PROXIMATE DETERMINANTS AND THEIR INFLUENCES ON FERTILITY REDUCTION IN VIETNAM

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INTRODUCTION

Every country has a desire to balance its population growth according to its socioeconomic conditions. Three major components affecting population growth are fertility, mortality and migration, and among these components, fertility plays the most important role. A number of factors such as social, cultural, economic, health and other environmental factors directly determine fertility. Davis and Blake (1956) first introduced the term intermediate variables of fertility to describe the biological and behavioral mechanisms through which social, economic and cultural conditions can affect fertility. Bongaarts (1978) later developed a model that quantified the effects of the intermediate variables on fertility. Bongaarts and Potter (1983) identified four key variables or principal proximate determinants that account for most cross-country variation in fertility levels which are marriage, contraceptive use, induced abortion, and postpartum infecundability. Bulatao and Lee (1984) studied the determinants of fertility and attempted to reach conclusions that are relevant for fertility reduction policies in developing countries. They suggest that socio-economic development has a decisive effect in lowering fertility in the long run but in the short run, and for specific households, the effect is not conclusive. The study concludes that education, especially of women, fairly and reliably reduces fertility, though its effect may take years to appear. Improved health and lower mortality also contribute to lower fertility, through both biological and behavioral channels. The effect of female employment, in contrast, is uncertain and undependable. The other determinants, i.e., fertility behaviors such as later marriage, longer breastfeeding and more frequent fertility regulation through contraception or abortion are also explored.

A study in 1985 exploring the utility of studying the proximate determinants of fertility for sub-national variations favours some modifications in proximate determinant framework and recommended its application in different background characteristics (Singh, 1985). The analysis was carried out with two important background variables namely education, place of

residence in 29 countries comprising five from Africa, 12 from Asia and 12 from Latin America. The study depicted that despite the variety of forms of marriage and stages of demographic transition, the effect of urbanity on non-marriage index was found uniform but this was not so in the case of index of contraception. The influence of residence on the index of contraception was minor in the African countries, moderate in Asia and pronounced in Latin American countries. A study done in Thailand in a broader context of rapid fertility decline in a third-world setting reveals the use of four proximate determinants borrowed from the proximate determinant framework. Among other determinants, primary sterility and coital frequency have not been observed to influence the ongoing fertility decline (Knodel, 1979; Knodel *et al.,* 1982). The conclusion arrived at by this study clearly mentions that, "Thailand's reproductive revolution is largely the product of increasing deliberate marital fertility control. In brief, Thailand has already entered into the most advanced stage of fertility transition" (Knodel *et al.*, 1987).

Hollerbach and Sergio (1983) found that the effect of contraception is most significant followed by the effect of marriage pattern on fertility regulation in one of the studies in Cuba. He again concluded that fertility regulation contribution of these two factors is greater than the effect of either abortion or post-partum infecundability. Another study of proximate determinants of fertility in India by Chander Shekhar (2004) revealed that fertility reduction is primarily a phenomenon of an increase in contraceptive use and longer duration of insusceptible period (combined duration of postpartum infecundability and abstinence) prevailing in the society.

Bongaarts model was used even in Vietnam to study unexpected rapid fertility decline (Haughton, 1997). During 1989 to 1993 total fertility rate in Vietnam appears to have fallen from 3.8 to 3.2 children per woman. But there remains a demographic puzzle which has been noted by several authors (Phai *et al*., 1995). He concluded that an application of the model shows that high rates of contraceptive use and induced abortion are more than enough to explain rapid fall in total fertility.

Keeping the above background in view, this paper is an attempts to understand levels and trends of fertility and its four principal proximate determinants as well as to study fertility-inhibiting influences of these proximate determinants in Vietnam during 1997 and 2002.

DATA AND METHODS

The study is based on the analysis of data obtained from the second and the third round of Vietnam Demographic and Health Survey 1997 (VNDHS 1997) and 2002 (VNDHS 2002). The nationally representative samples of 5,664 and 5,665 ever-married women aged 15-49 from 205 sampling clusters throughout Vietnam were interviewed respectively in the VNDHS 1997 and in the VNDHS 2002.

The Bongaarts model is used here to determine the contribution to fertility-inhibition effects of proportion married, contraceptive use, induced abortion and postpartum infecundability (Bongaarts 1978; Bongaarts and Potter 1983). It is also found that these four factors explain about 96 percent of fertility changes in most of the populations. The fertility-inhibiting effects of the most important determinants are quantified in Bongaarts model by four indices, each of which assumes a value between 0 and 1. When the index is close to 1, the proximate determinant will have a negligible inhibiting effect on fertility, whereas when it tends a value of 0, it will have a large inhibiting effect. The mathematical formulation of the model is given below;

$$TFR = Cm*Cc*Ca*Ci*TF$$

Where,

TFR is the total fertility rate; TF is the total fecundity; **Cm** is the index of proportion married, **Cc** is the index of non-contraception; **Ca** is the index of induced abortion; **Ci** is the index of postpartum infecundability. The average effectiveness of the family planning methods in use have been taken into account while calculating the index of non-contraception.

Having obtained the indices, it is possible to estimate fertility by using the above mathematical formulation. The value of TF is rather stable between 13 and 17 births per woman, with the average value being 15.3. In this analysis, the average of TF has been taken. The decomposition of fertility to find the contribution of each principal proximate determinant

between 1997 and 2002 has also been carried out (for detail calculation procedure see Bongaarts and Potter (1983)).

