# How does gender inequality affect economic growth?

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**Abstract**

This study attempts to characterise how gender inequality affects economic growth, across different regions and income levels. The results indicate that there is no consistent pattern to how gender inequality affects economic growth that manifests across both income level and geographic regions. That said, this study finds evidence that inequality in education and labour force participation are of distinct importance to economic growth, particularly in low income regions. This study applies the techniques of linear regression, dummy variables for data analysis and to check robustness, the Hausmann test. Taken in tandem with the literature discussed in the first part of this study, my analysis suggests that policy should vary depending on location with a main focus on education and labour force participation. Policy should address social change, rather than legal change.

**Why is this important?**

"...investing in women is not only the right thing to do. It is the smart thing to do. I am deeply convinced that, in women, the world has at its disposal, the most significant and yet largely untapped potential for development and peace".

Ban Ki Moon Ban Ki Moon, UN Secretary General www.iheu.org, (International Humanist and Ethical Union), 8 March 2008

**Figure 1** (Forsythe, N., Korzeniewicz, R. P., & Durrant, V. (2000))

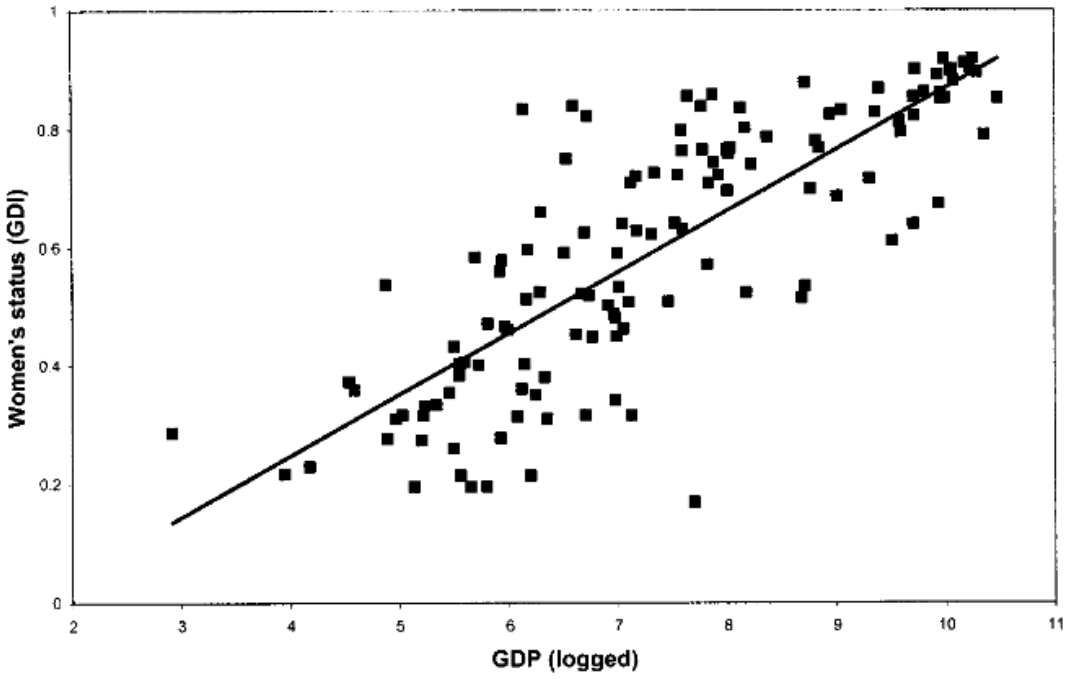



FIG. 1.—Scatterplot of the relationship between women's status (GDI) and GDP (logged). Sources: GDI: United Nations, *Human Development Report 1995* (New York: Oxford University Press, 1995); GDP: United Nations, *Womens' Indicators and Statistics Database (Version 2, CD-ROM)* (New York: United Nations, Department of Economic and Social Information and Policy Analysis Statistical Division, 1994).

In 1979 the United Nations General Assembly adopted The Convention on the Elimination of All Forms of Discrimination against Women. Furthermore, gender equality is a UN Millenium Development Goal and a Sustainable Development Goal.The effect of gender inequality on economic growth has been scrutinised over the past 50 years. There is an established correlation between gender inequality and economic development, figure 1(GDI is the gender development index). This study assumes that economic development is a desired outcome, therefore factors contributing to development are worth investigating. As of 2021, 49.7% of the

world's population are female. Yet women are significantly less likely to actively seek, or be engaged in paid employment. Globally, the labour force participation rate is slightly over 50% for women compared to 80% for men. In contrast, the higher education participation rate for women is 56.6% and 44.1% for men. This indicates an apparent largely untapped resource.

Indeed, in 2011 the FAO (Food and Agriculture Organisation) stated that "if women farmers used the same level of resources as men on the land they farm, they would achieve the same yield levels… which would increase agricultural output in developing countries between 2.5 and 4 percent"(The State of Food and Agriculture 2010-2011, (2011)). Furthermore, Cuberes, D. & Teignier, M. (2014) found that average output per worker drops by 12% if women are excluded from entrepreneurship and if women are excluded from the labour force, income per capita drops by approximately 40%. There also appear to be significant gains to increasing the status of women in the home. Particularly, greater control for women over household resources can be beneficial to countries growth prospects as women are more likely to invest in their children, the country's future, (World Development Report (2011)). Finally, increasing women's agency and ability as social and political actors will lead to more representative institutions and government bodies, leading to more suitable, representative, responsive development, and further provide role models for young women.

**Literature review and theory:**

A wealth of literature on the effect of gender inequality on economic growth has been conducted, dating back to at least Sinha, J.N. (1967). These studies have been inconsistent in their support of Moon's statement. Rather, the effect of gender inequality on economic growth is dynamic and extremely volatile to changes in numerous cultural and economic factors. Indeed, in a cross-country regression Barro, R. and Lee, J.W. (1994), found a coefficient representing female education to be negatively related to growth while the male coefficient positive. While results from Hill, M. A., & King, E. (1995) indicated that educating women fostered economic growth.

A likely reason for the differing results is the difficulty of studying the effect of gender inequality on economic growth. In order to approach the question one must first answer three primary questions.

How do you measure inequality?

How do you measure economic growth?

Where do you take your data from?

How an empirical study chooses to answer these questions heavily influences its findings and consequent policy implications. Thus the literature can be partitioned into sets according to how the primary questions are answered.

There are three pathways generally favoured by studies when measuring inequality: wages, education and labour force participation.

**Labour force participation:**

Women's participation in the labour force is affected by many factors including, education, wages, fertility rates and child mortality rates. As well as social factors such as changing gender norms and urbanisation. In economic theory a popular approach (Sinha, J.N. (1967); Goldin, C. (1995); Tam, H., (2011)) is to graph labour force participation against economic development. Typically, the graph forms a U shape, women's labour force participation is high initially in an agricultural society, it reduces as industrialisation occurs, then begins to rise again as economies become more service sector orientated (Goldin, C. (1995)). Several studies attribute this pattern largely to change in fertility rates and the gender education gap (Galor, O., and D. N. Weil. (1996); Lagerlöf, N.P. (2003) ; Hiller, V. (2014)). The Feminisation U-Hypothesis suggests a trade off between growth and gender inequality for undeveloped countries, an implication which is not always supported by the literature.

The causal chain by which gender inequality in labour force participation affects economic development and growth is complicated with a number of closely related pathways. Firstly, there is some evidence that women are less prone to nepotism and corruption than men (Swamy, A., Knack, S., Lee, Y., & Azfar, O. (2001), Rivas, M. F. (2013)). Furthermore, gender inequality in employment is inefficient since it reduces the total number of people from which employers can select their employees from, decreasing the likelihood that the best possible candidate is chosen, reducing the ability of the workforce (Esteve-Volart, B. (2004)). This has a consequent effect on those outside the job market since the overall quality of production and services from the job market will be reduced, leading to inefficiency. Seguino's (2000a, 2000b) results imply that the lack of cheap women's labour leads to less growth in specific export oriented economies, since without the labour force there can be no comparative advantage which incentivises foreign investments. Busse, M. and Spielmann, C. (2006) further support this.

