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INTERFERENCE OF ABORTION LAW ON THE RELATIONSHIP BETWEEN ECONOMIC DEVELOPMENT AND FERTILITY RATE OF WOMEN

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ABSTRACT

The last few decades have seen unprecedented economic growth and fertility decline. However, the relationship between economic development and fertility rate varies across countries due to country-specific characteristics. There are two schools of thought in the existing literature: the first holds that women's fertility declines with economic development, which happens in tandem with industrialization, while the second holds that fertility rises with economic growth because it encourages early marriage, coupled with an increase in financial security. However, there needs to be more information in the literature regarding how various birth control regulatory systems affect the connection between fertility and economic development. Therefore, the present study attempts to analyze the relationship between birthrate and GDP per capita growth in 182 nations (using panel data from 1990 to 2012). The study has three major findings. First, it implies that the U-shaped association between economic progress and fertility rate is not universal. Second, the law affects women's fertility. More abortion restrictions boost a woman's fertility. Finally, cultural influences like previous periods' fertility rates affect the current period's fertility, indicating an intertemporal link. The study contributes to the in-depth understanding of the determinants of fertility rate. It identified how the abortion law influences the relationship between economic development and fertility rate. The findings can help design fertility control measures based on a country's economic development status.

INTRODUCTION

The total fertility rate is "the number of children that would be born to a woman if she were to survive to the end of her reproductive years and bear children in accordance with existing age-specific fertility rates." Due to advances in medicine and societal mores, fertility rates dropped dramatically in the 20th century. As a result of this dramatic drop in fertility, a sizable portion of the global population is now below the replacement rate (defined as 2.1 children per woman) (Wilson, 2004). Literature suggests a significant relationship between fertility and socioeconomic status (Lacalle-Calderon, Perez-Trujillo, & Neira, 2017). The traditional concept of children (i.e. investment goods) and their numbers have shifted as societies shift from the earlier concept of having larger families to ensure economic security in old age to having fewer, more productive children, leading to a low fertility rate across the globe over the past few decades. As a result, rising living standards lead to a preference for a smaller number of high-quality children (Becker, 1981). So, sometimes family size control is deliberately done. It also observed that low-income families began taking contraception for population control as their incomes rose (Easterlin et al., 1980).

On the other hand, economic development also makes it easier for women to join the workforce and more expensive for mothers to stay at home (Becker, 1965). Thus, urbanization, family planning, and women's education all negatively impact birth rates (Giota & Panos, 1999). However, Myrskyla, Kohler, and Billari (2009) argued that the government caring for its citizens could increase the birth rate.

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The paradoxical effect is that the developed world has fewer children than the developing world, even though economic progress raises the status of women in society, leading to a drop in fertility. This suggests that a comprehensive study including many socioeconomic and legal elements is necessary to determine the impact of economic development on the fertility rate.

LITERATURE REVIEW

The demographic transition argument has drawn a lot of interest in demography for a long time. Although the term "transition" has been for a while, Notestein (1945) was the first to use it as a definition. The term "demographic transition" is often used to describe the natural consequence of rising living standards: the classification of many permutations of birth and death rates (Landry, 1987). The formal model (similar to Malthusian theory, 1965) claims that if a country's income is higher than the equilibrium level, the country will try to converge toward a fixed per-capita income, leading to a decrease in the mortality rate as both fertility and income rise. However, this idea needs to capture better the nineteenth-century evidence showing a fertility decline alongside rising prosperity. Therefore, the neoclassical models emerge from the dynamic growth process with three distinct demographic transition periods: pre-industrial society (characterized by high birth and death rates but slow economic growth), post-industrialization, and the era of modernization (a temporal imbalance exhibiting a high birth rate and low death rate as a consequence of the sudden improvement in technology); and the post-modern era (characterized by high birth rate and low death rate) (when the birth rate drops sharply along with constant death rate).

There are certain debates on demographic theories. Firstly, they assumed parents concern only about the number of children. It contradicts the present society's view and hence fertility rates. Demand for children in society is shaped by the cost of children, parents' income and their tastes. Secondly, they ignored the importance of human capital, which is a significant determinant of economic development. Huge wealth and time investments are required to turn into human capital from human – it initially requires wealth and time investments from parents (present) to children (future) side (Zhang & Nishimura, 1993; Hoddinott, 1992) with the expectation of old age security. So, to access better human capital with limited investment capacity, parents prefer to reduce no. of children causing low fertility rates. Finally, those theories are Europe-centric and somewhat misfit to the rest of the world's experiences of demographic transition and development.

