The Impact of Family Planning Program in Lowering Fertility[†]

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Following the precipitous mortality decline in the developing countries after the World War II, the population explosion of developing countries has been a global concern. We analyze the impact of family planning program effort of developing countries in the 20th century on fertility reduction. This paper studies if the family planning program impact is substantial and statistically significant in fertility reduction, after the endogeneity is controlled using total population, population density and government expenditure to GDP ratio as instrument variables, controlling for relevant economic variables that affect the desired level of fertility such as education level, per capita income and urbanization. We also analyze if family planning program impact varies by region, religion and income level and find that the program is most affective in countries whose GDP per capita is between $1,000 and $2,000, countries in the Middle East and countries with no major religion.

Keywords: Fertility, Family Planning Program, Fertility Transition
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1. Introduction

The world population exponentially grew after it reached 1 billion in the mid-19th century (Weeks (2012)). By the end of the 19th century, the population of the part of the world referred to as "developing" alone has already reached a billion. By the late 1950 it surpassed 2 billion, it reached 3 billion by 1975, and it exceeded 4 billion in the early 1990s (Bongaarts et al. (1990)). Now, in the early 21st century, the number has reached 5 billion.[1] Consequently concern about rapidly increasing population led to concerted effort to reduce fertility rate. In 1952, the first government family planning program was established in India. In addition the International Planned Parenthood Federation (IPPF) was established that year. After that, the scope and the number of such programs dramatically increased, and by 1985, 70 countries had either national family planning programs or significant nongovernmental family planning programs that are at least indirectly supported by government (Brown (1987), World Bank (1984)). However, the degree of impact of family planning programs on fertility reduction is a much debated issue.

This paper estimates family planning program impact on fertility, using a set of instrument variables to control for endogeneity. The causal impact of family planning programs on fertility is difficult to estimate without randomized regional experiments, as the family planning program effort is related to fertility of a region. We use Ross and Mauldin's (1996) cross-country estimate of family planning program effort, measured in four different time periods between 1972 and 1994, as the policy variable and use population, population density and government expenditure to GDP ratio as instrument variables. The use of instruments allows us to make inferences about the impact of family planning programs as per cross-country heterogeneity. We study heterogeneous impact of family planning programs on fertility by region, religion and income level of a country.

The rest of the paper is organized as it follows. In the next section, we will introduce other literatures about impact of family planning programs in fertility reduction in the developing countries in the 20th century. In the following section, we will describe the dataset and highlight factors that may affect fertility decision of households, such as income per capita, education level,

[1] The long run population projection of the developing nations from World Bank indicates that the population of the region will level off at about 10 billion by the end of the next century (Demeny (1990)).

urbanization, and family planning program efforts. After that, we will present the empirical strategy including the selection of instrument to control for simultaneity. In the final section, we will present and discuss the implications of the results. Then, we will conclude the paper.

2 Background

A rapid decline in fertility level first occurred in developed world in the 19th century without presence of strong family planning programs. Freedman (1990) showed that the dramatic fertility decline in various European countries occurred without modern contraceptives or family planning programs. Similarly, Friedlander (1973) showed that the decrease in fertility of Israel was independent of state run family planning program, hence concluding that such programs are not necessary for the decline in fertility. The economic development that improves the value of human capital, indicated by education level, per capita income and urbanization lowers the desired level of fertility and lack of contraceptives would be made up through private channels (Demeny (1990)).

The ongoing debate is on whether the fertility transition for the developing countries in the 20th century would have been delayed had it not been for the family planning programs, because the reduction in desired fertility may not have been achieved or at least delayed due to lack of knowledge or resources to practice contraception.[2] The main aspect of family planning programs is to increase the availability of contraceptives among general population and Freedman (1990) argues that the impact of increasing availability of birth control methods is not negligible in declining fertility rate of less developed region in the 20th century. A theoretical research that connects economic factors such as technical advancement with fertility reduction illustrates that expensive birth control method is a factor that limits human capital investment (Rosenzweig (1990)).