FINDINGS AND DISCUSSION

1. Level and trends of fertility and its proximate determinants in Vietnam.

Total fertility rate for Vietnam in 1997 and 2002 are shown in Table 1. The large socioeconomic variations have been found in the levels of fertility in Vietnam in 1997. These variations have shrunk to a great extent by 2002. At the national level, the TFR has gone down from 2.7 to 1.9 children per woman indicating on an average a Vietnamese woman now gives birth to fewer than two children during her lifetime. In rural areas also the TFR declined around by one child per woman between the two surveys. In this period, a slight decline (0.4) was observed even for urban area where fertility level was already low (1.84 child).

Also there are wide regional variations in the level of fertility. The highest fertility was observed in the Central Highlands at both the time points. The lowest fertility levels was observed in the Southeast region which declined from 1.87 in 1997 to 1.51 in 2002. The reason behind the highest level of fertility is that the population of the Central Highlands consists several ethnic groups, where even today higher fertility norms persist. The majority of women from the region are still remained out of the modernization process, education, and therefore do not use modern contraceptive methods. Even though they might be wanting to lower the family size, but unaware about these methods. On the contrary, the Southeast region is well developed region of the country. More than half of the population belongs to urban settings, which leads to better education among women and lower family size as well as improved knowledge and supply of modern contraceptive methods. As a result, the fertility levels in this region happens to be lower than others since long.

Fertility differentials by education are substantial and are inversely related to educational attainment. Women who completed higher secondary school have the lowest fertility while those with no education have the highest fertility, showing 1.97 children per woman in 1997 and 1.39 children per woman in 2002. Specifically during 1997-2002, reduction in fertility was found to be highest among women with no education (1.21 births per women). In this period of

five and a half years[1], the overall TFR declined by 0.8 children or 30 percent which is assumed to be a remarkable decline, especially at the already low level of fertility in 1992-96 in Vietnam.

Table 1. Trends in Total Fertility Rates in Vietnam by background characteristics.

Background characteristics	VNDHS 1997	VNDHS 2002	Decline
Residence			
Urban	1.84	1.40	0.44
Rural	2.90	1.99	0.91
Region			
Northern Uplands	3.14	2.01	1.13
Red River Delta	2.28	1.65	0.63
North Central	3.26	1.92	1.34
Central Coast	3.39	2.37	1.02
Central Highlands	4.28	2.90	1.38
Southeast	1.87	1.51	0.36
Mekong River Delta	2.31	1.69	0.62
Education			
No education	4.03	2.82	1.21
Some primary	3.13	1.98	1.15
Completed primary	2.79	2.13	0.66
Completed lower secondary	2.53	1.71	0.82
Completed higher secondary+	1.91	1.39	0.52
Total	**2.67**	**1.87**	**0.80**

The curve of age-specific fertility rates (ASFRs) shaped almost like a triangle with peak at age group 20-24 (Figure 1 and 2). After the age of 25 years, the curve skewed more sharply to the right side in VNDHS 1997 than that in VNDHS 1997. This fertility pattern is categorized as the early-childbearing model. It is likely that the high age at marriage has made fertility levels lower at young ages and family planning has contributed substantially to rapid declines in fertility at older ages of reproduction. It may be emphasized that fertility reduction mainly occurred among women aged 25 and over who have contributed significantly to fertility reduction in Vietnam. This pattern is common and plausible for populations experiencing a fertility decline. It occurs during the fertility transition when older women, who are more likely to have reached their desired family size make a greater effort to limit their births than do younger women, who are have not yet achieved their desired family size.

[1] The TFR for the VNDHS 1997 was calculated for the calendar period 1992-96, with a mid-point of mid-1994. For the VNDHS 2002, fertility rates refer to the 5-year period prior to the survey that corresponds roughly to mid-1998 to mid-2002, with a mid-point of early 2000.

There is a difference in fertility pattern by residence namely urban and rural. ASFR remained lower in urban areas than in rural areas, particularly for almost all the age groups in VNDHS 997. However, fertility rates beyond age 24 years became nearly equal for rural and urban areas in VNDHS 2002. In both the surveys, it indicated relatively delayed fertility behaviour in urban area than rural. In urban, the peak fertility level belongs to the age group 25-29. On the contrary, rural area is still characterized by early fertility where the age group 20-24 shows the highest fertility rate. Observing the age-specific fertility rates for VNDHS 2002, one can infer that fertility behaviour of women in the age-group 20-24 years solely creates the rural-urban fertility differentials in Vietnam.