So, what are the reasons for fertility reduction? Though a set of "proximate determinants" of socioeconomic factors are responsible for determining fertility (Bongaart, 1982) of society but an extended debate hovers around economic growth. Earlier findings exhibit positive (Kuznets, 1967) or no relation between per capita income and population growth rates. On the contrary, many studies found a negative relation between these two. Estimating the long-run effect using a demographic-economic simulation model, Ashraf, Weil, and Wilde (2013) argued that fertility reduction from the U.N. medium variant to the low variant caused's a rise of "output per capita by 11.9 percent at a horizon of 50 years". Ahituv (2001) finds that a 1 percent fall in fertility growth causes more than a 3 percent increase in GDP per capita growth. This is because the higher the population growth, the more skeletal the per-worker physical capital (Solow, 1956; Lucas, 1958), which pulls down economic growth. Unlike developing countries, developed countries have more outstanding per-worker physical capital, so their per capita income growth rate is higher (Ahituv, 2001). Bloom and his colleagues (2008) argued it as the "economic benefits of reduced fertility," indicating a positive association between the growth of per capita income and the growth of the working-age population. In this context, women's participation in the labour force is essential. Participation of women in the labourforce curtails the expected no. of children (Schultz, 1969). However, the story of developing countries is different since here, children are performers of domestic work, caretakers of their younger siblings etc. - showing a positive correlation between fertility and female labour supply (Bulatao & Lee, 1983) at the initial stage of development. Thus, fertility rate differs across countries due to heterogeneous preferences for children (Mankiw et al., 1992).

The present study attempted to examine, firstly, whether the usual U-shaped relationship between fertility and economic development exists in every stage of income; and, secondly, how the abortion law influences the relationship between economic development and fertility of females.

MATERIALS AND METHODS

Data

The present study used secondary data from World Bank's website[2] For the period 1990 to 2012. It used the data on Total Fertility Rate (TFR), Gross National Income Per Capita (GNIPC), Adult Literacy Rate (LIT), Household Final Consumption Expenditure (HFCE), Female Labor Force Participation (FLFP) and Public Spending on Education (PSE). The website provided data for 216 countries, but the study eliminated the countries for which data needed to be included. After eliminating the missing data, only 182 countries were considered for analysis. Moreover, it uses data on the quality of abortion laws of different countries from different websites on the internet.

Descriptions of Variables

The log of Total Fertility Rate (LTFR) is considered the dependent variable in our analysis. GNIPC was computed from Purchasing Power Parity (PPP) based Gross National Income (GNI). GNI "is the sum of value added by all resident producers plus any product taxes (fewer subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad" (Nizamuddin, 2021). PPP-based GNI is the gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States. Data are in current international dollars based

[2] www.data.worldbank.org/indicator accessed on 15th October 2014.

on the 2011 ICP round. LIT was measured by the percentage of literate people aged 15 years and above. To calculate HFCE (previously private consumption), the study examined the market value of all goods and services purchased by families. It excluded home purchases but included owner-occupied imputed rent, government permission and licence fees. The 2011 ICP round is used to convert data to international dollars[3]. FLFP was measured by "the percentage of the total show the extent to which women are active in the labour force. The labour force comprises people ages 15 and older who meet the International Labour Organization's definition of the economically active population."[4]. PSE is calculated as the sum of all government spending on education (current and capital) as a percentage of GDP for a particular year. Government spending on education encompasses funding for public and private schools, education administration, and transfer payments and subsidies to individuals and families. A categorical variable, i.e. Abortion Law (ABL), has four categories. Based on these characteristics, abortion laws are categorized[5] Into four types:

a) Type I (abortion is legal to save the woman's life or prohibited altogether);
b) Type II (abortion is legal to save the woman's life and to preserve health, however, Mental health was not considered);
c) Type III (abortion is legal to save the "woman's life, to preserve health" and on socioeconomic grounds); and
d) Type IV ("abortion is legal without restriction as to reason").

Model Specifications

An empirical study of this study includes two sections: bivariate and econometric analysis. The bivariate analysis includes a graphical representation of the Log of LTFR on the GNI Per Capita (LGNIPC) from 1990 to 2012 and for 1990, 1995, 2000, 2005 and 2012. The econometric analysis explores panel data analysis for 182 countries and 22 years. Initially, LTFR is regressed on LGNIPC and $LGNIPC^2$ (this non-linear specification is justified as unprecedented economic growth increases awareness among people and economic opportunities, which affects the fertility rate adversely). The endogeneity of the econometric model was also considered by introducing the lag values of LTFR in estimating Arrelleno-Bond panel data estimation.

A total of nine models were estimated. Descriptions of the models are given below.

