Women: An Under Utilized Formal Economic Resource

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Introduction:

Robert Barro wrote an article in 1991 and later a book in 1997 that shows educating women is bad for the economics of developing countries. Researchers from various fields have been trying to understand this phenomenon since; however, a satisfactory explanation has not been reached. Academics have tackled this problem from many different angles, arguing against the methodology and the data time period among others (Klasen 2002, Becker 1993). In all of the different paths they have taken, the results seem to prove robust and there are some explanations for this occurrence. It could be that women’s status in society is to blame, how they use their education, their time out of the job market for children or other responsibilities, and many other reasons that women may not be able to contribute to the economy the way men do. It is clear that there is a missing variable that causes women’s education to be shown as a disadvantage to economic growth, while male education clearly improves it. Many of the current attempts to reverse these results have major methodological problems, like multicollinearity and most studies include fertility exacerbating the problem. This would be a good idea because we know that fertility increases growth per capita and we know that education leads to decreased fertility. The problem with adding this and other variables like it is that it is highly correlated with both the other independent variables. I find that by considering political capacity, female labor participation and government type you can flip the sign and have a small level of significance; However, if you add fertility back into the equation the effects of education on growth lose their significance. This supports the claim that fertility is a main culprit in the gap between males and females human capital effects on development. These are crucial finding for policy initiation. Instead of a country determining that it should not waist resources on education it can determine what needs to be done to utilize the benefits of educating women. More work needs to be done in this field but this new direction could be crucial for female education attainment in the developing and Least developed world.

Literature review:

There is a great body of literature on female education and its benefits in many fields, including economics, international political economy (IPE), global politics, political demography, and significantly in the feminist field. I will be focusing on research in the IPE and global politics fields.

Female education has many benefits, including decreasing fertility, increasing overall education, lower infant and maternal mortality, higher life expectancy, and increased quality of life (King & Hill 2005, Knowles, Lorgelly & Owen 2002,IIASA 2008, Klasen 2002).

It is clear through Barro, as well as other research, that the more educated women become the fewer children they have (Klasen 2002). First off, women who spend more time in school have less time to bear children. The child bearing period is moved back as women continue their education through secondary and tertiary education, and even more so if they choose to postpone children until they are settled in their career. Also, as women become more educated society advances and mortality rates decline, causing less need to have multiple children. The need to generate more income is also not necessary as educated women increase the household income. In other words, families will not have children for agricultural labor or in order to put them to work for family income, because women will be providing that income. The quality of life associated with educated women also means there is less need to have multiple children as security for old age or retirement care. Fewer children mean’s clear GDP per capita growth, simply because less people allows for more money to go around.

It has been shown by King and Hill that as women become educated they are more likely to educate their children as well. Therefore, if female education is increased in this generation, then all education will increase in the future regardless of political support or assistance. It is clear in economic literature (Barrow, 1991, 1997) that increases in human capital such as education will give dividends to economic growth.

Female education has also been known to increase health and quality of life (Hill & King 2005). As women are more educated they are better able to seek a doctor or other professional help from child birth to sickness. This has decreased the mortality rate for children and mothers as well as improving life expectancy. Education makes women more aware of nutrition, hand washing and other general preventions such as boiling water that improve life expectancy. These improvements may not only benefit the economic growth of a country, but also improve the quality of life in that country.

Although it is proven that all of these benefits are likely improved through female education, this does not change the results that direct education is not beneficial to development. There is a variable that is preventing these results from translating to growth, yet there are still others who argue a direct correlation between female education and economic growth. Psacharopoulos (1984, 1994), Kreuger and Lindahl (2000) and the World Bank including Dollar And Gatti’s article attempt to prove that there are direct economic returns on educating the female population. While these results show us that there are benefits in developed countries, it is still robust that there is a negative and significant relationship between female education and economic growth; Dollar and Gatti even show a $2,000 per capita threshold where those below this income will not benefit from educating women, and those above it will. This does assist us further by determining that the X variable that is causing a negative relationship is found in those countries that are below the $2,000 range; more so than in those that are above this threshold.