Application of methodology used by Preston (1975) yields that non-economic factors contributed to reduction of population size in less developed region of the world by roughly 10% in 2000 (Heuveline (2001)). Watkins (1987) compares the fertility decline in Europe and in the third world, using the European Fertility Project and the World Fertility Survey and finds that fertility

[2] Bongaarts et al. (1990) reports that the developing region would have had 4.6 billion more people by the year 2100, under the assumption that the fertility transition of the developing countries would have been delayed without family planning programs.

decline was initiated in a relatively rural or poorer region of the world (e.g. France, China, Sri Lanka, and Thailand), or it occurred later than suggested by macroeconomic variables (e.g England and Mexico) and argues that institutional change can explain these exceptions. Family planning programs, first began in Asian countries, is a major example of such institutional change and it accords well with fertility decline of the region. The decline in fertility seemingly independent from economic development could be evidence that family planning program impact is significant.

However, there are sources of endogeneity in estimating family planning program impact on fertility. Endogeneity may be generated by regional unobserved characteristics that determine the program effort and within or cross-country migration decision based on the program effort (Rosenzweig and Wolpin (1986) and Rosenzweig and Wolpin (1988)), hence a line of literatures use either regional fixed effects or regional experiments to study the impact of family planning programs. Studies that use within-country regional fixed effects of Indonesia find that the impact is either small or statistically insignificant (Gertler and Molyneaux (1994) and Pitt et al. (1993)) but similar study of India shows that the impact is statistically significant (Duraisamy and Malathy (1991)). Using the Taichung City (Taiwan) experiment of 1963, Freedman and Takeshita (1969) shows that the family planning program significantly raises acceptance to contraceptive usage. Sinha (2005) finds that the impact of family planning program is significant in lowering fertility using experiments conducted in Matlab sub-district of Bangladesh in 1978.[3]

3 Data

The measurement of family program effort for different countries is not easy, nor is it possible to treat the 'existence' of such programs as a dummy variable because almost all less developed region of the world have some sort of family planning program nowadays. Therefore, in order to run regressions, we need the data about the degree of effort for family planning programs. The widely accepted dataset that assesses the effort of family planning programs is the one that composed by Ross and Mauldin (1996) that keeps track of the family planning program effort of 93 developing nations.

[3] Sinha (2005) finds that family planning program reduces fertility mainly through increased birth spacing. Kim (2010) also finds that family planning programs in Indonesia has positive impact on birth spacing.

They report scores based on detailed questionnaire answered by officials directly involved in family planning programs in each country, citizens familiar with such programs, donor personnel in various agencies, and knowledgeable foreigners in the year 1972, 1982, 1989, and 1994. The maximum score is 120, and scores are grouped into 4 categories for classification conveniences: policies and stage-setting activities, service and service-related activities, record-keeping and evaluation, and availability of contraceptive methods.[4]

The dataset from 1982, 1989, and 1994 are the same in design and procedure. They used 30-item scale, improved from 15-item scale of 1972 (Lapham and Mauldin (1972)), with 8 items in policy stage-setting activities, 13 items in service and service-related activities, 3 items in record-keeping and evaluation, and 6 items in availability of contraceptive methods (Lapham and Mauldin (1985)) The score range for each item is from 0 to 4, 4 indicating the strongest program. Thus, the maximum possible scores are 32 for policy stage-setting activities, 52 for service and service-related activities, 12 for record-keeping and evaluation, and 24 for availability of contraceptive methods. They did not merely take the average of the scores reported by all participants. Rather, they discounted responses that were very different from others, and for each item, tried to extract the answer from the correspondent who is most knowledgeable about the program in each country. Although 1972 survey was a little different in design, Ross and Mauldin (1996) concluded that it was sufficiently similar to later surveys to allow reasonable comparisons (p.137).

We construct a panel as per the years and countries specified in Ross and Mauldin. Measures for education, urbanization, per capita income, government expenditure, total GDP, total population and total fertility rate were all attained from the United Nations country database. Total fertility was available from the United Nations national data of 1973, 1983, 1988, and 1993. For education measure, we divided the total number of education enrolment at secondary level by total population of each country for years 1970, 1980, 1990, 1996, the closest available years from Ross and Mauldin measure. Government spending, total GDP and GDP per capita of

[4] Family programming effort sharply increased from 1972 to 1982, and again from 1982 to 1989 overall. However it did not change much from 1989 to 1994, when some countries that reached desirably low enough fertility rates purposely decreased their family planning effort. The regions that had the lowest score in 1989 survey were the ones that increased their score most between 1989 and 1994, mostly in policies and stage-setting activities category.

current prices were used for years 1972, 1982, 1989, and 1994, while the percentage of urban population was available for years 1970, 1980, 1990, and 1995.[5]