Model-I: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LGNIPC_{it}^2 + €_{it}$

Model-II: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LGNIPC_{it}^2 + \beta_3 ABL_{it} + €_{it}$

Model-III: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LGNIPC_{it}^2 + \beta_3 LIT_{it} + €_{it}$

Model-IV: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LGNIPC_{it}^2 + \beta_3 LIT_{it} + \beta_4 FLFP_{it} + €_{it}$

Model-V: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LGNIPC_{it}^2 + \beta_3 ABL_{it} + \beta_4 LIT_{it} + \beta_5 FLFP_{it} + €_{it}$

Model-VI: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LLIT_{it} + \beta_3 LHFCE_{it} + \beta_4 LFLFP_{it} + \beta_5 LPSE_{it} + \Sigma\theta_i T_{i}$ ….with Time dummies

Model-VII: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LLIT_{it} + \beta_3 LHFCE_{it} + \beta_4 LFLFP_{it} + \beta_5 LPSE_{it} + \Sigma\theta_i T_{i}$ ……with Slope dummies

Model-IX: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LGNIPC_{it}^2 + \beta_3 ABL_{ij} + €_{it}$

Dealing with Endogeneity

To capture the impact of other factors (not included in Model 1) that may influence the impact of GNI on fertility rate, lagged value of the dependent variable (Model 2). It drives the possibility of correlation between the independent variable and the error component, which sometimes is not eradicated even using the differencing method as it suffers from information loss (Arellano & Bond, 1991) where T_i implies time dummies (for T=1990 to 2012).

Model-X: $LTFR_{it} = \alpha_{ij} + \beta_1 LGNIPC_{it} + \beta_2 LGNIPC^2_{it} + \gamma LTFR_{i(t-1)}$ + Time Dummies

RESULTS

Descriptive Analysis

The link between the fertility rate per woman and GNIPC from 1990 to 2012 is shown in Figure 1. The graph suggests that the fertility rate and GNIPC have a negative association. Individual year graphs (Appendix A1 to A5) confirm the negative association between fertility and GNIPC.

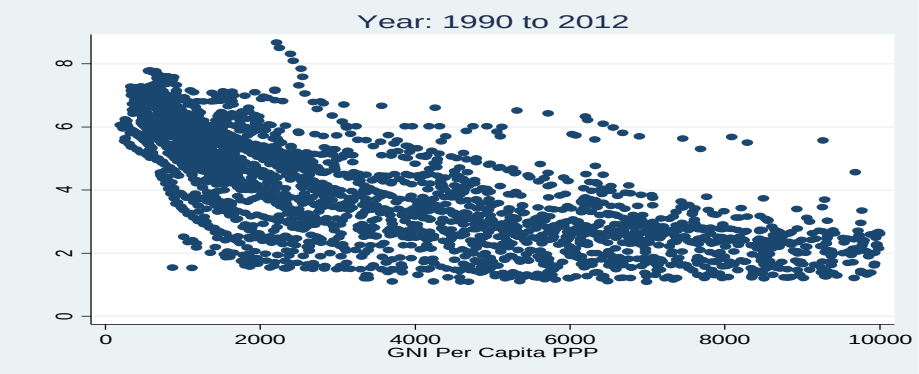

Figure 1. Relationship between fertility rates and GNI per capita

[3] www.ceicdata.com
[4] data.worldbank.org.
[5] as abortiongang.org. and www.abortionlaws.com.

Figure 2A to 2D show the relationship between the fertility rate and GNIPC for different groups of countries. The countries are grouped according to the income quartiles: low-income countries, lower middle-income countries, higher middle-income countries, and high-income countries.