Finally, there is a large body of evidence that suggests female labour force participation increases women's power within the household which has a positive effect on the household's economic decisions. Women often invest more into health, savings and education for the future generation. (Amartya, S. (1990); Lawrence. J. H., Hoddinott, J., Alderman H. (1997); Thomas, D. (1997); World Bank (2001); Klasen, S., Wink. C. (2003); and King, E,. Klasen, S. and Porter, M. (2008)).

The overwhelming literature agrees that gender inequality in labour force participation is almost always inefficient for the economy. More than 60 years ago Becker, G.S., (1957) made the case that discrimination in the labour market was harmful to economic growth rates because of being economically inefficient. Implying that firms in less competitive markets are more able to discriminate. More recently, Tzannatos, Z. (1999) finds sufficient evidence to support the claim that "labour markets in developing countries are transformed relatively quickly in the sense that gender differentials in employment and pay are narrowing much faster than they did in industrialised countries". Tzannatos finds labour market gender discrimination is inefficient, and

the cost of the inefficiencies are primarily borne by women. Klasen, S. (1999) mentions that there are measurement and causality issues, but “gender inequality in employment in South Asia and Sub-Saharan Africa may have reduced growth by another 0.3%, compared to East Asia”. In 2008 Klasen extended the analysis, suggesting the impact of employment gaps in Sub Saharan Africa and Latin America in the 1990s is significantly greater than other countries, enough to skew the average to imply that gender gaps in employment are more significant than education. However, once those counties' 1990s data is removed “education and employment have a similar impact on economic growth”. Implying that the data set is vulnerable to outliers. Focussing on India, Esteve-Volart, B. (2004), finds that “a 10 percent increase in the female-to-male managers ratio in India would increase total output per capita by 2 percent, while a 10 percent increase in the female-to-male workers ratio would increase total output per capita by 8 percent”. Löfström, Å. (2009) makes an even larger estimate for EU member states, stating that “with a labour market in gender balance… the EU member states would theoretically be able to boost their GDP by between 14 and 45 per cent”. Thévenon, O., Ali, N., Adema, W., & del Pero, A. S. (2012) suggest that the size of the effect of increased female labour force participation on economic growth is dependent on the rate of convergence between men and women. The authors go on to estimate “a potential gain of 12% to the size of the total economy by 2030, on average across OECD countries, if complete convergence occurs in the next 20 years”.

Kapsos, S. (2005) identifies a trend in the global labour market that female employment elasticities are greater than male in all time periods studied, thus implying that there may be reverse causality. Similarly, Bussmann, M. (2009) finds that “trade openness in developing countries increases female labour force participation”. In female labour market participation and economic growth, Luci, A. (2009) finds that female labour force participation has a positive impact on growth, but the “impact of growth on women’s labour force participation is not as clear”. Tsani, S., Paroussos, L., Fragiadakis, C., Charalambidis, I., & Capros, P. (2013) confirms the feminisation U-hypothesis, implying that although there is an equalising effect of economic growth to increase the entry of women into the labour force, it is not sufficient for optimum growth in the short term. Rather active policies are needed.

The feminisation U-hypothesis is questioned by Gaddis, I. and Klasen, S. (2011) who find that the declining portion “has little relevance for most developing countries today”. This evidence is supported by Rahman, R. I., & Islam, R. (2013). Lechman, E., & Kaur, H. (2015) sought to resolve the debate on the feminisation U-hypothesis with a study on 162 countries. Their “main findings support the hypothesis of the U-shaped relationship between female labour force participation and economic growth” however “the U-shaped feminization hypothesis was not positively verified in the case of low-income countries”. Low income countries are likely developing.

There is some recent debate, Ruiters, M., & Charteris, A. (2020) find that in South Africa greater female participation in the labour market has no effect on growth. Agénor, P. R., Ozdemir, K. K., & Pinto Moreira, E. (2021) suggest a potential reconciliation for Ruiters and the majority of the literature. Agénor, P et Al. find that the growth effect of policies targeted at labour force

participation inequality, may have a trade off “with respect to female unemployment when they are combined with subsidies to women’s training”.

To summarise, although there is debate around feminization U-hypothesis, a majority of the literature supports that female labour force participation is beneficial for economic growth.

**Wages:**

The gender wage gap and its impact on economic growth is a matter of debate among scholars.

Neoclassical growth theory implies that gender based wage inequality is inefficient, it leads to discrimination in the job market and a misappropriation of talent. By the efficiency wage hypothesis, optimal wages are set such that workers are incentivised not to quit and to maintain productivity. Therefore, wage inequality implies that women are less inclined to work and less inclined to be productive at work. This relates to the aforementioned argument for inefficiency in unequal labour force participation. Furthermore, wage inequality affects income inequality. If men and women are paid equally across all stratas of society and one artificially reduces the wages of women, one decreases the minimum income without changing the maximum, increasing income inequality. Severe levels of income inequality are heavily associated with financial crises, debt, inflation and economic instability (Dabla-Norris et al.(2019)).

However, within the literature there are several exceptions. In export oriented economies women can function as an effective low paid underclass for the cheap production of labour intensive goods that still require expertise (Seguino, S. (2000b)). Here, wage inequality can positively influence economic growth through comparative advantage, as the comparatively low cost of production gained from cheap yet skilled labour attracts foreign investment through high profitability. This typically occurs in patriarchal societies where state policies crowd women into manufacturing of highly labour intensive and price-elastic goods and social expectation on women to be secondary earners serves to restrict their bargaining power (Kabeer, N., Natali L. (2013)). In 2000, Seguino published two papers, 2000a and 2000b on this topic. In 2000a Seguino found “...that gender inequality which works to lower women's wages relative to men’s is a stimulus to growth in export-oriented economies”. In 2000b Seguino states that “Asian economies that have discriminated against women the most grew the fastest from 1975 to 1990. Gender discrimination and the consequent low female wages have been a stimulus to investment and exports by lowering unit labour costs, providing the foreign exchange to purchase capital and intermediate goods which in turn raise productivity and growth rates” Seguino (2000b). These results were partially corroborated by Berik, G, van der Meulen Rodgers, Y, and Zveglich, J. (2004) who found that increased import competition widens the wage gap, “thus women appear to be bearing the brunt of employers’ cost cutting efforts” in an effort to match competition. Moreover, Busse, M. and Spielmann, C. (2006) found results “in line with those of Seguino, S. (1997, 2000a,b)” yet going further to say “wage-inequality is always positive and significant, implying that the positive linkage holds over time”.

Hazarika, G. and Otero, R. (2004) found something contradictory in urban Mexico, that the more foreign trade there was the less workplace gender discrimination, including wage inequalities. Similarly, in the United States, Black and Brainerd (2004) reached conclusions in line with neoclassical growth theory: increased competition in manufacturing industries due to imports lead to smaller residual wage gaps. Yet in concentrated manufacturing industries in India Menon, Nidhiya & Rodgers, Yana (2009) found the precise opposite: increasing openness led to wider wage gaps. This apparent contradiction indicates the volatility of the relationship between wage gaps and economic growth.

