# The Role of Religion in Determining Female Labor Force Participation Rates

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# Abstract

This paper looks at macro level data to measure the influence religion has played on female labor force participation (FLFP) rates between 1980 and 2005. It also attempts to find if this influence has changed over time. It then focuses specifically on African and post-communist nations as that is where some of the major religious changes have taken place in the last few decades. There is no clear pattern of an increasing or decreasing influence of religion on FLFP rates. Rather, different religions in different parts of the world affect FLFP in different ways. Finally, this paper looks specifically at Islamic and Catholic nations to see what variables have an effect on rising FLFP rates in those countries.


**Key Words:** female labor force participation, religion, culture, identity, Hausman-Taylor,

# Table of Contents

# 1. List of tables

# 2.    List of Figures

# 3.    Introduction

For a long time economists have studied gender inequality.  They have found that increasing gender equality in education decreases fertility and increase human capital, increasing economic growth (Dollar & Gatti, 1999; Klasen, 1999; Klasen & Lamanna, 2009). The effects of female labor force participation (FLFP) on development and growth has been less studied. However, Klasen & Lamanna (2009) have found that a lack of female participation in the labor force (which they use as a proxy for employment) hinders economic growth in ways similar to that of education inequality. They also find that as gender inequality in education has been decreasing over time, the gender gap in labor force participation will play a larger role in explaining growth differences between regions of the world. Young (1995) has found that a significant part of the East Asian miracle can be attributed to the entrance of women into the labor force.  Looking at data from India, Esteve-Volart (2004) found support for the idea that restricting women's access to employment, or certain types of employment such as managerial positions, lowers non-agricultural productivity and slows economic development. Excluding workers from the labor force or certain sectors of the labor force based on their gender does not allow the best individual to work at the job most suited for them.

Beyond the positive impacts that gender equality has on economic development the capabilities approach has much to say about gender equality (Nussbaum, 2003; Sen, 1999). This approach focuses on the freedoms people enjoy, or in other words, the capabilities to perform certain actions. For example, increasing the levels of female education gives women the capability to read. Likewise increasing FLFP allows women more capabilities. The ability of a woman to earn an income independent of a man allows a large degree of freedom and empowerment. Women have the capability to divorce or not marry in the first place along with being able to spend their income in a way which more closely matches their own utility not the utility of their husband. They have more bargaining power within the household unit.

In the last few decades economists have begun to focus more on the role that culture plays in economics. Clark, Ramsey, & Adler (1991) define cultural conditions as "the shared ways of thinking, believing, perceiving, and evaluating that define a group and that are transmitted from one generation to another" (p. 48). Culture manifests itself through identification with social categories such as religion.

It has become clear that different forms of culture, such as religion, have an influence on economic attitudes and decisions (Guiso, Sapienza & Zingales, 2003; Iannaccone, 1998).

Secularization theories have claimed that as modernization occurs and levels of development and education increase, religious belief and influence will decrease. However, Iannaccone (1998, 2003) argues that empirical results are mixed and vary from country to country. There is no clear pattern that emerges for all countries. Religious following has not decreased as modernization increased around the world. For example in the Middle East there has been a growth of fundamental Islam. There has also been a resurgence of religion in post-communist nations and South America has seen an increase of Protestantism.

This paper will show what effects different religions have on FLFP rates across the world. It will then see if these effects have changed over the last few decades. It may be that an increase in globalization has decreased the level that religion impacts FLFP rates. Even if secularization has not occurred in most of the world, the impact that religion has on economic decisions may have decreased or changed. Religion may no longer be an important factor in shaping the behavior of women with respect to the labor market.

The breakup of the Soviet Union has led to major changes in Eastern Europe and Central and Northern Asia. A number of countries have seen a transition from authoritarianism and state capitalism to democracy and a relatively free-market form of capitalism. At the same time there has been a religious resurgence in this part of the world. This paper looks more specifically at this part of the world to see what effects this transition has had on FLFP and if the religious resurgence has seen a growing effect on FLFP rates. Also, Orthodox Christianity is only represented by a single country when looking at data starting in 1980. Looking at data from 1995 onward for this part of the world allows a better view of what effects orthodox Christianity has on FLFP rates, as more countries are included in the sample.

I will also take a closer look at Africa. This is where much of the religious conversions have taken place in the last few decades. A number of countries have stopped being predominantly followers of traditional indigenous religions and have converted to Christianity or Islam. Because Christianity and Islam are relatively new in parts of this continent the effects they have on FLFP may change over time more drastically than the rest of the world.

Finally, some of the reasons as to why FLFP rates have increased in Catholic and Islamic countries over the last few decades, even though Islam and Catholicism both have a negative impact on FLFP rates will be presented.

# 4.    Economic Theory of Female Labor Force Participation

The simplest explanation for labor force participation is the income-leisure model. As described by Psacharopoulos & Tzannatos (1989), "the decision to work - and, if so, for how long - depends on the remuneration from work (wage rate), other (non-labor) income, and tastes" (p. 190). A higher wage rate has two opposing effects. A substitution effect, which makes the opportunity cost of not working more costly, and an income effect which allows workers the ability to take more time off from work. "Other income", an example of which may be the wages of a spouse, will make entering the labor force less attractive. Tastes are preferences that individuals hold when it comes to leisure or work.

In the 1960s Gary Becker (1965) and others expanded this simple income-leisure model to include household production. This new approach viewed households in a similar fashion to that of firms. Households allocate their resources to produce consumption goods. The consumption of these goods increases the utility of the members of the household. Whether or not to enter the labor force now depends on maximizing utility between the trade-offs of income, leisure and household production.

Specialization increases efficiency, so it would only make sense that individual members of a household would divide up the different tasks to maximize their total utility. This would create a division of labor, where one individual may focus on maximizing their income while the other focuses on household production. Even if the members of the household are identical in every way, specialization in the investment in human capital will create increasing returns for that household (Becker, 1985).

Throughout the world this household division of labor is largely based on gender, with women almost universally being responsible for household production while men focus on earning income. An argument can be made that human capital is responsible for some of this division; men, on average, are physically stronger and better suited for certain types of labor intensive work. However, as economic development progresses there is an increase in jobs where physical attributes are no longer important. Most jobs in the service industry can be used as an example. In these types of jobs there is no clear reason to divide labor based on gender.

A second explanation for the gender-based division of labor is different tastes held by different individuals. Some of these tastes may be intrinsic. People may be simply born to prefer one thing over another. However, social factors also play a role in developing tastes. In their seminal paper Akerlof and Kranton (2000) show how identifying with a social category and being identified with a social

category affects someone's tastes and behavior. They do this by including identity in the utility function. In this model, deviating from the actions acceptable to one's identity will lower utility. For example, say a woman belongs to a certain religion, and the women of that religion are expected to not take part in wage labor. By entering the labor force, this woman's utility will be negatively affected through her identification with that religion.

A second factor, which Akerlof and Kranton (2000) point out, is the effects of identity on others. If women take part in something that is considered a male activity, the identity of men will be threatened. This attack on their identity will lower men's utility; they feel less manly. So if taking part in wage labor is considered a male activity, men will have an incentive to pressure women to keep out of the labor force. This is similar to the idea that Goldin (1994) presents, where it is the husband who suffers from a social stigma if he allows his wife to work. The husband is labeled lazy or unable to provide for his family. The utility the household gains from the added income of the wife earning a wage is offset by the negative utility the husband receives from the attacks on his identity as a man.

Similarly, two individuals may identify as part of the same social category. If one violates the prescribed behavior of members of that social category, the other is likely to scorn and ostracize the first. In this way, if a working woman belongs to a religion whose followers say that women should not engage in wage labor, she faces possible social pressure not just from male co-workers but also from other men and women of her religion.

In focusing on identity, Akerlof and Kranton (2000) also point to two ways in which tastes and preferences can change. Firstly, to a certain extent individuals have a choice as to which groups to identify with. It is possible to change what religion one identifies with. It is also possible to change the style or intensity of one's religion. For example, individuals can choose to attend a more conservative or a more liberal church congregation without necessary changing their religion.

Secondly, notions of identity evolve. The prescribed behavior of a social category changes over time. An obvious influence on identity change, which Akerlof and Kranton (2000) mention, is advertising. Advertising promotes an image of what an ideal individual from a certain social category should be. Cigarette commercials show the ideal man and the characteristics he should hold. As people view these advertisements, what they identify as an ideal man or woman changes.

The decision to enter the labor force is then a utility maximizing choice based on income, leisure, household production and identity. Through an increase in trade, globalization has had an impact on the income. It has also led to an exchange of ideas. In the last few decades, immigration,

9

movies, satellite television and the Internet have all helped spread certain ideas around the world. Likewise globalization has led to a spread of certain values through global political organizations. Through these different factors of globalization religious identities may have evolved leading to changes in the acceptance of female labor participation.

## 5.     Literature Summary

FLFP rates depend on a number of factors, economic and non-economic. This section will present some of the previous work, which looks at FLFP.

Looking at the effects of per-capita GDP on FLFP a number of studies have documented a general U-shaped relationship (Goldin, 1994; Mammen & Paxson, 2000; Psacharopoulos & Tzannatos, 1989). As the market for wage labor initially grows, women leave the labor force. This may be due to an increase in a husband's income or a decrease in the income that a woman may earn. It may also be due to a social stigma on women working blue-collar jobs (Goldin, 1994). Most likely it is a combination of these factors. However, over time, as the GDP of a country increases, education levels of girls and women increase, increasing their human capital, allowing them to be employed in white-collar higher paying jobs. When this happens, the substitution effect becomes more powerful and women start to enter the labor market.

Studies have found education to have a positive role on FLFP (Goldin, 1994; Lincove, 2008; Psacharopoulos & Tzannatos 1989). A higher level of female education generally tends to increase the level of women in the labor force along with the time spent in the labor force. It has also been found that the degree of effects of female education on the labor force participation are affected by country specific variables. For example, Cameron, Dowling, & Worswick (2001) found that in countries with traditionally more rigid gender roles female education has less of an impact on FLFP. A second finding of theirs is that higher education has a larger role in increasing FLFP rates. In fact, for certain countries, primary education has no effect or a negative effect. This may be due to the increase in wages from an investment in primary education not being substantial to convince a woman to enter the labor force.

Smits, Ultee, & Lammers (1996) find that in European Union countries, the occupation level of a married woman's husband has an effect on the wife's labor force participation rates. They find evidence of a "glass ceiling" effect, where women are not employed in occupations that surpass their husbands. There is also a facilitating effect where women married to husbands with higher occupational status levels also have higher occupational status, relative to unmarried women. This suggests that

women are most likely to enter the labor force when their occupational opportunities closely resemble that of their husbands. They find that this effect is more prevalent in Catholic countries than in Protestant countries. This would mean that when educational levels between men and women are more similar, married women are more likely to enter the work force, as they are more likely to have a job on a similar level to their husband.

There is a negative relationship between fertility and FLFP (Bussmann 2009; Mammen & Paxson 2000; Meyer, 2006). Having more children increases the amount of household production which needs to take place. Since household production is largely done by women, this allows less time and energy to be used in generating income. However, Ahn and Mira (2002) have found that since the 1980s there has been a positive relationship between fertility and FLFP in OECD countries. For much of a country's development, this relationship is negative, but once a high level of development is reached, this relationship stops being negative. This may be due to wealthy households outsourcing their household production by hiring childcare.

The role trade openness has on FLFP seems to also depend on the level of development of a country. Bussmann (2009) finds that higher trade openness decreases FLFP in OECD countries while increasing it in other countries. Meyer (2006) found that when looking at cross-section data trade openness is positively related to FLFP but when looking at panel data trade openness is negatively related to the level of change of FLFP. She also finds that FLFP is positively affected by trade openness in middle income countries but negatively in high and low-income countries. Due to comparative advantage, more developed countries may be specializing in capital intensive production needing less people in the labor force while less developed countries specialize in labor intensive production.

Gray, Kittilson & Sandholtz (2006) look at 180 countries from 1975 to 2000 to see what effect globalization has had on women's literacy rates, life expectancy, labor and parliamentary participation rates. Along with international trade and foreign direct investment, they find that membership to international bodies such as the United Nations and the World Bank and ratification of international treaties, such as the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), have a positive effect on the lives of women, including higher levels or FLFP. It is possible that only countries in which women were already more empowered ratified the CEDAW. To check for this the authors ran a regression of FLFP in 1975 against various explanatory variables along with a dummy variable for countries which ratified the CEDAW by 1985. This dummy variable was not statistically significant, providing evidence that ratification of the CEDAW was not due to pre-existing

country conditions. Their paper suggests that participation in international organizations and treaties has an impact on formal institutions and may have an impact on domestic culture.

Cultural factors also influence the level of FLFP (Antecol, 2000; Clark, Ramsbey, & Adler, 1991; Fernández & Fogli, 2005; Meyer, 2006; Psacharopoulos & Tzannatos 1989). Culture is partly responsible for the tastes that a woman holds when determining if and to what extent she will join the labor force. However, culture is also a social pressure placed on a woman from those around her, including her family members and neighbors (Antecol, 2003; Fernández & Fogli, 2005).

Clark, Ramsey & Adler (1991) look at at least 75 countries, assigning one of six cultural variables to each country along with controlling for factors such as education, commodity concentration and GNP. They find that culture has a considerable impact on FLFP. A cross-sectional analysis of 1980 data finds that in Islamic and Latin American countries women were less likely to participate in the labor force. They also find that from 1960 to 1980 the FLFP in Islamic countries declined, which may be due to a rise in Islamic fundamentalism. Marxist and African countries had higher levels of FLFP than other nations, with the FLFP increasing the fastest in Marxist nations from 1960-1980.

Antecol (2003) looks at data from 23 countries in the 1994 International Social Survey Programme. She looks at answers men in different countries give to survey questions regarding family and gender roles. She finds that men's attitude towards FLFP affects the level of FLFP in a country. She also finds that men in post-soviet countries had more conservative views on the family and the role of women in society than men in the other, mostly Western countries surveyed.

Other than looking at cross-country differences, studies have been done to gauge the impact of culture on the economic activity of immigrants. Antecol (2000) looks at first generation immigrants in the United States to see if their culture, for a proxy of which she uses home-country FLFP, affects their FLFP in the USA. She finds that the rate of home-country FLFP does affect the FLFP of immigrants, though this effect declines with second and further generations. Similarly, Fernández & Fogli (2005) look at married women born in the USA whose parents were immigrants. They use past FLFP of the home-country of the parents as a proxy for culture to see if this has an effect on the FLFP of the USA-born daughter and find there to be a significant effect.

Using data from the World Values Survey, Guiso, Sapienza, & Zingales (2003) look at the relationship between the intensity of religious beliefs and economic attitudes for six religions; Catholics, Protestants, Jews, Muslims, Hindus, and Buddhists. They find that on average, religious

beliefs have a positive effect on economic attitudes. Most religious people are more likely to trust the legal system, less willing to break the law, and believe that market outcomes are fair. However, they also find that across all of the six religious groups they look at, people are less sympathetic to women's rights and hold a more conservative view of women's role in society. These views on women are twice as strong for Muslims than for other religious people.

I hope to add to the literature by looking at cross-country macro data to examine the effects of culture on FLFP rates. Dominant religion is used as the cultural variable in hopes that this is a more accurate representation of what the local culture looks like than the largely geographic cultural variables used by Clark, Ramsey & Adler (1991). Using more up to date data will show if recent world occurrences, such as the fall of the Soviet Union and the increasing levels of globalization have had an effect on the role religion has on FLFP rates. I will not only look at what impact religion has on FLFP levels, but if and how the impact of religion has changed since the 1980s. Finally this paper will attempt to explain why FLFP rates in Muslim and Catholic countries have risen, even though those religions discourage women from participating in the labor force.

# 6.    Data Description

The analysis presented uses a number of different data sources to look at the period between 1980 and 2005 with five year intervals being used. Data of up to 138 countries is used, though only 100 countries have data available for all time periods. For a list of countries used see Appendix A.

The dependent variable in this paper is the ratio of female labor force participation to male labor force participation. These participation rates come from the International Labour Organization's Key Indicator of the Labour Market database (International Labour Organization, 2007). The labor force participation rate is a percentage of the working-age population which takes part in the labor market, including both the employed and unemployed. This includes both government jobs, such as the military and first time job seekers.

Because of the different levels in overall labor force participation between countries[1] it is more sensible to look at the ratio of female labor force participation to male labor force participation. The term FLFP refers to female/male labor force participation. This shows the gender gap in labor force

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1. For example Mammen and Paxson (2000) point out that in developing countries wage labor outside of the household is often rare. They give use Cote d'Ivoire as an example where "only 27.6 percent of the men and 5.6 percent of the women did any work as employees" (p. 141).

participation while taking into account cross-country differences in total labor participation rates. Using a ratio value creates the problem that an increase in this value may be due to men exiting the labor force rather than women entering the labor force. This is somewhat unlikely as male labor force participation rates are inelastic. Whether women work, or not, rarely changes the fact that men work. Secondly, a major reason for promoting FLFP is the empowerment of women. If husbands are leaving the labor force while wives earn a wage, it is assumed that the men will take up household production. This will encourage a household specialization which is not based on gender, lifting many of the restrictions placed on women by traditional gender roles.