Some nations, mostly from Africa, reported that their total fertility was exactly the same to three decimal places in all four sample periods in 1972, 1982, 1989, and 1994. It was highly conceivable that so many countries from the region having exactly the same self-reported fertility rate for over two decades were due to errors in data collection.[6] Therefore, countries that self-reported the same fertility rate from 1972 to 1994 were dropped out from the sample before running the regression.[7]

The total population of each country was divided by the land area[8] to estimate the population density. Each country was categorized into 7 religion groups: Buddhism, Roman Catholic, Christianity, Hindu, Muslim, Other indigenous, and none. If more than 50 percent of population in a country was indicated as having one specific religion,[9] the country was classified under the religion. Otherwise, the country was categorized under 'none', indicating that there is no major religion in that country. Finally, to control for the non-religious cultural aspect of each country, each country was divided into the following 5 region categories, based on the location: Asia, Middle East and North Africa, Africa, Central America, and South America.

The plot of family program effort measures against total fertility rates reveals that there seem to be a weak negative correlation between them (See Figure 1). There are regional variations in the two variables. Countries in Africa tend to have relatively lower level of family planning effort with greater total fertility level while countries in Far East tend to have relatively greater level of family planning effort with smaller total fertility level. Middle Eastern and Northern African countries tend to have total fertility rates greater than 5 while most Asian countries display total fertility rate less than 5. Therefore, in the following sections, we will not only determine the

[5] Dataset reference numbers for UN website are: 14920 for total fertility, 13660 for total population, 13710 for urbanization, and 19510 for GDP/capita. The secondary enrolment data is from UNESCO Institute for Statistics (http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=136&IF_Language=eng&BR_Topic=0).

[6] There was a total fertility rate dataset directly gathered by UN, not self-reported, also available, but the dataset was too limited in duration and in the number of countries.

[7] Those countries were Benin, Bhutan, Brundi, Burkina Faso, Central African Republic, Chad, Congo, Cote I'voire, Laos, Liberia, Mali, Mozambique, Nigeria, Oman, Sierra Leone, Somalia and Togo.

[8] Source: CIA World Factbook

[9] Source: CIA World Factbook

impact of program effort on fertility, controlling for other economic variables but also estimate and compare the program effort elasticity by region, religion and income level.

4 Empirical Strategy

The linear regression model is used to analyze the impact of family planning programs. The dependent variable is total fertility level of a country. The equation to be estimated takes the following form:

$$Total\ Fertility_{it} = \beta_0 + \beta_1 Program\ Effort_{it} + \sum_j \beta_j X_{it} + \sum_k \beta_k X_i + \sum_t D_t + e_{it} \quad (1)$$

where *i* indexes countries, *t* indexes time, *j* indexes time variant country specific characteristics such as proportion of population enrolled in tertiary education, per capita income and urbanization and k indexes time invariant country specific characteristics such as geographic region and major religion. The $Program\ Effort$ variable is the Ross and Mauldin (1996) measure of family planning program effort and D_t represents the time fixed effect.[10]

The time variant country specific characteristics represent the determinants of desired fertility as proxies for economic development. Industrialization and urbanization are defining factors for the onset and the progress of decreasing fertility rates and a numerous empirical works confirms the connection (Mosk (1977)). According to Axinn and Barber (2001), education level of the husband and the proximity to school of wife when young affects fertility rate negatively, indicating that education is a determining factor of fertility. In addition, Rosenzweig (1990) reaffirms the theory that the increasing wage rate, i.e. income, is related to decreasing fertility. In addition, we added country specific regional and religious variables to measure the impact of religion and other behavioral/cultural aspects specific to geography on fertility.

The $Program\ Effort$ variable is endogenously determined by other economic variables and the desired fertility level. The selection of instruments, therefore, was of substantial importance to control for the endogeneity. We selected three instruments: total population, population density and government expenditure to GDP ratio. The total population and population density would increase the need to reduce fertility level for the policy makers at a country level; hence the strength of family planning program effort would be positively affected by those factors.

[10] To control for heteroskedasticity in the error term, we used clustered standard error on year of observation.

Government expenditure to GDP ratio also increases the available funds for government projects, including the family planning programs. However, the fertility is determined at individual household level and the macroeconomic variables such as government spending, population and population density would not have a direct impact on the individual decision making.