In a direct response to Seguino (2000a,b), Schober, T. and Winter-Ebmer, R. (2009), find using a replica of Sequino's analysis with data from counties across a wide spectrum of income classes (54 countries), there is no "evidence that more discrimination might further economic growth - on the contrary: if anything the impact of gender inequality is negative for growth". Oostendorp, R. H. (2009) attempts to reconcile the two sides by looking for a pattern by splitting his sample into richer and poorer countries, yet Oostendorp finds "little evidence that trade and FDI (foreign direct investment) also reduce the occupational gender wage gap in poorer countries". And that in richer countries the gender wage gap "tends to decrease with increasing economic development". This is further corroborated in Australia by Agénor, P. R., & Canuto, O. (2013), and in Indonesia by Taniguchi, K., & Tuwo, A. (2014) who found the gender pay gap in Indonesia (a lower-middle income economy, defined by the World Bank) rose with a progression towards urbanisation and an export oriented economy. And by Wolszczak-Derlacz, J. (2013) who found across 18 OECD countries that the gender wage gap was negatively correlated with sectoral growth. The debate summarised here is complex, but one broad conclusion is that using different data sets - selecting different types of economy or different time periods for analysis, can have significant effects on conclusions.

More recent studies generally support a negative effect of gender wage inequality on economic growth. Kennedy, T., Rae, M., Sheridan, A., & Valadkhani, A. (2017) find that in Australia "reducing the (gender wage) gap by 10% can boost per capita output up to 3%". Hakura, M. D., Hussain, M. M., Newiak, M. M., Thakoor, V., & Yang, M. F. (2016) find that "income inequalities… are negatively associated with per capita GDP growth" and that the relationship "prevails mainly in lower income countries". Ramanayake, S. S., & Ghosh, T. (2017) state that " policies that promote equity boost the economic growth of developing countries, including those in South and Southeast Asia (Seguino's main area of study)".

In summary, studies on the wage component of gender inequality have conflicted findings on its relationship with economic growth. There is no overarching pattern, and the comparative advantage argument outlined above does provide a plausible mechanism by which income inequality might promote economic growth in a specific type of economy.

**Education:**

Econometric studies on the impact of inequality education on economic growth have found a strong correlation. In his capacity as World Bank Chief Economist, in 1992 Lawrence Summers

wrote “Investment in girls’ education may well be the highest return investment available in the developing world”. Economists have theorised numerous alternative pathways to attempt to explain this relationship. First, the argument of human capital. Human capital theory argues that investment into education and training increases working productivity, increasing economic growth rates. In maintaining inequality in education there is a decrease in productivity and therefore economic growth. Economists (Dollar, D. and Gatti, R. (1999); World Bank (2001); Knowles, S., Lorgelly, P. K. and Owen, P. D. (2002)) theorise that because of decreasing marginal returns to education the marginal cost of not educating women for one year is far greater than the marginal benefit of another year of education for men. When gender inequality occurs in education, it is preferred to educate the discriminated party.

Secondly, it is widely agreed that education for women reduces fertility levels and child mortality rates (Murphy, S., Belmonte, W., Nelson, J. (2009)). This causes many social and ethical benefits which have an indirect economic effect. Economically, reduced child mortality is more efficient since resources invested into children are more likely to bear fruit. Furthermore, decreased child mortality rate is strongly associated with a decreased fertility rate, fewer children implies a higher concentration of human capital, therefore greater productivity per capita and a higher concentration of wealth passed down generationally . Reduced fertility rates facilitates labour force participation for women, which implies the benefits discussed above. Lastly, initially reducing the fertility rates will cause the percentage of the population that is working to grow, causing an initial boom. It should be noted that if fertility rates continually reduce generationally there will no longer be positive consequences. Furthermore, education itself has no ability to affect economic growth, there must be structures in place to realise the benefits of education.

Finally, in accordance with the work of Seguino, S. (2000a, 2000b), The World Bank (2001); Busse, M. & Spielmann, C. (2006). Education for women is important since it increases competitiveness on an international level. To induce the comparative advantage discussed in the wage section, women must be educated in order to function as an effective yet underpaid workforce.

Numerous studies found the decreased education inequality, generally in terms of years in schooling, has a positive impact on economic growth. Hill, M. A., & King, E. (1995) certainly reinforce this, stating that “education enhances labour market productivity and income growth for all…rising levels of education improve women's productivity in the home which in turn can increase family health, child survival, and the investment in children's human capital. The social benefits…range from fostering economic growth to extending the average life expectancy in the population, to improving the functioning of political processes”.

Few papers disagree with this perspective. Dollar, D. and Gatti, R. (1999) find that “Gender inequality leads to lower growth and income whereas investing in girls, in particular in their education, raises national income”. Klasen, S. (1999) then goes on to claim that; “point estimates suggest that between 0.4-0.9 % of the differences in growth rates between East Asia and Sub Saharan Africa, South Asia, and the Middle East can be accounted for by the larger

gender gaps in education prevailing in the latter regions". Klasen follows up his 1999 article with another in 2002, where he provides results that suggest that gender equality in education and employment is a win-win, both increasing economic growth and promoting human development goals like lower mortality and fertility as well as increased life expectancy Klasen, S. (2002). Chaudhry, I. S. (2007) finds results consistent with Klasen, S. (2002). Klasen again followed up in 2008 extending the results to "the combined 'costs' of education and employment gaps in Middle East and North Africa and South Asia amount respectively to 0.9-1.7 and 0.1-1.6 percentage point differences in growth compared to East Asia (Klasen, S. (2008)).
Esteve-Volart, B. (2000) first shows that education inequality distorts the talent pool leading to less economic growth. Then using a model she attempts to graph the rate of economic growth against gender inequality and finds the relationship to be convex. Knowles, S., Lorgelly, P. K. and Owen, P. D. (2002) also find similar suggesting emphasis on female education is justified. Many more papers are in the same vein. More recently, Yumusak, I. G., Bilen, M., & Ates, H. (2013), Bandiera, O., & Natraj, A. (2013), Oztunc, H., Oo, Z. C., & Serin, Z. V. (2015), Karoui, K., & Feki, R. (2018), Ezeh, K. (2020). Together the literature forms an impressive argument for investment in women's education.

Despite the overwhelming evidence that gender inequality in education is inefficient for economic growth, such inequality persists today. Moheyuddin, G. (2005) attempts to explain why developing countries do not invest in women's human capital, finding that "gender inequality in education is an endogenous variable" that can be largely explained "...by religious preference, regional factors and civil freedom". Low investment in female education is not made as an efficient economic choice. However, the consensus from the literature is that gender equality in education is the efficient economic choice.

**Methodology review :**

In the field of economics estimating growth using a regression is typical. Neo-classical econometric models tend to include labour as an exogenous factor of population growth. This limits the capability of the model to explore human and gender dimensions of growth (Walters B. 1995). More suited to the analysis of the gender component of economic growth is Endogenous Growth Theory, which emphasises internal mechanisms such as increases in human capital as an engine for economic growth. Many studies on gender inequality, such as those above, have tested this mechanism via the proxy of gender differences in education.

It is widely acknowledged in the literature that to empirically confirm a causal relationship between gender inequality and economic growth is difficult. Knowles et al. (2002) state that in such studies: 'any conclusion must be tempered by acknowledging that disentangling patterns of significance and causation from highly collinear, interrelated cross-country data of varying quality is fraught with difficulties'. The most common method in the literature is to use a cross country regression analysis (Klasen, S. (1999); Klasen, S. (2002); Seguino, S. (2000a, 2000b); Schober, T. & Winter-Ebmer, R) attempting to relate a measure of economic growth, to a measure of inequality, controlling for variables associated with growth such as level of investment, population growth and level of trade. This approach "assumes that countries'

structural differences are unimportant to the growth process. Or if they do, differences are randomly distributed with 0 mean" (Stephen M. Miller (1996)). Typically, empirical models of this type use per capita GDP or per capita income to measure growth. Either of which is effective since "many of the predictions of growth theory can be successfully considered in a cross section context by examining the levels of income across countries"(Robert E. Hall, Charles I. Jones(1999)).