Due to the inclusion of both employed and unemployed persons in the labor participation rates, there is a possibility of ignoring a significant difference in the labor market between genders. It may be that women bear the burden of unemployment more than men while having a similar labor participation rate. The main reason employment rates have not been considered in this paper is the lack of comparable international data. According to Klasen & Lamanna (2009) gender differences in unemployment rates are usually less than one percentage point in much of the world. The exceptions are Latin America and the Middle East and North Africa, where women experience higher rates of unemployment than men. This should be kept in mind and whatever gap there is in labor participation rates is even larger in employment rates in these regions. Another consideration is that this paper looks at country wide aggregate data. This aggregate point of view treats women as a single homogeneous unit. Within country differences in FLFP are not taken into account.

The central explanatory variable in this paper is religion. Dummy variables are used for five religious categories; Protestant (including nondenominational Christian), Catholic, Orthodox Christian, Muslim and "other". "Other" religions is specifically referring to various traditional indigenous African religions. It does not refer to all religions not included under Catholicism, Orthodox Christianity, Islam or Protestantism. For example, Judaism or Hinduism is not included in the "other" category. A country receives a value of 1 for a religious category if 50% of more of the population adhere to a certain belief. Countries in which 50% or more of the population does not adhere to a single category receive 0 for all the religious dummy variables.

The religious data comes from the World Christian Encyclopedia (Barrett, Kurian, & Johnson, 2001) and the data from the 2005 wave of the World Christian Database found in Grim & Finke (2006). Originally a Christian missionary tool, the World Christian Encyclopedia has been widely used (Hsu, Reynolds, Hackett, & Gibbon, 2008) in academic research as a reliable measure of the adherence levels

of numerous religions in most nations of the world. The database does have a tendency to slightly overestimate Christian adherence and underestimate Muslim adherence (Hsu, Reynolds, Hackett, & Gibbon, 2008). However, since I do not use percentages but simple dummy variables this should not pose a problem.

While the World Christian Encyclopedia includes a large number of countries and has reliable and detailed information on the religious adherence of each country, the data has not been collected regularly. There is data for 2000 and 2005, but before then the most recent wave is 1970. For most countries in this paper this is not a problem since the dominant religion does not change over time. But according to the World Christian Encyclopedia, 17 countries did change their dominant religion. There were nine countries in Africa that saw a change in the dominant religion. This was either the adherence to 'other' religions decreasing to less than 50% or the adherence to Protestantism or Catholicism increasing to at least 50%, or both. Four post-communist countries also saw changes in their dominant religion. Indonesia became a predominantly Muslim country. Finally, in Canada, Switzerland and Germany Protestantism moved from being the dominant religion to not being a dominant belief in those countries. The changes in religion can be seen in Table 1.

**Table 1. Changes in Dominant Religions**

| Country | Dominant religion in 1970 | Dominant religion in 2000 |
|---------|---------------------------|---------------------------|
| Armenia | none | Orthodox |
| Botswana | Other | Protestant |
| Canada | Protestant | none |
| Congo Republic | Protestant | Catholic |
| Czech republic | Catholic | none |
| Germany | Protestant | none |
| Indonesia | none | Muslim |
| Kenya | none | Protestant |
| Kyrgyzstan | none | Muslim |
| Liberia | Other | none |
| Malawi | none | Protestant |
| Russia | none | Orthodox |
| Rwanda | none | Catholic |
| Sierra Leon | Other | none |
| Switzerland | Protestant | none |
| Togo | Other | none |
| Zambia | none | Protestant |

The problem of conversion was dealt with first by considering the history of each of the countries in which the dominant belief system changed. For example in the post-communist countries

there was a religious revival after the collapse of the Soviet system. In these cases it is assumed that the dominant belief system changed between 1990 and 1995. For the other countries it is assumed that the change in beliefs was constant over time, and from that assumption the date of change of the dominant belief was estimated. For example, Togo saw a decrease in the adherence of "other" religions from 57% in 1970 to 38% in 2005. It was assumed that the rate of conversion was constant, and so the "other" religious adherence was assumed to have shrunk 2.38% every five years (57% subtracted by 38%, divided by eight five-year intervals). In this case, Togo was assumed to have over 50% of the population adhere to "other" religions up until 1980. By 1985 the number drops to 49.88%. So Togo is given a value of 1 for 1980 for the dummy variable of "other" religions, and 0 for all other time periods.

Along with religion a number of explanatory variables, which the literature has found to affect FLFP, are included. They are listed in Table 2, along with their sources.

The first of these is Real per-capita GDP. Real per-capita GDP is expected to impact FLFP through the income and substitution effects. There is also an increase in "other income" for married women whose husbands are employed. Wages of the husband increase as GDP increases, decreasing the likelihood of women entering the labor market.

Another aspect of GDP growth is the increase in funds which the government has. In rich countries, the government is able to create more formal institutions such as public child care which makes entering the labor force easier for women.

The literature has found a U-shaped relationship between FLFP and GDP. The income effect and the effect of "other income" are more powerful than the substitution effect and FLFP decreases as GDP goes up, until it reaches a certain point where the substitution effect becomes more powerful and women start to reenter the labor force. Because of this a quadratic relationship is expected. Both GDP and the GDP squared (GDP2) are included as explanatory variables in most cases. The expectation is that GDP will have a negative coefficient while GDP2 will have a positive coefficient. When this quadratic relationship is not found, the relationship is assumed to be more linear and GDP2 is excluded from the regression.

A dummy variable from Cheibub, Gandhi & Vreeland (2009) is used for the presence of democracy. This is a more straightforward and easier to interpret than alternative measures of democracy which assign point scales based on more subjective judgment. Instead, a country is considered a democracy when the following observable conditions are all met:

1. The chief executive must be chosen by popular election or by a body that was itself popularly elected.

2. The legislature must be popularly elected.

3. There must be more than one party competing in the elections.

4. An alternation in power under electoral rules identical to the ones that brought the incumbent.

(Cheibub, Gandhi & Vreeland, 2009, p. 69)

Since women are not a minority they should be able to advance their interests through the democratic process creating formal institutions which act towards their benefit. These may include anti-discrimination laws and maternity leave regulations.  The presence of these women-friendly formal institutions should make it easier for women to enter the labor market.

The United Nation's 1979 Convention on the Elimination of all Forms of Discrimination against Women (CEDAW) is composed of a preamble and a list of 30 articles defining what constitutes discrimination against women. By ratifying this convention, states commit themselves to taking measures to eliminate gender-based discrimination. They also submit a report to the United Nations Committee on the Elimination of Discrimination against Women every four years. This committee reviews the steps taken to end gender discrimination and makes recommendations for further actions. Many countries, which ratify the CEDAW, do so with reservations. Nonetheless the CEDAW applies international pressure on governments to implement women-friendly policies. The ratification of the CEDAW should have a positive effect on FLFP through changes in formal institutions. It may also empower non-governmental organizations pushing for change in policy but also in cultural and social norms.

Fertility rates affect FLFP through the amount of unpaid household production required. When women are occupied with raising children they have less time and energy for other activities, such as paid labor. For mothers, child birth also means time off from work. This produces gaps in their employment history, providing them with less experience than men and women without children, potentially decreasing their relative income, making entering the labor force less attractive. The direction of causality between fertility and FLFP has long been debated in academic literature (Engelhardt, Kögel, & Prskawetz, 2004). In this paper the causality is assumed to flow from fertility to FLFP, however, when simultaneity problems are found to exist, fertility is dropped from the equation.

Brown, Deardorff & Stern, (2003) have found that Foreign Direct Investment (FDI) inflows generally increase wages and working conditions. Depending on what type of industry the FDI inflows

take place, they may either cause an increase in the substitution and income effects for women or cause an increase in the income of a married woman's husband, or both. Another effect may come from pressure on multinational companies from social justice activists to enact gender equality policies, encouraging women to enter the workforce. This would create a more welcoming work environment, possibly encouraging women to enter the labor force. Finally, unlike local firms, international firms may have less concern for local cultural stigmas and traditions. Local cultures which discourage the hiring of women might have less of an impact on a foreign firm if the hiring decisions are made by a foreigner. The natural log of FDI stock inflows is used to adjust for skewness.

Three education ratios are considered in this paper. As with FLFP the ratio of female education to male education is used. Using a ratio shows the levels of inequality between the genders in education in each country while accounting for between-country differences in total education levels. This is not the same as total female education, but instead looks at the gender equality in education within a country. Women are more likely to take part in the labor force when their potential occupational status is similar (but not exceeding) that of their husbands (Smits, Ultee & Lammers, 1996). Because of this, it is assumed that equality in education (human capital) has a stronger effect on FLFP rates than the level of female education not relative to that of male education.

An increase in schooling increases human capital and productivity. This increase in productivity should increase the potential wage someone may receive. Education may also be viewed as an investment, and to get a return on that investment the educated individual should enter the labor force. The variables are: the ratio of the average years of total schooling for females to males, the ratio of the percentage of females to males who finish secondary schooling and the ratio of the percentage of females to males who finish tertiary schooling. I expect total schooling to be especially important in less developed countries where the population as a whole receives less tertiary and secondary education. Total schooling is a better measure than completed primary schooling because it measures the differences in those who attended some schooling but did not finish. For example, on average boys may finish four out of five years of primary schooling while girls may only finish one out of five years of primary school, yet both are counted as not completing primary school.

The literature (Cameron, Dowling, & Worswick, 2001; Lincove, 2008) shows that higher education has a larger impact on FLFP than primary education. Increased levels of primary education tend to increase household productivity, but do not translate into entrance into the labor market. Secondary and tertiary educations are expected to have a positive effect on FLFP. The completion of a

tertiary education is expected to be especially important in developed countries where most individuals of both genders complete their secondary education.

In Islamic countries gender equality in education was found to have a negative effect on FLFP rates. In an attempt to explain this, a second regression was run using total female education and total population education variables.

Communist nations have had higher FLFP than none communist nations (Clark, Ramsey & Adler, 1991). This may be due to formal institutions that encouraged women to enter the labor force, but also because the communist parties attempted to influence the culture of nations they controlled. Because of this I include a dummy variable for being, or having been, a communist nation. This includes former Soviet nations, but also Asian nations such as China, and also includes nations such as Nicaragua and Ethiopia. This inclusion helps to ensure that the communist variable doesn't simply measure certain regional traits found in Eastern Europe or Northern and Central Asia.

Finally, trade openness is expected to have an impact on FLFP. Trade openness allows countries to use their comparative advantage to build certain industries. For low-income countries where there is a large amount of cheap unskilled labor this means labor intensive industries such as the textile industry. These industries are likely to hire women, especially if female labor is cheaper than male labor. At the same time, high-income countries may see a drop in their FLFP due to their unskilled jobs moving overseas. This paper uses the natural log of trade openness data to account for skewness.

| Table 2. List of Variables and Sources | | |
|---|---|---|
| | | |
| **Variable Name** | **Variable Description** | **Source** |
| **FLFP** | The ratio of female labor force participation to male labor force participation. (including the unemployed) | International Labour Organization (2009) |
| **GDP** | The natural log of real GDP per capita | Heston, Summers, & Aten (2011) |
| **GDP2** | The natural log of real GDP per capita squared | Heston, Summers, & Aten (2011) |
| **Democracy** | A dummy variable for the presence of democracy | Cheibub, Gandhi, & Vreeland (2009) |
| **CEDAW** | Ratification of the Convention on the Elimination of All Forms of Discrimination Against Women | United Nations Treaty Collection. (2011) |
| **Fertility** | 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 current age-specific fertility rates. | World Bank (2011) |
| **FDI** | The natural log of FDI stock inflows as a percentage | United Nations Conference on Trade |

| | of GDP | and Development (2010) |
|---|---|---|
| **Avrg schooling** | The ratio of average years of schooling for females to the average years of schooling for males | Barro, & Lee (2010) |
| **Secondary** | The ratio to females who complete secondary education to males who complete secondary education | Barro, & Lee (2010) |
| **Tertiary** | The ratio to females who complete tertiary education to males who complete Tertiary education | Barro, & Lee (2010) |
| **Female avrg schooling** | Average total years of schooling for females | Barro, & Lee (2010) |
| **Total avrg schooling** | Average total years of schooling for the whole population | Barro, & Lee (2010) |
| **Female secondary** | Percentage of female who completed secondary education | Barro, & Lee (2010) |
| **Total secondary** | Percentage of population who completed secondary education | Barro, & Lee (2010) |
| **Female tertiary** | Percentage of female who completed tertiary education | Barro, & Lee (2010) |
| **Total tertiary** | Percentage of population who completed tertiary education | Barro, & Lee (2010) |
| **Communism** | Past or present communist rule | Cheibub, Gandhi, & Vreeland (2009) |
| **Openness** | The natural log of (exports+imports)/GDP | Heston, Summers, & Aten (2011) |
| **Catholic** | Dummy variable for 50% or more of the population being Catholic | Barrett, Kurian, & Johnson, (2001) and Grim, & Finke (2006) |
| **Protestantism** | Dummy variable for 50% or more of the population being Protestant | Barrett, Kurian, & Johnson, (2001) and Grim, & Finke (2006) |
| **Muslim** | Dummy variable for 50% or more of the population being Muslim | Barrett, Kurian, & Johnson, (2001) and Grim, & Finke (2006) |
| **Orthodox** | Dummy variable for 50% or more of the population being Orthodox Christian | Barrett, Kurian, & Johnson, (2001) and Grim, & Finke (2006) |
| **Other** | Dummy variable for 50% or more of the population belonging to traditional African religions. | Barrett, Kurian, & Johnson, (2001) and Grim, & Finke (2006) |

# 7.    Preliminary Descriptive Statistics.

Table 3 shows the change in FLFP – that is the ratio of female to male labor participation rates - for the world as a whole and for certain groups of countries. Overall there has been a steady increase in FLFP. The largest exception to this are post-communist states which have had almost no change in FLFP. Low-income countries have also seen only a very small increase in FLFP. However both of these groups have had some of the highest levels of FLFP in 1980 and are still higher than the world average.

**Table 3. Mean FLFP Per Year**
**(Standard deviation in parentheses)**

|  | World | OECD | Catholic | Protestant | Muslim | Africa | Sub-Saharan Africa | Low income | Post-communist |
|---|---|---|---|---|---|---|---|---|---|
| **1980** | .60 | .58 | .54 | .68 | .42 | .67 | .71 | .76 | .78 |
|  | (.22) | (.13) | (.17) | (.13) | (.24) | (.22) | (.19) | (.18) | (.07) |
| **1985** | .61 | .62 | .56 | .71 | .44 | .67 | .71 | .76 | .77 |
|  | (.21) | (.14) | (.16) | (.13) | (.23) | (.22) | (.18) | (.18) | (.06) |
| **1990** | .63 | .65 | .58 | .74 | .47 | .68 | .72 | .76 | .77 |
|  | (.20) | (.13) | (.15) | (.13) | (.23) | (.21) | (.18) | (.17) | (.06) |
| **1995** | .64 | .69 | .59 | .77 | .49 | .69 | .73 | .77 | .76 |
|  | (.19) | (.12) | (.14) | (.12) | (.22) | (.21) | (.18) | (.17) | (.06) |
| **2000** | .67 | .72 | .64 | .78 | .52 | .71 | .75 | .78 | .77 |
|  | (.19) | (.11) | (.14) | (.12) | (.22) | (.20) | (.17) | (.16) | (.06) |
| **2005** | .69 | .74 | .67 | .80 | .54 | .73 | .77 | .78 | .78 |
|  | (.18) | (.12) | (.13) | (.11) | (.22) | (.20) | -0.16 | (.16) | (.06) |
| **change from 1980 to 2005** | .08 | .16 | .13 | .12 | .12 | .06 | .05 | .03 | .01 |

Source: International Labour Organization (2009)

FLFP rates have increased by about 8% from 1980 to 2005 world-wide. The largest increase has been in the most developed, OECD countries. In comparison, post-communist nations saw almost no change. Interestingly, though having quite different starting levels of FLFP in 1980, Catholic, Protestant and Muslim countries saw very similar growth in their FLFP rates, all higher than the world average.

Low income countries saw very little growth in FLFP rates, though their initial rates in 1980 were some of the highest in the world. Not surprisingly, since Africa is the world's poorest continent, it saw FLFP rates rise less than in the rest of the world (6%) with Sub-Saharan Africa even lower (5%).

Figure 1 shows two-way quadratically fitted regression lines for FLFP on GDP from the panel data for six different country groups. Each is compared to the world two-way quadratically fitted regression line for FLFP on GDP. Muslim and Catholic countries largely resemble the world-wide U-shape relationship between FLFP and GDP. Low and high levels of GDP have higher FLFP rates, while the middle of the graph has lower rates. The graph for Muslim countries is below the rest of the world, indicating that at all levels of development Muslim women take less part in the labor market.

