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**THE DEMOGRAPHIC DIVIDEND AND POVERTY REDUCTION**

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## A. INTRODUCTION

The ICPD Plan of Action addresses a wide range of issues that bear on poverty reduction. In this brief note, however, our focus is limited to the effects of fertility decline associated with improved access to and quality of reproductive health services. The note summarizes new research on the demographic dividend, shows the implications of this work for poverty reduction, and presents new analysis of how fertility decline, in general and among high poverty risk groups, will influence achieving the MDG goal of cutting poverty in half by 2015.

In the decade since the 1994 International Conference on Population and Development, many countries around the world have experienced fertility decline, but many developing countries, particularly the poorest of the poor, continue to have high rates of childbearing. Countries with more than 10 per cent of their population living on less than a dollar per day have a total fertility rate (TFR) of 4.6 as compared with a TFR of 2.3 in countries with poverty rates below 10 per cent. The most impoverished countries also had high rates of child dependency – in excess of 40 per cent (Table 1). High fertility and high rates of child dependency also characterized the countries with the largest poverty gaps.

Table 1. Poverty and Demographic Indicators, 1990-2002.

	Population in Poverty (%)		Poverty Gap	
	<10%	> 10%	<5 %	>5%
Number of Countries	45	49	59	35
Total Fertility Rate	2.3	4.6	2.7	4.8
Percentage of Population Under 15	27.9	41.3	30.5	42.2

Source: World Development Indicators 2004.

Note: Poverty measures based on \$1 a day concept. Values are averages of estimates available for the 1990 to 2002 period.

The simple correlation between demographic variables and poverty variables apparent in Table 1 cannot be taken as evidence of a causal relationship, i.e., that reducing the TFR will reduce poverty. There are many other factors at play and high fertility may be, in part, an outcome of poverty. The important conclusion to be drawn from Table 1 is that implementing more effective reproductive health programs in high fertility countries will target countries where poverty is greatest. The question at hand is whether fertility reduction is an effective measure for reducing poverty.

There are many important and contentious issues related to the number of children and poverty. Many studies have shown that incomes are lower in larger families, but as with Table 1 issues of causality make it difficult to clearly interpret this correlation. We also know that a variety of behavioral responses mediate the financial impact of an event such as a birth of a child. Other household members may work harder, family members may help with time or financial resources, and public support may reduce the financial impact of an additional birth. Education and health may be affected adversely by family size and parents may invest less in the human

capital of unwanted children. Children make financial contributions to the family at a relatively young age in some societies and are an important source of financial support in many countries.<sup>1</sup>

Recent research, however, provides compelling evidence that fertility rates have an important bearing on poverty. This conclusion is supported both by micro- and macro-level studies. The micro-level evidence comes in a series of studies that have provided comprehensive estimates of intergenerational flows including those to and from children (Stecklov 1997; Lee 2000; Lee 2003). These studies consistently find that children are a financial burden in high fertility settings. Moreover, the financial transfers to dependent children far outweigh the financial transfers from adult children to elderly parents. The hypothesis that parents are having more children because they will benefit financially is not borne out by the facts. Children consume far more than they produce even in traditional settings. Thus, the birth of an additional child reduces the material standard of living of other family members.<sup>2</sup>

The macro-level evidence complements and reinforces the micro-level evidence by showing that per capita income grows more rapidly when the number of working-age adults is growing faster than the number of children. Again, children are consuming but not producing. At the aggregate level or at the household level a decline in the number of children per adult leads to higher per capita income for the country and for the household.

Most recent research addresses the relationship between demographic factors and average income or economic growth rather than poverty *per se*. Given any distribution of income, an increase in average income will by definition lead to a reduction in poverty. As an empirical matter, economic growth has had an important, favorable effect on poverty. But not all economic growth nor all growth policies are pro-poor. In an analysis of 21 economic growth spells in Asia during the 1990s, poverty declined in 13, was stagnant in 3, and increased in 5 (Asian Development Bank 2004).

In light of these considerations, recent empirical work by Eastwood and Lipton is particularly salient. They show that high fertility, net of infant mortality, not only leads to slower economic growth but also skews the distribution of consumption against the poor (Eastwood and Lipton 1999; Eastwood and Lipton 2001b; Eastwood and Lipton 2001a). Thus, Eastwood and Lipton's evidence suggests reducing fertility is not only pro-growth but pro-poor.

## B. THE DEMOGRAPHIC DIVIDEND AND POVERTY REDUCTION: AN AGGREGATE PERSPECTIVE

This section addresses in more detail whether fertility reduction *per se* is a pro-poor development policy. We draw on recent research on the demographic dividend to provide broad estimates of the poverty impact. The analysis presented below indicates that the dividend could lead to a reduction in poverty rates by about 14 per cent between 2000 and 2015 – an important contribution to meeting the MDG goal for poverty reduction.