Granting the assumptions of cross country regressions there are still several drawbacks when using the technique to attempt to empirically quantify the relationship between gender inequality and economic growth. There are numerous endogeneity concerns, this occurs when the independent variables are driven by factors in the error term of the regression. First, there is the problem of reverse causality. Numerous studies find that gender inequality has a negative effect on economic growth. But it is also plausible that, for a range of reasons, economic growth increases gender equality. Hence, to disentangle the causality and find the precise effect one has on the other is difficult. Another common source of endogeneity is omitted variable bias. This is particularly difficult to address in the sphere of gender inequality since regressions are limited to the available data and data on family work done is not recorded. Moreover, it is likely that some variables are only relevant in a particular country or income level and by not including them across x countries in the regression, results are flawed. This argument suggests that a cross country regression is no longer precise enough and one must focus on one country or region in order to have definitive results (able to draw on more locally contextualised relevant data). Because of the methodological issues in studies such as this, definitive proof of causality is not possible, rather findings should be taken as suggestive evidence.

A common method of avoiding endogeneity issues is an instrumental variable analysis. Here one uses 'a third 'instrumental' variable to extract variation in the variable of interest that is unrelated to the dependent variable, and to use this variation to estimate its causal effect on an outcome measure' (J.H. Stock (2001)). This has its own difficulty as it requires a variable that only contributes to growth via its impact on gender inequality. Klasen (2002) uses this technique to address endogeneity in education, finding that "gender inequality in education has a persistent effect on economic growth". Klasen makes use of variables, 'education spending (as a share of GDP), initial fertility levels, and changes in fertility rates' as instruments, stating that they are good candidates as they 'pass standard relevance and over- identification tests'. Esteve Volart (2004) also uses the same technique, this time to check for endogeneity in the relationship between the labour market and economic growth. Using the instrumental variable ' the ratio of prosecutions launched to the number of complaints received under the Maternity Benefits Act (1961)' Volart confirms her results that gender discrimination in the labour market is inefficient for economic growth.

Since Volart the more popular technique to check robustness of results has been the instrumental variable generalised method of moments technique or IV- GMM. Kazandjian (2019) uses the IV-GMM method to show that gender inequality impedes output diversification and lowers exports. The advantage of GMM over IV is clear. If heteroskedasticity is present the GMM estimator outperforms the IV estimator and if heteroskedasticity is not present the GMM

estimator is just as good as the IV (Baum, C.F., Schaffer, M.E., & Stillman, S. (2003). Hakura, M.D.S., M.M. Hussain, M. Newiak, V. Thakoor, and M.F. Yang, (2016) use the GMM technique to show that 'income and gender inequality are found to jointly impede growth mostly in the initial stages of development'.

Perhaps the most methodologically debated area is centred around the results of Seguino in East Asia. Seguino (2000a) used 1975-1995 data for 20 semi-industrialised export-oriented economies to explore the hypothesis that in an export oriented economy comparatively low inequality in education and high inequality in wage rate was beneficial to the economy via inducing foreign investment because of comparative advantage. In 2000b Seguino chose nine countries from the earlier 20 and investigated the impact of gender wage gap, again finding that countries with the widest wage gaps grew the quickest. The results indicated that again this was because of the positive effect on profits and therefore investment. Seguino suggested that the likely explanation for the apparent effectiveness of wage discrimination was because of the prevalent patriarchal and discriminatory attitudes women's secondary earner status served to restrict bargaining power and lower wages. As detailed above in the wages section.

Schober and Winter Ebmer carried out an investigation using Seguino's sample and variations on the sample, they found comparable results to Seguino in that both investment and human capital were positively correlated with economic growth, however Schober and Winter Ebmer found that "the impact of gender wage differentials was either 0 or negative".

Seguino challenged these findings on methodological grounds in 2011 (Seguino, S. (2011)). Firstly finding issues with their measure of gender wage gaps, particularly noting inconsistencies in the measurement of wage gaps year by year implying that panel data estimation techniques won't be as effective. Seguino also noted that Schober and Winter-Ebmer result's accuracy was bluntened as they didn't restrict the wage sample to the manufacturing sector where many of the women were concentrated and the gender wage gap was often largest. Lastly, Seguino criticised the dataset used by Schober and Winter-Ebmer since much of the data on the wage gap was taken from human capital regressions and many of these include variables that are "themselves products of discriminatory processes (such as the share of females in an industry) so that their inclusion reduces the extent to which wage gap data capture discrimination" (Seguino, S. (2011)).

**Empirical Study**

**Hypothesis**

This study aims to characterise the effect of gender inequality on economic growth. This study will attempt to further analyse changes in the relationship across different geographic regions and income levels. Namely, East Asia and Pacific, South Asia, Latin America and Caribbean, Middle East and North Africa, Europe and Central Asia and Sub-Saharan Africa. These geographic locations are then further split into low(GNI per capita of <$1,085), lower middle (GNI per capita of $1,086 to $4,255), upper middle(GNI per capita of $4,256 to $13,205), and

high income (GNI per capita of >$13,206) economies to observe the changing effect as economies develop.

**Methodology**

This study used panel data acquired from The World Bank to conduct several different regressions with a variety of methods. Initially using multiple linear regression then panel estimation investigating fixed effects, random effects and the Huasman test. Results are then further analysed by restricting the regression to individual income levels and geographic regions. The robust command in Stata is used to reduce the influence of outliers in the data set. Robustness checks for endogeneity are then performed. Endogeneity occurs when the explanatory variables are correlated with the error term.

The linear regression takes the form below.

$$Y_i = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \gamma_1 Z_1 + \gamma_2 Z_2 + \gamma_2 Z_3 + \gamma_2 Z_4 + \epsilon_k$$

Where $X_i$ indicates the independent variables. $Z_c$ is the control variables and $\epsilon_k$ is the error term.

$Y_i$ - GDP in current USD

$X_1$ - School enrolment, primary, female (% gross)

$X_2$ - Secondary education, general pupils (% female)

$X_3$ - The women business and the law index

$X_4$ - Fertility rate total birth per woman

$Z_1$ - Foreign direct investment, net inflows (BoP, current US$)

$Z_2$ - Official development assistance received per capita in current USD

$Z_3$ - Population growth as an annual percentage

$Z_4$ - Adjusted savings: energy depletion (current US$)

**Data**

The data used was acquired through The World Bank development indicators, open data resource on STATA, (Azevedo, J.P. (2011)). The data ranges from 1970-2019, this was the maximum range for an adequate number of observations globally. Data taken from the world

bank development indicators originates from a variety of sources, but it is generally reliable (sources are indicated in the references for the data). Any quotations in the Choice of variables section are taken from the World Bank's information on its indicators.

**Choice of variables**

First, a broad point about the choice of variables for the linear regression. In light of the endogeneity concerns and the necessary assumption required for a regression discussed in the methodology, this study should be viewed as evidence rather than causal proof. This reality influenced the choice of variables, since the study attempts to generalise the relationships across countries and income levels and collect as much evidence as possible, the variables have been chosen for their pervasiveness in the years of studies, 1970-2020 to maximise the number of observations in the regression. Rather than the precision to which the variables represent their theoretical link.

The dependent variable of the regression, intended to represent economic growth, is GDP in current USD. GDP "measures the monetary value of final goods and services—that is, those that are bought by the final user—produced in a country in a given period of time (say a quarter or a year). It counts all of the output generated within the borders of a country"(The World Bank, World Development Indicators (2012)). Moreover data on GDP is prolific within the boundaries of the study. As such GDP is an obvious choice for the dependent variable. In choosing between GNI and GDP the choice was decided since GNI includes money made on foreign investments and is therefore less likely to be affected by changes in local inequality. There is a strong argument for GDP per capita as a dependent variable, since this is a superior representative of living standards than GDP alone, however this study is intended to target economic growth, defined as, an increase in the quantity and quality of economic goods a society produces and consumes: therefore real GDP is the better indicator.

The explanatory variables chosen to represent gender inequality are; the percentage of female general pupils in secondary education; women business and the law index and the total fertility rate in births per woman.