African and low-income countries have GDP values that correspond to the left hand side of the

U-shaped world curve. Because of this, the relationship between FLFP and GDP in these countries is negative. As GDP grows, FLFP rates decrease.

OECD countries, being largely made up of GDP levels on the right hand side of the U-shaped curve see a positive relationship between FLFP and GDP. As GDP increases, so does FLFP.

Post-communist countries have a flat inverse U-shape. The lowest and highest GDP levels in this group see lower FLFP rates, but the differences are small. Due to the relative flatness of this curve, it seems like GDP has less effect on FLFP than for other countries in the world.

**Figure 1. Quadratically fitted regression lines for FLFP on GDP**
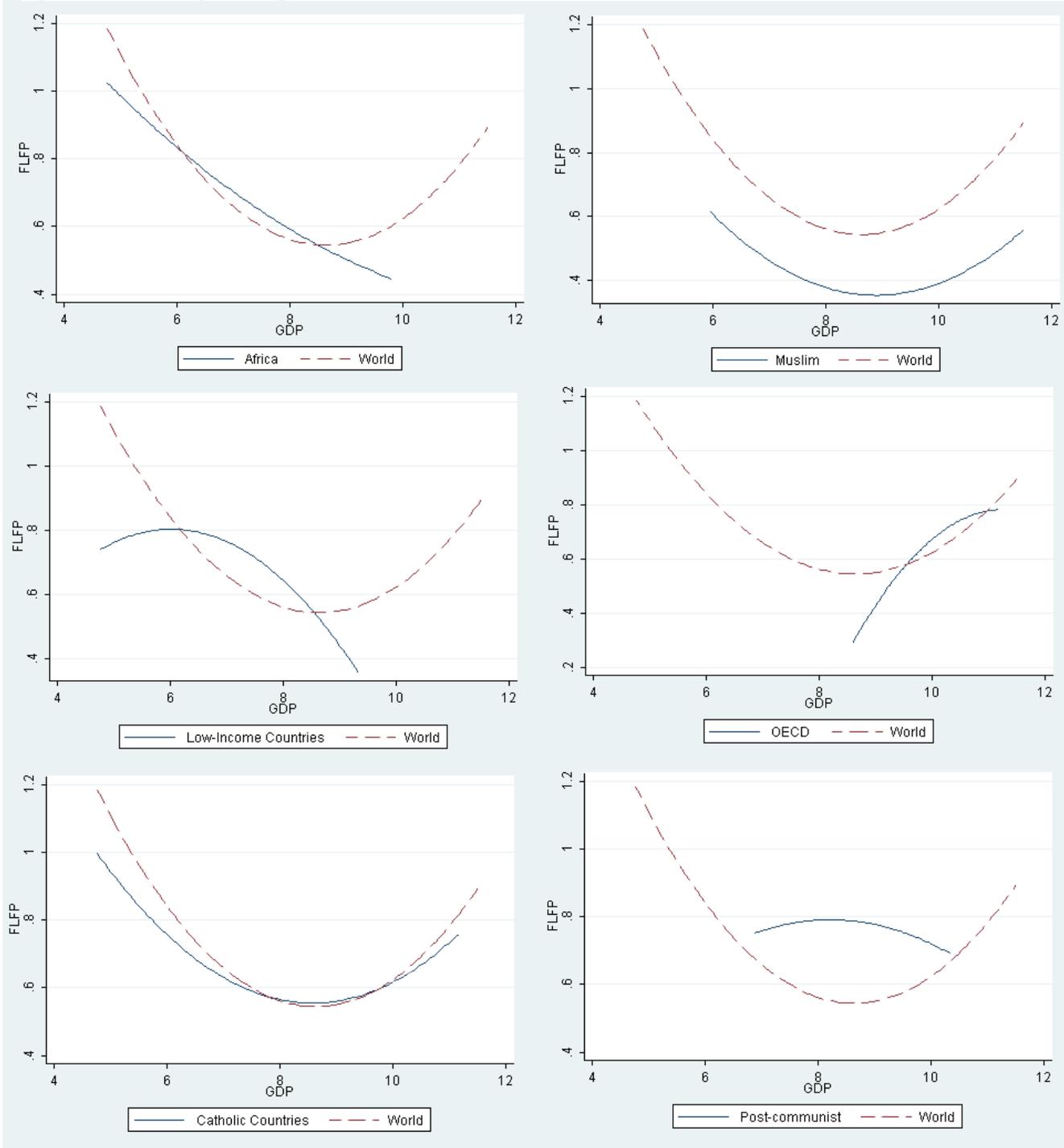


Table 4. shows the pairwise correlations between the different variables from the panel data.

Table 4. pairwise correlations

| | FLFP | GDP | FDI | Openness | Democracy | CEDAW | Fertility | Avrg schooling | Tertiary | Secondary | Communism |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FLFP | 1.0000 | | | | | | | | | | |
| GDP | -0.1981*** | 1.0000 | | | | | | | | | |
| FDI | 0.0936** | 0.1915*** | 1.0000 | | | | | | | | |
| Openness | -0.0893** | 0.1886*** | 0.4546*** | 1.0000 | | | | | | | |
| Democracy | 0.0530* | 0.3994*** | 0.1518*** | 0.0143 | 1.0000 | | | | | | |
| CEDAW | 0.2241*** | 0.0644** | 0.2297*** | 0.0671** | 0.2872*** | 1.0000 | | | | | |
| Fertility | -0.0892** | -0.7174*** | -0.2474*** | -0.1632*** | -0.4484*** | -0.3311*** | 1.0000 | | | | |
| Avrg schooling | 0.1526*** | 0.6332*** | 0.2232*** | 0.2117*** | 0.3059*** | 0.2250*** | -0.6865*** | 1.0000 | | | |
| Tertiary | 0.0351 | 0.4639*** | 0.1872*** | 0.2308*** | 0.1934*** | 0.2480*** | -0.4851*** | 0.6806*** | 1.0000 | | |
| Secondary | 0.0341 | 0.5360*** | 0.0832** | 0.1495*** | 0.2873*** | 0.1543*** | -0.5515*** | 0.7608*** | 0.5191*** | 1.0000 | |
| Communism | 0.3464*** | -0.1618*** | -0.0827** | -0.1047** | -0.1849*** | 0.0894** | -0.1742*** | 0.0495 | 0.0106 | 0.0087 | 1.0000 |
| Catholic | -0.1248*** | 0.1852*** | 0.1067** | -0.0234 | 0.3214*** | 0.1701*** | -0.1637*** | 0.2483*** | 0.2077*** | 0.2086*** | -0.0564* |
| Protestant | 0.2337*** | 0.1759*** | 0.1550*** | 0.0276 | 0.2108*** | -0.0474 | -0.0865** | 0.2001*** | 0.0711** | 0.1452*** | -0.2330*** |
| Orthodox | 0.1102*** | 0.0908** | -0.0138 | -0.0060 | 0.0636** | 0.0979** | -0.2437*** | 0.0976** | 0.1076** | 0.0454 | 0.2768*** |
| Muslim | -0.4195*** | -0.1497*** | -0.1722*** | 0.0168 | -0.3568*** | -0.1947*** | 0.3111*** | -0.3552*** | -0.1695*** | -0.2544*** | -0.0954** |
| Other | 0.1498*** | -0.2259*** | -0.0514 | 0.0054 | -0.1178*** | -0.0772** | 0.2500*** | -0.2958*** | -0.2496*** | -0.2749*** | 0.0207 |

* Refers to 90% significance, ** refers to 95% significant and *** refers to 99% significance levels.

24

Variables most highly correlated with FLFP include: CEDAW (0.22481), communism (0.3464), Protestantism (0.2337) and Islam (-0.4195). Catholicism has a negative correlation with FLFP (-0.1248) while Orthodox Christianity (0.1102) and "Other"religions (0.1498) have positive correlations. It is also important to note the high correlations between explanatory variables such as the education variables and fertility or GDP. This is a signal that multicollinearity may be a potential problem in the data. One of the advantages of using panel data is that this is less likely to be a problem than in time-series data (Baltagi, 2005).

Table 5. is a cross-country pairwise correlation between FLFP and the explanatory variables for each of the five year intervals this paper looks at. This shows what types of changes occurred in the relationships between FLFP and the explanatory variables over time.

**Table 5. Year by Year Pairwise Correlations Between FLFP and Other Variables**

|  | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 |
|---|---|---|---|---|---|---|
| GDP | -0.338* | -0.276* | -0.211* | -0.207* | -0.174* | -0.131* |
| Openness | -0.173* | -0.227* | -0.229* | -0.120 | -0.075 | -0.021 |
| FDI | 0.001 | 0.003 | 0.032 | 0.055 | 0.055 | 0.101 |
| Democracy | -0.041 | -0.080 | -0.066 | 0.065 | 0.119 | 0.153* |
| CEDAW | 0.039 | 0.194* | 0.220* | 0.254* | 0.269* | 0.136* |
| Fertility | -0.088 | -0.069 | -0.060 | -0.040 | -0.015 | 0.000 |
| Secondary | -0.088 | -0.016 | 0.032 | 0.024 | 0.028 | 0.030 |
| Tertiary | -0.014 | -0.108 | -0.070 | 0.032 | 0.025 | 0.054 |
| Avrg schooling | 0.108 | 0.098 | 0.141* | 0.146* | 0.138 | 0.146* |
| Communist | 0.415* | 0.390* | 0.367* | 0.326* | 0.304* | 0.109 |
| Catholic | -0.157* | -0.150* | -0.154* | -0.147 | -0.087 | -0.059 |
| Protestant | 0.150* | 0.195* | 0.253* | 0.281* | 0.282* | 0.275* |
| Orthodox | 0.106 | 0.100 | 0.103 | 0.127* | 0.118 | 0.096 |
| Muslim | -0.423* | -0.430* | -0.429* | -0.425* | -0.427* | -0.440* |
| Other | 0.199* | 0.189* | 0.170* | 0.119 | 0.132* | 0.130* |

* refers to 90% significance level.

It would seem that over time the negative relationship between Catholicism and FLFP has decreased. In contrast, the negative relationship between Islam and FLFP stay fairly constant over the years. It would also seem that the positive relationship between Protestantism and FLFP increases over time. This table includes changes in the dominant religion and they may be what is responsible for the changes in the relationship between Catholicism and Islam seen in this table. Finally, surprisingly, the negative relationship between fertility and FLFP actually becomes slightly positive, though never significant.

# 8.    Econometric Methodology

This paper looks at both cross-sectional and panel data. Cross-sectional data looks at the differences between units (in this case countries) over a single point in time. This shows what effects explanatory variables have on the dependent variable. Panel data, sometimes called cross-sectional time series data, looks at cross-sectional data over time. This type of data shows both differences between units (countries) and differences within units over time. This shows what effects the explanatory variables have on the changes of the dependent variable. Panel data is said to be balanced when every unit being looked at has an observation for every time period being looked at. When certain units have gaps in the observations available over time, the panel data is said to be unbalanced.  In this paper, both cross sectional and panel data look at the period between 1980 and 2005, with the data collected for every five years.

The dependent variable is the ratio of the amount of women in the labor market (including the unemployed) to the amount of men in the labor market (including the unemployed), referred to as the female labor force participation (FLFP) rate.

The explanatory variables cover a range of economic, policy and cultural effects which have been found to have an effect on FLFP in the literature. These variables include; GDP, FDI inflows, trade openness, the presence of democracy, the ratification of the CEDAW treaty, fertility, education equality, communism and religion.

To see the effects that religion and other explanatory variables have on the change in FLFP this paper uses unbalanced panel data for 138 countries. This paper considers the following model:

$$y_{(it)} = X_{(it)} B_{(1)} + Z_{(i)} \gamma + \varepsilon_{(it)} \tag{1}$$

where $y_{(it)}$ is the dependent variable observed for unit $i$ during time $t$, $X_{(it)}$ are the time-variant explanatory variables, $B_{(1)}$ are the coefficients of the time-variant variables, $Z_{(i)}$ are the time-invariant explanatory variables, $\gamma$ are the coefficients for the time-invariant variables, and $\varepsilon_{(it)}$ is the error term. The error term is assumed to be made up of:

$$\varepsilon_{(it)} = \alpha_{(i)} + \eta_{(it)} \tag{2}$$

where $\alpha_{(i)}$ is a time-invariant unit-specific effect and $\eta_{(it)}$ is a stochastic error term.

The two main approaches to analyzing panel data for FLFP rates are fixed effects (FE) regressions and random effects (RE) regressions. The former has been the most common method for studying the effects of economic variables, such as trade or FDI on FLFP. This method controls for

between-unit differences, allowing the researcher to focus solely on time effects. It is impossible to use $Z_{(i)}$ in this type of model. Because religion is generally time-invariant, or at least rarely changing over time, this method is inappropriate for much of this study.

Random effects regressions are commonly used as an alternative to the FE regression when the researcher is interested in time-invariant variables. However, unlike FE regressions, RE regressions assume that all explanatory variables are exogenous; that is, $\alpha_{(i)}$ must be distributed independently of all the explanatory variables. A priori it would seem that the variables used in this paper violate this condition. It is quiet unlikely that variables such as fertility and female levels of education are purely exogenous.

A formal way to test for exogeneity in time-variant variables is using the Hausman (1978) test. This test compares the random effects model to the fixed effects model. The null hypothesis is that the RE model is more efficient than the FE model and both are consistent. If the difference between the estimators given by these two methods is large, the null hypothesis is rejected. When the null hypothesis is not rejected the individual effects are uncorrelated with the other regressors. If the null hypothesis is rejected then random effects model would give biased and inconsistent results and should not be used.

Baltagi, Bresson & Pirotte (2003) suggest a second Hausman test between the Hausman -Taylor (1981) method and the fixed effects model. In this second test, if the difference between the Hausman-Taylor method and the fixed effects method is not large enough to reject the null hypothesis, then both the Hausman-Taylor and the fixed effects methods are consistent but the Hausman-Taylor method is more efficient. In this case the Hausman-Taylor method should be used. This also shows that the chosen set of endogenous variables cannot be rejected. This paper uses these two tests, between the fixed effects method and the random effects method, and then between the fixed effects method and the Hausmant-Taylor method to determine which model is most appropriate. The resulting $X^2$ values for the first regression from each panel table can be seen in Appendix B.

The results for these tests suggest that this paper use the Hausman-Taylor method in all cases. This method is not only the most efficient, it allows the use of time-invariant variables. To use this method equation (1) is expanded into:

$$y_{(it)} = X_{(1it)} B_{(1)} + X_{(2it)} B_{(2)} + Z_{(1i)} y_{(1)} + Z_{(2i)} y_{(2)} + \alpha_{(i)} + \eta_{(it)} \qquad (3)$$

Where $X_{(1it)}$ are the exogenous time-variant explanatory variable, $X_{(2it)}$ are the endogenous time-variant

explanatory variables, $Z_{(1i)}$ are the exogenous time-invariant explanatory variables and $Z_{(2i)}$ are the endogenous time-invariant explanatory variables. This method uses an instrumental-variable technique to eliminate the correlation between the endogenous variables and the error term. It is $Z_{(2i)}$ and $X_{(2it)}$ which cause the random effects methods to be unusable. To adjust for this, $(X_{(2it)} - \bar{X}_{(2i)})$ is used as an instrument for $X_{(2it)}$ and $\bar{X}_{(1i)}$ is used as an instrument for $Z_{(2i)}$. Because $X_{(1it)}$ and $Z_{(1i)}$ do not pose a problem, they act as their own instruments. This approach allows for consistent and efficient results while still being able to use time-invariant variables such as religion.

The main obstacle with this method is that it is up to the researcher to specify which variables are endogenous and which are exogenous. There is no formal way to do this and Hausman and Taylor (1981) use economic theory to make their choices. This paper does the same, and then compares the results to results from a fixed effects model using the Hausman test. Not being able to reject the null hypothesis is evidence that $X_{(1it)}$ and $Z_{(1i)}$ have been chosen correctly (Baltagi, 2005). In this paper, the assumption is that GDP, GDP2, fertility and education are endogenous variables. All other variables are assumed to be exogenous. Comparing fixed effects to Hausman-Taylor confirms this.

The cross sectional data is studied using the Ordinary Least Square (OLS) method. This shows what effect the explanatory variables have on FLFP levels. One of the goals of this paper is to show if there has been a change in the effects of religion over time. It is therefore necessary to compare the same countries over time. These calculations look at the largest number of countries that possibly had data available for all time periods considered. Comparing the impact each of the explanatory variables have on FLFP for every five year period shows if the degree of influence on FLFP has changed over time.