Figure 1. Age-specific fertility rates, Vietnam, VNDHS 1997

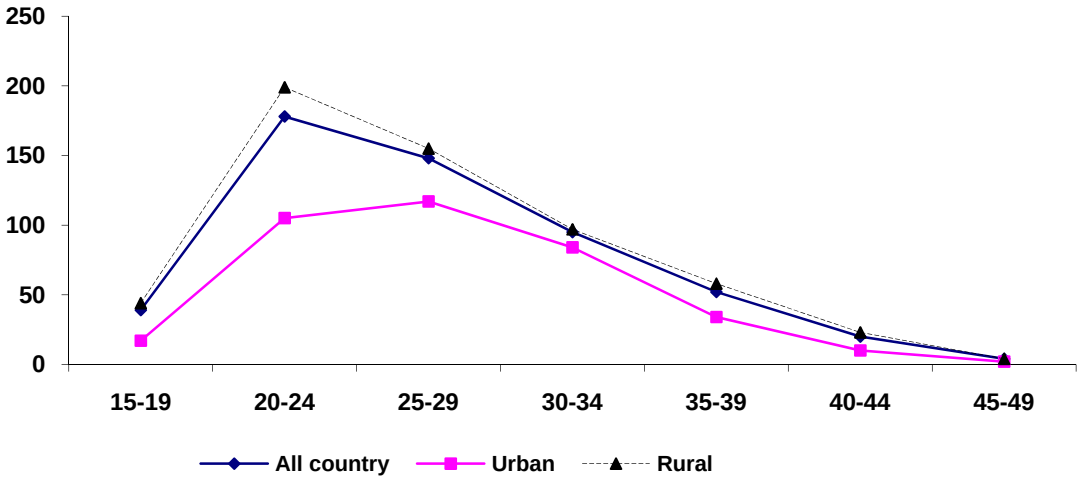
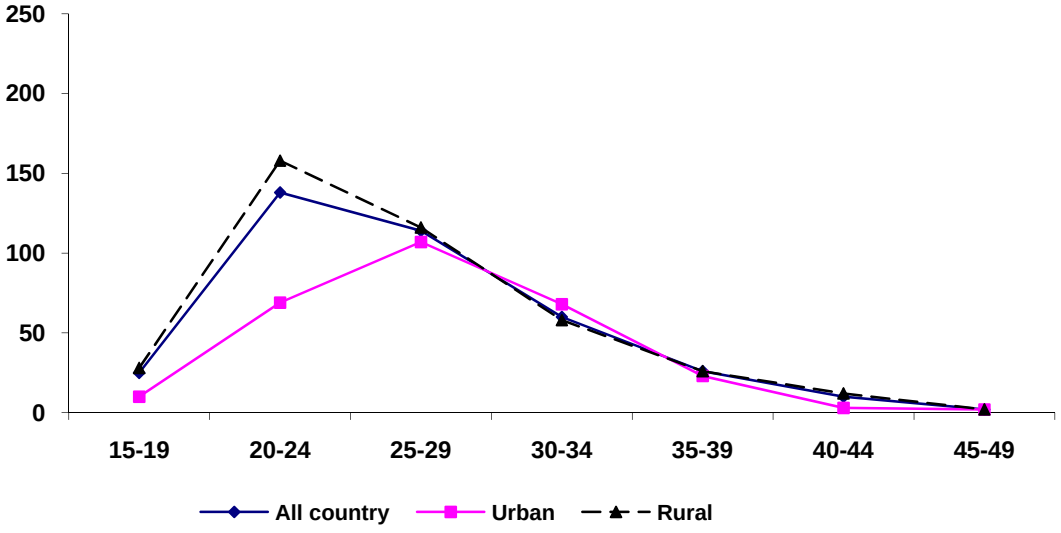


Figure 2. Age-specific fertility rates, Vietnam, VNHDS 2002



Age at marriage

There has been a transition from traditional to modern patterns of marriage in Vietnam. A major characteristic of this process is the trend towards late marriage. In the traditional Vietnamese family prior to the twentieth century, marriage was an especially important matter and universal, not only because of its relationship to the lifetime happiness of the couple, but also because of its effect on the extended family and the kinship network (Tran, 1991). Expansion of work opportunities outside of agriculture, especially for women, has substantially increased the individual's economic independence from parents, thereby helping young couples to determine their own marriage mate. The difficulties associated with job opportunities and living conditions in the recent years have also contributed to delay in marriage. Today, the youth enjoy greater self-determination with regard to marriage. Although parents in rural areas still have some influence in many instances on the marriage decisions of their children, the strength of tradition has greatly diminished. Specially, younger people living in urban areas create larger discrepancy in age at marriage by postponing marriage towards higher ages.

In Vietnam, marriage generally indicates the point at which a woman begins her childbearing. Early age at marriage often results in early age at childbearing and high fertility since women who marry early will have, on average, longer exposure to the risk of pregnancy. Very few children are born outside marriage in Vietnam. Unlike the pattern observed in many other countries, the median age at first marriage in Vietnam has not increased over the last 25 years and has been stable at about 21 years during 1997 – 2002 (NCPFP, 2003).

Table 2. Proportion of currently married women and age-specific marital fertility rates (ASMFR) by residence in Vietnam, 1997 and 2002.

Age group	VNDHS 1997						VNDHS 2002					
	Proportion married			ASMFR			Proportion married			ASMFR		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
15-19	0.028	0.088	0.077	101.9	134.8	131.3	0.021	0.046	0.041	115.3	124.4	123.5
20-24	0.329	0.572	0.520	198.1	264.7	253.4	0.267	0.519	0.464	140.5	213.3	201.6
25-29	0.635	0.805	0.767	152.3	167.8	165.1	0.654	0.841	0.800	136.4	127.1	128.9
30-34	0.773	0.874	0.858	87.9	101.7	99.1	0.763	0.920	0.888	77.2	60.4	63.7
35-39	0.822	0.869	0.859	36.4	57.5	52.8	0.879	0.898	0.897	25.6	28.0	27.5
40-44	0.776	0.836	0.822	9.6	22.6	19.5	0.841	0.863	0.857	2.9	12.3	10.5
45-49	0.730	0.793	0.778	3.0	3.7	3.4	0.783	0.832	0.820	1.6	2.3	2.1

