.9 | 10.0 | 90.0 |
| *Education* | 75.9 | 17.4 | 22.7 | 113.0 |
| *Education gap* | 1.0 | 0.1 | 0.6 | 1.2 |

**Table 3: Gender inequality and growth (linear model)**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: *Growth* | | | | | | | | | |
| *GII* | -5.973** | -6.487** | -5.314** | -4.166 | -6.048** | -4.756* | -9.900*** | -5.039 | -5.323** |
| | (0.035) | (0.032) | (0.050) | (0.115) | (0.039) | (0.063) | (0.000) | (0.103) | (0.037) |
| *Income* | -1.203*** | -1.167*** | -1.483*** | -0.793** | -1.077** | -0.944** | -1.374*** | -1.406*** | -1.089*** |
| | (0.005) | (0.005) | (0.000) | (0.042) | (0.025) | (0.017) | (0.001) | (0.002) | (0.006) |
| *Civil liberty* | | 0.134 | | | | | | | -0.184 |
| | | (0.586) | | | | | | | (0.368) |
| *Ethnic fractionalization* | | | -0.584 | | | | | | -0.196 |
| | | | (0.696) | | | | | | (0.893) |
| *Linguistic fractionalization* | | | -2.357* | | | | | | -1.933 |
| | | | (0.051) | | | | | | (0.105) |
| *Religious fractionalization* | | | -0.648 | | | | | | -1.675* |
| | | | (0.494) | | | | | | (0.086) |
| *Muslim* | | | | -0.027*** | | | | | -0.029*** |
| | | | | (0.003) | | | | | (0.008) |
| *Catholic* | | | | -0.017** | | | | | -0.017** |
| | | | | (0.045) | | | | | (0.032) |
| *Protestant* | | | | -0.049*** | | | | | -0.026*** |
| | | | | (0.000) | | | | | (0.008) |
| *Inflation* | | | | | 0.089 | | | | -0.030 |
| | | | | | (0.308) | | | | (0.677) |
| *Landlocked* | | | | | | 0.887 | | | 0.776 |
| | | | | | | (0.147) | | | (0.116) |
| *Population* | | | | | | 0.387** | | | 0.298* |
| | | | | | | (0.029) | | | (0.052) |
| *Trade* | | | | | | 0.008 | | | 0.005 |
| | | | | | | (0.179) | | | (0.406) |
| *Fiscal freedom* | | | | | | | 0.096*** | | 0.085*** |
| | | | | | | | (0.000) | | (0.000) |
| *Financial freedom* | | | | | | | -0.005 | | -0.002 |
| | | | | | | | (0.704) | | (0.876) |
| *Education* | | | | | | | | 0.028 | -0.007 |
| | | | | | | | | (0.301) | (0.779) |
| Countries | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| R-squared | 0.099 | 0.103 | 0.173 | 0.252 | 0.112 | 0.154 | 0.309 | 0.109 | 0.480 |

p-values in brackets. All regression results use a constant term (not shown). Estimation method is OLS. Significance level is denoted by *** (1% or less), ** (5% or less) and * (10% or less).