It is possible that changes of religious influence on FLFP levels over time are simply a result of changes in the majority religion of certain countries. For example, if countries with high levels of FLFP convert to a majority Catholic, it may seem that the effect of Catholicism on FLFP has increased over time when no such increase took place in countries that were majority Catholic the whole time. To control for this, an additional OLS regression was run using only 1970s religious data. If a country had a majority Catholic population in 1970 it receives a dummy variable value of 1 for all years, even if by 2005 Catholicism was no longer the dominant religion. Likewise, if a country became majority Catholic after 1970, it still receives a dummy variable of 0 for all years.

Each table includes a note when heteroskedasticity was found to be a problem. In these cases robust standard errors were used. There were also simultaneity problems. The inability to find a proper

instrumental variable blocked attempts to use the two stage least square method. Instead the fertility variable is excluded from these regressions. Finally, when multicollinearity was found to be a problem (VIF values above 10) the problematic variables were dropped. This is also noted in the sections where it occurs.

# 9.    Empirical Results

## 9.1    World

Table 6 shows the results for the Hausman-Taylor regressions run on the world panel data. Equations 1-3 are results for unbalanced panel data with religious changes accounted for. The differences between these equations is in the educational variable used. Equation 4 is the same unbalanced panel, but religious data from the 1970s was used for all years. Equation 5 is a balanced sub-panel of 100 countries with religious changes accounted for. As Baltagi (2005) points out, creating such a sub-panel is only throwing away useful information creating inefficient estimates. The results for the unbalanced panel should be regarded as more accurate. The sub-panel is reported to show the results for the 100 countries which are analyzed in the OLS regressions.

**Table 6. Results from Hausman-Taylor Regressions for World Wide Panel on FLFP**

|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **GDP** | -0.286*** | -0.294*** | -0.295*** | -0.244*** | -0.339**** |
|  | (0.039) | (0.040) | (0.040) | (0.037) | (0.044) |
| **GDP2** | 0.020*** | 0.021*** | 0.021*** | 0.017*** | 0.023*** |
|  | (0.002) | (0.002) | (0.002) | (0.002) | (0.003) |
| **FDI** | 0.006*** | 0.007*** | 0.007*** | 0.006*** | 0.009*** |
|  | (0.002) | (0.002) | (0.002) | (0.002) | (0.003) |
| **Openness** | -0.006 | -0.005 | -0.005 | -0.005 | -0.007 |
|  | (0.006) | (0.006) | (0.006) | (0.006) | (0.007) |
| **Democracy** | -0.003 | -0.004 | -0.004 | -0.006 | -0.005 |
|  | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) |
| **CEDAW** | 0.014*** | 0.016*** | 0.016*** | 0.015*** | 0.013** |
|  | (0.005) | (0.005) | (0.005) | (0.005) | (0.006) |
| **Fertility** | -0.022*** | -0.024*** | -0.024*** | -0.020*** | -0.021*** |
|  | (0.003) | (0.003) | (0.004) | (0.003) | (0.004) |
| **Secondary** |  | 0.011 |  |  |  |
|  |  | (0.019) |  |  |  |
| **Tertiary** | 0.046*** |  |  | 0.045*** | 0.046*** |
|  | (0.013) |  |  | (0.013) | (0.014) |
| **Avrg schooling** |  |  | 0.026 |  |  |
|  |  |  | (0.045) |  |  |
| **Communism** | 0.163*** | 0.165*** | 0.165*** | 0.175*** | 0.225** |
|  | (0.050) | (0.051) | (0.051) | (0.050) | (0.090) |
| **Catholic** | -0.067*** | -0.060** | -0.061** | -0.191*** | -0.120*** |
|  | (0.024) | (0.024) | (0.024) | (0.049) | (0.032) |
| **Protestant** | -0.018 | -0.023* | -0.023* | -0.046 | -0.013 |
|  | (0.012) | (0.012) | (0.012) | (0.057) | (0.014) |
| **Orthodox** | -0.070 | -0.067 | -0.069 | -0.162* | -0.248 |
|  | (0.092) | (0.094) | (0.094) | (0.098) | (0.211) |
| **Muslim** | -0.091*** | -0.085*** | -0.087*** | -0.277*** | -0.085*** |
|  | (0.028) | (0.028) | (0.028) | (0.052) | (0.030) |
| **Other** | 0.016 | 0.015 | 0.015 | 0.141* | 0.020 |
|  | (0.018) | (0.018) | (0.018) | (0.082) | (0.019) |
| **Constant** | 1.649*** | 1.686*** | 1.673*** | 1.540*** | 1.889*** |
|  | (0.176) | (0.178) | (0.182) | (0.166) | (0.196) |
| **Oobservation** | 732 | 732 | 732 | 732 | 600 |
| **Groups** | 138 | 138 | 138 | 138 | 100 |
| $X^2$ | 500.84*** | 479.84*** | 479.46*** | 523.350 | 436.80*** |
| **Degrees of Freedom** | 14 | 14 | 14 | 14 | 14 |

\* refers to 90% significance, \*\* refers to 95% significant
and \*\*\* refers to 99% significance levels.

Table 6 confirms a number of results that previous papers have found. The first is the U-shaped relationship that GDP has with FLFP. GDP has a negative coefficient while GDP2 has a positive

coefficient, suggesting that lower levels of per capita GDP decrease FLFP, but then after a certain point is reached, start to increase FLFP.

FDI is seen to have a positive and statistically significant impact on FLFP.

Trade openness and the presence of democracy both have negative coefficients, however, neither is statistically significant.

Ratification of the CEDAW is positive, and significant, with a coefficient of between 0.013 and 0.016. This signifies that international political pressure on a country is an effective way to create more gender equality in the labor force.

As expected, fertility has a highly significant negative effect on FLFP.

Higher levels of completed tertiary education for females compared to males had a significant and positive effect on FLFP. Other educational variables were not significant in their effects on changes in FLFP rates. This supports the idea that higher education, which is a larger investment, has a stronger effect on labor force participation than lower levels of education.

Communism has the largest positive coefficient of any of the variables. This suggests that the formal and informal institutions created by communist states which encouraged female participation in the labor force were effective in increasing FLFP rates.

Every religious variable has had a negative effect on FLFP except for "Other" religions. The most negative is Islam, which is also highly significant. This is followed by Catholicism which is significant at either the 99% or 95% level. Orthodox Christianity has coefficient values close to those of Catholicism, however it is never statistically significant. Surprisingly Protestantism also has a negative coefficient which is significant at the 90% level for equations 2 and 3. This supports the finding by Guiso, Sapienza, & Zingales (2003) that followers of all of these religions have a more conservative view of women's gender roles.

"Other"religions have a statistically insignificant positive coefficient in equations 1, 2 and 3. However, in Equation 4, where religious changes are ignored, "Other" religions have a much higher positive impact and significance at the 90% level. In fact, all of the religious variables become stronger in Equation 4, where religious conversions are not taken into account. This possibly suggests that the institutions and norms of a religion are more engrained in the societies of countries where that religion was dominant for longer. Even after a change in the dominant religion it may take time for those norms and customs to change. This is visible in papers which find that first generation immigrants do not change their FLFP rates but second or third generation immigrants do adopt to the new countries FLFP

rates (Antecol, 2000). Similarly, it may take time for the norms of a religion to take hold on society as a whole.

Table 7 shows cross-country OLS regressions year by year for a 100-country sub-panel. Fertility is not included in the regressions due to simultaneity problems[2].  To control for heteroskedasticity robust standard errors are used.

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2  An attempt was made to use a two stage least squares method with child mortality as an instrument for fertility, but this was found to be a weak instrument. It is not possible to use a time lag of fertility rates as an instrument because there is a lack of data before 1980 on fertility rates for much of the world.

**Table 7. Year by Year OLS Estimates of a 100 Country Subpanel on FLFP**

| | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 |
|---|---|---|---|---|---|---|
| GDP | -0.812*** | -0.848*** | -0.807*** | -0.537*** | -0.472*** | -0.423*** |
| | (0.164) | (0.169) | (0.159) | (0.154) | (0.126) | (0.130) |
| GDP2 | 0.046*** | 0.049*** | 0.047*** | 0.032*** | 0.028*** | 0.025*** |
| | (0.009) | (0.010) | (0.009) | (0.009) | (0.007) | (0.007) |
| FDI | 0.026*** | 0.019** | 0.005 | -0.002 | 0.024* | 0.009 |
| | (0.010) | (0.009) | (0.011) | (0.013) | (0.014) | (0.018) |
| Openness | -0.044** | -0.043** | -0.035* | -0.033 | -0.043 | -0.023 |
| | (0.018) | (0.018) | (0.020) | (0.023) | (0.026) | (0.033) |
| Democracy | 0.026 | 0.006 | -0.049 | -0.052 | 0.010 | 0.034 |
| | (0.047) | (0.052) | (0.046) | (0.035) | (0.039) | (0.041) |
| CEDAW | 0.070 | 0.050 | 0.084** | 0.143*** | 0.094* | -0.007 |
| | (0.054) | (0.031) | (0.038) | (0.048) | (0.053) | (0.063) |
| Avrg school | -0.017 | -0.012 | -0.010 | -0.015 | -0.015 | -0.018 |
| | (0.011) | (0.012) | (0.012) | (0.012) | (0.010) | (0.011) |
| Tertiary | 0.100* | 0.079 | 0.103 | 0.098 | 0.135** | 0.113* |
| | (0.052) | (0.074) | (0.069) | (0.074) | (0.060) | (0.062) |
| Communism | 0.074* | 0.078* | 0.076 | 0.110* | 0.099* | 0.111* |
| | (0.045) | (0.044) | (0.050) | (0.064) | (0.059) | (0.063) |
| Catholic | -0.079* | -0.093* | -0.095** | -0.098** | -0.128*** | -0.109** |
| | (0.046) | (0.050) | (0.047) | (0.049) | (0.043) | (0.046) |
| Protestant | 0.092* | 0.101** | 0.089** | 0.112*** | 0.069* | 0.065 |
| | (0.049) | (0.045) | (0.038) | (0.043) | (0.040) | (0.041) |
| Orthodox | -0.107** | -0.145*** | -0.112*** | -0.127*** | -0.093** | -0.100** |
| | (0.049) | (0.042) | (0.036) | (0.040) | (0.037) | (0.041) |
| Muslim | -0.283*** | -0.251*** | -0.236*** | -0.226*** | -0.236*** | -0.256*** |
| | (0.059) | (0.055) | (0.053) | (0.059) | (0.054) | (0.055) |
| Other | 0.064 | 0.063 | 0.075 | -0.057 | -0.062 | -0.059 |
| | (0.069) | (0.074) | (0.0824) | (0.097) | (0.060) | (0.086) |
| Constant | 4.279*** | 4.347*** | 4.099*** | 2.908*** | 2.669*** | 2.545*** |
| | (0.697) | (0.708) | (0.669) | (0.623) | (0.524) | (0.554) |
| | | | | | | |
| F | 15.91*** | 14.82*** | 16.59*** | 15.73*** | 14.41*** | 10.61*** |
| R squared | 0.6150 | 0.6075 | 0.6351 | 0.6184 | 0.6007 | 0.5523 |

\* Refers to 90% significance, \*\* refers to 95% significant and \*\*\* refers to 99% significance levels. Robust standard errors are used due to heteroskedasticity.

GDP and GDP2 show evidence of a U-shaped relationship with FLFP. Both are significant for all years, and the coefficients of both moves towards zero starting in 1990. This suggests a flattening off of the U-shape and a decrease of the positive and negative influence that GDP has on FLFP. The level of economic development seems to be becoming less important in predicting the gender equality in labor force participation rates.

FDI has a positive impact on the level of FLFP for all years except 1995, however it is only significant in 1980, 1985 and 2000 at the 99%, 95% and 90% levels respectively. This suggests that in

general, the presence of multinational firms improves gender equality in labor market participation. But the growth in the standard error values may indicate that the positive impact of FDI on FLFP may vary more in recent years than in the past. This may be due to different effects of FDI on FLFP across different countries, or it may indicate more variance in the types of foreign investment or the countries where much of the world's FDI comes from changes.

Trade openness is only significant in the early years, but is always negative. This negativity suggests that women may lose in terms of total female labor participation when jobs move around the world due to global trade.

The coefficients for democracy are never significant and vary from positive to negative in different years. This may be explained by certain countries becoming democratic and others which stop being democratic. Therefore comparing this variable over time in this manner is not very meaningful. The presence of democracy does not seem to have a role in determining FLFP rates. This suggests that female political empowerment, which is assumed to exist to a higher degree in democratic regimes does not lead to greater participation in the labor force by women.

Ratification of the CEDAW has a positive effect on the level of FLFP until 2005, but it is not significant in 1980 and 1985. This may be due to a lag in the positive effects of the CEDAW. Countries should not expect to see their FLFP levels rise as soon as the CEDAW is ratified. Rather, the positive effects on FLFP take time to implement. By 2000 all but eight countries in the sample has ratified the CEDAW, so the significance of it begins to drop. By 2005 all but four countries have ratified the CEDAW, rendering the variable statistically insignificant. (Ratification of the treaty may still play a positive role on FLFP rates, it simply becomes difficult to measure.)

More gender equality in the total years of schooling leads to less FLFP. This supports the idea that a general increase in basic female education may not lead to increased entry into the labor market. This finding supports the idea that basic education of females leads to more productivity in household production but not in the labor force. The results for this variable are not significant.

Gender equality in the completion of a tertiary education does have a positive effect on FLFP levels, though is only sometimes statistically significant. This is in line with the literature (Cameron, Dowling, & Worswick, 2001; Lincove, 2008) which suggests that higher education plays a prominent role in affecting labor participation rates.

Currently, or formerly, being a communist country has a positive coefficient which is significant at the 90% level for all but one years.

Catholicism is found to have a negative effect on FLFP rates for every time period. This effect becomes more negative until 2000 with a less negative coefficient value in 2005. It also becomes more significant over time. This suggests that the negative effect of Catholicism on FLFP has increased over time. The coefficient value changes from -0.079 in 1980 to -0.128 in 2000 before dropping to -0.109 in 2005. Appendix C shows the same regressions as Table 7 using only 1970s religious data. This controls for changes in dominant religions that occurred over this time period. Data in Appendix C shows that the rising negative influence of Catholicism on FLFP cannot be explained simply by countries with already low FLFP rates converting to Catholicism. The numbers do vary somewhat, but the pattern seen in Appendix C is the same, with coefficient values becoming more negative until 2000 and then becoming less negative in 2005.

Protestantism has a positive effect on FLFP levels. No real pattern is visible, except that the strength of this positive effect drops in 2000 and 2005 compared to the other years. Appendix C shows that when controlling for religious changes this drop is even larger. Countries which had a majority Protestant population in 1970 see a more clear pattern of decline in the positive influence of Protestantism on FLFP rates since 1985. This suggests that the positive influence which Protestantism has on FLFP rates has been decreasing in recent decades. Taken together with Table 6, this suggests that Protestant nations have a higher level of FLFP, but Protestantism is having a negative effect on changes in FLFP.

The effect of being an Orthodox Christian nation on FLFP seems to be negative and varying across years. However, there is only one nation in the 100 country sub-panel which was predominantly Orthodox Christian (Greece) and so these results should not be looked at as representative of other Orthodox Christian nations.

A majority Islamic nation has a strongly negative impact on the levels of FLFP. The negative size of the coefficient is second only to GDP and it is highly significant in all time periods. The size of the coefficient becomes less negative until 1995 and then in 2000 starts to become more negative again. This may indicate an initial decline in Islamic norms which negatively affect FLFP levels, but then a resurgence of these norms may have occurred starting between 1995 and 2000. Appendix C shows a stronger pattern of Islams negative effect on FLFP becoming less negative over time. The change in negative influence goes from -0.283 in 1980 to -0.228 in 2000 but then becomes increasingly negative in 2005 with a coefficient value of -0.247. In general it does seem that the negative influence of Islam on FLFP rates has decreased, but the rise in 2005 may signal a resurgence of this negative effect.

"Other" religions seem to have a positive effect on FLFP levels until 1990 and then a negative effect since 1995. Most likely however, this is due to certain countries moving away from "Other" as being their dominant religion. In Appendix C "Other" religions have a positive coefficient for all the years considered, but no clear pattern. In both tables this variable is never significant.

## 9.2 Post-communist Countries

Table 8 shows the results of Hausman-Taylor regression on an unbalanced sub-panel of post-communist countries. The panel is unbalanced due to the availability of 1990s data for five countries, while the rest did not have all data available until 1995. This panel includes former USSR countries along with Eastern Bloc countries and Mongolia. It does not include African or South American countries such as Nicaragua or Ethiopia, nor does it include current communist countries such as China. Equations 1, 2 and 3 include different educational variables. There is a lack of educational attainment data available seven post-communist countries and these countries are not included in this panel. Equation 4 excludes any education variable in favor of increasing the number of countries observed. Because education is an important variable in predicting FLFP changes, equation 4 is only shown for comparison purposes and the results should not be considered accurate.