Stephan Klasen argues that Dollar and Gatti as well as Barro find results supporting developed countries only because they have multicollinearity issues and they provide no fix for this problem. He also argues that Dollar and Gatti’s measure for secondary education is not sufficient. Klasen attempts to fix these issues and finds that female education is most beneficial for economic growth in Sub-Sahara Africa and other less developed countries. Becker provides additional arguments against the Barro findings, arguing that his data does not consider women’s increased entrance into the workforces since the 1980 and 1990’s and today women would be even more prevalent in the workforce. This would be particularly true since the most recent recession between 2006 and now when women increased as heads of household (Mendelson 2010).

Measures:

All of my variables, except my political capacity measures and my dummy variables, are from the World Bank’s World Development Index (WDI). Relative Political Reach (RPR) and Relative Political Extraction (RPE) are both from Kugler et al. The Organization for Economic Co-operation and Development (OECD) dummy was determined by the OECD website of members and their initiation date. The democracy dummy is derived from Polity IV, but I changed all positive numbers to a 1 and all negative numbers to a 0 to take it off the scale and make it a dummy instead.

My dependent variables are GDP per capita growth and total life expectancy which are both used to measure development. GDP is a common measure of growth and development and using per capita growth allows me to control for population. Life expectancy is used because it is also a measure of development but can take into account the unreported benefits of educating women. It is argued that women participate in the black market and unpaid labor force, and this does not allow GDP to capture their development contributions. This is a common measure in Political Demography. As mentioned above both of these measures are taken from the World Bank WDI. GDP per capita growth is the percentage annual GDP per capita growth rate for each country in the study and life expectancy is in number of years determined at birth.

The independent variables are female secondary education and female labor participation. I choose only secondary education because most women do not make it to tertiary education in developing or least developed nations. Secondary education has enough data and is the level of education that Barro argues is a hindrance to growing economies (1997). So I determine that to prevent multicollinearity between education levels, it is best to concentrate on secondary. I believe like Becker that some of the discrepancy that Barro finds in his results is that women were unable to enter the job market at the same rate or pay as men. This is most likely still the case in many developing countries. Secondary education is measured as female percentage of gross secondary school enrollment. This measure is lacking in that it does not determine if females graduate from secondary school, only that they enroll. If they drop out in the first year of secondary school then they will not have the opportunity to contribute at the rate that they would if they graduate. Female labor participation is measured as the female labor participation rate as a percentage of female population aged 15 and older. Again, this is the only measure available with enough data to run the models. This measure is also lacking because it does not take into account the women’s level of education, it simply measures out of the entire female population. It also would not consider females who have left the labor market at old age, because it only includes ages 15 and older.

I use fertility, OECD, democracy and two measures of political capacity, RPR and RPE as control variables. They are meant to capture political and economic measures that will determine if women have equal access to the job market. There are many other variables that could be used, but mine are meant to be unbiased and they do not run the risk of multicollinearity with female education. By unbiased, I mean they are not variables used to indicated inequality between the sexes. The current data available is not only biased, but does not focus on economic equality which is what I would need in this case.

 Fertility is measured as total births per women. I will discuss the disadvantages of this variable later in the paper. This measure is only used to determine if fertility could be the culprit and the gap between male and female education. We know that male education is significant and positively associated with growth (Barro 1991, 1997) and fertility could be the reason for the gap. Women that have children lose time in the job market, meaning they are not able to advance or they leave the workforce all together. Women also universally share a larger burden of the child bearing and house work (Elson 99). Children could be the time constraint that does not allow women to advance even if they do not take time off work for the child. The fact that women in developed countries have far less children at even a negative population growth rate (Haub 2012), could be the difference between developed and developing countries. While this measure is not the focus of my paper, it does allow me to shed light on the missing variable.