**Table 4: Gender inequality and growth controlling for education gap**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: *Growth* | | | | | | | | | | |
| *GII* | -5.973** | -5.334* | -6.089** | -4.695* | -3.818 | -5.340* | -3.956 | -8.843*** | -6.250** | -5.399** |
| | (0.035) | (0.060) | (0.037) | (0.092) | (0.148) | (0.059) | (0.113) | (0.001) | (0.045) | (0.038) |
| *Income* | -1.20*** | -1.694*** | -1.651*** | -1.786*** | -1.275*** | -1.687*** | -1.417*** | -1.61*** | -1.549*** | -1.12*** |
| | (0.005) | (0.000) | (0.000) | (0.000) | (0.002) | (0.001) | (0.001) | (0.000) | (0.001) | (0.006) |
| *Education gap* | | 10.970*** | 11.222*** | 9.460*** | 10.361*** | 10.927*** | 11.889*** | 6.447*** | 12.687*** | 8.149*** |
| | | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.003) | (0.000) | (0.003) |
| *Civil liberty* | | | 0.200 | | | | | | | -0.099 |
| | | | (0.387) | | | | | | | (0.615) |
| *Ethnic fractionalization* | | | | -0.964 | | | | | | -0.242 |
| | | | | (0.527) | | | | | | (0.867) |
| *Linguistic fractionalization* | | | | -1.139 | | | | | | -1.359 |
| | | | | (0.367) | | | | | | (0.241) |
| *Religious fractionalization* | | | | -0.561 | | | | | | -1.424 |
| | | | | (0.557) | | | | | | (0.143) |
| *Muslim* | | | | | -0.024*** | | | | | -0.030*** |
| | | | | | (0.008) | | | | | (0.005) |
| *Catholic* | | | | | -0.017** | | | | | -0.017** |
| | | | | | (0.027) | | | | | (0.033) |
| *Protestant* | | | | | -0.048*** | | | | | -0.028*** |
| | | | | | (0.000) | | | | | (0.003) |
| *Inflation* | | | | | | 0.004 | | | | -0.062 |
| | | | | | | (0.969) | | | | (0.389) |
| *Landlocked* | | | | | | | 1.074* | | | 0.882* |
| | | | | | | | (0.052) | | | (0.058) |
| *Population* | | | | | | | 0.441*** | | | 0.320** |
| | | | | | | | (0.010) | | | (0.034) |
| *Trade* | | | | | | | 0.005 | | | 0.002 |
| | | | | | | | (0.351) | | | (0.679) |
| *Fiscal freedom* | | | | | | | | 0.078*** | | 0.068*** |
| | | | | | | | | (0.000) | | (0.000) |
| *Financial freedom* | | | | | | | | -0.007 | | -0.002 |
| | | | | | | | | (0.570) | | (0.885) |
| *Education* | | | | | | | | | -0.031 | -0.038 |
| | | | | | | | | | (0.322) | (0.182) |
| Countries | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| R-squared | 0.099 | 0.225 | 0.234 | 0.257 | 0.364 | 0.225 | 0.297 | 0.345 | 0.234 | 0.516 |

p-values in brackets. All regression results use a constant term (not shown). Estimation method is OLS. Significance level is denoted by *** (1% or less), ** (5% or less) and * (10% or less).

**Table 5: Interaction between gender inequality and income**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: *Growth* | | | | | | | | | | |
| *GII* | -5.97** | -67.01*** | -69.84*** | -62.49*** | -55.33*** | -66.54*** | -70.46*** | -53.31*** | -66.97*** | -48.11*** |
| | (0.035) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) |
| *Income* | -1.20*** | -4.337*** | -4.580*** | -4.225*** | -3.554*** | -4.288*** | -4.220*** | -3.676*** | -4.338*** | -3.232*** |
| | (0.005) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| ***GII*Income*** | | **6.472*** ** | **6.858*** ** | **6.085*** ** | **5.388*** ** | **6.421*** ** | **6.966*** ** | **4.802*** ** | **6.469*** ** | **4.692*** ** |
| | | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.002)** |
| *Civil liberty* | | | -0.209 | | | | | | | -0.318* |
| | | | (0.273) | | | | | | | (0.077) |
| *Ethnic fractionalization* | | | | -1.279 | | | | | | -0.579 |
| | | | | (0.372) | | | | | | (0.692) |
| *Linguistic fractionalization* | | | | -0.354 | | | | | | -0.942 |
| | | | | (0.775) | | | | | | (0.441) |
| *Religious fractionalization* | | | | -0.376 | | | | | | -1.336 |
| | | | | (0.657) | | | | | | (0.130) |
| *Muslim* | | | | | -0.019** | | | | | -0.020** |
| | | | | | (0.021) | | | | | (0.039) |
| *Catholic* | | | | | -0.010 | | | | | -0.015** |
| | | | | | (0.148) | | | | | (0.046) |
| *Protestant* | | | | | -0.027** | | | | | -0.016 |
| | | | | | (0.013) | | | | | (0.125) |
| *Inflation* | | | | | | 0.017 | | | | -0.041 |
| | | | | | | (0.824) | | | | (0.574) |
| *Landlocked* | | | | | | | 1.545*** | | | 1.229** |
| | | | | | | | (0.005) | | | (0.014) |
| *Population* | | | | | | | 0.325** | | | 0.359** |
| | | | | | | | (0.030) | | | (0.023) |
| *Trade* | | | | | | | 0.001 | | | 0.002 |
| | | | | | | | (0.922) | | | (0.718) |
| *Fiscal freedom* | | | | | | | | 0.054** | | 0.054*** |
| | | | | | | | | (0.011) | | (0.001) |
| *Financial freedom* | | | | | | | | 0.005 | | 0.006 |
| | | | | | | | | (0.668) | | (0.643) |
| *Education* | | | | | | | | | 0.000 | -0.014 |
| | | | | | | | | | (0.988) | (0.576) |
| Countries | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| R-squared | 0.099 | 0.354 | 0.363 | 0.371 | 0.399 | 0.354 | 0.428 | 0.402 | 0.354 | 0.540 |