**Table 8. Hausman-Taylor Estimates for Post-Communist Countries**
**Dependent variable: FLFP**

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **GDP** | -0.448* | -0.365 | -0.408* | -0.056 |
|  | (0.237) | (0.240) | (0.232) | (0.046) |
| **GDP2** | 0.026* | 0.022 | 0.024* | 0.005 |
|  | (0.014) | (0.014) | (0.013) | (0.003) |
| **FDI** | -0.006 | -0.006 | -0.009 | 0.001 |
|  | (0.005) | (0.006) | (0.006) | (0.004) |
| **Openness** | 0.015 | 0.013 | 0.013 | 0.001 |
|  | (0.020) | (0.020) | (0.019) | (0.015) |
| **Democracy** | -0.036* | -0.035* | -0.040** | -0.027 |
|  | (0.020) | (0.021) | (0.020) | (0.017) |
| **CEDAW** | 0.010 | 0.004 | 0.011 | 0.003 |
|  | (0.025) | (0.026) | (0.025) | (0.021) |
| **Fertility** | -0.012 | -0.024 | -0.026 | -0.006 |
|  | (0.021) | (0.022) | (0.020) | (0.016) |
| **Avrg schooling** | 0.643** |  |  |  |
|  | (0.284) |  |  |  |
| **Secondary** |  | 0.000 |  |  |
|  |  | (0.107) |  |  |
| **Tertiary** |  |  | 0.169** |  |
|  |  |  | (0.066) |  |
| **Catholic** | 0.000 | -0.028 | -0.008 | -0.032 |
|  | (0.038) | (0.044) | (0.035) | (0.044) |
| **Orthodox** | 0.052 | 0.043 | 0.034 | 0.016 |
|  | (0.038) | (0.047) | (0.036) | (0.040) |
| **Muslim** | -0.154* | -0.077 | -0.083 | 0.019 |
|  | (0.087) | -0.100 | (0.079) | (0.057) |
| **Constant** | 2.027* | 2.270** | 2.392** | 0.876*** |
|  | (1.046) | (1.093) | (1.045) | (0.220) |
| **Observations** | 65 | 65 | 65 | 84 |
| **Groups** | 20 | 20 | 20 | 27 |
| $X^2$ | 19.22* | 12.88 | 21.09** | 12.66 |
| **Degrees of Freedom** | 11 | 11 | 11 | 10 |

\* Refers to 90% significance, ** refers to 95% significant
and *** refers to 99% significance levels.

A U-shaped relationship between GDP and FLFP growth is observed for post-communist countries. Poorer countries see a decline in FLFP as their GDP grows while richer countries see an increase in FLFP as their GDP grows.

FDI and trade openness seem to have the opposite effect on FLFP growth for this set of

countries than for the world as a whole. FDI has a negative coefficient (except in equation 4 when education is not taken into account) and trade openness has a positive coefficient. However, these results are not significant.

Democracy has had a negative effect on FLFP changes. Moving away from authoritarian political regimes decreases the amount of women in the labor force. These results are significant at 90% for equations 1 and 2 and 95% for Equation 3 and not significant for Equation 4. Because the data is mostly made up of 1995 and beyond, this is not a comparison between Soviet and post-Soviet eras. Rather it should be viewed as a comparison between those countries which adopted a democratic system of government and those which did not. Those countries which have taken a path towards democracy have seen a relative decrease in the gender equality of their labor force.

Ratification of the CEDAW and fertility both have expected coefficient signs of positive and negative, respectively, though neither is significant.

Schooling has had an important positive effect on FLFP growth. Both the ratio of the average years of female to male schooling and the ratio of completed tertiary for females to males have relatively large coefficients of 0.643 and 0.169 and both are significant at the 95% level. This is also seen in the explanatory values of the regressions as a whole. Equations 1 and 3 have a higher $X^2$ than equations 2 and 4. The level of secondary schooling does not have a significant effect and has a coefficient of 0.000. The average total years of schooling is more important than tertiary education in this part of the world.

Religion does not seem to be statistically significant, except for a 90% significance of the negative influence of Islam on FLFP change in Equation 1. Catholic and Islam generally have negative coefficients, however, in Equation 4 where the number of Muslim countries increases, Islam has a positive coefficient. This positive coefficient is not statistically significant, and the exclusion of an education variable makes this positive coefficient suspect. Nonetheless this may be an indication that the negative influence of Islam on FLFP may be over stated due to sampling bias.

A second interesting result is that for every equation, the coefficient of Orthodox Christianity is positive. Though never significant, this may indicate that Orthodox Christianity has a positive effect on FLFP growth in this part of the world.

Table 9 looks at yearly OLS regressions for twenty Post-communist countries. Only post-soviet and Eastern Bloc countries and Mongolia are looked at. Only 1995 onward is considered. This is both due to lack of data and due to the fact that many post-communist countries were not independent states

in 1990 and earlier. The fertility variable was dropped due to simultaneity problems. CEDAW was dropped due multicollinearity and it being fairly meaningless by 1995 because most countries had already ratified the treaty.

**Table 9. Year by Year OLS Estimates for Post-Communist Countries dependent variable: FLFP**

|  | 1995 | 2000 | 2005 |  |
| --- | --- | --- | --- | --- |
| **GDP** | 0.000 | -0.009 | 0.003 |  |
|  | (0.018) | (0.017) | (0.017) |  |
| **FDI** | -0.001 | 0.000 | -0.017 |  |
|  | (0.018) | (0.025) | (0.035) |  |
| **Openness** | 0.070* | 0.067 | 0.106 |  |
|  | (0.036) | (0.043) | (0.066) |  |
| **Democracy** | 0.002 | -0.014 | -0.088** |  |
|  | (0.027) | (0.028) | (0.038) |  |
| **Secondary** | 0.172 | 0.135 | 0.058 |  |
|  | (0.112) | (0.095) | (0.078) |  |
| **Catholic** | -0.015 | -0.008 | -0.021 |  |
|  | (0.029) | (0.029) | (0.028) |  |
| **Orthodox** | 0.074* | 0.059* | 0.039 |  |
|  | (0.035) | (0.030) | (0.032) |  |
| **Muslim** | -0.164** | -0.161** | -0.189** |  |
|  | (0.064) | (0.065) | (0.084) |  |
| **Constant** | 0.295 | 0.427 | 0.340 |  |
|  | (0.309) | (0.273) | (0.306) |  |
|  |  |  |  |  |
| **n** | 20 | 20 | 20 |  |
| **F** | 2.03 | 1.69 | 1.44 |  |
| **Adj R-squared** | 0.3028 | 0.2243 | 0.1562 |  |

\* Refers to 90% significance, \*\* refers to 95% significant
and \*\*\* refers to 99% significance levels.


The first this to notice in the results is the low Adjusted R squared values and low and statistically insignificant F values. These models are lacking in their ability to explain FLFP rates.

GDP2 is not included in the regressions as these countries did not exhibit a U-shaped relationship between GDP and FLFP levels.

The FDI coefficients hover around 0 for 1995 and 2000 and in 2005 drop to -0.017 but are never significant.

Trade openness has a positive relationship with the levels of FLFP, but is only significant at the 90% level in 1995.

Democracy starts out with an insignificant coefficient of 0.002 in 1995, and by 2000 has an insignificant coefficient of -0.014. By 2005 this has dropped to -0.088 and is significant at the 5% level. This is a pretty clear increase in the negative effects of Democracy on FLFP rates. A move away from authoritarian political regimes has had an increasingly negative effect on the amount of women in the labor force relative to men in the labor force.

In Table 9 Secondary education is used rather than the other education variables. None of the educational variables were statistically significant, and Secondary education gave the highest F and adjusted R squared values so it is the one reported. This suggests that even though in Table 8 gender equality in secondary education was not statistically significant in affecting *changes* in FLFP it is the education variable that is more likely to determine the *level* of FLFP. The effects of secondary education equality on FLFP rates is decreasing over time. This implies that education is becoming less important in influencing women's decision to be a part of the labor market. However, this variable is not significant.

There does not appear to be a clear change in the effects of Islam or Catholicism on FLFP over the time period examined. Both have negative coefficients. Both see a slight drop in the size of the negative coefficient in 2000 and then an increase in 2005 to levels above those in 1995. The coefficients for Islam are much more negative than those for Catholicism. The Muslim coefficients are also significant at the 95% level, while the Catholic coefficients are not significant.

Orthodox Christianity however does show a clear pattern in way it affects FLFP levels over the years. Starting with a coefficient of 0.074 in 1995 the values decrease to 0.059 in 2000 and then 0.039 in 2005. The positive effect that Orthodox Christianity has had on FLFP levels has decreased since the fall of the Soviet Union. The coefficients are significant at the 90% level for 1995 and 2000, and not significant for 2005.

To account for changes in the belief system of the majority of a country being responsible for these results, 1970s religious data was used to make the same regressions. The results are shown in Appendix D These results are very similar to those in Table 9. Worth noting is that the drop in the positive effect Orthodox Christianity has on FLFP levels is even more drastic when excluding countries which recently became majority Orthodox. For countries that were majority Orthodox in 1970, the coefficient for 2005 is 0.017.

This suggests that the religious resurgence seen in post-Soviet nations is seeing the emergence of a more conservative form of Orthodox Christianity. One in which the participation of women in the

labor force is viewed in a less positive light.

## 9.3   African Countries

Table 10 shows Hausman-Taylor regressions on an unbalanced panel of 36 African countries. Three different equations are presented, each using a different educational variable.

**Table 10. Hausman-Taylor Estimates for African Subpanel**
**dependent variable: FLFP**

| | 1 | 2 | 3 |
|---|---|---|---|
| **GDP** | -0.064 | -0.052 | -0.061 |
| | (0.065) | (0.067) | (0.065) |
| **GDP2** | 0.005 | 0.004 | 0.005 |
| | (0.005) | (0.005) | (0.005) |
| **FDI** | -0.006* | -0.005* | -0.005 |
| | (0.003) | (0.003) | (0.003) |
| **Openness** | 0.002 | 0.002 | 0.001 |
| | (0.009) | (0.009) | (0.009) |
| **Democracy** | 0.000 | -0.001 | -0.001 |
| | (0.008) | (0.008) | (0.009) |
| **CEDAW** | 0.012* | 0.012* | 0.013* |
| | (0.007) | (0.007) | (0.007) |
| **Fertility** | -0.023*** | -0.024*** | -0.025*** |
| | (0.004) | (0.004) | (0.004) |
| **Avrg schooling** | | | -0.002 |
| | | | (0.053) |
| **Secondary** | | 0.017 | |
| | | (0.025) | |
| **Tertiary** | 0.019 | | |
| | (0.014) | | |
| **Catholic** | 0.002 | 0.008 | 0.008 |
| | (0.022) | (0.022) | (0.022) |
| **Protestant** | -0.010 | -0.014 | -0.013 |
| | (0.011) | (0.011) | (0.011) |
| **Muslim** | -0.352*** | -0.354*** | -0.354*** |
| | (0.071) | (0.071) | (0.071) |
| **Other** | -0.010 | -0.013 | -0.011 |
| | (0.014) | (0.014) | (0.014) |
| **Constant** | 1.107*** | 1.063*** | 1.116*** |
| | (0.238) | (0.250) | (0.247) |
| | | | |
| **Observations** | 207 | 207 | 207 |
| **Groups** | 36 | 36 | 36 |
| | | | |
| $X^2$ | 141.06*** | 138.26*** | 137.48*** |
| **DF** | 12 | 12 | 12 |

\* Refers to 90% significance, \*\* refers to 95% significant
and \*\*\* refers to 99% significance levels.

GDP values are not significant in their effects on FLFP changes. The U-shape relationship is visible, though the coefficients for GDP2 are rather low. Excluding GDP2 also dropped the $X^2$ values, indicating that a quadratic relationship has better explanatory value.

FDI has a negative effect on FLFP changes and is significant for equations 1 and 2 at a 90%

level.

Trade openness and democracy both hover around zero and are not significant.

Ratification of the CEDAW treaty is positive at the 0.012 level in equations 1 and 2 and the 0.013 level in equation 3. It is also statistically significant at the 90% level in all three equations.

Fertility is highly significant and has a value between -0.023 and -0.025. An increase in the amount of children a woman has will make her less likely to enter the labor force. The more children in a household, the more household production which needs to take place. Women are largely responsible for household production, so more children leads to less time to engage in paid labor. This is unsurprising and the same result that a long line of economic literature (Dollar & Gatti, 1999; Engelhardt, Kögel, & Prskawetz, 2004; Klasen, 1999; Klasen & Lamanna, 2009) has found.

Years of female average schooling compared to male average schooling has a negative coefficient of -0.002, while secondary and tertiary education have positive coefficient values of 0.017 and 0.019, respectively. It would seem that increasing female schooling in general is not as important in producing positive changes on FLFP as increasing secondary and higher education. None of these variables are significant though.

The only significant religious variable was Islam. It was significant at the 99% level, and the coefficients are more negative than in the other panel regressions ran in this paper. The coefficient here is -0.352 in equation 1 or -0.354 in equations 2 and 3. This can be compared to a value of -0.090, -0.087 and -0.085 in Table 6 which shows the results for an unbalanced panel of 138 countries.  This suggests that Islam has a more negative effect on changes in FLFP in Africa than in other parts of the world. This could be due to higher initial levels of FLFP in Africa which drop more rapidly as Islam becomes more widespread in the continent.  This would be in comparison to the Middle East for example where Islam has a long history and where countries have an initially low level of FLFP. Another explanation for this more negative coefficient value may be that Islamic norms in Africa discourage women from being in the labor force more so than the forms of Islam found in the rest of the world.

The other religious variables have coefficients with signs opposite those seen in Table 6 where 138 countries are considered. Catholicism has positive coefficients while Protestantism and "other" religions have negative coefficients. Neither is statistically significant.

Appendix E. shows the same panel regression using religious data from 1970 to ignore any types of changes in the dominant religion. The results are much the same for the non-religious

43

variables. On the other hand, Catholicism sees a large increase in its positive coefficient. From 0.002, 0.008 and 0.008 in table 10 to 0.072, 0.078 and 0.079 in Appendix E. In a similar but opposite fashion, the coefficients for Protestantism become much more negative. From -0.010, -0.014 and -0.013 in table 10 to -0.106, -0.107 and -0.106 in Appendix E. however, both Catholic and Protestant variables remain statistically insignificant. The Muslim coefficients stay similar to table 10. The coefficients for "other" religions become slightly positive, at 0.015, 0.013 and 0.010, but is statistically insignificant.

Table 11 shows the results for OLS regressions for each year for 49 African countries. The only variables included in this regression are GDP and the religious variables.

**Table 11. OLS Estimates for Africa Using only GDP and Religious Variables**
**dependent variable: FLFP**

|  | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 |
|---|---|---|---|---|---|---|
| **GDP** | -0.107*** | -0.105*** | -0.101*** | -0.093*** | -0.092*** | -0.082*** |
|  | 0.037 | 0.034 | 0.033 | 0.030 | 0.025 | 0.024 |
| Catholic | -0.048 | -0.036 | -0.039 | -0.060 | -0.026 | -0.001 |
|  | 0.092 | 0.089 | 0.093 | 0.086 | 0.075 | 0.074 |
| Protestant | -0.049 | -0.024 | 0.039 | 0.057 | 0.073 | 0.057 |
|  | 0.098 | 0.088 | 0.083 | 0.075 | 0.072 | 0.071 |
| Muslim | -0.198*** | -0.199*** | -0.160** | -0.161** | -0.139** | -0.142** |
|  | 0.071 | 0.069 | 0.074 | 0.065 | 0.063 | 0.062 |
| Other | 0.014 | 0.009 | 0.034 | -0.003 | 0.047 | 0.044 |
|  | 0.076 | 0.074 | 0.082 | 0.090 | 0.094 | 0.093 |
| Constant | 1.503*** | 1.492*** | 1.445*** | 1.398*** | 1.405*** | 1.359*** |
|  | 0.259 | 0.236 | 0.232 | 0.206 | 0.179 | 0.173 |
|  |  |  |  |  |  |  |
| **n** | 49 | 49 | 49 | 49 | 49 | 49 |
| **F** | 4.76*** | 5.27*** | 4.64*** | 4.90*** | 5.41*** | 5.25*** |
| **Adj R-squared** | 0.2814 | 0.3076 | 0.2750 | 0.2889 | 0.3145 | 0.3069 |

* Refers to 90% significance, ** refers to 95% significant
and *** refers to 99% significance levels.

The relationship between GDP and FLFP was not found to be quadratic in set of countries, so the GDP2 term is excluded from the model. Per capita GDP is found to be highly significant and have a negative effect on FLFP levels. This effect is consistently decreasing in scope as the years go by. This suggests that if a U-shape relationship between FLFP and GDP exists, Africa may simply be on the left hand side of the U. In this case, growth in GDP will decrease FLFP, until a bottom is reached, and then growth in GDP will begin to increase FLFP rates.