5 Discussion

The result of the empirical analysis in regression model (1) and summary statistics of relevant variables are presented in Table 1. The first three columns of model (1), (2) and (3) report the regression result without using the instruments. Model (1) only includes time variant economic variables, model (2) additionally includes regional and religious time invariant controls and on top of that, model (3) includes the time fixed effects. Model (4) is the results of IV regression, where all independent variables from model (3) are included in the first and the second stage regression. The coefficient of primary interest β_1 is reported in the top row. The impact of family planning program strengthens after the model is treated with instrument variables. Comparing the model that includes all fixed effects, model (3), and the model that includes instruments on top of all fixed effects, model (4), reveals that each point increase in program effort score leads to the reduction of total fertility rate by 0.027 and 0.069 respectively. For example, the increase of family planning program effort by 10 out of 100 would result in the reduction of total fertility rate by 0.27 and 0.69 respectively. This result is consistent with Angeles et al. (2005) that use 1993 Indonesia Family Life Survey to show that models without endogeneity control seriously understates the impact of family planning programs and overstates the impact of parents' education level on fertility.[11]

Model 4 suggest that religious and regional factors are significant factors of fertility. We find that the total fertility rate of Roman Catholic countries is greater than countries with no major religion by 1.2. Religious characteristic of Roman Catholic that prevents the use of contraceptives may contribute to increased level of total fertility rate. Compared to the countries in Asia, all the regions except for South Africa have similar fertility levels, controlling for the program effort and other economic variables.

[11] They jointly estimate four outcomes (fertility, marriage, father's and mother's education) using maximum likelihood estimation method.

The relative size of coefficients of other economic and regional/religious variables generally tend to change significantly under the use of the instrument as well. Table 2 illustrates that the program effort elasticity β_1 is relatively greater compared to other economic, regional and religious characteristics when instrument variables were used. A model (3) show that impact of a percentage point increase in female population enrolled in secondary education is analogous for 107 point increase in family planning program effort. However, the full IV model (4), presented in the second column of Table 2, shows that a percentage point increase in the female secondary education enrolment would reduce total fertility rate by 2.2, the impact analogous to only 31 point increase in family planning program effort, again consistent with Angeles et al. (2005). As such, in model (4), the increase in per capita GDP by 1,000 USD would reduce the total fertility rate by 0.10, impact analogous to a 1.4 point increase in family planning program effort. Controlling for education and income, the impact of urbanization is weakly significant and the magnitude is small, where the impact of a percentage point increase in urbanization on total fertility rate is analogous to the impact of only a 0.28 point increase in family planning program effort in model (4). The impact of family planning program not only rises from no IV model of model (3) to IV model of model (4), but also the relative sizes of the family planning program impact to female education and urbanization increase.

Sensitivity of fertility levels to family planning effort varies by region, religion and income level (See Table 3). Table 3 reports the coefficient of interest β_1 for regression models (1) to (4) as specified in Table 1, for subgroups by region, religion and income level. Panel A divides the whole sample by regional subgroups. In model (4), countries in Asia, Africa and Middle East have significant and negative program impact on fertility reduction. For South America and Central America the significance dissipates as we add more time fixed effects, religion fixed effects and instrument variables that in model (4), none of the two coefficients are significant. The program impact and statistical significance precipitously increases from model (3) to (4) for Asia, Africa, and Middle East. In model (4) with all fixed effects and instrument variables, Middle East is most sensitive to the program effort increase that a point increase in family planning program effort would lead to 0.15 point reduction in the level of total fertility rate, almost 3 times greater than 0.05 point reduction in the level of fertility rate of Asia. African elasticity is approximately double the number for Asia that a point increase in program effort would lead to 0.11 point reduction in the level of fertility rate.

Impact of family planning effort may vary by region for the level of unwanted fertility and measurement error. Level of unwanted fertility and the need for contraceptives may vary across regions. Economic structure, proximity to industrialized regions of the world, cultural openness and acceptance to contraceptive use and climate characteristics that affects the use of contraceptives are contributing factors of unwanted fertility. In some regions level of unwanted fertility may be smaller or even negligible because the unmet need to contraceptives would be met by alternate means. Then, in those regions economic variables and time trends may be enough to explain the fertility trend. As the family planning effort is a survey data, leniency of respondents may lead to overstatement of family planning effort by region. Then the impact of family planning program effort would be understated in those regions. For example, countries in Middle East may have greater level of unwanted fertility due to lower degree of social acceptance to contraceptive use than Asia and/or the family planning program effort survey respondents may be less lenient in self-assessment than the respondents in Asia.