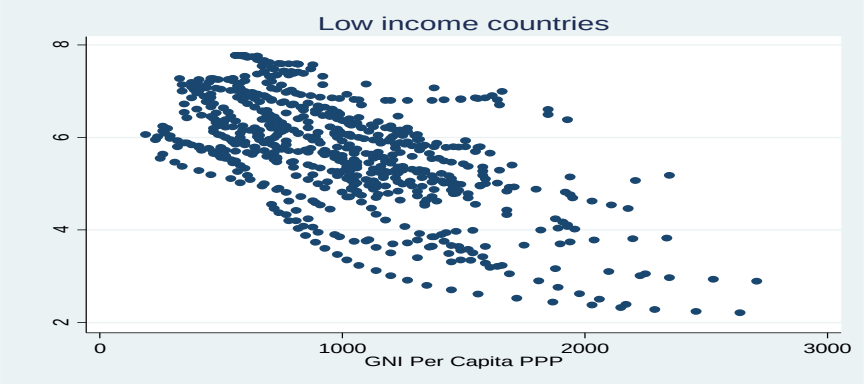

Figure 2A. Fertility rates and GNI per capita for low-income countries

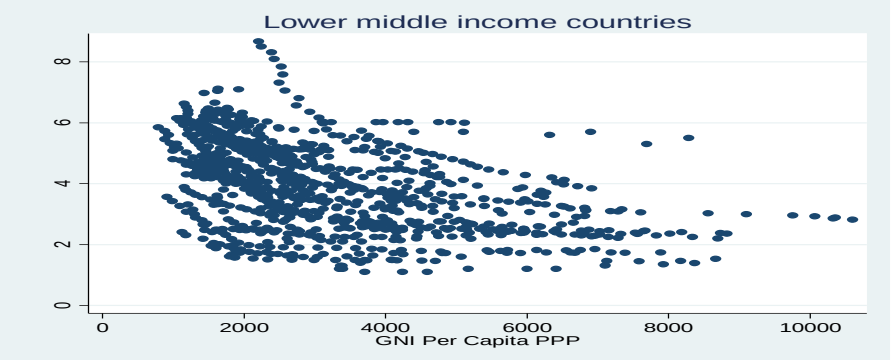

Figure 2B. Fertility rates and GNI per capita for lower-middle-income countries

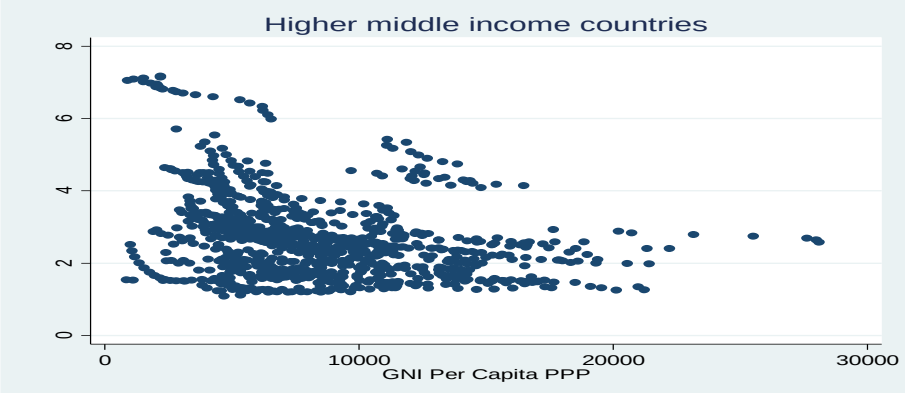

Figure 2C. Fertility rates and GNI per capita for higher middle-income countries

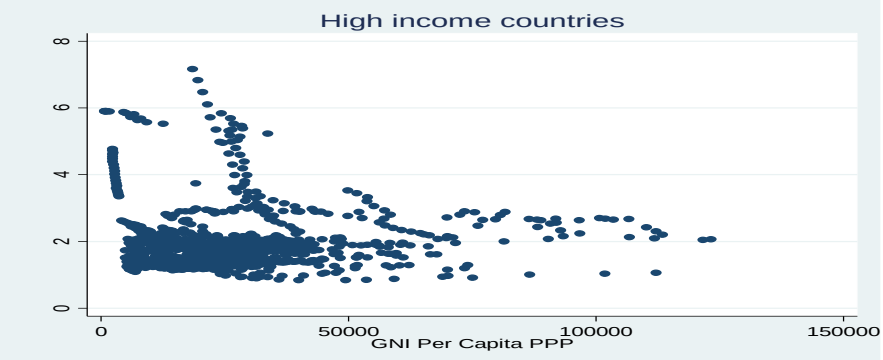

Figure 2D. Fertility rates and GNI per capita for high-income countries

The graphs (Figure 1 to 2D) show a convex relation between fertility and economic development. However, surprisingly, it was discovered that even in the low-income group, many countries have fertility rates below the replacement level (approximately 2.1 children per woman), and this trend has increased over time.

Determinants of Fertility Rate

The bivariate analysis shows a non-linear relationship between fertility rates and economic development. So, we used a non-linear econometric model for analysis to capture the impact of economic development on fertility rates. Analysis of the non-linear econometric model enables us to understand how economic development influences the fertility rate in society.

All models (from Model I to Model X) deal with cross-section and time-series data. So, first and foremost, we must determine whether country-specific effects, time-specific effects, or both cause heterogeneity or individual-specific effects that influence the relationship between economic development and fertility rate per woman. Breusch-Pagan test (considering the null hypothesis as there is no country-specific effect) shows a very high χ^2 value (31169.40) with p=0.000 implying that the null hypothesis of constant variance should be rejected at the 1% level of significance. The result suggests that panel data analysis will be more appropriate because individual-specific effects persist among the countries. After identifying the appropriateness of panel data analysis, we checked the nature of the country effect by using the Standard Hausman test (null hypothesis: coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator). The result (χ^2=43.61, p–value=0.000) suggests that OLS and GLS are inconsistence (or, fixed effect model is more appropriate) and rejects the existence of a correlation between economic development and errors in estimation.