Islam is the only other significant variable, varying between significance levels of 99% in the earlier years and 95% in the later years. This variable also has a negative effect on FLFP levels with coefficients which are more negative than any other in the model. This effect seems to be decreasing as

the years go by though, with a coefficient of -0.198 in 1980 to a coefficient of -0.142 in 2005. This suggests that the negative impact of Islam on FLFP rates in Africa has been decreasing.

The other pattern which can be seen in Table 11 is the growth of positive effects of Protestantism on FLFP levels. This variable starts off with a negative coefficient in 1980 (-0.049) becomes positive (0.039) by 1990, and reaches a high point (0.073) in 2000. 2005 does see a dip back down to 0.057. By and large there seems to be an increasing positive effect of Protestantism on FLFP levels in Africa. It needs to be noted that none of the figures for Protestantism are ever significant.

Catholicism and "other" religions do not seem to show any clear patterns in change. The former is negative and the later largely positive (except in 1995), and neither are ever significant.

To account for changes in dominant religions as being the reason for the patterns seen in Table 11, table 12 shows the same OLS regressions, but with dummy variables for dominant religions from 1970.

**Table 12. OLS Estimates for GDP and Religious Variables for Africa Using 1970s Religious Data dependent variable: FLFP**

|  | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 |
|---|---|---|---|---|---|---|
| GDP | -0.107*** | -0.104*** | -0.093*** | -0.083*** | -0.081*** | -0.076*** |
|  | 0.037 | 0.034 | 0.033 | 0.030 | 0.026 | 0.024 |
| Catholic 1970 | -0.048 | -0.039 | -0.068 | -0.080 | -0.033 | -0.017 |
|  | 0.092 | 0.088 | 0.087 | 0.085 | 0.082 | 0.080 |
| Protestant 1970 | -0.049 | -0.037 | -0.031 | -0.018 | -0.001 | -0.029 |
|  | 0.098 | 0.094 | 0.093 | 0.090 | 0.085 | 0.081 |
| Muslim 1970 | -0.198*** | -0.201*** | -0.202*** | -0.193*** | -0.180*** | -0.191*** |
|  | 0.071 | 0.068 | 0.068 | 0.066 | 0.062 | 0.060 |
| Other 1970 | 0.014 | 0.007 | 0.009 | 0.018 | 0.041 | 0.026 |
|  | 0.076 | 0.073 | 0.073 | 0.071 | 0.066 | 0.064 |
| Constant | 1.503*** | 1.486*** | 1.412*** | 1.344*** | 1.342*** | 1.339*** |
|  | 0.259 | 0.237 | 0.232 | 0.207 | 0.181 | 0.173 |
| n | 49 | 49 | 49 | 49 | 49 | 49 |
| F | 4.76*** | 5.29*** | 4.98*** | 5.14*** | 5.93*** | 6.13*** |
| Adj R-squared | .2814 | .3089 | .2931 | .3012 | .3394 | .3484 |

* Refers to 90% significance, ** refers to 95% significant and *** refers to 99% significance levels.

GDP is similar to Table 11, consistently becoming less negative. In Table 12 the negative coefficients move towards zero at a faster rate. In 2005 the GDP coefficient is not -0.076 whereas in table 11 it was -0.082.

The change in the negative effect Islam has on FLFP levels is different in Table 12 than in Table

11. When controlling for changes in dominant religion by using 1970s data, the negative effects of Islam on FLFP do not change as much over time. The pattern is a lot less clear, but the coefficients for 1980, 1985 and 1990 are higher than the coefficients for 1995, 2000 and 2005, suggesting that while the change may not be as large as shown in Table 11, the negative influence of Islam on levels of FLFP in Africa is decreasing.

A pattern somewhat similar to that in Table 11 can be seen for Protestantism. From 1980 there is a steady move towards zero in the value of the Protestant coefficients. However, unlike Table 11, the Protestant coefficient never reaches a positive value. The closest it gets to zero is a value of -0.001 in 2000, and then in 2005 sees a jump back to a value of -0.029. This suggests that there may have been a decrease in the negative influence of Protestantism on FLFP in Africa until 2000.  Again, it must be noted that these results are not statistically significant.

There is again no clear patter in the changes in Catholicism, with the coefficients being negative but insignificant.

"Other" religions do show an increase in their positive effects on FLFP levels from 1985 to 2000, but 1980 and 2005 do not adhere to this pattern. These results are also not significant, and the pattern is not clear enough to draw any conclusions.

Table 13 shows what happens to the OLS regression results when the other control variables are included. Due to a lack of data for certain variables, the number of countries drops to 32.

**Table 13. OLS Estimates for Africa**
**dependent variable: FLFP**

|  | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 |
|---|---|---|---|---|---|---|
| **GDP** | -0.178*** | -0.174*** | -0.177*** | -0.104* | -0.079 | -0.038 |
|  | (0.050) | (0.052) | (0.045) | (0.055) | (0.049) | (0.043) |
| **FDI** | 0.028 | 0.005 | -0.002 | -0.009 | 0.040 | 0.030 |
|  | (0.023) | (0.022) | (0.023) | (0.027) | (0.038) | (0.037) |
| **Openness** | -0.063 | -0.033 | -0.021 | 0.013 | -0.044 | -0.112 |
|  | (0.067) | (0.065) | (0.059) | (0.073) | (0.047) | (0.078) |
| **Democracy** | 0.050 | -0.377 | -0.189 | -0.013 | 0.157 | 0.117 |
|  | (0.127) | (0.280) | (0.203) | (0.077) | (0.091) | (0.078) |
| **CEDAW** |  | 0.042 | 0.094 | 0.043 | -0.009 | 0.115 |
|  |  | (0.059) | (0.056) | (0.082) | (0.100) | (0.159) |
| **Fertility** | 0.017 | -0.037 | -0.021 | 0.017 | 0.007 | 0.018 |
|  | (0.036) | (0.050) | (0.037) | (0.035) | (0.035) | (0.029) |
| **Avrg schooling** | 0.390* | 0.363 | 0.517* | 0.256 | 0.608* | 0.419 |
|  | (0.217) | (0.244) | (0.266) | (0.369) | (0.345) | (0.339) |
| **Catholic** | 0.231** | 0.145 | 0.176 | 0.125 | 0.034 | 0.020 |
|  | (0.134) | (0.129) | (0.127) | (0.141) | (0.121) | (0.115) |
| **Protestant** | -0.057 | -0.108 | -0.031 | 0.018 | -0.080 | 0.001 |
|  | (0.095) | (0.108) | (0.092) | (0.096) | (0.090) | (0.085) |
| **Muslim** | -0.206** | -0.275*** | -0.209** | -0.243*** | -0.239** | -0.280*** |
|  | (0.095) | (0.095) | (0.091) | (0.082) | (0.092) | (0.078) |
| **Other** | 0.091 | 0.044 | 0.096 | 0.001 | 0.064 | 0.073 |
|  | (0.100) | (0.095) | (0.099) | (0.135) | (0.128) | (0.125) |
| **Constant** | 1.812*** | 2.073*** | 1.760*** | 1.132* | 0.867 | 0.878 |
|  | (0.505) | (0.546) | (0.460) | (0.573) | (0.561) | (0.550) |
| **n** | 32 | 32 | 32 | 32 | 32 | 32 |
| **F** | 5.19 | 5.38 | 6.57 | 3.82 | 4.00 | 4.10 |
| **Adj R-squared** | 0.5747 | 0.6086 | 0.6641 | 0.5005 | 0.5159 | 0.5240 |

* Refers to 90% significance, ** refers to 95% significant and *** refers to 99% significance levels.

GDP is once again seen to be having a negative impact on FLFP levels, and once again this negative impact in decreasing with time. This decrease is more drastic than in Tables 11 and 12.

FDI has a positive coefficient the majority of the time, while trade openness has a negative coefficient the majority of the time, however, neither is significant and there is no clear pattern in changes over time.

Democracy also exhibits no clear patters, and the signs and values of this variable change so much that it is impossible to draw any sort of conclusion.

No African country ratified the CEDAW in 1980, hence the missing value. This variable has

positive coefficients in all years except 2000 but is never significant.

Even though fertility was highly significant in having a negative effect on changes in FLFP in Table 10, here the coefficients vary from sometimes positive to sometimes negative and never significant. This suggests that while fertility may have an important effect on changes in FLFP, it does not have much effect on FLFP levels.

Average schooling of females relative to males has a relatively high positive coefficient every year. However, it is only significant at the 90% level some years.

Unlike Tables 11 and 12 where we did not include control variables, in Table 13 the positive effects of Catholicism on FLFP levels decreases every year except 1990.

The other religious variables do not seem to have any clear patterns in how their influence on FLFP changes over the years when religious conversion is controlled for. Any patters that do emerge, such as those in Tables 11 may be attributed to certain countries converting to those religions.

Table 14 presents the results from an OLS regression which includes the control variables but substitutes consistent 1970s religious data to account for changes in the dominant religion.

As with Table 13, here there is a pattern visible for countries which were Protestant in 1970. The impact of Protestantism on the level of FLFP in these countries begins at a negative value, but by 2005 is positive. Again, these values are not significant, but taken together with Table 12 it seems that the cultural effects of protestantism in Africa are having a growing positive effect on FLFP.

**Table 14. OLS Estimates for Africa Using 1970s Religious Data**
**dependent variable: FLFP**

|  | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 |
|---|---|---|---|---|---|---|
| **GDP** | -0.178*** | -0.156*** | -0.174*** | -0.123** | -0.091* | -0.052 |
|  | (0.050) | (0.050) | (0.044) | (0.05) | (0.047) | (0.038) |
| **FDI** | 0.028 | 0.005 | -0.004 | -0.028 | 0.035 | 0.024 |
|  | (0.023) | (0.022) | (0.022) | (0.028) | (0.033) | (0.030) |
| **Openness** | -0.063 | -0.054 | -0.017 | 0.003 | -0.022 | -0.117 |
|  | (0.067) | (0.061) | -0.059 | -0.066 | (0.043) | (0.074) |
| **Democracy** | 0.050 | -0.298 | -0.190 | 0.051 | 0.138* | 0.112 |
|  | (0.1269) | (0.264) | (0.209) | (0.077) | (0.071) | (0.068) |
| **CEDAW** |  | 0.050 | 0.093 | 0.086 | -0.008 | 0.115 |
|  |  | (0.059) | (0.058) | (0.080) | (0.095) | (0.147) |
| **Fertility** | 0.017 | -0.023 | -0.022 | 0.020 | 0.010 | 0.021 |
|  | (0.036) | (0.047) | (0.038) | (0.033) | (0.032) | (0.028) |
| **Avrg schooling** | 0.390* | 0.312 | 0.483* | 0.641* | 0.586* | 0.612* |
|  | (0.217) | (0.246) | (0.255) | (0.328) | (0.315) | (0.305) |
| **Catholic 1970** | 0.231** | 0.175 | 0.189 | 0.086 | 0.174 | 0.104 |
|  | (0.134) | (0.125) | (0.116) | (0.123) | (0.120) | (0.113) |
| **Protestant 1970** | -0.057 | -0.058 | -0.022 | -0.020 | -0.021 | 0.014 |
|  | (0.095) | (0.092) | (0.092) | (0.086) | (0.086) | (0.079) |
| **Muslim 1970** | -0.206** | -0.255** | -0.205** | -0.159 | -0.172* | -0.220*** |
|  | (0.095) | (0.093) | (0.091) | (0.096) | (0.095) | (0.077) |
| **Other 1970** | 0.091 | 0.064 | 0.102 | 0.171 | 0.111 | 0.145 |
|  | (0.100) | (0.094) | (0.095) | (0.120) | (0.094) | (0.087) |
| **Constant** | 1.812*** | 1.957*** | 1.754*** | 0.949 | 0.827 | 0.796 |
|  | (0.505) | (0.533) | (0.461) | (0.551) | (0.526) | (0.506) |
|  |  |  |  | . |  |  |
| **n** | 32 | 32 | 32 | 32 | 32 | 32 |
| **F** | 5.19*** | 5.17*** | 6.55*** | 4.56*** | 4.76*** | 5.13*** |
| **Adj R-squared** | 0.5747 | 0.5970 | 0.6632 | 0.5579 | 0.5719 | 0.5945 |

\* Refers to 90% significance, \*\* refers to 95% significant and \*\*\* refers to 99% significance levels.

When control variables are included in the regression in Table 13 Catholicism shows a pattern of decreasingly positive effects on FLFP levels. In table 14 when only countries which were Catholic for all time periods are considered this pattern becomes less clear. However, the three coefficient values for 1980, 1985 and 1990 all have a larger value than those for 1995, 2000 and 2005. So while a clearly visible pattern does not exist, it may be that the effects of Catholicism on FLFP rates are moving towards zero, or possibly towards a negative value, which would be similar to the effect Catholicism has in the rest of the world.

Again, Protestantism and Catholicism in general are not significant.

The negative impacts of Islam on FLFP did appear to potentially decrease over time in Tables

11 and 12 however, when control variables were added to the equation this decrease over time disappeared. No clear pattern emerges, indicating that the negative effects of Islam on FLFP levels in Africa have not changed over time.

Finally, It seems that "other" religions have a positive effect on FLFP levels, but no patter of change over time exists and these effects are not statistically significant.

## 9.4    Muslim Countries

Table 15 shows the results from Hausman-Taylor and fixed effects regressions on countries which had a majority Muslim population. Based on the pretest suggested by Baltagi, Bresson & Pirotte (2003), the Hausman-Taylor results are more efficient, but the fixed effects model is included for comparison purposes. The final two columns show a Hausman-Taylor and a fixed effects estimate using religious data from the 1970s to exclude countries which more recently converted to a majority Muslim population.

Overall, these results indicate a number of reasons why Islamic countries have lower FLFP than the rest of the world. Their GDP coefficients do not show a quadratic relationship. Because of this, GDP2 is excluded from the equation. Instead, GDP alone has a negative effect on FLFP. This indicates that as income in Muslim countries rises, females are less inclined to join the labor force. This would suggest that the income effect and the effect of a husband's income has a higher influence on FLFP than does the substitution effect.

**Table 15. Hausman-Taylor (HT) and Fixed Effects (FE) Estimates for Muslim Countries dependent variable: FLFP**

| | HT | FE | HT | FE | HT | FE | HT 1970s | FE 1970s |
|---|---|---|---|---|---|---|---|---|
| **GDP** | -0.054*** | -0.056*** | -0.049*** | -0.050*** | -0.055*** | -0.056*** | -0.053*** | -0.057*** |
| | (0.017) | (0.018) | (0.017) | (0.018) | (0.017) | (0.018) | (0.017) | (0.018) |
| **FDI** | 0.016*** | 0.016*** | 0.016*** | 0.016*** | 0.015*** | 0.015*** | 0.016*** | 0.016*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| **Openness** | -0.041*** | -0.042*** | -0.041*** | -0.042*** | -0.039*** | -0.040*** | -0.041*** | -0.042*** |
| | (0.013) | (0.013) | (0.013) | (0.014) | (0.013) | (0.014) | (0.013) | (0.013) |
| **Democracy** | 0.017 | 0.018 | 0.009 | 0.010 | 0.006 | 0.005 | 0.020 | 0.022 |
| | (0.014) | (0.014) | (0.014) | (0.014) | (0.014) | (0.014) | (0.015) | (0.015) |
| **CEDAW** | 0.004 | 0.005 | 0.001 | 0.002 | 0.002 | 0.002 | 0.003 | 0.005 |
| | (0.010) | (0.010) | (0.010) | (0.011) | (0.010) | (0.011) | (0.010) | (0.010) |
| **Fertility** | -0.044*** | -0.044*** | -0.038*** | -0.038*** | -0.034*** | -0.035*** | -0.044*** | -0.044*** |
| | (0.006) | (0.006) | (0.005) | (0.005) | (0.005) | (0.005) | (0.006) | (0.006) |
| **Avrg schooling** | -0.191** | -0.202*** | | | | | -0.191** | -0.206*** |
| | (0.075) | (0.077) | | | | | (0.076) | (0.077) |
| **Secondary** | | | -0.046 | -0.053 | | | | |
| | | | (0.043) | (0.044) | | | | |
| **Tertiary** | | | | | 0.014 | 0.014 | | |
| | | | | | (0.025) | (0.025) | | |
| **Communism** | 0.248 | | 0.229 | | 0.208 | | 0.252 | |
| | (0.195) | | (0.185) | | (0.182) | | (0.197) | |
| **Constant** | 1.345*** | 1.388*** | 1.1680*** | 1.196*** | 1.150*** | 1.169*** | 1.338*** | 1.395*** |
| | (0.182) | (0.188) | (0.1683) | (0.174) | (0.168) | (0.173) | (0.184) | (0.190) |
| | | | | | | | | |
| **Observations** | 155 | 155 | 155 | 155 | 155 | 155 | 152 | 152 |
| **Groups** | 30 | 30 | 30 | 30 | 30 | 30 | 29 | 29 |
| | | | | | | | | |
| $X^2$ | 176.19*** | | 163.72*** | | 161.25*** | | 174.23 | |
| **Degrees of freedom** | 8 | | 8 | | | | 8 | |
| **F** | | 24.14*** | | 22.35*** | | 21.98** | | 24.00*** |

\* Refers to 90% significance, ** refers to 95% significant and *** refers to 99% significance levels.