In Panel B, program impact is reported per religion. The significance of coefficients disappears for Christian countries as we introduce instrument variables. Program effort coefficient for Christianity is insignificant in model (4) and the coefficient is significant for all other religious groups after the introduction of instruments in model (4). Size of family planning impact estimation precipitously increases when the instruments are introduced for all religious groups. The result suggests Roman Catholic countries may have the greatest unmet need for contraceptives, followed by countries with no major religion and Muslim countries.

We divided developing countries into three categories in Panel C: low income countries whose per capita income is less than $1,000, middle income countries whose per capita income is between $1,000 and $2,000 and high income countries whose per capita income is greater than $2,000.[12] Increase in the impact of family planning program effort from no IV models (1)-(3) to IV model (4) is the greatest for high income countries and the smallest for low income countries and the program effort coefficient is statistically significant for all income groups in model (4). For middle income countries, the impact is significant and substantial that a point increase in family planning program effort leads to 0.14 point reduction in total fertility level, almost 2.5

[12] All values in USD.

times greater than the impact for low income countries of one point increase in the effort for 0.06 point reduction in total fertility level. The result suggests that family planning program effort is the most effective for middle income countries with already suitable level of economic development and the decrease in desired level of fertility, compared to low and high income countries.

6 Conclusion

Consensus exists among scientists that desired fertility level is strongly affected by economic variables, as illustrated by fertility transitions of both the developed and developing countries. Whether the family planning programs introduced in the mid-20th century among the developing countries shortens the time for the onset of fertility transition however is still much debated. Past literatures studying the correlations of family planning program and fertility level using cross-country data did not rigorously consider the endogenously determined family planning program effort. We used the instrument variables to control for the simultaneity and found that the impact of family planning program actually strengthens when the instruments were introduced and the relative size of the planning effort increases compared to other coefficients. We also introduced regional and religious variables and found that they are also an important determinant in fertility. Finally, we found that sensitivity of fertility level to program effort varies by region, religion and income level. Results of this paper suggest that family planning effort would be the most effective for a middle income, Roman Catholic country, located in the Middle East and Northern Africa. Policymakers may consider subgroup analysis of planning program effort to optimize the effectiveness of family planning program effort on fertility reduction.

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Figure 1: Family Planning Program Effort and Total Fertility Rate of Developing Countries 1972-1994