I have two dummy variables in the paper, an OECD dummy and a democracy dummy. The OECD variable was entered by hand using the data from the OECD website on what countries are members and which year they joined. It is a simple 1 for OECD member years and a 0 for nonmember years. The democracy dummy was determined by Polity IV. For each positive number on polity I put a 1, for each negative number in the polity variable I put a 0. This created a simple dummy for democracy instead of the scale that polity offers. These are simple control variables. OECD is used because Barro and other have found that developed countries have positive growth from female education (Dollar and Gatti 1999). In Yi Feng’s book, *Democracy, Governance, and Economic Performance*, he believes that democracies have better growth from human capital. This variable is used to determine if female education is more beneficial to growth in democracies as well.

My political capacity measures are from Kugler et al. I use both RPR and RPE. Together they are meant to measure the ability a government has to implement policy choices (Kugler et al. 2012). I find this measure to be quite useful in determining a government’s ability to gain from female labor force. If they can reach their population and extract from their population, then they have the ability to influence economic gender equality. They can allow women to be employed and influence female status in society. Just because they have the political capacity to influence does not mean that they will do it for the benefit of women. But the ability is still very important and a crucial measure in my model. For more information on how political capacity is measured see Kugler et al. 2012. Although relative political allocation could also be helpful in this paper, there is not enough data in this measure. I find RPR to be the most important measure in determining if a government is able to change female status in a society that could be effecting their economic growth.

Hypotheseis:

 Thus we get to the hypotheseis. I attempt to prove that female education is beneficial to growth given other opportunities are true, such as access to the labor force and high relative political capacity of the government.

*Hypothesis 1: Female human capital has the potential lead to development under the right circumstances*

*Hypothesis 2: Fertility is the main reason female education does not impact growth the way male’s education does.*

Although I spend the most time on hypothesis one, I do show that fertility has a negative impact on females education’s effect on growth. There are two crucial factors that change male and female human capital impacts. The first is the ability to enter the job market and the second is the ability to stay in that job market. Political capacity and labor force participation explain the ability to enter the job market and fertility is a reason women do not stay in the job market.

Method:

 My data includes 142 countries spanning 21 years, from 1990 to 2011. The countries that are omitted are because of the large gaps in the data available. This is also the reason for the years chosen and since female labor statistics were not available until 1990. I present three models in this paper and each are run using linear panel corrected standard errors regression. I run a basic linear model to replicate Barro’s model, but because my data is in panel format, it is not appropriate to run a simple OLS model as he does.

* Model 1: $gdppcgrow= β\_{0}+βsecondarygross\_{i}+βflarborpart\_{i}+βrpr\\_work\_{i}+βoecd\_{i}+βdemocracy\_{i}+ βrpe\\_gdp\_{i}+βsecondarygross\_{i} X βrpr\\_work\_{i}+E\_{i} $

My first model uses secondary education, female labor participation, RPR, OECD, democracy, and the interaction of secondary education with RPR to determine GDP per capita growth. This model will test my first hypothesis.

* Model 2:$ gdppcgrow= β\_{0}+βsecondarygross\_{i}+βflarborpart\_{i}+βrpr\\_work\_{i}+βoecd\_{i}+βdemocracy\_{i}+ βrpe\\_gdp\_{i}+βsecondarygross\_{i} X βrpr\\_work\_{i}+βfertility\_{i}+E\_{i}$

My second model is the same as the first but includes fertility. This model is to show the negative effects that fertility has on the relationship between female education and growth, it addresses my second hypothesis.

* Model 3: $totlifeexp= β\_{0}+βsecondarygross\_{i}+βflarborpart\_{i}+βrpr\\_work\_{i}+βoecd\_{i}+βdemocracy\_{i}+ βrpe\\_gdp\_{i}+βsecondarygross\_{i} X βrpr\\_work\_{i}+E\_{i}$

The third model is a reinforcement of hypothesis one. It is similar to model 1 but the dependent variable is total life expectancy. This model is to show the results of female education on other measures of development.