The data in table 2 indicate that proportion of currently married women is found to be highest in the age group 35-39 years. During 1997-2002, there has been a very slight increase in the overall proportion of women who are currently married, from 63 to 64 percent. Nevertheless, overall proportion of women who are currently married has increased very slightly between the two surveys, the proportion of women aged 15-24 who are currently married has declined. In particular, 52 percent of women aged 20-24 were married in 1997, compared with 46 percent in 2002. Since the age-specific fertility rates are found to be highest at ages 20-24 (see Figure 1 and 2), reductions in the proportions of women married in that age group would be expected to have a larger effects on the overall fertility levels. The level of age specific marital fertility rate is at peak in the age group 20-24 and afterwards it is declining at older ages. In the age group 20-24, both rural and urban areas experience almost equal decline in the proportion currently married women between the two surveys. In both the settings, marriage postponement clearly was observed. Table 2 shows decline in the proportion of currently married women below age 25 years on one hand, and increase for older age on the other. As a result age-specific fertility might have decline significantly in these first two reproductive age-groups.

Table 2 also provides age-specific marital fertility rates (ASMFR) by residence for the year 1997 than 2002. A cursory look reveals significant reduction in marital fertility rate across all the age groups and the age group 20-24 contributed maximum decline. Factors other than marriage, primarily contraception is responsible for decline in the marital fertility rates. From Table 2, one can see that there has been a sharp decline (around 58 births per thousand married women) in ASMFR of urban women in the age group 20-24 years between 1997 and 2002. For rural married women aged 20 to 34, the decline in fertility stood at 40-50 births per thousand between the two points of time. However, levels of marital fertility rate in all the age groups is still high. The total fertility marital rate (TMFR) calculated from ASMFR for year 2002 comes around 2.8 children per married woman. It means a married woman one average tends to have almost three children in 2002.

Contraceptive use

The level of current use of contraception is one of the prominent indicators used to assess the success of family planning programs. It is also a widely used measure in the analysis of fertility

determinants. In Table 3, data on current use of contraception show that there is an increase in percent of currently married women using any method of family planning method during 1997 (75 percent) to 2002 (79 percent) in Vietnam. Comparing with other countries, the level of contraceptive use is quite higher among Vietnamese women. But the use of modern contraceptive methods is only 57 percent and rest of the women use of traditional methods (22 percent). The most commonly used method in Vietnam is IUD, which is being used by 39 and 38 percent of currently married women in 1997 and 2002 respectively followed by withdrawal (11.9 percent in 1997 and 14 percent in 2002). Despite its predominance of IUD as the leading method in Vietnam, use of the IUD has actually declined slightly (around one percentage point) during 1997-2002. Conversely, use of pills has increased slightly (from 4 to 6 percentage point) during the same period. Unlike other countries, it is found that use of traditional methods and pills has increased while female sterilization and condom use have gone down in Vietnam. There is negligible difference in contraceptive use among currently married women by residence during 1997-2002.

The sources to obtained have direct bearing on quality of care of family planning services. In Vietnam, the family planning services have been heavily dependent on the public delivery system due to the launch of massive government supported family planning programme aiming to reduce fertility in 1993. According to VNDHS (2002) almost 86 percent Vietnamese contraceptive users were receiving methods from the public sources and rest from the private. Forty five percent, 22 percent and 9 percent of users reported to receive services from community health centers, government hospitals and mobile clinic respectively. IUD users depended completely on community health centers and government hospital whereas pills users were mainly receiving supply from community health centers and public fieldworkers. Sterilization facility were available only at the government hospitals. There major sources to supply of condoms were pharmacy outlet, community health centers and public fieldworkers.

Comparing the family planning situation in Vietnam with a few South-East Asian neighbouring countries, particularly with Thailand, Indonesia and Philippines will definitely lead to understand the effective socio-political environment and delivery system required to improve the quality of family planning and reproductive health services in region. In case of

Thailand, majority of women use pills (44 percent), followed by female sterilization (30 percent) and injectables (18 percent). Nearly sixty percent Thai women receive family planning services from the public sources of supply. Thus, a big chunk of women in reproductive age group also receive services from the private sources. Thai service delivery system in family planning (FP) works as a three-tier hierarchical system, placing provincial hospital on the top, district hospital in middle and at the primary level health center, which caters the FP needs of clients (Kongsri *et al.*, 2011). Despite several ups and downs in political process, Thailand has maintains long history of strong family planning programme (Lee *et al.*, 1998). However, there are still some bottlenecks by which the programme has got suffered. According to the factsheet by the WHO SEARO, inadequacy of staff, low accessibility in southern region and decrease in use of male contraceptive method are the major hurdles.

In Philippines, the family planning programme is as old as in Thailand. It started in 1970 with full support from the government and continued to receive huge donors' support (Lee *et al.*, 1998). It is highly unfortunate that use of modern method of family planning remain quite low (34 percent, 2008). The overall contraceptive use roamed around 50 percent since last one decade. The policy on paper appears to be ideal, however, it has faced major setbacks on various stages of the implementation level. Exactly one-third of women use traditional methods of family planning mainly due to catholic strong reservations against artificial methods and their highhandedness in the political circuit. Women completely rely on public supported services, but in the absence of adequate and quality FP services they forgo the use of contraceptives. As a result more than half of the women receive services from private sources, which are not cost effective, and thus cost has become one of the major barriers in use of family planning methods. Unmet need for modern contraceptive methods is found to be the highest (20 percent) in the region (Casterline and Sinding, 2000; Guttmacher Institute and Likhaan, 2010). Gillespie *et al.* (2007) also found that there is high inequity in outreach of family planning workers in Philippines.