The first two variables were chosen to encapsulate the education factor of inequality, across basic education. Firstly, School enrollment, primary, female (% gross)(The World Bank, World Development Indicators (2012)). This is the ratio of total enrollment to the wider population of an age relevant to primary school education. The inclusion of this variable is due to it adequately describing how many females are in primary education, and therefore learning basic skills like reading, writing and mathematics, compared to the wider population. Moreover, the variable is widely available in the relevant years. School enrollment, primary, female (% gross) has, however, several drawbacks as a variable to represent female education. Enrollment indicators do not necessarily accurately describe the actual attendance throughout the year, if someone were to drop out after the first class this statistic would read the same as if they had not missed a class. Moreover, the statistic does not take into account gender differences in the curriculum, it

assumes that men and women attend the same classes. Furthermore, a high enrollment ratio could indicate repetition or late entry instead of an efficient, effective education system.

Secondary education, general pupils (% female)(The World Bank, World Development Indicators (2012)) is included to quantify the effect of education beyond basic numeracy and literacy. Secondary general pupils is the number of secondary students in general education programs, this describes the gender composition of enrollment. It is theorised that there is a diminishing returns relationship to education (Dollar, D. and Gatti, R. (1999); World Bank (2001); Knowles, S., Lorgelly, P. K. and Owen, P. D. (2002)). Note that the variable is limited in assessing gender inequality since it is affected by the gender composition of the population. This effect should not be too significant as where there are wide sex imbalances it is likely due to a high migrant population consisting largely of men seeking employment. It is assumed that migrants form an insignificant percentage of those who attend secondary school.

The women business and the law index (WBL index)(The World Bank, World Development Indicators (2012)) is a composite variable from the world bank. The index is intended to describe the economic opportunity available to women and how the law affects those opportunities. The WBL index is a score out of a hundred, calculated by taking the average score across eight indexes; Mobility, Workplace, Pay, Marriage, Parenthood, Entrepreneurship, Assets and Pension. The data used to estimate the score is taken from standardised questionnaires to ensure comparability across economies. This study attempts to describe the wage and labour force participation aspects of economic inequality using the WBL index. As the world bank states on their development indicator website, “better performance in the areas measured by the Women, Business and the Law index is associated with more women in the labour force and with higher income and improved development outcomes”. The WBL index has limitations. In order to ensure comparability across economies assumptions have to be made, meaning that all particularities and restrictions are not necessarily included. For example, it is assumed that the woman works in the central business city of the economy, in some economies laws can vary across provinces, hence such restrictions are not found. Also, the data only examines laws in the private sector. The data assumes enforcement, the extent to which laws are followed is not measured. Finally, it is assumed that the laws measured apply to all women in the same way, unaffected by ethnicity, disability etcetera.

Finally, intended in conjunction with the WBL index to measure labour force participation and wage inequality, fertility rate in total birth per woman. As described on the world bank development indicator website, “Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year”.The fertility rate has been shown to be correlated with both labour force participation and wage rates for women Bernhardt, E. M. (1993). The total fertility rate is limited in its capability to describe gender inequality, as its effect is largely indirect. A high fertility rate is associated with wage inequality, education inequality and inequality in labour force participation( Hiller (2014), Murphy, S., Belmonte, W., Nelson, J. (2009), Klasen, S. (1999)).

The control variables chosen are significantly limited since many of the development indicators are given as a percentage of GDP, therefore a source of endogeneity.

For a control variable this study uses foreign direct investment, net inflows (BoP, current US$)(The World Bank, World Development Indicators (2012)). This is the sum of equity capital, reinvestment of earnings and other capital. It's included as a control variable since foreign investments are likely to influence changes in GDP significantly, especially in less developed nations. Hence, changes in GDP unassociated to gender inequality have to be controlled for. The inclusion foreign direct investment as a control variable is not without debate, as according to Seguino, in many countries there is a correlation between gender inequality and foreign investment. Particularly in East Asia. Hence, by controlling for it one limits the accuracy of the estimation of the effect of gender inequality. However, this study includes it since the positive correlation between inequality and foreign investment is only debatably present in a small number of counties in specific time periods, across the data set it is likely to be insignificant.

Next, net official development assistance received per capita in current USD(The World Bank, World Development Indicators (2012)). This consists of loans and grants made by official agencies to promote economic development and welfare. It is calculated by dividing net ODA by the mid year population estimate. This is included as a control variable since for less developed nations a component of change in GDP is certainly influenced by development assistance. Were development assistance to increase or change during the time gender inequalities are changing, without controlling for official development assistance one would expect the effect of change in equality to include a factor of changing development assistance. Furthermore, the variable is included as a proxy for wars, natural disasters and other GDP shocks. This is based on the assumption that after a shock of this form ODA will increase. The data does not include information on loans given from recipient countries to other recipient countries, nor does it distinguish on the types of aid.

Population growth as an annual percentage is included as a control variable."Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage . Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship"(The World Bank, World Development Indicators (2012). Population growth (annual %)). It is a stylised fact that population growth is an engine for economic growth. The more workers the greater the production capability of the economy. Population growth also helps control for natural disasters and famine. It functions as a representative for the health of the population. The assumption being healthy populations grow.

Finally adjusted savings: energy depletion (current US$). "Energy depletion is the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years). It covers coal, crude oil, and natural gas"(The World Bank, World Development Indicators (2012)). This is included to control growth at the expense of natural resources. Natural resources have significant economic weight in terms of the amount of GDP they provide. Therefore it is important to control for depletion since one would expect the ratio to increase with GDP as

natural resources are depleted faster. Therefore including adjusted savings: energy depletion (current US$) accounts is important as a control so as not to by chance falsely attribute change in gender inequality with change in GDP.

**Results**

Table 1. Linear Regression. R squared value = 0.8697

| Dependent variable - GDP (current USD) | Coefficient | Robust standard error | t | P>\|t\| |
|---|---|---|---|---|
| School enrollment, primary, female (% gross) | 1.77e+08 | 6.14e+07 | 2.88 | 0.004 |
| Secondary education, general pupils (% female) | -1.01e+09 | 2.91e+08 | -3.46 | 0.001 |
| Total fertility rate in births per woman | -8.63e+09 | 2.86e+09 | -3.02 | 0.003 |
| Women Business and the Law index | -1.15e+09 | 2.96e+08 | -3.90 | 0.000 |
| Population Growth | 1.73e+09 | 1.11e+09 | 1.55 | 0.121 |
| Foreign direct investment, net inflows (BoP, current US$) | 41.32967 | 4.512835 | 9.16 | 0.000 |
| Adjusted savings: energy depletion (current US$) | -7.227889 | 4.253554 | -1.70 | 0.089 |
| Net official development assistance received per capita in current USD | -1.03e+08 | 2.51e+07 | -4.12 | 0.000 |
| Cons | 1.46e+11 | 2.98e+10 | 4.91 | 0.000 |

Table 1 shows the results of the initial linear regression, without controlling for the income or regional differences. It is the most general regression aimed to show the general relationship. With 3,827 observations, the R-squared value tells us that approximately 87% of variation in GDP can be explained by the variables in the regression. This regression and the following all utilise the robust command in order to account for potential outliers in the data without skewing the data unintentionally by deleting large swathes. The F and Prob > F values show that the explanatory variables reliably predict the dependent variable, GDP. The root mean square error (MSE), 2.0e11 can be interpreted as the variance of the residuals of the model. The Y intercept given by the regression is 1.46e+11, the value of GDP when all the variables are 0.

**The coefficients and reconciliation with literature**

The P values indicate that the explanatory variables of Table 1 are all statistically significant. Therefore there is sufficient evidence to conclude that a non- zero correlation exists for all explanatory variables.