Table 1. Results of fixed effect model (of the static panel)

Variables	Model-I	Model-II	Model-III	Model-IV	Model-V
			All Countries		
LGNIPC	-0.63***	-0.63***	-0.81***	-0.50***	-0.50***
	(0 .04)	(0 .04)	(-0.04)	(-0.04)	(-0.04)
LGNIPC^2	0.02***	0 .02***	0.04***	0.03***	0.03***
	(-0.002)	(-0.002)	(0.00)	(-0.002)	(-0.002)
ABL		-0.18***			-0.11***
		(-0.07)			(-0.05)
LIT				-0.11***	-0.11***
				(-0.01)	(-0.01)
FLFP			-0.95***	-0.75***	-0.75***
			(-0.03)	(-0.03)	(-0.03)
R^2 within	0.61	0.74	0.33	0.17	0.17
F-values	882.48	591.63	1011.55	648.29	648.29
No. of Countries	182	182	172	167	167
			Low-Income Countries		
LGNIPC	0.63***	0.63***	0.46***	0.93***	0.93***
	(-0.16)	(0 .16)	(0 .15)	(-0.16)	(-0.16)
LGNIPC^2	-0.07***	-0.07***	-0.05***	-0.08***	-0.08***
	(-0.01)	(0 .01)	(0 .01)	(-0.01)	(-0.01)
ABL		Omitted			
LIT				-0.03***	-0.03***
				(-0.01)	(-0.01)
FLFP			-0.74***	-0.03***	-0.52***
			(0 .09)	(-0.01)	(-0.09)
R^2 within	0.36	0.36	0.18	0.32	0.32
F-values	343.32	343.32	276.22	228.55	228.55
No. of Countries	31	31	31	31	31
			Lower Middle-Income Countries		
LGNIPC	-1.72***	-1.72***	-1.55***	-0.69***	-0.69***
	(0 .21)	(0 .21)	(-0.2)	(-0.196)	(-0.195)
LGNIPC^2	0.09***	0.09***	0.08***	0.03***	0.03***
	(0 .01)	(0 .01))	(-0.01)	(-0.01)	(-0.01)
ABL		-0.15***			-0.12***
		(0 .06)			(-0.04)
LIT				-0.06***	-0.06***
				(-0.01)	(-0.01)
FLFP			-0.74***	-0.59***	-0.58***
			(-0.06)	(-0.06)	(-0.06)
R^2 within	0.51	0.51	0.23	0.289	0.51
F-values	497.34	335.07	421.33	250.44	203.07
No. of Countries	47	47	44	42	42
			Upper Middle-Income Countries		
LGNIPC	0.18	0.18	-0.32***	-0.43***	-0.43***
	(0 .17)	(0 .17)	(-0.15)	(-0.17)	(-0.17)

LGNIPC^2	-0.02*** (0 .01)	-0.02*** (0 .01)	0.01*** (-0.01)	0.02*** (-0.01)	0.02*** (-0.01)
ABL		Omitted			
LIT				-0.12*** (-0.02)	-0.12*** (-0.02)
FLFP			-0.93*** (-0.05)	-0.84*** (-0.06)	-0.84*** (-0.06)
R^2 between	0.04	0.04	0.09	0.15	0.15
F-values	325.84	325.84	398.02	255.02	255.02
No. of Countries	50	50	45	42	42
			High-Income Countries		
LGNIPC	0.16 (0 .12)	0.16 (0 .12)	-0.28*** (-0.1)	-0.091 (-0.092)	-0.091 (-0.092)
LGNIPC^2	-0.01*** (0 .01)	-0.01*** (0 .01)	0.01*** (-0.01)	0.02*** (-0.004)	0.02*** (-0.004)
ABL		Omitted			
LIT				-0.28*** (-0.02)	
FLFP			-1.03*** (-0.06)	-0.72*** (-0.07)	
R^2 within	0	0.08	0.26	0.24	0.24
F-values	48.08	48.08	123.95	116.73	116.73
No. of Countries	54	54	52	52	52

Source: Estimated by the authors.

Note: *** implies a 1% level of significance. ** implies 5% level of significance, and * implies 10% level of significance.

Table 1 shows the results of the fixed-effect static panel model. Both the values of the coefficients of the log of GNIPC and the square of the log of GNIPC are significant for all counties. However, the coefficients of log GNIPC are negative, but the coefficients of square log GNIPC show positive signs. The findings suggest that there is a U-shaped relationship between fertility and economic development for all countries. Interestingly there is an inverted U-shaped association between fertility and economic development in low-income nations, but none between the log of GNIPC and fertility rate in high-income countries as we assessed the models for each income category of the countries.