Indonesian has been a role model in success of family planning programme and often regarded as a world leader. Initially, it was supported by private stakeholders and then the government of completely took over in year 1970. However, it still receives technical support

from donors and professional agencies working in the area of family planning and reproductive health. In recent time, it has vision to achieve "Quality Families by 2015". The supreme body to fund, operate and monitor the programme is the National Family Planning Coordinating Board (NFPCB) and popularly known as BKKBN in Indonesia. The programme has been supported by all major religious sects in the country to promote modern method of family planning methods. Indonesian family planning programme's execution is based on three-tier delivery system- national, provincial and district levels. Village level unit called PPKBD are responsible to manage the family planning services at the grass root level. Besides wider mass media campaign, the programme is getting support of field level volunteers to propagating and promoting the services. However, the programme is in need to make efforts to bring more gender equity in contraceptive use through empowering women and adopting strategies to enhancing role men's role in family planning.

Table 3. Percent distribution of currently married women using contraceptive methods by residence, VNDHS, 1997 and 2002.

Contraceptive methods	VNDHS 1997			VNDHS 2002		
	Urban	Rural	Total	Urban	Rural	Total
Any method	79.3	74.4	75.3	79.1	78.4	78.5
Any modern method	54.0	56.2	55.8	54.9	57.1	56.7
Pills	4.1	4.4	4.3	6.9	6.2	6.3
IUD	32.5	39.9	38.5	30.3	39.5	37.7
Injection	0.0	0.2	5.9	0.2	0.5	0.4
Condom	11.8	4.5	0.2	12.6	4.2	5.8
Female sterilization	5.3	6.6	6.3	4.8	6.2	5.9
Male sterilization	0.3	0.6	0.5	0.2	0.6	0.5
Any traditional method	24.9	17.9	19.2	24.1	21.2	21.8
Periodic abstinence	14.2	5.7	7.3	11.8	6.5	7.5
Withdrawal	10.7	12.2	11.9	12.3	14.8	14.3
Other methods	0.4	0.3	0.3	0.1	0.0	0.1
Not currently using	20.7	25.6	24.7	20.9	21.6	21.5

Postpartum Insusceptibility

Postpartum amenorrhea is the interval between the birth of a child and the resumption of menstruation. It is the period following childbirth during which a woman becomes temporarily and involuntarily infecund. Postpartum protection from conception can be prolonged by the intensity and length of breastfeeding. Postpartum abstinence refers to the

period of voluntary sexual inactivity after childbirth. A woman is considered insusceptible if she is not exposed to the risk of pregnancy, either because of amenorrhea or postpartum abstinence. Information was obtained about the duration of amenorrhea and the duration of sexual abstinence following childbirth during the three years preceding the survey (NCPFP, 2003). According to VNDHS 1997 and 2002, the rural-urban differentials in the median duration of breastfeeding is very narrow (around one month). Studying the fertility inhibiting-effects of postpartum insusceptibility Mosely *et al.* (1977) found that in some developing countries, traditional methods of birth spacing are more effective than clinical contraceptives and was of the view that planners could regard these methods as substitutes for contraception in the target population.

Data in Table 4 show that postpartum insusceptibility declined from 9.1 in 1997 to 8.5 in 2002 or 0.6 months at the national level. For rural areas, postpartum insusceptibility reduction is slightly higher (0.7 months). On the contrary, there is an increase in insusceptibility for urban areas from 5.6 to 7.5 months between 1997 and 2002. Overall, the median duration of postpartum insusceptibility in rural areas is higher than in urban areas. The observed decline in the duration of postpartum insusceptibility tends to increase in martial fertility rate, which might have been offset by other inhibiting factors like increase in contraceptive use.

Table 4. Median number of months of postpartum amenorrhea, postpartum abstinence, and postpartum insusceptibility by residence in VNDHS 1997 and 2002.

Residence	VNDHS 1997 Postpartum			VNDHS 2002 Postpartum		
	Amenorrheic	Abstinence	Insusceptible	Amenorrheic	Abstinence	Insusceptible
Urban	4.6	2.9	5.6	6.6	4.4	7.5
Rural	9.3	3.3	9.5	7.6	3.8	8.8
Total	8.8	3.3	9.1	7.5	3.9	8.5

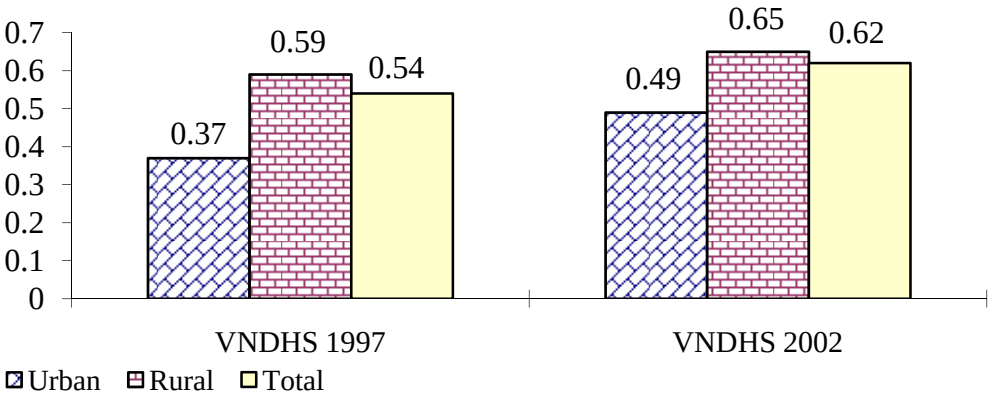
Induced Abortion

Abortion is legal and widely practiced in Vietnam. The law of People's Health Protection (1989) stressed the fact that "*A woman has the right to undertake induced abortion at her request, to access health care services for checking and treating gynaecological diseases, to take prenatal and delivery care and to be assistant at delivery care in health services"*. Abortion services, including menstrual regulation are readily available both in public