The regression in Table one indicates, as expected from the theory above, a positive relationship between School enrollment, primary, female (% gross) and GDP, all other variables held constant. The general theory is that this positive relationship will be largely present across income levels and geographic regions(Dollar, D. and Gatti, R. (1999), Klasen, S. (1999)., Yumusak, I. G., Bilen, M., & Ates, H. (2013)). Interestingly, Table 2 below contradicts this theory. When isolated to Sub Saharan Africa the same regression gives a negative value for the coefficient between School enrollment, primary, female (% gross) and GDP (current US$). When further restricted to lower middle and low income countries in Sub Saharan Africa, the coefficient decreases further. This pattern is replicated when applying the same restriction to all regions, or the p value increases to the point of rendering the coefficient statistically insignificant. This data implies that for lower income countries one can expect negative change in GDP with a positive change in percentage points of female primary school enrollment rate, or no change whatsoever. One can speculate that in lower income countries the economy is closer in structure to an agricultural economy, therefore in accordance with the feminization U-hypothesis, school enrollment implies less labour force participation which is inefficient in an agricultural economy.

Table 2

| **Region** | **Coefficient: School enrollment, primary, female (% gross)** |
|---|---|
| East Asia and Pacific | 1.08e+09 (p-value under 0.05) |
| South Asia | Rejected |
| Sub Saharan Africa | -1.12e+08 (p-value under 0.05) |
| Europe and Central Asia | Rejected |
| Middle East and North Africa | 6.14e+08 (p-value under 0.05) |
| Latin America and Caribbean | 6.36e+08 (p-value under 0.05) |

The linear regression in Table 1 shows a negative coefficient for secondary education, general pupils (% female) for the correlation with GDP. The negative relationship is maintained when the regression is isolated to each region. This difference to the primary school can potentially be explained by diminishing returns. The basic skills acquired in primary school such as literacy and numeracy are more economically valuable than those skills acquired in further schooling. Furthermore, the measurement is given as percentage female, thus one would expect a similar theoretical inefficiency if the percentage point were to rise above 50% (the theoretical split of the population being 50% female and 50% male) leading to a theoretical negative relationship with increasing percentage points. Indeed in Graph 1, observe that high values of GDP become much denser around 50%.

Graph 1

The negative relationship between secondary education and GDP is maintained when the regression is isolated to all of the regional variables. However, the sign changes when isolated to low income countries. See Table 3 below. This result is unexpected since it is the opposite case to that of primary school enrollment. One can theorise that this is due to an introduced bias. By reducing the countries to lower income one decreases the density of countries above 50% secondary school enrollment far more than below, compare Graph 1 to Graph 2. There is also a possibility that specifically in low income countries there is a greater endogeneity issue. Lower income economies tend to have more of an agricultural structure. Plausibly, secondary school enrollment rate (%female) is significantly correlated with the agricultural output and hence, overall wellbeing. Simply, in good times families can afford to educate women and men yet when times are hard only the men are educated as women are needed at home and the man is perceived as the provider so he is educated. One would expect this pattern to be particularly evident in countries that are more patriarchal in structure. This is the case, if the regression is again constricted further to the top ten most patriarchal by the Global Gender Gap Report (2020) of the previous low income countries, the coefficient again increases to 4.43e+08, still statistically significant. This is further evidence of an endogeneity issue.

An endogeneity issue in low income is not the only interpretation for this pattern of data. In accordance with the theory established above one would expect a positive relationship between GDP and secondary school education. This seems to be the case for only low income countries and particularly those that are unequal. Perhaps this is evidence of the limitations of the variable, Secondary education, general pupils (% female). It is only effective as a measure of inequality when there is inequality present (It should be noted that the lowest income countries are often the most unequal). Indeed there are possible explanations for an unequal split in general pupils in secondary education that don't involve inequality. Such as the overall population being uneven, which could be due to factors like war or immigration. In such circumstances the variable no longer represents inequality but rather those alternate factors. However if one conducts the original regression again, this time limiting to the 86 most unequal countries in the sample, ordered by world population review . The coefficient for secondary education is still negative, -1.60e+09 (statistically significant). Indicating that the likely explanation is endogeneity.

Table 3

| **Income level** | **Coefficient : Secondary education, general pupils (% female)** |
|---|---|
| High | -6.18e+09 (p-value under 0.05) |
| Low | 3.15e+08 (p-value under 0.05) |
| Lower Middle | -1.32e+09 (p-value under 0.05) |
| Upper middle | -2.79e+09 (p-value under 0.05) |

Graph 2

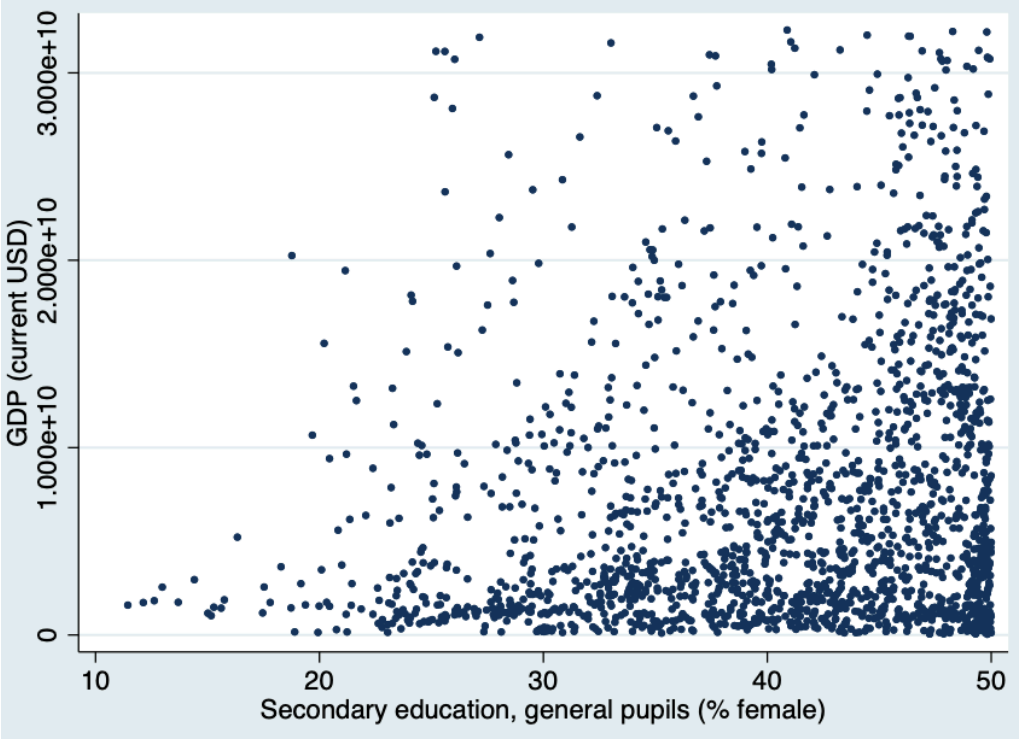
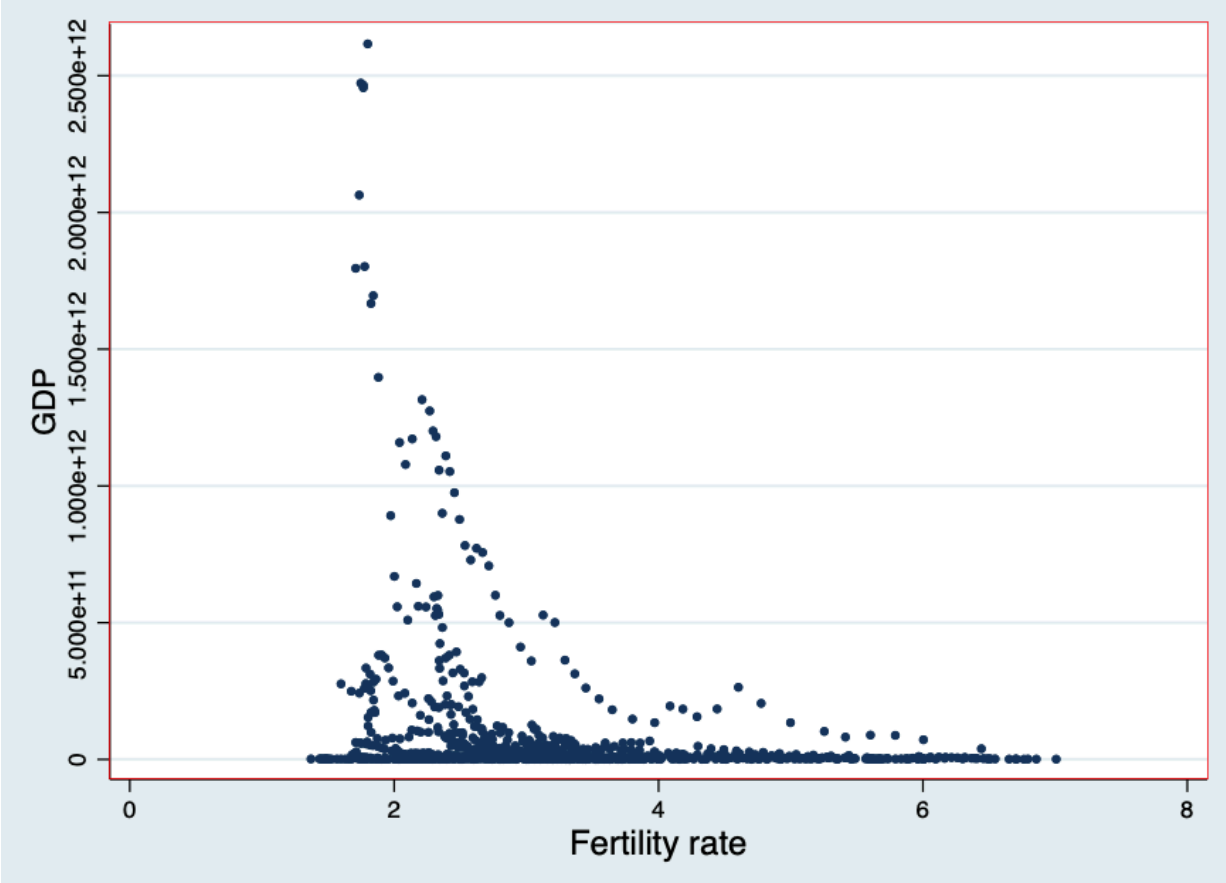