FDI has a highly significant and positive relationship with a coefficient of around 0.016, indicating that the presence of foreign companies encourages FLFP rates to grow.

Trade openness on the other hand has an equally significant (at the 99% level) and stronger (coefficients around -0.041) negative impact on FLFP growth.

Democracy and CEDAW both have positive and insignificant coefficients.

Fertility is highly significant and negative with a coefficient varying between -0.034 and -0.044. There has been a decrease in fertility rates in the Islamic world from a mean of 6.25 children in 1980 to a mean of 3.70 children in 2005. This is a decrease of about 40% compared to the world as a whole

which saw a change from 4.58 to 3.01 a change of around 34%. Figure 2 shows the steady decline in fertility in Islamic countries since 1980. This can be compared to Figure 3 and Appendix F which show the same graph for Catholic countries and the world. This may be one of the main reasons there has been an increase in FLFP rates in Muslim nations, even though the effects of Islam on FLFP remain largely unchanged.



Figure 2. Fertility Rates for Muslim Countries
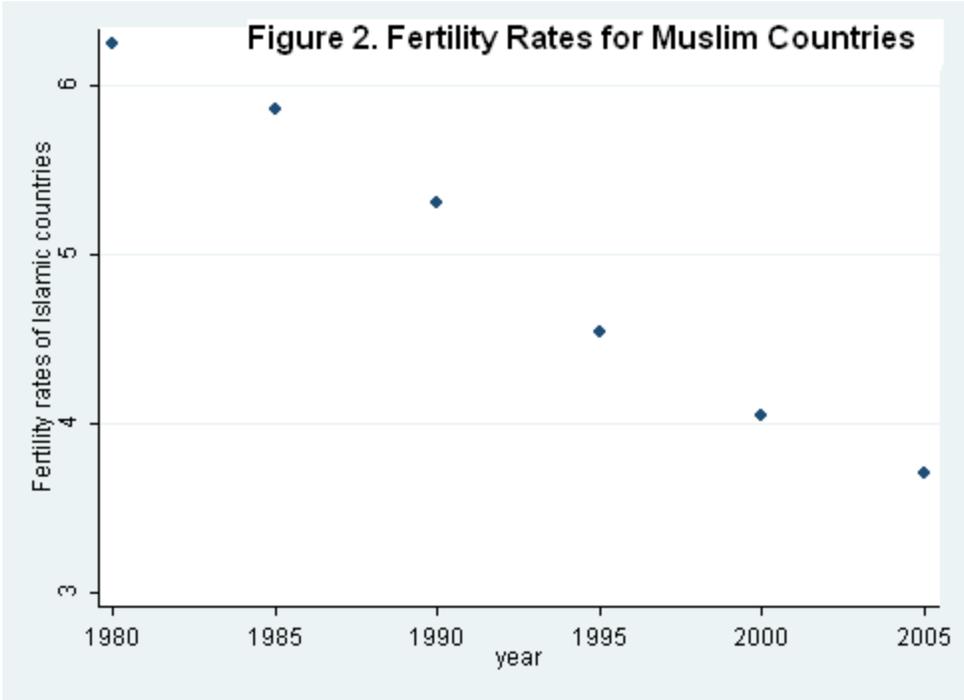
The ratio between female and male average years of schooling is significant and has a highly negative coefficient of -0.191 for the Hausmant-Taylor model and -0.202 for the fixed effects model. This suggests that when there is more gender equality in the time spent in the educational system there will be a decrease in the rates that women enter the labor force. This finding is similar to that of Cameron, Dowling, & Worswick (2001) who found that in societies which have more rigid gender roles, female education has less of a positive and sometimes negative impact on FLFP rates.

In poorer countries, where FLFP rates are higher, the opportunity cost of sending girls to school may be too high. A family may only be able to afford to send their male children to school. As the income of a country increases, the FLFP will decrease, but the amount of girls being sent to school will increase. Higher income countries have higher levels of gender equality in education, where the whole population is more educated. Because of a higher general income level, a husband's income may be enough to sustain the family, and married women tend not to enter the labor force. In the income-

leisure model, "other income" seems to have a stronger effect for women in Islamic countries.

The ratio of completed secondary education also have negative coefficients, however these are lower than those for average years of schooling and not statistically significant.

The ratio of completed tertiary education is positive, but also not statistically significant. This suggests that investments in higher education of women is more likely to lead to participation in the labor market than lower levels of education.

To look more in depth at what effects education has in predominantly Muslim countries, Table 16 shows the same regressions as Table 15 except that the ratio of female to male education is not used. Instead, total female education and total overall education are used.

**Table 16. Hausman-Taylor (HT) and Fixed Effects (FE) Estimates for Muslim Countries Using Female and Total Education**
**dependent variable: FLFP**

| | HT | FE | HT | FE | HT | FE |
|---|---|---|---|---|---|---|
| GDP | -0.060*** | -0.062*** | -0.079*** | -0.081*** | -0.058*** | -0.060*** |
| | (0.017) | (0.018) | (0.017) | (0.018) | (0.017) | (0.018) |
| FDI | 0.015*** | 0.015*** | 0.014*** | 0.014*** | 0.014*** | 0.014*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| Openness | -0.032** | -0.033** | -0.028** | -0.029** | -0.040*** | -0.040*** |
| | (0.013) | (0.014) | (0.013) | (0.013) | (0.013) | (0.014) |
| Democracy | 0.007 | 0.007 | 0.008 | 0.008 | 0.007 | 0.007 |
| | (0.013) | (0.014) | (0.013) | (0.013) | (0.014) | (0.014) |
| CEDAW | 0.009 | 0.010 | 0.008 | 0.009 | 0.004 | 0.004 |
| | (0.010) | (0.011) | (0.010) | (0.010) | (0.010) | (0.011) |
| Fertility | -0.038*** | -0.038*** | -0.037*** | -0.038*** | -0.035*** | -0.035*** |
| | (0.006) | (0.007) | (0.005) | (0.005) | (0.005) | (0.005) |
| Female avrg schooling | 0.038** | 0.037** | | | | |
| | (0.016) | (0.016) | | | | |
| total avrg schooling | -0.045*** | -0.045*** | | | | |
| | (0.017) | (0.017) | | | | |
| Female secondary | | | 0.014*** | 0.014*** | | |
| | | | (0.003) | (0.003) | | |
| total secondary | | | -0.015*** | -0.015*** | | |
| | | | (0.003) | (0.003) | | |
| Female tertiary | | | | | 0.017* | 0.017* |
| | | | | | (0.010) | (0.010) |
| total tertiary | | | | | -0.014 | -0.014 |
| | | | | | (0.009) | (0.009) |
| Communist | 0.084 | | 0.030 | | 0.087 | |
| | (0.132) | | (0.134) | | (0.134) | |
| Constant | 1.246*** | 1.276*** | 1.365*** | 1.393*** | 1.196*** | 1.215*** |
| | (0.170) | (0.178) | (0.166) | (0.171) | (0.170) | (0.176) |
| | | | | | | |
| Observations | 155 | 155 | 155 | 155 | 155 | 155 |
| Groups | 30 | 30 | 30 | 30 | 30 | 30 |
| F | | 21.08*** | | 24.78*** | | 19.85*** |
| $X^2$ | 175.94*** | | 205.98*** | | 165.11*** | |
| Degrees of freedom | 9 | | 9 | | 9 | |

* Refers to 90% significance, ** refers to 95% significant and *** refers to 99% significance levels.

Most of the coefficient values are not different from Table 15. GDP becomes more negative, trade openness less negative, but there are no dramatic changes. The one exception is the coefficient of communism, which drops to less than half of what it is in table 15, but it is insignificant in both tables.

It is the education variables which are of interest here. Rather than looking at the equality in gender education, Table 16 looks at the absolute values of education. Equations 1 and 2 look at what effect the average total years of female education has on changes in FLFP while including the average total years of education for the whole population in the equation. This controls for the education level of the country as a whole. Equations 3 and 4 look at the effect the number of females who completed secondary education has on FLFP changes while controlling for the total population's completion of secondary education. Finally, equations 5 and 6 look at the effect of totally female completion of tertiary education on FLFP while controlling for the totally population's completion of tertiary education.

All three variables looking solely at women's education have positive effects on FLFP. The average total number of years in school for females is significant at the 95% level, the percentage of females who completed a secondary education is highly significant and the percentage of females who completed a tertiary education is significant at the 90% level. The more time women invest in education the more likely they are to be a part of the labor force.

The average total years of schooling, the completion rate for secondary and tertiary educations for the whole population have a negative relationship with FLFP. These results show that the amount of education of a country as a whole has a negative effect on changes in FLFP rates. One possible explanation for this is that as the total education of a country increases, the wages of males go up due to their higher levels of human capital. This increases the income that married women see from "other" sources, and are less inclined to join the labor force to gain an income of their own.

These results show a contradictory effect that education has on women. More educated women are more inclined to enter the labor force. At the same time, women living in more educated countries are less inclined to enter the labor force. This relationship is true for the rest of the world also (see appendix G) the difference is that in the rest of the world, the positive effect of educated women entering the labor market is stronger than the negative effect of total education levels decreasing FLFP. In predominantly Muslim countries the opposite is true, except for tertiary education. Increasing gender equality in lower levels of education in Muslim countries will not directly increase FLFP rates.

## 9.5   Catholic Countries

Table 17 shows Hausman-Taylor and fixed effects models for Catholic countries. The Hausman-Taylor model was found to be more efficient, but the fixed effect model is included as a comparison.

The results for Catholic countries largely support previous literature. GDP is found to have a quadratic relationship to FLFP changes. The U-shape of this relationship appear to be more pronounced under the Hausman-Taylor model, with GDP being more strongly negative and GDP2 being more strongly positive than in the fixed effects model.

Trade openness has a highly significant positive effect on changes in FLFP.

**Table 17. Hausman-Taylor (HT) and Fixed Effect (FE) Estimates for Catholic Countries.**
**dependent variable: FLFP**

| | HT | FE | HT | FE | HT | FE |
|---|---|---|---|---|---|---|
| **GDP** | -0.292** | -0.184 | -0.272** | -0.168 | -0.252** | -0.145 |
| | 0.121 | 0.127 | 0.120 | 0.126 | 0.120 | 0.126 |
| **GDP2** | 0.023*** | 0.018** | 0.023*** | 0.018** | 0.021*** | 0.016*** |
| | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 |
| **FDI** | -0.003 | -0.004 | 0.000 | -0.001 | -0.003 | -0.004 |
| | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |
| **Openness** | 0.043*** | 0.042*** | 0.042*** | 0.041*** | 0.045*** | 0.043*** |
| | 0.013 | 0.014 | 0.013 | 0.013 | 0.013 | 0.013 |
| **Democracy** | -0.025*** | -0.025** | -0.022** | -0.021** | -0.022** | -0.022** |
| | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 |
| **CEDAW** | 0.022** | 0.020** | 0.023** | 0.021** | 0.019** | 0.017* |
| | 0.009 | 0.010 | 0.009 | 0.010 | 0.009 | 0.010 |
| **Fertility** | -0.030*** | -0.032*** | -0.027*** | -0.030*** | -0.021*** | -0.024*** |
| | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.008 |
| **Avrg schooling** | 0.136 | 0.150 | | | | |
| | 0.095 | 0.097 | | | | |
| **Secondary** | | | 0.130*** | 0.124** | | |
| | | | 0.048 | 0.049 | | |
| **Tertiary** | | | | | 0.091*** | 0.083*** |
| | | | | | 0.027 | 0.028 |
| **Communism** | 0.034 | | 0.044 | | 0.055 | |
| | 0.110 | | 0.108 | | 0.098 | |
| **Constant** | 1.136** | 0.581 | 1.247** | 0.724 | 1.006* | 0.478 |
| | 0.578 | 0.610 | 0.564 | 0.593 | 0.565 | 0.596 |
| | | | | | | |
| **Observations** | 210 | 210 | 210 | 210 | 210 | 210 |
| **Groups** | 41 | 41 | 41 | 41 | 41 | 41 |
| | | | | | | |
| $X^2$ | 377.59*** | | 390.91*** | | 400.45*** | |
| **Degrees of freedom** | 9 | | 9 | | 9 | |
| **F** | | 46.61*** | | 48.27*** | | 49.25*** |

* refers to 90% significance, ** refers to 95% significant and *** refers to 99% significance levels

Democracy has a significant negative influence on changes in FLFP. This is likely due at least in part to the transition in post-communist Catholic countries.

CEDAW has a positive and significant effect. The coefficients are larger than those seen in Muslim countries (Table 15) or the world as a whole (Table 6). This would indicate that international pressure has a stronger effect on increasing FLFP in Catholic countries than for other countries.

Not surprisingly, fertility is highly significant and negative. Like Islamic countries, a fall in fertility rates between 1980 and 2005 is responsible for some of the FLFP changes in Catholic

countries. From a high of 3.94 in 1980 to a low of 2.69 in 2000, this represents a change of almost 32%. This is below the world average which changed from 4.58 to 3.01 (a change of over 34%). Being below the world average suggests that changing fertility rates in Catholic countries may not be as important in explaining the rise in FLFP as in Muslim countries. Figure 3 shows the decreasing mean fertility rate for Catholic countries.



Figure 3. Fertility Rates for Catholic Countries
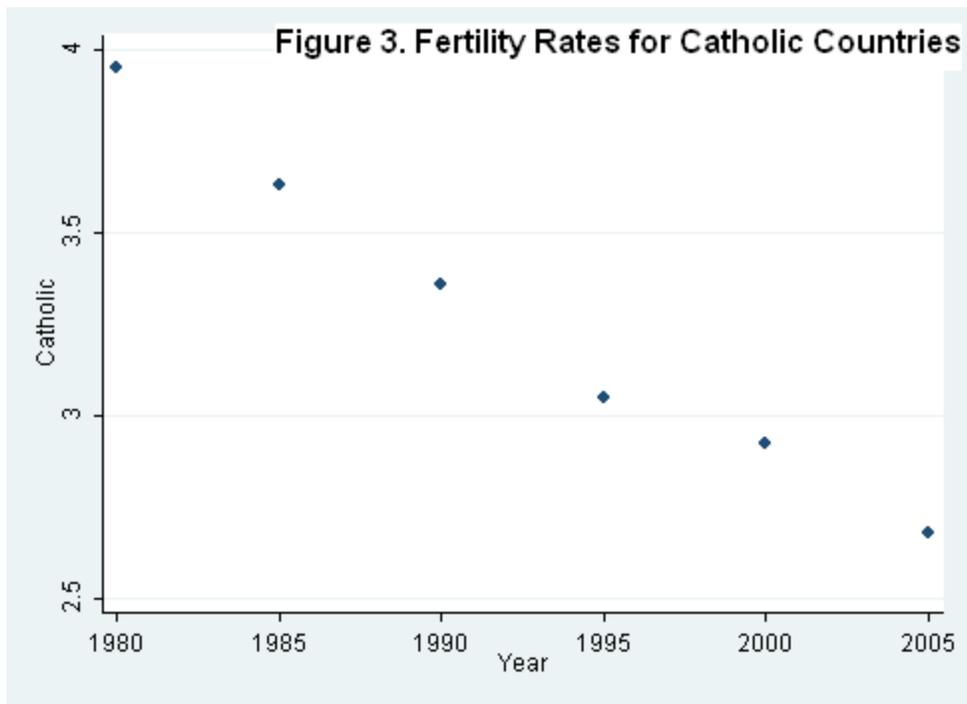
The ratio between female and male average total years of schooling is positive, but not significant. Secondary education has a significant and positive coefficient, suggesting that gender equality in secondary education has a positive effect on FLFP rates. Tertiary education has a significant and positive effect on the changes in FLFP. It seems equality in secondary education is has more of an effect on FLFP than tertiary education, but both play an important role in increasing FLFP.

## Conclusion

Female labor force participation is an important factor in economic development. It is also essential in empowering women. The results in this paper have confirmed that religion plays a role in determining the level of FLFP. They have also shown that the effects of certain religions on FLFP have changed between 1980 and 2005. Finally, I presented some of the reasons why FLFP has risen in

Islamic and Catholic countries despite the largely negative effects of these religions on FLFP rates.

Some of the changes seen in the religious effects on FLFP rates support the idea of secularization; that as countries develop, religion plays a less important role in determining economic activity. The coefficients of certain religions moved towards zero, indicating that the influence of religion on FLFP rates is decreasing. The positive effects of Orthodox Christianity in post-communist countries and Protestantism in the world decreased, while the negative effects of Islam in the world and Catholicism in Africa have become less negative.