and private facilities. It is evident from the survey data that women in Vietnam often resort to abortion due to lack of contraception and contraceptive failure. The VNDHS 2002 reported that the almost 25 of current users discontinued the methods were being used by them since last 12 months. Except IUD, the discontinuation rate for all other major spacing family planning methods were estimated 30 percent and above in Vietnam. Slightly above one-fourth of women discontinued due to method got failed and they became pregnant (NCPFP, 2003).

Figure 3 presents abortion rates in Vietnam for the five years period preceding the survey dates. These are total abortion rates (TAR) and are based on reporting of both menstrual regulation and abortion. There is an increase in total induced abortion rate for the whole country from 0.54 in 1997 to 0.62 in 2002. The same is found to be true by residence also. In contrast to the trend in other parts of the world, it is surprising that women in rural Vietnam have a higher rate of induced abortion than those in the urban areas at both points of time. Generally, it is difficult to collect reliable information on induced abortion in the developing countries (Goodkind, 1994). In case of Vietnam, those who underwent induced abortion, 64 percent were using a method of family planning. It reveals that there is also an unmet need for family planning as rest of the women 36 induced abortion seekers were non-user. By methods, 49 percent abortion seekers were using the traditional methods of family planning in Vietnam. It seems that the reason behind higher abortion rate especially in rural area is high desire of smaller family size and unavailability of methods with high effectiveness. Also a significant proportion of all ever-married (36 percent) could not report the correct fertile period in the VNDHS 2002. Thus, such women, if start using traditional contraceptive methods, will have high chances of unwanted pregnancy. In particular, stronger son-preference in rural area due to several social obligations is also one of the prominent causes of induced abortion (Guilmoto, 2009). Those who had strong desire for son are more likely to go sex-selective abortion. However, son-preference in urban has reduced over the years due to empowerment of women and higher gender equality.

Figure 3. Total induced abortion rate by residence, Vientnam, VNDHS 1997 and 2002



2. Role of principal proximate determinants in fertility decline in Vietnam

The four principal proximate determinants are considered inhibitors of fertility. They are found to be lower than their maximum value as a result of delayed marriage and marital disruption, the use of contraception and induced abortion, and postpartum infecundability (Bongaarts, 1982). The indices of marriage, contraceptive use, induced abortion and postpartum infecundability as well as the TFR and TF as obtained from the Bongaarts model for the years 1997 and 2002 by residence are presented in Table 5. In analyzing these findings, it should be kept in mind that the lower the value of an index, the higher is the percentage reduction in the TFR due to that proximate determinant.

Table 5 shows that estimated TFR has declined by 0.36 births from 1.91 to 1.55 between 1997 and 2002 at the national level as well as in urban areas, but little higher decline was observed in rural areas (0.39 births). The model underestimated the TFR as compared to the observed total fertility in all the cases, except for urban areas in 2002 where model produced TFR and observed TFR were found to be same. By 2002, the difference between actual and estimated TFR have narrowed down, especially it has significantly reduced in case of rural Vietnam. Finally, the most important index in explaining this fertility decline is the index of contraception followed by the indices of marriage and postpartum infecundability at both time points. Except postpartum infecundability, other three proximate determinants had higher fertility inhibiting effects in 2002 than 1997. As induced abortion rate has increased at the later time points, fertility inhibiting effects of induced abortion were found to be higher in

2002 survey than in 1997 survey. However, the induced abortion index still had least effects among all the four proximate determinants in declining fertility in Vietnam during the period of observation for this study.

Table 5. Estimates of selected fertility measures, indices of proximate determinants and actual total fertility rate for Vietnam, 1997 and 2002.

	1997			2002		
	Urban	Rural	Total	Urban	Rural	Total
Index of						
Marriage (Cm)	0.461	0.610	0.576	0.429	0.557	0.526
Contraception (Cc)	0.340	0.336	0.338	0.340	0.309	0.317
Induced abortion (Ca)	0.885	0.884	0.885	0.816	0.824	0.822
Postpartum infecundability (Ci)	0.830	0.714	0.725	0.769	0.733	0.741
Total fecundity rate (TF)	15.3	15.3	15.3	15.3	15.3	15.3
Estimated total fertility rate (TFR)	1.76	1.98	1.91	1.40	1.59	1.55
Actual total fertility rate	1.84	2.90	2.67	1.40	1.99	1.87
Differences (Actual TFR - estimated TFR)	**0.08**	**0.92**	**0.76**	**0.00**	**0.40**	**0.32**

Decomposition of the role of the four major determinants on fertility decline between 1997 and 2002 by residence in Vietnam

Knowing that the proximate determinants model is multiplicative in nature, but additive while measuring the fertility inhibiting effects, therefore, the decomposition of these effects in declining fertility are possible (Bongaarts and Potter, 1983). The decomposition of the change in Vietnam's TFR by residence between 1997 and 2002 is given in Table 6. In the first column, percentage change in TFR is presented for each of the determinants responsible. In the next column, the decomposition results are standardized to add to 100 percent, in the third column, the absolute change in the TFR is presented taking into account the contributions made by various proximate variables. The negative sign before the values suggests the decline or fertility reducing effects of the respective proximate determinant.