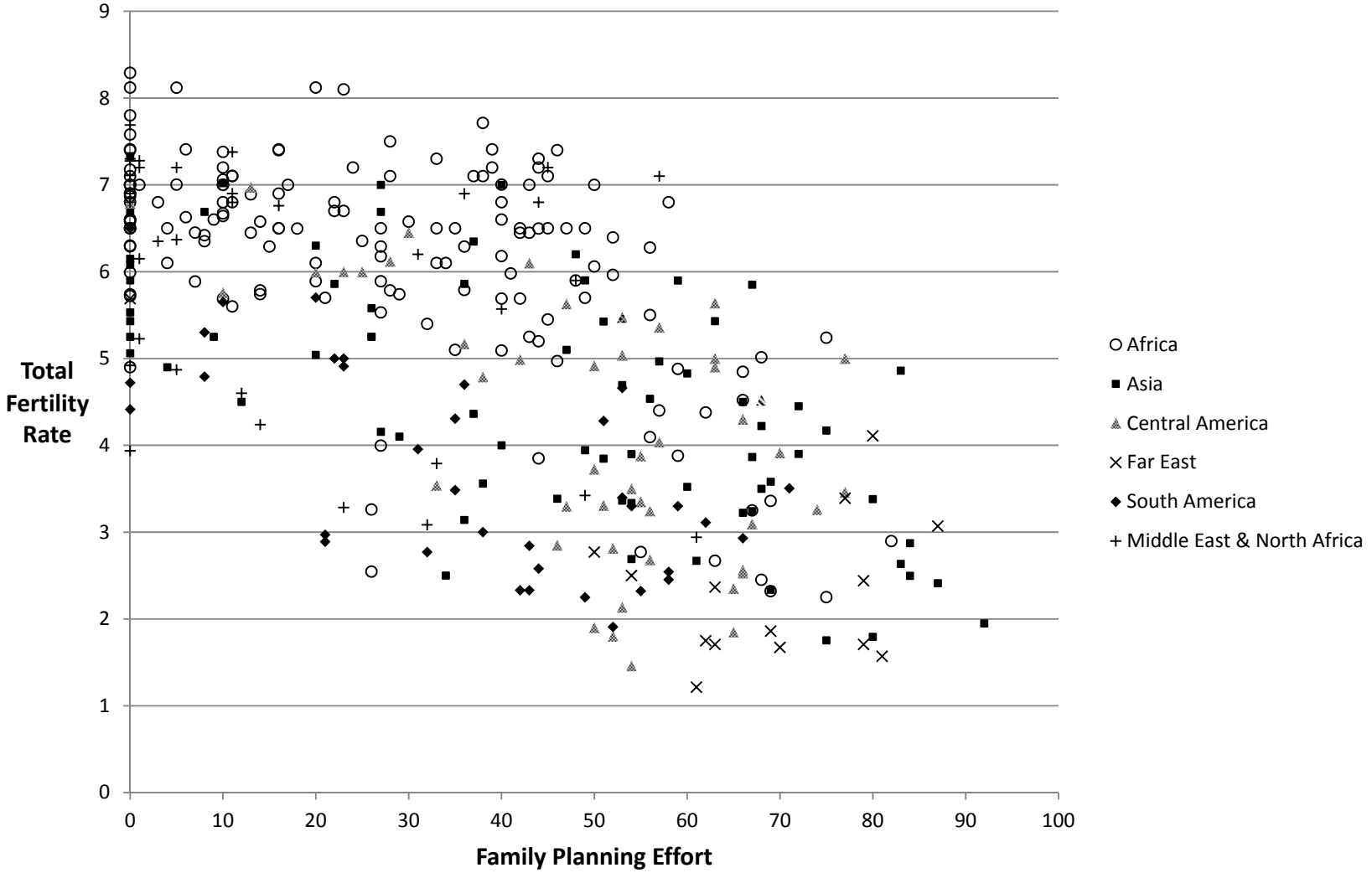

Table 1: Regression Result

Independent Variable	Sample Mean	Without IV			With IV
		(1)	(2)	(3)	(4)
Program effort	36.62 [24.33]	-0.034*** (0.006)	-0.026*** (0.005)	-0.027** (0.006)	-0.069*** (0.013)
Proportion of secondary school age male population enrolled in secondary education	0.395 [0.218]	1.437 (0.743)	0.989 (1.049)	0.969 (1.214)	1.406 (1.212)
Proportion of secondary school age female population enrolled in secondary education	0.333 [0.242]	-3.828*** (0.830)	-2.913** (1.049)	-2.893* (1.170)	-2.151* (1.206)
Per capita income (in '000s USD)	1.528 [2.855]	0.012 (0.015)	-0.017 (0.015)	-0.017 (0.017)	-0.096** (0.042)
Urbanization	40.901 [23.873]	-0.016** (0.005)	-0.024*** (0.004)	-0.024*** (0.004)	-0.019** (0.009)
Regional Fixed Effects: (Control Group: Far East)					
Africa			0.984*** (0.071)	0.972*** (0.076)	0.109 (0.398)
Central America			0.292 (0.276)	0.309 (0.281)	-0.307 (0.528)
South America			-0.279 (0.458)	-0.263 (0.474)	-1.342** (0.664)
Middle East			1.522** (0.399)	1.505** (0.410)	-0.177 (0.649)
Religion Fixed Effects: (Control Group: No Major Religion)					
Buddhism			-0.073 (0.178)	-0.081 (0.276)	-2.048** (0.881)
Roman Catholic			1.292*** (0.266)	1.268** (0.287)	1.163*** (0.396)
Christianity			0.385** (0.098)	0.377** (0.111)	0.102 (0.320)
Hindu			0.641*** (0.070)	0.652*** (0.091)	0.545 (0.521)
Muslim			0.563*** (0.089)	0.564*** (0.095)	0.362 (0.313)
Other			0.346 (0.504)	0.308 (0.489)	-0.096 (0.782)
Time Fixed Effects		No	No	Yes	Yes
Observations		169	169	169	169
Adjusted R^2		0.709	0.798	0.800	0.644
First Stage:					
Population (in millions)	46.091 [152.514]				0.303*** (0.008)
Population Density (number per square kilometer)	127.988 [481.534]				0.042*** (0.013)
Government expenditure to GDP ratio	0.152 [0.084]				-21.407 (16.737)
All Other Independent Variable in (3)					Yes
F Statistic for IV					19.27

Note: Dependent variable used is total fertility rate. The analysis is identical to the model specified in equation (1). Standard errors are reported in parenthesis. *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level.