Table 2. Results of fixed effect model (of the dynamic panel)

Variables	**All Countries**		**High**		**Upper Middle**		**Lower Middle**		**Low**	
	β	**z**	**β**	**z**	**β**	**z**	**β**	**z**	**β**	**z**
L1	0.63***	26.99	0.62***	14.9	0.87***	20.59	0.85***	22.13	1.63***	41.0
L2	0.09***	4.32			0.07***	1.54	0.14***	3.11	-0.45***	-6.12
L3	-0.02	-1.25					-0.2***	-7.05	-0.19***	-5.36
LIT $_{(t-1)}$	0.02***	3.49	0.11***	9.79	0.04***	3.42	0.04***	8.99	0***	-2.46
LGNIPC	-0.28***	-13.88	-0.46***	-6.78	-0.43***	-5.74	-0.02	-0.44	-0.01*	-1.83
LGNIPC^2	0.02***	16.29	0.03***	7.54	0.03***	6.27	0	0.93	0*	1.77
Constant	1.23***	13.13	1.85***	5.81	1.77***	5.48	0.07	0.33	0.07***	3.15
Time Dummies	Present		Present		Present		Present		Present	
Wald χ^2(25)	88522.01***		10578.11		22744.49		72719.70***		1.77e+06***	
No. of Countries	179		54		47		47		31	

Source: Estimated by the authors.

Note: *** implies a 1% level of significance. ** implies 5% level of significance, and * implies 10% level of significance.

The influence of the preceding three years' fertility rates on the current fertility rate was evaluated using a dynamic model (Table 2). Results indicate that regardless of the income level of countries, all three previous years have a significantly positive impact on the present fertility rate.

Table 3. Results of two-stage least square

Indicators	**With Time Dummies**		**With Slope Dummies**	
	Coefficients	**t-ratios/Z**	**Coefficients**	**t-ratios/Z**
LGNIPC	-0.25***	-10.57	0 .18***	3.53
LLIT	-0.37***	-5.63	-0.07	-1.06
LHFCE	-0.03***	-2.63	-0.18***	-4.34
FLFP	-0.37***	-5.44	-0.93***	-11.33
LPSE	-0.06	-1.52	-0.06**	-2.10
Constant	6.96***	17.46	8.54***	14.32
Wald χ^2(24)	678.25***		16163.59***	
R^2	0.74		0.99	
RMSE	0.25		0.06	
Number of countries	237		237	

Source: Estimated by the authors.

Note: *** implies a 1% level of significance. ** implies 5% level of significance, and * implies 10% level of significance.

Other than economic development, several socioeconomic factors may affect the fertility rate. So, the static panel model was extended by adopting a 2-Stage-Least Square Method (Table-3) to find out the impact of literacy rate (LIT), household expenditure (HFCE), female workforce participation rate (FLFP) and expenditure on education as a percentage of GDP (PSE) on fertility rate. The results suggest that adult literacy rate, household expenditure, female workforce participation and government expenditure on education have a negative relationship with the fertility rate.

Effect of Abortion Law

Table 4 demonstrates the percentage distribution of fertility rate of women across the income status and types of abortion laws of the countries. Most high-income and upper-middle-income countries have low fertility rates, while low-income and lower-middle-income nations have high fertility rates. It is noticeable that nations with high fertility rates have Type-I abortion laws. However, the opposite is true for countries with low fertility rates, where Type-IV abortion laws predominate.

Table 4. Fertility and abortion law by income status of countries

Country Groups	Type of Abortion Law	Fertility Rates		
		High	**Replacement Level**	**Low**
Low Income	Type-I	13	3	0
	Type-II	18	0	0
	Type-III	0	2	0
	Type-IV	3	1	0
Lower Middle Income	Type-I	22	8	0
	Type-II	10	1	0
	Type-III	3	1	1
	Type-IV	2	11	6
Upper Middle Income	Type-I	11	13	3
	Type-II	5	18	3
	Type-III	1	2	0
	Type-IV	1	12	18
High Income	Type-I	4	9	6
	Type-II	5	12	8
	Type-III	0	2	10
	Type-IV	2	5	45

Source: Computed by the authors.

Table 5. Results of static panel model with abortion law

Indicators	Coefficients	t-ratios
LGNIPC	-3.34***	-24.20
LGNIPC^2	0.15***	19.16
ABL	-0.65***	-2.96
Constant	22.09***	27.98
R^2 Within	0.38	
F	740.11***	
Number of observations	3874	

Source: Estimated by the authors.

Note: *** implies a 1% level of significance. ** implies 5% significance level and * implies 10% significance.

Furthermore, we estimated the fixed effect (Model-IX) static panel to understand whether the present abortion law regulates the fertility rate. The results (Table 5) suggest that abortion law has a negative sign and a significant relationship with fertility rates.