Table 1 shows a negative relationship with GDP for the Women Business and the Law index. This runs against the theory contained in the literature review. The index is intended to measure how laws and regulations affect women's economic opportunity. Perhaps, the reason the relationship isn't as expected, rather its negative, is because laws and regulations are an ineffective measure for women's economic opportunity since the variable does not take into account whether laws are enforced. Moreover, the absence of discriminatory laws may not reflect the presence of equality, rather inequality is perpetuated by cultural, social forces that don't manifest legally. In addition, legislation may be caused by the perception of inequality, so legislation may be positively correlated with inequality. When the regression is limited to Latin America and Caribbean, Sub-Saharan Africa or South Asia the sign of the coefficient changes.

However, there is no discernable income pattern, when constricted by income levels rather than geographic regions the sign remains the same. Furthermore, when the three geographic regions are considered together the sign of the Women Business and the Law index is negative. Suggesting that the positive sign change is more due to the sample changing to a pattern that appears positive than an economic relationship changing with the region.

Table 1 shows a negative relationship with GDP for Fertility rate, total (births per woman) which aligns with the theory discussed above. This negative relationship is maintained when the regression is isolated to all different incomes and regions, yet the negative relationship switches to positive when isolated to Latin America and the Caribbean. There is little discernible reason for this since the relationship appears clearly negative when solely GDP and Fertility rate are plotted against each other see Graph 3 below. This unexpected result is analysed below in the wrong sign section of the robustness check. Decreased Fertility rate is strongly correlated with decreased child mortality rate, a high child mortality rate is associated with less developed countries, this is a source of endogeneity. Births per woman is also strongly negatively correlated with income per person. This aligns with theory as in countries where income is higher,  the cost of having children is also higher, therefore there is reverse causality.

Graph 3



**Robustness, limitations, challenges.**

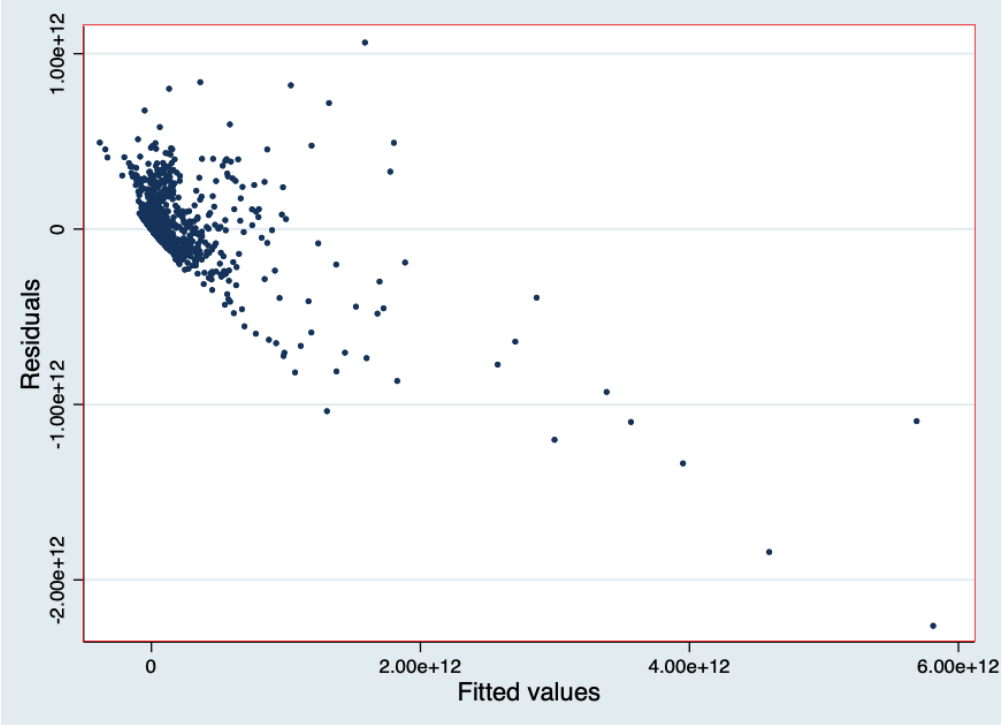
There are five key assumptions to multivariable regression namely; linearity, homoskedasticity, independence of errors, normality of errors  and independence of explanatory variables.

The linearity assumption is that there is a linear relationship between each of the explanatory variables and the dependent variable. Implying that a change in the explanatory variable always has the same effect on the dependent variable regardless of where the change occurs on the range of the explanatory variable. It is necessary to assume the linearity of the relationship to conduct a simple linear regression. However, the relationship between any of the explanatory variables and GDP is not linear. All of the variables are complex and have varied, nuanced relationships with GDP individually, subject to exceptions and outliers. This significantly impacts the model's ability to make predictions, and the coefficients are likely biassed. However the key focus of this study is the sign of the coefficient rather than the number itself. In this way the results still maintain some significance. This approach is often used in the previous literature where OLS regression is very common (Knowles et al. (2002), Brummet (2008), Gaddis and Klasen (2012).

The assumption of homoscedasticity is that variance of the error term or residual in the regression is constant, or unchanging. This assumption fails in the regressions since there is a clear correlation to the residuals when plotted against the fitted value of the regression, see Graph 4. Graph 4 shows residuals plotted against fitted values, observe that the regression is a far better predictor close to 0 for GDP than it is for high values. At low values of GDP the same plot shows a negative relationship between the fitted value and residuals - see Graph 4. This bias is present throughout the study as the regression is limited to income levels and geographic regions. This relationship between the residuals and the predicted values is likely due to two reasons, firstly the explanatory variables perform better as indicators closer to 0. For high values of GDP, the components of GDP are often more complex and diverse and the simple variables used are less effective predictors. For example, components of GDP are more complicated in the UK opposed to an agricultural society. Second, the linear model is a better fit closer to 0, for example for a diminishing return relationship the linear model is a good fit for the initial section of the curve. This pattern also leads to the violation of the third and fourth assumptions, namely, independence of error and normality of error.