p-values in brackets. All regression results use a constant term (not shown). Estimation method is OLS. Significance level is denoted by *** (1% or less), ** (5% or less) and * (10% or less).

**Table 6: Gender inequality and growth interaction term controlling for education gap**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: *Growth* | | | | | | | | | | |
| *GII* | -67.01*** | -58.38*** | -61.63*** | -55.58*** | -42.28*** | -58.42*** | -60.26*** | -48.15*** | -58.34*** | -40.91*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) | (0.000) | (0.000) | (0.000) | (0.004) |
| *Income* | -4.337*** | -4.101*** | -4.303*** | -4.031*** | -3.124*** | -4.119*** | -3.932*** | -3.532*** | -3.967*** | -2.886*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) |
| ***GII*Income*** | **6.472*** ** | **5.584*** ** | **5.983*** ** | **5.376*** ** | **4.034*** ** | **5.590*** ** | **5.921*** ** | **4.282*** ** | **5.512*** ** | **3.896*** ** |
| | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.002)** | **(0.000)** | **(0.000)** | **(0.002)** | **(0.000)** | **(0.008)** |
| *Education gap* | | 4.338* | 3.682 | 3.936 | 5.670** | 4.432 | 5.095** | 2.878 | 5.635* | 4.997** |
| | | (0.088) | (0.172) | (0.119) | (0.026) | (0.104) | (0.026) | (0.209) | (0.060) | (0.045) |
| *Civil liberty* | | | -0.144 | | | | | | | -0.243 |
| | | | (0.474) | | | | | | | (0.186) |
| *Ethnic fractionalization* | | | | -1.356 | | | | | | -0.542 |
| | | | | (0.356) | | | | | | (0.710) |
| *Linguistic fractionalization* | | | | -0.080 | | | | | | -0.758 |
| | | | | (0.950) | | | | | | (0.533) |
| *Religious fractionalization* | | | | -0.372 | | | | | | -1.239 |
| | | | | (0.668) | | | | | | (0.172) |
| *Muslim* | | | | | -0.019** | | | | | -0.022** |
| | | | | | (0.018) | | | | | (0.026) |
| *Catholic* | | | | | -0.012* | | | | | -0.015** |
| | | | | | (0.090) | | | | | (0.046) |
| *Protestant* | | | | | -0.031*** | | | | | -0.019* |
| | | | | | (0.004) | | | | | (0.079) |
| *Inflation* | | | | | | -0.008 | | | | -0.058 |
| | | | | | | (0.919) | | | | (0.418) |
| *Landlocked* | | | | | | | 1.527*** | | | 1.218** |
| | | | | | | | (0.004) | | | (0.012) |
| *Population* | | | | | | | 0.358** | | | 0.362** |
| | | | | | | | (0.018) | | | (0.021) |
| *Trade* | | | | | | | 0.000 | | | 0.001 |
| | | | | | | | (0.938) | | | (0.863) |
| *Fiscal freedom* | | | | | | | | 0.050** | | 0.049*** |
| | | | | | | | | (0.019) | | (0.004) |
| *Financial freedom* | | | | | | | | 0.003 | | 0.005 |
| | | | | | | | | (0.790) | | (0.700) |
| *Education* | | | | | | | | | -0.022 | -0.032 |
| | | | | | | | | | (0.439) | (0.244) |
| Countries | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| R-squared | 0.354 | 0.369 | 0.372 | 0.383 | 0.423 | 0.369 | 0.449 | 0.408 | 0.373 | 0.552 |

p-values in brackets. All regression results use a constant term (not shown). Estimation method is OLS. Significance level is denoted by *** (1% or less), ** (5% or less) and * (10% or less).