DISCUSSIONS

The female fertility rate is a complex phenomenon with multiple determinants. The present study attempted to explain how abortion law influences the relationship between economic development and the fertility rate of women. The results of the descriptive analysis suggested a negative relationship between economic development and the fertility rate, but as we estimated the econometric models, the results demonstrated a U-shaped relationship between economic development and the fertility rate. It indicates that if economic development occurs, fertility decreases initially and then increases. These findings correlate with the Theory of Demographic Transition (TDT) (Heer, 1966). According to TDT, the drop in the fertility rate with economic development is a direct consequence of the rise in social status that accompanies industrialization. The most well-known relationship between economic growth and birthrates is that they move in opposite directions (Myrskyla et al., 2009; Bryant, 2007). However, after a certain period of economic development, the relationship turns positive when a country has reached a high level of economic development (Luci-Greulich & The'venon, 2014). Factors like increases in women's economic independence, education, and labour force participation contribute to lower birth rates (De Lange et al., 2014; Bryant, 2007). However, the relationship between economic developments varies across the income categories of the countries.

Interestingly, there is an inverted U-shaped association between fertility and economic development in low-income nations, but none between the log of GNIPC and fertility rate in high-income countries as we assessed the models for each

income category of the countries. This might indicate that at the initial stage of economic development, the fertility rate increases because the economic status of the citizens improves, and they become more confident in growing up with additional children. On the contrary, in high-income countries, economic development loses its importance in determining fertility rate probably because they reach a saturation level.

The current study estimated the fixed effect of a static panel by incorporating information about the types of abortion laws in the model to understand why economic development does not affect all countries uniformly. The findings suggest that fewer restrictions on abortion law result in a low fertility rate. The study also estimated the impact of socioeconomic that can influence fertility and economic development. One of these can be a cultural factor. If there was higher fertility in the previous period, then it helps to stimulate the fertility of the next period, implying an intertemporal relationship between these two.

CONCLUSIONS

The contribution of the present study is as follows: Firstly, it suggests that the usual U-shaped relationship between economic development and fertility rate only holds uniformly across some countries. In low-income countries, the fertility rate can initially increase with economic development. Secondly, the legal environment significantly influences the fertility rate of women. One of these can be a cultural factor. For example, more restrictions on legal abortion increase a woman's fertility rate. Finally, cultural factors like previous periods' fertility rates have a significant association with the fertility of the next period, implying an intertemporal relationship between these two.

Based on the findings, the study suggests that implementing an abortion law is insufficient for low-income countries to achieve fertility control. Instead, it allows them to afford the precautions necessary for such controls. However, the mobility of workers from low-income to high-income countries can point to a solution to the labour resource problem caused by the decline in fertility in high-income countries, opening a new line of inquiry.

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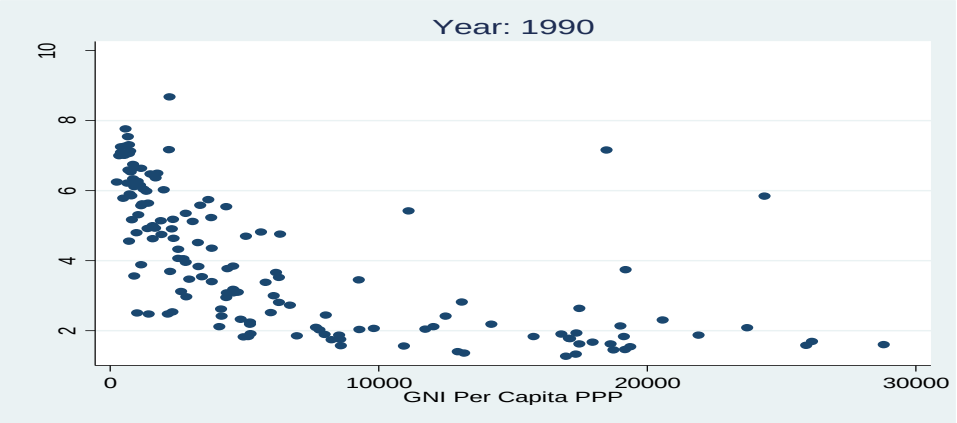
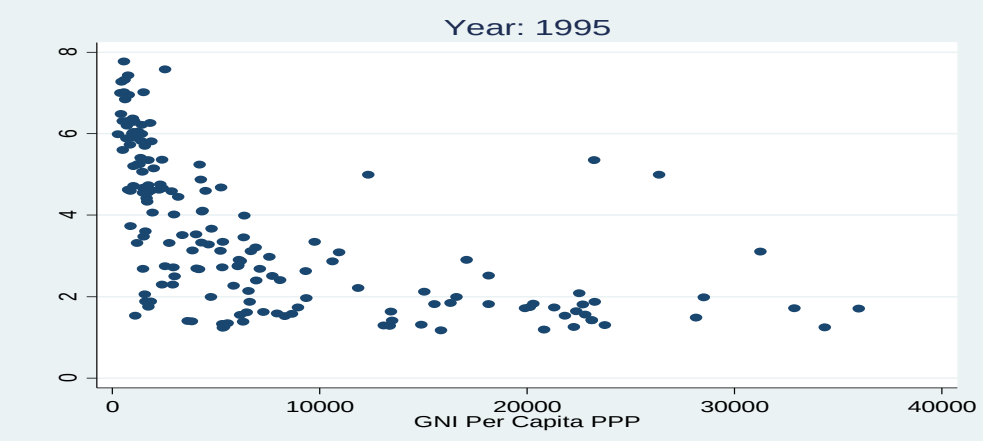
APPENDICES