Graph 4


Graph 4 (zoomed in)



Independence of explanatory variables: this assumption relates directly to endogeneity. In a linear regression, an explanatory variable should not be directly affected by variation in any other variable in the regression. This is the case, there are no direct causal relationships between any of the explanatory variables and the other variables in the regression. Despite the violation of several assumptions the simple linear regression model is still useful. Rather than attempting to make a future prediction or accurately quantify the percentage points lost in GDP growth because of inequality, this study attempts to provide strong evidence that gender inequality is inefficient for the economy. In this manner simple linear regression is adequate.

The regression results do not change significantly when omitting individual variables, indicating some degree of robustness. I was particularly concerned with the control variable, net official development assistance received (ODA). The reason for this was the intuition that those countries that receive development assistance, particularly from Western societies, may accept some Western influence, applying pressure for greater gender equality. In that manner the explanatory variables may be correlated with ODA. A source of endogeneity. However upon closer examination, the regression coefficients do not appear to change significantly when ODA is removed from the regression. See Table 5 below. Thus tentatively ODA is not a source of endogeneity.

**Table 5**

| **Regression Variables** | **Coefficient with ODA** | **Coefficient without ODA** |
|---|---|---|
| School enrollment, primary, female (% gross) | -6.96e+07 (p-value under 0.05) | -7.64e+07 (p-value under 0.05) |
| Secondary education, general pupils (% female) | 4.28e+08 (p-value under 0.05) | 4.14e+08 (p-value under 0.05) |
| Total fertility rate in births per woman | -3.22e+09 (p-value under 0.05) | -3.40e+09 (p-value under 0.05) |
| Women Business and the Law index | -1.54e+08 (p-value under 0.05) | -1.72e+08 (p-value under 0.05) |
| Population Growth | 1.34e+09 (rejected) | 1.04e+09 (rejected) |
| Foreign direct investment, net inflows (BoP, current US$) | 17.18723 (p-value under 0.05) | 17.28372 (p-value under 0.05) |
| Adjusted savings: energy depletion (current US$) | 14.75747 (rejected) | 14.88493 (rejected) |

**Overfitting**

Overfitting is a common problem econometricians deal with when conducting regressions. The problem of overfitting occurs when the regression begins to describe the random error rather than the relationship between the explanatory variables and the dependent variable. This issue is relevant once the regression is limited to specific geographic locations or income levels, since the number of observations significantly decreases. However, again, the key focus of the regression is largely on the sign associated with the coefficient assigned to an explanatory variable, rather than the precise number. In this way some degree of overfitting is not significant as the overall trend of the relationship will remain the same.

**Hausmann test.**

The Hausman test on the fixed and random effects regression has a P-value of 0.0000, hence the fixed effects model is appropriate.

**Limitations:**

The regression is limited. The study suffers from all the methodological problems mentioned in the methodology review. For example, the linear regression method assumes that structural differences are unimportant in the growth process. The ability that the explanatory variables have to highlight inequality is dependent on location and circumstance. Inequality does not manifest in a consistent manner. There are numerous examples of this given in the literature review. For example, Menon, Nidhiya & Rodgers, Yana (2009) and Black and Brainerd (2004). Thus, consistent variables to measure inequality are flawed. This apparent volatility in the relationship between gender inequality and economic growth across countries also raises an issue of omitted variable bias. Since the relationship changes one can expect there to be omitted variables that are relevant to specific countries. The study also has its unique problems. The study may be overambitious, in including many different countries and income ranges the meaning behind the variables is blurred. Since, in one instance a low number in school enrollment, primary, female (% gross) can imply inequality yet in another it is a result of a skewed population. In this way precise interpretation of results becomes difficult.

Furthermore, there is a significant endogeneity problem. The most obvious source is reverse causality, economic growth often has an effect on gender inequality. There are numerous mechanisms by which this can take place. For example, economic growth can lead to an expansion of women's economic opportunities relative to men, and with better opportunities comes better bargaining power. Indirectly, expansion increases the openness of the economy, increasing competition, thus increasing the costs to employers of inefficient hiring. Furthermore, increased growth may allow greater spending on education and hence greater acceptance of liberal Western ideas about the desirability of gender equality. Finally increased growth can simply mean the government has the means to enforce laws on gender inequality (Kabeer, N., Natali L. (2013)). To address this endogeneity problem techniques such as instrumental variable

regression, or GMM regression should be used with suitable instrumental variables as described in the methodology review section.

**Policy implications:**

Firstly, this study combined with the results from the literature review suggest that there is a strong case for investing in gender inequality, particularly in low income areas. Investing in gender inequality via the pathways of increasing women's bargaining power in the home, introducing more competition to the workplace, and more efficient utilisation of available human resources most likely leads to economic growth. However, policies must reflect the particular location in which they're implemented. This study and others show that policies have to be made to local circumstances to be maximally efficient. For example, the priority may be to increase women in education in order to increase the average talent in the workplace. Yet in other circumstances the priority could be to give women more financial authority in order to foster growth in the next generation. This variation in priority reflects the changing coefficients in the study. Moreover, my analysis suggests that policy must focus on affecting social rather than legal change for significant effects.

Whilst maximising growth, macroeconomic policies must also be accompanied with measures to account for discriminatory effects created (Kabeer, N., Natali L. (2013)). Such as affirmative action to ensure all benefit from policy or indirect measures such as low interest investment loans. This study and others have highlighted the importance of equality, particularly in education and labour force participation. However, unaccounted for in these studies is women's unpaid reproductive, and domestic work. Often with change in education and labour force participation there is little change in redistribution of the aforementioned unpaid work. This causes women to be attracted to roles in which they can perform both roles. Policy needs to address the redistribution of unpaid work if it is to address gender inequality.

Finally, policy needs to address moral problems, not just economic growth. Equality is a moral imperative and all the studies discussed find evidence of gender inequality .

**Conclusion:**

In summary, the study found little evidence for a consistent relationship between economic growth and gender inequality across a spectrum of income levels and geographic regions. The study found significant evidence, via the fertility rate coefficient, in favour of the feminisation U-Hypothesis, particularly the initial section of the curve. For lower income countries one can expect a negative change in GDP with a positive change in female primary school enrollment rate. However, almost the exact opposite occurs when examining the secondary school enrollment rate. The relationship is positive when the regression is isolated to low income countries. To reconcile these apparently contradictory results this study suggests that secondary school enrollment (%female) as well as a facet of inequality is a proxy for the economic stability of a region. Which isn't the case for primary school enrollment since that is viewed as an essential. There is little to conclude on WBL index since results had little discernible pattern,

from this one can speculate that the legal changes in inequality do not have significant impact on inequality experienced by women, rather change has to be more social. Fertility rate in births per woman is consistently associated with negative growth. This is inline with the literature. However it is likely that the effect of fertility rate on economic growth is not direct, rather a high fertility rate is a hallmark of an economic system that relies on women for reproductive unpaid work, and it is the absence of women from the labour market that induces the negative relationship. Together, the results of this study are mixed in their support of established theory. This study cannot simply characterise gender inequality as negative or positive for economic growth, however, the results suggest that a country's income is more consequential on the relationship between gender inequality and economic growth than that geographic and therefore cultural factors.

Future studies may benefit from a significantly narrowed approach; a focus on an individual country or even region is necessary in order to make specific policy recommendations. Furthermore, a focus on per capita economic growth would perhaps yield more convincing results since much of the effect of gender inequality described in the literature focuses on welfare. Finally, equality is not only an economic imperative, it is a moral imperative. Perhaps in this vein future studies should consider measures of happiness as an indicator of development, rather than GDP.

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