However, there are exceptions to this trend. Catholicism's negative effect on FLFP levels for the world sample was increasingly negative. Islam and Catholicism in post-communist countries do not show any sort of clear pattern. Neither do Islam or "other" religions in Africa. Because of these exceptions, it is difficult to make a case for the idea that secularization is changing the influence of religion on FLFP rates. Rather, these changes may be peculiar to certain religions or to certain parts of the world. As more data is collected over the coming years, clearer patterns may emerge for these religions.

Further research is needed to determine in which ways religious influence has changed over time. Whether this change is due to a changing importance of religion in modern life, or whether the teachings of religious leaders has changed in respect to women participating in the labor market.

Finally, there is evidence that different factors are responsible for the growth of FLFP levels in Catholic and Islamic countries. In Islamic countries an above average decline in fertility rates and inflows of FDI are largely responsible for the increase in FLFP rates, while in Catholic countries equality in secondary and tertiary education, ratification of the CEDAW and trade openness play a more important role. Different factors and different forms of globalization affect FLFP in different countries in distinct ways.

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# 11. Appendix
## Appendix A. List of Countries Used in This Paper

| | | | |
|---|---|---|---|
| Afghanistan | France | Mongolia* | Tunisia |
| Albania* | Gabon | Morocco | Turkey |
| Algeria | Gambia | Mozambique | Uganda |
| Argentina | Germany* | Nepal | Ukraine* |
| Armenia* | Ghana | Netherlands | United Arab Emirates* |
| Australia | Greece | New Zealand | United Kingdom |
| Austria | Guatemala | Nicaragua | United States |
| Bahrain | Guyana | Niger | Uruguay |
| Bangladesh | Haiti | Norway | Venezuela, Bolivarian Republic of |
| Barbados | Honduras | Pakistan | Viet Nam |
| Belgium* | Hungary* | Panama* | Yemen* |
| Belize | Iceland* | Papua New Guinea | Zambia |
| Benin* | India | Paraguay | Zimbabwe |
| Bolivia | Indonesia | Peru | |
| Botswana | Iran, Islamic Republic of | Philippines | |
| Brazil | Iraq* | Poland* | |
| Brunei Darussalam | Ireland | Portugal | |
| Bulgaria* | Israel | Qatar* | |
| Burundi | Italy | Romania* | |
| Cambodia | Jamaica | Russian Federation* | |
| Cameroon | Japan | Rwanda* | |
| Canada | Jordan | Saudi Arabia* | |
| Central African Republic | Kazakhstan* | Senegal | |
| Chile | Kenya | Sierra Leone | |
| China | Korea, Republic of | Singapore | |
| Colombia | Kuwait* | Slovakia* | |
| Congo | Kyrgyzstan* | Slovenia* | |
| DR of Congo | Lao PDR | South Africa | |
| Costa Rica | Latvia* | Spain | |
| Côte d'Ivoire | Lesotho | Sri Lanka | |
| Croatia* | Liberia | Sudan | |
| Cuba* | Libyan Arab Jamahiriya* | Swaziland | |
| Cyprus* | Lithuania* | Sweden | |
| Czech Republic* | Luxembourg | Switzerland* | |
| Denmark | Malawi | Syrian Arab Republic* | |
| Dominican Republic | Malaysia | Tajikistan* | |
| Ecuador | Maldives | Tanzania, United Republic of | |
| Egypt | Mali | Thailand | |
| El Salvador | Malta | Togo | |
| Estonia* | Mauritania* | Tonga | |
| Fiji | Mauritius | Trinidad and Tobago | |
| Finland | Mexico* | | |

* represents countries which did not have data available for all time period.

**Appendix B. Results for Hausman Test Between Fixed Effects, Random Effects and Hausman-Taylor**

| Table # | FE v. RE $X^2$ | FE v. HT $X^2$ |
| --- | --- | --- |
| 6. World | 26.14*** | 8.51 |
| 9. Post-Communist | 16.73** | 3.37 |
| 10. Africa | 22.41*** | 11.12 |
| 15. Muslim | 13.65* | 1.08 |
| 16. Muslim | 16.08* | 0.59 |
| 17. Catholic | 37.15*** | 12.18 |

When the $X^2$ value for FE v RE is significant RE is rejected. When the $X^2$ value for FE v. HT is not significant, then HT is more efficient than FE.

FE stands for fixed effects, RE stands for random effects, HT stands for Hausman-Taylor.

* Refers to 90% significance, ** refers to 95% significance and *** refers to 99% significance.

**Appendix C. Year by Year OLS Regression Using 1970s Data for Religion for The World dependent variable: FLFP**

|  | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 |
|---|---|---|---|---|---|---|
| **GDP** | -0.812*** | -0.862*** | -0.801*** | -0.550*** | -0.449*** | -0.423*** |
|  | (0.164) | (0.170) | (0.165) | (0.165) | (0.154) | (0.154) |
| **GDP2** | 0.046*** | 0.049*** | 0.047*** | 0.033*** | 0.026*** | 0.025*** |
|  | (0.009) | (0.010) | (0.009) | (0.009) | (0.009) | (0.009) |
| **FDI** | 0.026*** | 0.019** | 0.005 | -0.003 | 0.024 | 0.006 |
|  | (0.010) | (0.009) | (0.011) | (0.013) | (0.014) | (0.020) |
| **Openness** | -0.044** | -0.041** | -0.036* | -0.033 | -0.051* | -0.024 |
|  | (0.018) | (0.019) | (0.019) | (0.022) | (0.028) | (0.035) |
| **Democracy** | 0.026 | 0.007 | -0.060 | -0.048 | 0.010 | 0.030 |
|  | (0.047) | (0.051) | (0.045) | (0.036) | (0.040) | (0.041) |
| **CEDAW** | 0.070 | 0.048 | 0.083** | 0.130** | 0.086 | -0.016 |
|  | (0.054) | (0.031) | (0.038) | (0.050) | (0.053) | (0.062) |
| **Avrg school** | -0.017 | -0.012 | -0.011 | -0.010 | -0.011 | -0.011 |
|  | (0.011) | (0.012) | (0.012) | (0.012) | (0.010) | (0.011) |
| **Tertiary** | 0.100* | 0.089 | 0.104 | 0.106 | 0.145** | 0.116* |
|  | (0.052) | (0.075) | (0.071) | (0.070) | (0.061) | (0.063) |
| **Communism** | 0.074* | 0.078* | 0.066 | 0.079 | 0.090 | 0.105* |
|  | (0.045) | (0.044) | (0.048) | (0.057) | (0.058) | (0.061) |
| **Catholic** | -0.079* | -0.096* | -0.099** | -0.105** | -0.115*** | -0.095** |
|  | (0.046) | (0.049) | (0.047) | (0.047) | (0.041) | (0.044) |
| **Protestant** | 0.092* | 0.098** | 0.090** | 0.083* | 0.060 | 0.042 |
|  | (0.049) | (0.047) | (0.043) | (0.044) | (0.039) | (0.044) |
| **Orthodox** | -0.107** | -0.146*** | -0.110*** | -0.136*** | -0.087** | -0.102** |
|  | (0.049) | (0.043) | (0.039) | (0.040) | (0.036) | (0.041) |
| **Muslim** | -0.283*** | -0.255*** | -0.251*** | -0.238*** | -0.228*** | -0.247*** |
|  | (0.059) | (0.054) | (0.052) | (0.056) | (0.056) | (0.055) |
| **Other** | 0.064 | 0.059 | 0.035 | 0.031 | 0.044 | 0.065 |
|  | (0.069) | (0.074) | (0.078) | (0.096) | (0.069) | (0.075) |
| **Constant** | 4.279*** | 4.401*** | 4.108*** | 2.987*** | 2.589*** | 2.529*** |
|  | (0.697) | (0.713) | (0.694) | (0.676) | (0.629) | (0.663) |
|  |  |  |  |  |  |  |
| **F** | 15.91*** | 14.61*** | 15.69*** | 13.08*** | 12.87*** | 9.43*** |
| **R squared** | 0.6127 | 0.6014 | 0.6313 | 0.5993 | 0.5729 | 0.5224 |

\* Refers to 90% significance, ** refers to 95% significant and *** refers to 99% significance levels.

Robust standard errors are used due to heteroskedasticity.

**Appendix D. OLS Estimates for Post-Communist Countries Using 1970s Religious Data**
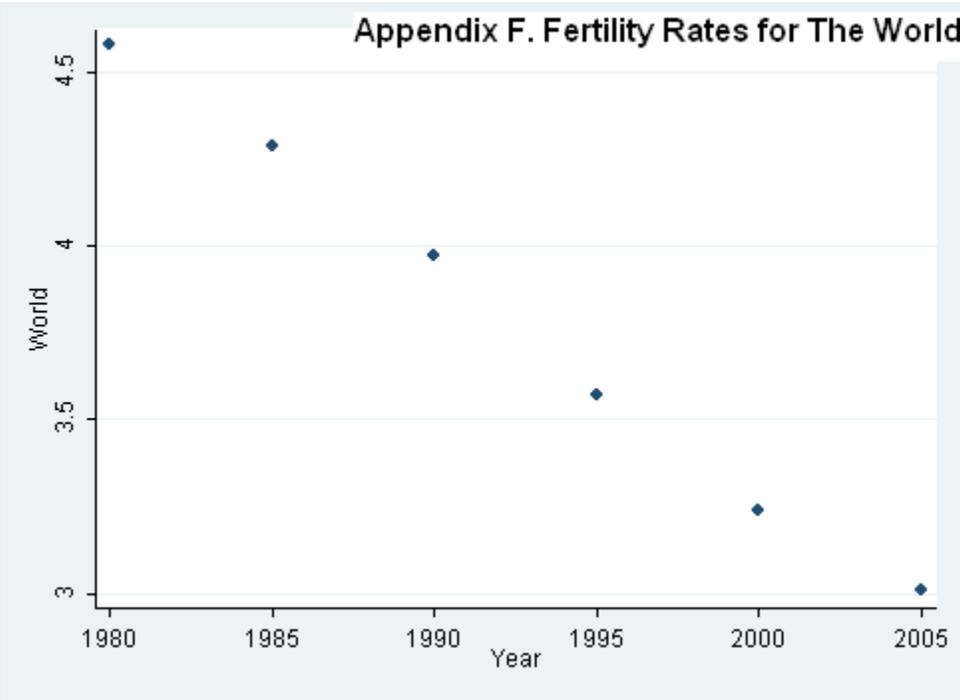**dependent variable: FLFP**

|  | 1995 | 2000 | 2005 |  |
|---|---|---|---|---|
| **GDP** | -0.004 | -0.011 | 0.002 |  |
|  | (0.017) | (0.018) | (0.018) |  |
| **FDI** | -0.008 | 0.006 | -0.002 |  |
|  | (0.015) | (0.026) | (0.034) |  |
| **Openness** | 0.054 | 0.033 | 0.066 |  |
|  | (0.032) | (0.041) | (0.058) |  |
| **Democracy** | -0.017 | -0.020 | -0.085* |  |
|  | (0.027) | (0.031) | (0.042) |  |
| **Secondary** | 0.175 | 0.121 | 0.033 |  |
|  | (0.106) | (0.099) | (0.079) |  |
| **Catholic 1970** | -0.016 | -0.009 | -0.023 |  |
|  | (0.027) | (0.031) | (0.030) |  |
| **Orthodox 1970** | 0.083** | 0.054 | 0.017 |  |
|  | (0.033) | (0.034) | (0.033) |  |
| **Muslim 1970** | -0.182** | -0.159** | -0.171* |  |
|  | (0.060) | (0.069) | (0.088) |  |
| **Constant** | 0.431 | 0.600** | 0.520* |  |
|  | (0.279) | (0.262) | (0.276) |  |
| **n** | 20 | 20 | 20 |  |
| **F** | 2.40 | 1.40 | 1.15 |  |
| **Adj R-squared** | 0.3707 | 0.1432 | 0.0593 |  |

* Refers to 90% significance, ** refers to 95% significant
 and *** refers to 99% significance levels.

**Appendix E. Hausman-Taylor Estimates of Africa Using 1970s Religious Data**
**dependent variable: FLFP**

|  | 1 | 2 | 3 |
|---|---|---|---|
| **GDP** | -0.070 | -0.064 | -0.069 |
|  | (0.059) | (0.060) | (0.059) |
| **GDP2** | 0.005 | 0.005 | 0.005 |
|  | (0.004) | (0.004) | (0.004) |
| **FDI** | -0.005 | -0.005 | -0.006* |
|  | (0.003) | (0.003) | (0.003) |
| **Openness** | 0.000 | 0.001 | 0.002 |
|  | (0.009) | (0.009) | (0.009) |
| **Democracy** | -0.001 | -0.001 | 0.000 |
|  | (0.009) | (0.008) | (0.008) |
| **CEDAW** | 0.012* | 0.012* | 0.011 |
|  | (0.007) | (0.007) | (0.007) |
| **Fertility** | -0.025*** | -0.024*** | -0.023 |
|  | (0.004) | (0.004) | (0.004) |
| **Avrg schooling** | -0.002 |  |  |
|  | (0.054) |  |  |
| **Secondary** |  | 0.012 |  |
|  |  | (0.025) |  |
| **Tertiary** |  |  | 0.021 |
|  |  |  | (0.013) |
| **Catholic 1970** | 0.079 | 0.078 | 0.072 |
|  | (0.146) | (0.146) | (0.146) |
| **Protestant 1970** | -0.106 | -0.107 | -0.106 |
|  | (0.102) | (0.102) | (0.102) |
| **Muslim 1970** | -0.360*** | -0.359*** | -0.357 |
|  | (0.081) | (0.081) | (0.081) |
| **Other 1970** | 0.010 | 0.013 | 0.015 |
|  | (0.092) | (0.092) | (0.092) |
| **Constant** | 1.165*** | 1.133*** | 1.137 |
|  | (0.226) | (0.224) | (0.215) |
| **Observations** | 207 | 207 | 207 |
| **Groups** | 36 | 36 | 36 |
| $X^2$ | 137.59*** | 137.99*** | 141.98*** |
| **Degrees of freedom** | 12 | 12 | 12 |

\* Refers to 90% significance, \*\* refers to 95% significance
and \*\*\* refers to 99% significance levels.

Appendix F. Fertility Rates for The World

**Appendix G. Hausman-Taylor Estimates for The World Sample Using Total Female Education and Total Country Education Variables.**
**dependent variable: FLFP**

|  | 1 | 2 | 3 |
|---|---|---|---|
| GDP | -0.230*** | -0.269*** | -0.174*** |
|  | (0.040) | (0.039) | (0.041) |
| GDP2 | 0.016*** | 0.019*** | 0.012*** |
|  | (0.002) | (0.002) | (0.003) |
| FDI | 0.004* | 0.006*** | 0.005** |
|  | (0.002) | (0.002) | (0.002) |
| Open | -0.007 | -0.005 | -0.011* |
|  | (0.006) | (0.006) | (0.006) |
| Democracy | -0.007 | -0.006 | -0.005 |
|  | (0.007) | (0.007) | (0.007) |
| CEDAW | 0.013** | 0.015*** | 0.013** |
|  | (0.005) | (0.005) | (0.005) |
| Fertility | -0.011*** | -0.019*** | -0.024*** |
| Female avrg schooling | 0.058*** |  |  |
|  | (0.011) |  |  |
| Total avrg schooling | -0.040*** |  |  |
|  | (0.011) |  |  |
| Female secondary |  | 0.004*** |  |
|  |  | (0.002) |  |
| Total secondary |  | -0.002 |  |
|  |  | (0.001) |  |
| Female tertiary |  |  | 0.012*** |
|  |  |  | (0.003) |
| Total tertiary |  |  | -0.005* |
|  |  |  | (0.003) |
| Communist | 0.140*** | 0.149*** | 0.149*** |
|  | (0.051) | (0.051) | (0.049) |
| Catholic | -0.060** | -0.055** | -0.044* |
|  | (0.024) | (0.024) | (0.023) |
| Protestant | -0.031** | -0.022* | -0.014 |
|  | (0.012) | (0.012) | (0.012) |
| Orthodox | -0.079 | -0.075 | -0.092 |
|  | (0.094) | (0.094) | (0.091) |
| Muslim | -0.079*** | -0.073*** | -0.075*** |
|  | (0.027) | (0.028) | (0.027) |
| Other | 0.013 | 0.013 | 0.010 |
|  | (0.018) | (0.018) | (0.017) |
| Constant | 1.407*** | 1.589*** | 1.322*** |
|  | (0.181) | (0.175) | (0.177) |
|  |  |  |  |
| **Observations** | 732 | 732 | 732 |
| **Groups** | 138 | 138 | 138 |
| $X^2$ | 575.37*** | 536.57*** | 585.86*** |
| **Degrees of freedom** | 15 | 15 | 15 |

* Refers to 90% significance, ** refers to 95% significance and *** refers to 99% significance levels.