Table 2: Relative Size of Other Coefficients to Program Effort Coefficient

Independent Variable	No IV	IV
	(3)	(4)
Proportion of secondary school age male population enrolled in secondary education	35.88 (1.10)	20.38 (1.35)
Proportion of secondary school age female population enrolled in secondary education	107.15*** (7.84)	31.17 (2.53)
Per capita income (in '000s USD)	0.630 (0.44)	1.39*** (7.74)
Urbanization	0.89*** (9.01)	0.28* (3.28)
Regional Fixed Effects (Control Group: Asia):		
Africa	34.33*** (9.39)	1.58 (0.07)
Central America	11.44 (0.64)	4.45 (0.37)
South America	9.74 (0.36)	19.45** (5.47)
Middle East	55.74*** (9.91)	2.57 (0.08)
Religion Fixed Effects (Control Group: No Major Religion):		
Buddhism	3.00 (0.03)	29.68*** (9.65)
Roman Catholic	46.96*** (12.28)	16.86** (6.05)
Christianity	13.96 (2.30)	1.48 (0.10)
Hindu	23.04 (2.53)	7.90 (1.02)
Muslim	20.89** (4.88)	5.25 (1.17)
Other	11.41 (0.27)	1.39 (0.02)

Note: The numbers in this table was calculated by dividing the coefficient of respective independent variable by the coefficient on the program effort. F-statistics of non-linearity tests for the coefficients are reported in parenthesis. *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level.

Table 3: Family Planning Program Impact Coefficient for Subgroups by Regional, Religious and Income Level.

Independent Variable	Without IV			With IV
	(1)	(2)	(3)	(4)
Panel A: Program Effort by Region				
Asia	-0.029**	-0.031	-0.035	-0.052**
	(0.008)	(0.014)	(0.019)	(0.011)
Africa	-0.014**	-0.015**	-0.023**	-0.109***
	(0.003)	(0.004)	(0.004)	(0.012)
Central America	-0.007*	-0.011	-0.008	0.034
	(0.002)	(0.005)	(0.005)	(0.264)
South America	-0.012*	-0.012*	-0.012	-0.108
	(0.005)	(0.005)	(0.007)	(0.054)
Middle East	-0.044**	-0.044*	-0.041	-0.146***
	(0.013)	(0.013)	(0.019)	(0.010)
Panel B: Program Effort by Religion				
Roman Catholic	-0.010*	-0.015**	-0014**	-0.154*
	(0.005)	(0.005)	(0.004)	(0.063)
Christianity	-0.001	-0.006**	-0.019**	-0.072
	(0.004)	(0.002)	(0.005)	(0.086)
Muslim	-0.047***	-0.037***	-0.036***	-0.072*
	(0.003)	(0.004)	(0.003)	(0.023)
No Major Religion	-0.042***	-0.019**	-0.033***	-0.117***
	(0.007)	(0.005)	(0.006)	(0.015)
Panel C: Program Effort by Income Level				
Low Income	-0.026***	-0.019**	-0.023**	-0.063***
(per capita income less than $1,000)	(0.004)	(0.004)	(0.005)	(0.011)
Middle Income	-0.055***	-0.043***	-0.041***	-0.147**
(per capita income between $1,000 and $2,000)	(0.003)	(0.005)	(0.004)	(0.028)
High Income	-0.034**	-0.023	-0.015	-0.075**
(per capita income greater than $2,000)	(0.010)	(0.012)	(0.008)	(0.018)

Dependent variable: total fertility rate.

Note: Dependent variable used is total fertility rate. This table reports β_1 coefficient from regression model (1) for specified model and subgroup. Model (1)-(3) were identified by running the regression model (1) on each respective subgroup. Model (4) was identified by first estimating the identical first stage fitted value of the variable $Program\ Effort$ from the pooled sample. Then the fitted value was used on each respective subgroup at the second stage. The religious subgroups Buddhism, Hindu and Other were omitted due to limited number observations. Standard errors are reported in parenthesis. *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level.