 There are some problems with these models as there are with all, but they are much better than the current literature in that they are not biased toward certain gender statistics and they get closer to explaining female education’s relationship with development. One of the strongest features for them verses the current literature is that they do not have major multicollinearity problems. As you can see in figure 1, none of my independent variables in model 1 or 3 are strongly correlated. Fertility as we know is strongly correlated with secondary education and I will discuss this further in the results section.



 Figure 1

Results:

Figure 2 shows the results of my models revealing that secondary education is positive and significant. The Z statistic for the variable is on the threshold at 2.00, but the results are still very satisfactory. I am also satisfied with the female labor participation being positive as well. It is only significant at the .10 level, but the sign is in the right direction. I am a bit surprised by OECD being negative and significant, but when you consider that countries at that level of development often have very slow growth, it makes more since. And in the time period that we are covering there have been at least three world recessions, one in the 1990s and two in the 2000s which explains the variables’ sign.

 In model 2, secondary education does not go negative as expected but it does lose its significance. It makes sense that female labor participation would still be positive and significant at the .10 level because regardless of fertility, when women are employed they are still contributing to growth. This model is hard to trust because there is a high correlation of almost .9 between female secondary education and fertility. Fertility is negative and highly significant, consistent with all of other findings since fewer births’ means more money per capita.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Model 1 GDP per capita growth  | Model 2GDP per capita growth | Model 3Total life expectancy |
| Secondarygross | .0630 \*\*(.018) | .002 (.015) | .123\*\*\*(.014) |
| Flaborpart | .0172\*(.009) | .017\*(.009) | -.126\*\*\*(.007) |
| Rpr\_work | .138(.850) | .850(.909) | -3.492\*\*\*(.846) |
| Oecd | -1.380\*\*\*(.382) | -1.25 \*\*\*(.368) | 2.500\*\*\*(.275) |
| Democracy | -.147(.269 | -.563\*\*\*(.266) | 1.586\*\*\*(.186) |
| Rpe\_gdp | -.145(.351) | -.582\*(.346) | -2.845\*\*\*(.436) |
| SecondarygrossX rpr\_work | -.023\*(.013) | -.029\*\*(.013) | .094\*\*\*(.009) |
| Fertil |  | -1.029\*\*\*(.153) |  |
| \_cons | 1.370(1.377) | 6.924\*\*\*(1.206) | 63.418\*\*\*(1.246) |
| R2  | .013 | .044 | .767 |
| # of obs | 1995 | 1995 | 2038 |

Figure 2: Regression results. \* indicates significance at the .1 level, \*\* indicates significance at the .05 level and \*\*\* indicates significance at the .01 level.

 In model 3, all of the independent variables are significant. Strangely, female labor participation is negative. For every unit increase in female labor participation there is a .13 year decrease in total life expectancy. This could be because of high female participation in the factory and labor jobs that have been exported to developing countries, but the results being so high and significant still seems out of place. OECD changes to positive which is consistent with the level of development that OECD countries have reached.

 My R squared values are extremely low; Although, they are relatively high considering my dependent variable is GDP per capita growth and I am only using a portion of human capital and a few political factors to explain it. When you consider that female secondary education and labor, government type, and political capacity are explaining just under 2% of the variance in per capita growth, it is actually quite remarkable. The second model includes fertility and the R squared more than doubles.

Conclusion:

Although there is still a significant amount of work to be done in this subject, we have reached a breakthrough in determining not only that political capacity is a significant variable in assisting female education in contributing to growth but also that fertility has a strong negative effect on the ability for female human capital to assist growth. We know that women are used in the informal sector significantly, but their impact in the formal sector seems to be diminished, as my title explains (Elson 1999). We now understand more of why that is. A study on how specifically fertility effects growth would be a good start from this point. Is it the share of child rearing or the time off for child birth? Could there be other factors that are associated with fertility that is leading to this phenomenon? Another avenue that could be taken is to determine what policies a country could implement to allow female human capital to contribute more to growth. Once a country has high political capacity, some solutions to could be to implement equal wage policies or affirmative action hiring policies to help women contribute at the rate of men.

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