Table 6. Decomposition of the change in total fertility rate in Vietnam during 1997 and 2002 by residence.

Factors responsible for fertility changes	Urban			Rural			Total		
	Percentage change in TFR	Distribution of percentage change in TFR	Absolute change in TFR	Percentage change in TFR	Distribution of percentage change in TFR	Absolute change in TFR	Percentage change in TFR	Distribution of percentage change in TFR	Absolute change In TFR
Marriage Proportion	-6.8	-33.2	-0.12	-8.6	-43.8	-0.17	-8.7	-46.4	-0.17
Contraception	-0.1	-0.5	0.00	-7.9	-40.6	-0.16	-6.3	-33.6	-0.12
Induced abortion	-7.8	-38.3	-0.14	-6.8	-34.9	-0.13	-7.1	-37.9	-0.13
Postpartum infecundability	-7.3	-35.8	-0.13	2.6	13.1	0.05	2.2	11.9	0.04
Interaction	1.6	7.7	0.03	1.2	6.2	0.02	1.1	5.9	0.02
Total	-20.4	100.0	-0.36	-19.5	100.0	-0.39	-18.7	100.0	-0.36

Results in Table 6 indicate that the TFR in Vietnam declined by 20.4 percent or in absolute term by 0.36 points between 1997 and 2002 in urban areas. This decline is 0.39 points or 19.5 percent in rural areas. For Vietnam as a whole, 18.7 percent or 0.36 points decline in TFR was observed during the same period. The decomposition analysis for urban area suggests that one-third of the total fertility decline in Vietnam between 1997 and 2002 is due to increase in induced abortion, and slightly more than one-third of total decline is due to an increase in postpartum infecundability as well as due to reduction in proportion married among women, primarily due to marriage delay. The contribution of contraceptive use was quite small (0.5 percent) suggesting a negligible impact of contraceptive use on fertility decline. Thus, it is clear that change in induced abortion, postpartum infecundability and proportion married were the predominant factors responsible for fertility change in urban areas of Vietnam during the observed period. For rural areas and the country as a whole, it was found that change in proportion of married women, contraceptive use and induced abortion were the main factor responsible for fertility decline. On the contrary, reduced duration of postpartum infecundability increases fertility around 13-12 percent of change in TFR in the respective populations between 1997 and 2002. In rural Vietnam, the decomposition analysis suggests that marriage delay among women contributed more than two-fifths of the total fertility decline followed by contraceptive use (40 percent) and induced abortion (35 percent). In Vietnam as a whole, the contribution of marriage delay in fertility decline between 1997 and 2002 was found to be highest (46 percent) followed by induced abortion (38 percent). The use of family planning also had contributed significantly (33 percent) in declining fertility during the above

period. The contribution of interaction in fertility change, which primarily occurs due to overlapping of two or more proximate determinant factors (Chander Shekhar and Ram, 2006), remained minimal in both rural and urban settings of Vietnam.

To summarize, the contributions made by the four principal proximate determinants in changing the TFR in urban and rural areas between 1997 and 2002 are presented in Figure 4 and 5 respectively. The figures are plotted to indicate the trends in the total fertility rate (TFR), the total natural marital fertility rate (TN), the total marital fertility rate (TM), and the total fecundity rate (TF). There is an increase in natural marital fertility owing to a shortening of the duration of postpartum insusceptibility in rural areas. The fertility-inhibiting effects from induced abortion, marriage and contraception have enlarged and accelerated declined in TFR, TM and TN in rural Vietnam. In urban areas of Vietnam, induced abortion, postpartum infecundability and marriage were owing to decline in TF, TN and TFR. Thus, the decline in the proportion married of women and increase in induced abortion in both the settings accelerated the fertility inhibition effects in Vietnam.

Figure 4: Fertility-Inhibiting effects of principal proximate determinants in urban Vietnam 1997 and 2002