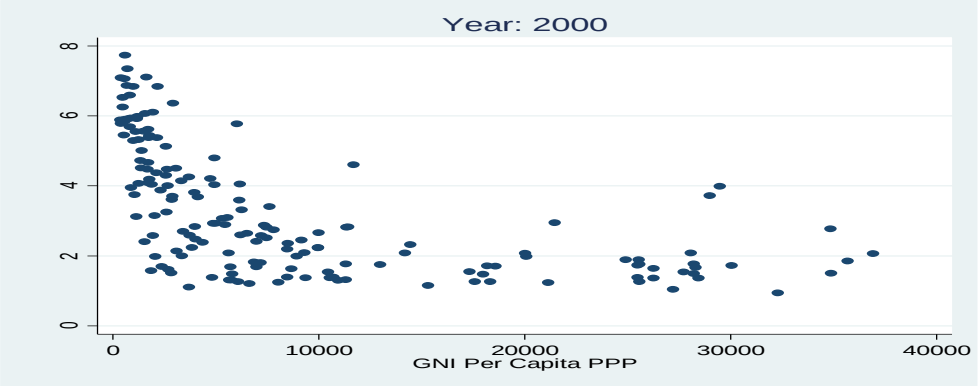
Appendix A1: Relationship between fertility rates and GNI per capita for 1990



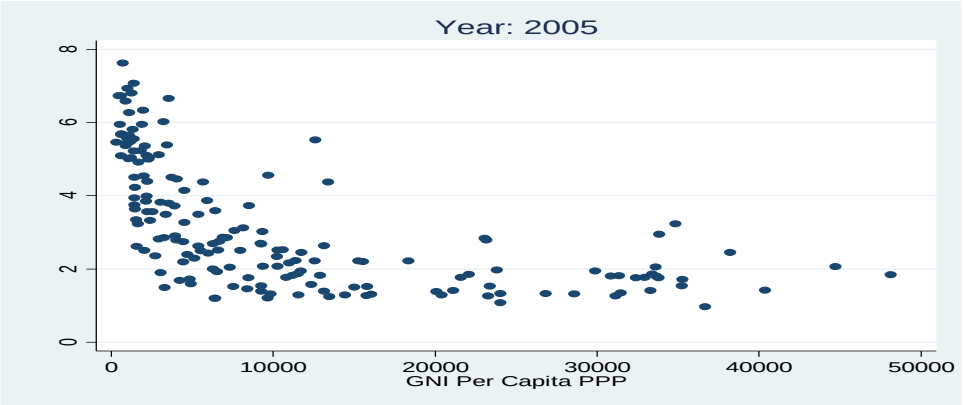
Appendix A2: Relationship between fertility rates and GNI per capita for 1995



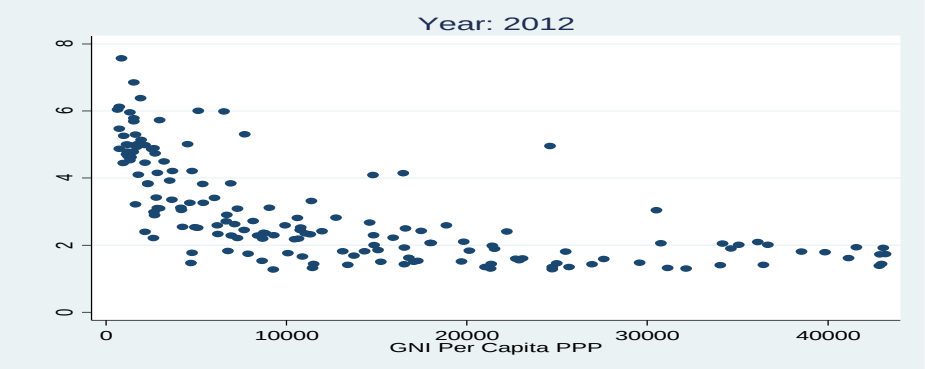
Appendix A3: Relationship between fertility rates and GNI per capita for 2000



Appendix A4: Relationship between fertility rates and GNI per capita for 2005



Appendix A5: Relationship between fertility rates and GNI per capita for 2012



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