**Table 7: Gender inequality and growth interaction term controlling for education gap**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: *Growth* | | | | | | | | | | |
| *GII* | -58.38*** | -54.67*** | -57.92*** | -52.62*** | -40.28*** | -54.70*** | -59.63*** | -44.99*** | -53.86*** | -40.89*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.002) | (0.000) | (0.000) | (0.001) | (0.000) | (0.005) |
| *Income* | -4.10*** | -2.345 | -2.543 | -2.608 | -2.067 | -2.362 | -3.610* | -1.955 | -1.827 | -2.878 |
| | (0.000) | (0.206) | (0.158) | (0.173) | (0.279) | (0.202) | (0.053) | (0.279) | (0.332) | (0.150) |
| ***GII*Income*** | **5.584*** ** | **5.188*** ** | **5.587*** ** | **5.055*** ** | **3.819*** ** | **5.193*** ** | **5.852*** ** | **3.947*** ** | **5.020*** ** | **3.895** ** |
| | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.004)** | **(0.000)** | **(0.000)** | **(0.004)** | **(0.000)** | **(0.012)** |
| *Education gap* | 4.338* | 17.107 | 16.494 | 14.309 | 13.436 | 17.238 | 7.461 | 14.437 | 21.267 | 5.061 |
| | (0.088) | (0.179) | (0.183) | (0.272) | (0.321) | (0.188) | (0.556) | (0.273) | (0.107) | (0.705) |
| *Education gap*Income* | | -1.579 | -1.584 | -1.282 | -0.962 | -1.582 | -0.293 | -1.429 | -1.902 | -0.008 |
| | | (0.305) | (0.291) | (0.415) | (0.560) | (0.309) | (0.854) | (0.370) | (0.221) | (0.996) |
| *Civil liberty* | | | -0.145 | | | | | | | -0.243 |
| | | | (0.473) | | | | | | | (0.188) |
| *Ethnic fractionalization* | | | | -1.266 | | | | | | -0.542 |
| | | | | (0.398) | | | | | | (0.713) |
| *Linguistic fractionalization* | | | | -0.118 | | | | | | -0.758 |
| | | | | (0.928) | | | | | | (0.536) |
| *Religious fractionalization* | | | | -0.353 | | | | | | -1.239 |
| | | | | (0.683) | | | | | | (0.175) |
| *Muslim* | | | | | -0.019** | | | | | -0.022** |
| | | | | | (0.019) | | | | | (0.026) |
| *Catholic* | | | | | -0.012* | | | | | -0.015** |
| | | | | | (0.091) | | | | | (0.050) |
| *Protestant* | | | | | -0.031*** | | | | | -0.019* |
| | | | | | (0.006) | | | | | (0.080) |
| *Inflation* | | | | | | -0.009 | | | | -0.058 |
| | | | | | | (0.913) | | | | (0.420) |
| *Landlocked* | | | | | | | 1.518*** | | | 1.217** |
| | | | | | | | (0.005) | | | (0.014) |
| *Population* | | | | | | | 0.353** | | | 0.362** |
| | | | | | | | (0.028) | | | (0.029) |
| *Trade* | | | | | | | 0.000 | | | 0.001 |
| | | | | | | | (0.961) | | | (0.868) |
| *Fiscal freedom* | | | | | | | | 0.050** | | 0.049*** |
| | | | | | | | | (0.019) | | (0.004) |
| *Financial freedom* | | | | | | | | 0.003 | | 0.005 |
| | | | | | | | | (0.774) | | (0.701) |
| *Education* | | | | | | | | | -0.026 | -0.032 |
| | | | | | | | | | (0.360) | (0.258) |
| Countries | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| R-squared | 0.369 | 0.373 | 0.376 | 0.386 | 0.424 | 0.373 | 0.449 | 0.411 | 0.379 | 0.552 |

p-values in brackets. All regression results use a constant term (not shown). Estimation method is OLS. Significance level is denoted by *** (1% or less), ** (5% or less) and * (10% or less).