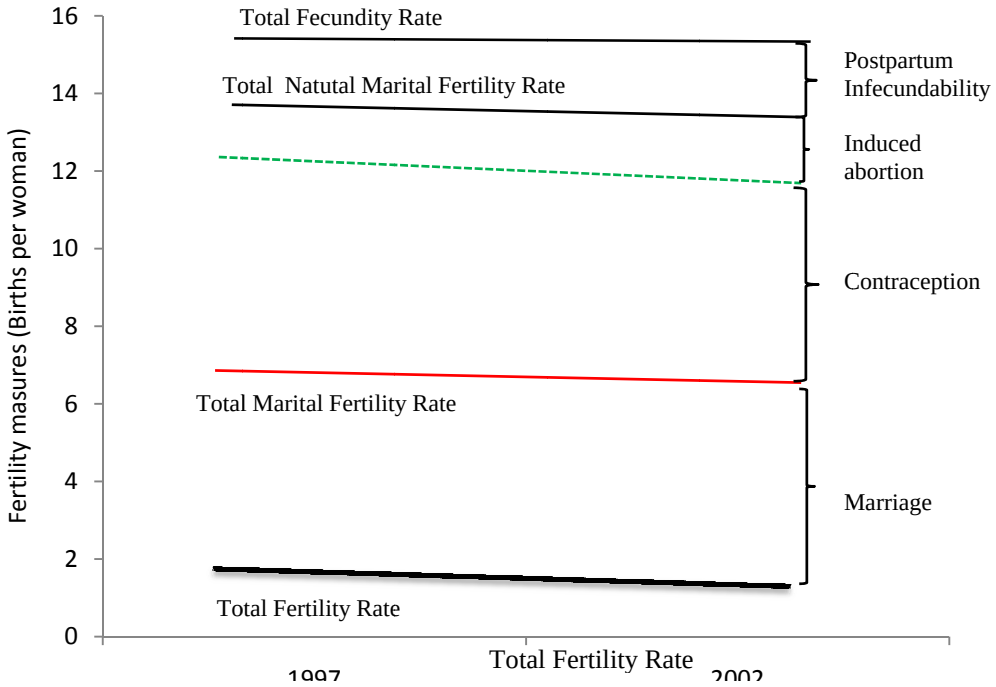
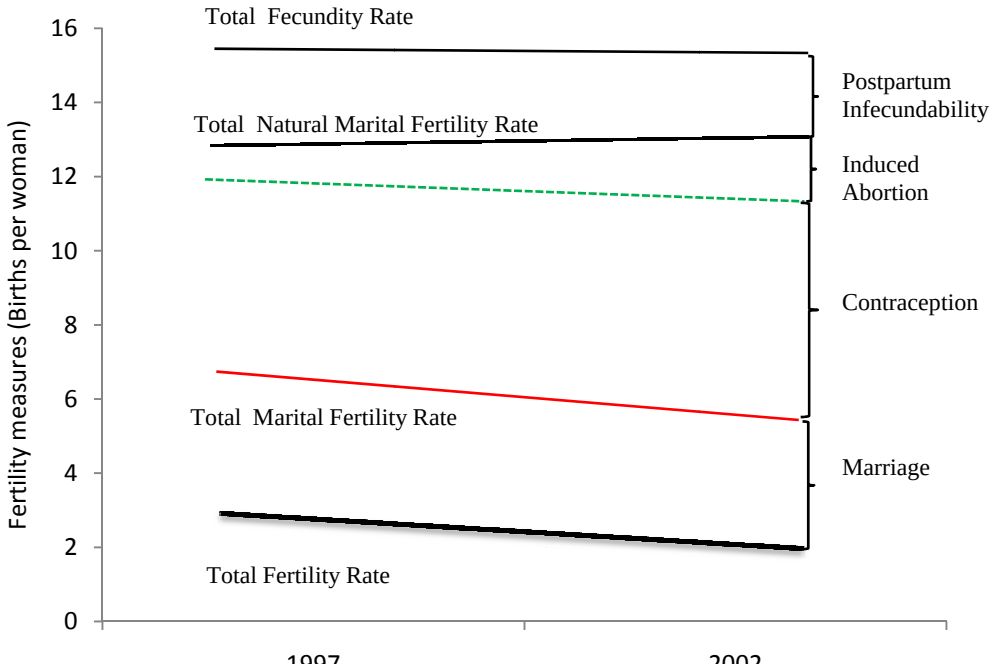


Figure 4: Fertility-Inhibiting effects of principal proximate determinants in rural Vietnam, 1997 and 2002



Note to be scaled. Both figures are plotted for the purpose of providing changes in the effects

CONCLUSION

The study suggests that fertility-inhibition effects at a give point of time in rural and urban areas are observed the largest from contraception followed by married proportion and postpartum infecundability. These effects are the lowest in case of induced abortion. However, the predominant factors in urban area, which primarily contributed to fertility decline between 1997 and 2002, in order of magnitude are due to increase in induced abortion and duration of postpartum infecundability and primarily postponement of marriages. During the same period the factors responsible in fertility decline in rural areas in order of magnitude are the postponement of marriages, increase in induced abortion and contraceptive use. Declining role of postpartum infecundability is worrisome as long as it is not compensated by increase the use of effective family planning methods among rural Vietnamese women. The study gives a clear indication that estimated TFR is smaller than the actual one. The difference between actual and estimated TFR have narrowed down over time, and only rural area showed a residual of 0.4 children per woman. This might be possible through overlapping fertility-inhibiting effects from two or more factor. For example, some proportion of rural women might be using family

planning methods being in postpartum infecund state, or some proportion of them might be using a family planning status during the post induced abortion period.

The finding of this paper have certain programmatic and policy implications. First of all, programme managers in Vietnam need to prepare a wider network of family planning services at the grass root level especially for supply of spacing methods. This will help to bring down high use of traditional methods and number of induced abortion due to their failure rate. It is important in view of the finding that 64 percent of induced abortion seekers were using some or other methods of family planning, primarily traditional. The utilization of sterilization is very low because of its access only at the government hospitals, and therefore, these services can be made available at least some CHCs of selected areas. Vietnam should not depend only on public sources, but NGOs, volunteers and public-private partnership must be encouraged to ensure wider choices and regular accessibility of the affordable family planning services at the local level.

Any programme strategy should focus about regional and gender inequity in access to and utilization of contraceptive services. In particular Central Highland region should be given priority. There has to be a culturally suitable family-life-education programme for youths. Gender equity and reproductive health issues including menstrual cycle, alternative contraceptive choices, safe abortion practices have to be focal point of such programmes. In these programmes and other social sectors should uniformly give equal importance to women empowerment and to discard sex-selective abortion. In long run, it will help to bring a greater role of men in family planning and reproductive health issues. Therefore, the government, representative from civil society, women's organization, youths and corporate sector must come together to deal the larger issue of sex-selective abortions in Vietnam.

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