The demographic dividend arises, in large part, when the number of producers in the population grows more rapidly than the number of consumers. The phenomenon occurs as fertility decline yields an immediate drop in the rate of growth in the number of consumers (children), but a substantially delayed decline in the rate of growth of the number of workers.

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<sup>1</sup> Several recent reviews treat these issues extensively (Ahlburg, Kelley et al. 1996; Eastwood and Lipton 2001a; Merrick 2001).

<sup>2</sup> That children impose a financial cost does not imply that their birth reduces the welfare of parents or other family members. Children are valued for reasons other than being future workers.

Two distinctive methods have been used to quantify the dividend. Cross-national regression models have been estimated by several scholars (Kelley and Schmidt 1995; Bloom and Williamson 1998; Kelley and Schmidt 2001). Direct estimates have been constructed by combining population data with estimates of age-profiles of consumption and production obtained by analyzing micro data (Cutler, Poterba et al. 1990; Mason and Lee 2004). The evidence assembled to date indicates that these two methods are statistically equivalent (Kelley and Schmidt 2001).

The direct estimation method has been used by Mason and Lee (2004) to estimate the demographic dividend for all countries in the world using United Nations population data (United Nations 2000) and a standard age-profile of consumption and productivity. Thus, variation in the demographic dividend among regions and over time is related entirely to demographic variation among countries rather than differences in the age-profiles of production and consumption. Not captured by the calculations are differences in policy, institutions, or other contextual variables that influence the success with which countries exploit the opportunities created by changing age structure.

Briefly stated the analysis indicates that during the last four decades the countries of Asia and Latin America were the main beneficiaries of the demographic dividend. Neither the least developed countries nor the countries of Africa have to this point experienced favorable demographic conditions. The regional difference is a direct reflection of the persistence of high fertility in many of the least developed and African countries. In the future, however, the demographic dividend will become increasingly important in the least developed countries and Africa.

The results presented in Table 2 provide crude estimates of the effect of the demographic dividend on \$1 per day poverty assuming that: 1) economic growth due to fertility decline is as effective at reducing poverty as other growth policies; and 2) that economic growth is equally effective at reducing poverty in all regions. The estimates are constructed using an estimate of the elasticity of poverty with respect to per capita income growth of -1.5 based on analysis of 111 growth spells from 51 developing countries (Asian Development Bank 2004).<sup>3</sup> In words, an increase in per capita income by 1 per cent is estimated to reduce the poverty rate by 1.5 per cent.

Table 2. Demographic Dividend and Poverty Reduction, 1960-2015. Major Regions of the World.

	Annual Reduction in Poverty Rate (%)		Total Reduction in Poverty Rate (%)	
	1960-2000	2000-2015	1960-2000	2000-2015
Less developed regions	0.38	0.30	14.1	14.1
Least developed countries	-0.11	0.26	-4.6	12.3
Africa	-0.07	0.29	-2.8	13.5
Asia	0.44	0.30	16.2	13.8
Latin America and Caribbean	0.54	0.39	19.5	17.7

Notes: Based on elasticity of \$1 per day poverty with respect to income growth of -1.5 (ADB 2004). Estimates of demographic dividend based on Mason and Lee (2004).

<sup>3</sup> A growth spell refers to a period for which comparable income and expenditure or poverty surveys can be used to measure economic growth and poverty or a period of three or more years.

Under these conditions, the demographic dividend would have led to a reduction of poverty rates in the developing world by 14 per cent between 1960 and 2000 and an additional 14 per cent between 2000 and 2015. For the least developed countries poverty rates were adversely affected by demographic change between 1960 and 2000. Between 2000 and 2015 the effect on the least developed countries are favorable – leading to an estimated reduction in poverty rates of 12 per cent. The regional patterns mirror the less developed – least developed pattern. Demographic change did not facilitate poverty reduction in Africa between 1960 and 2000, but had very favorable effects in Asia and Latin America - reducing poverty rates by 16.2 and 19.5 per cent, respectively. During the 2000-2015 period, however, significant reductions in poverty are anticipated in all three regions due to favorable changes in age structure.

The calculations presented in Table 2 provide a general indication of the magnitude of the effects associated with population change and show that, for the first time, demographic conditions could be favorable throughout the developing world during the next 15 years. There are important issues, however, that are not addressed by this approach. One is that the effect of economic growth on poverty varies from region to region and from country to country and even within countries. This issue has been explored in a number of studies with the conclusion that initial conditions matter. Poverty is more responsive to economic growth where initial income inequality is lower (Ravallion 2004) and educational attainment is higher (Ravallion and Datt 1999). Consistent with these observations are empirical estimates of poverty elasticities that are somewhat higher in Asia—where income inequality has been lower and where educational attainment is generally higher than elsewhere. This suggests that the effects shown in Table 2 may be under-estimated for Asia and over-estimated for Latin America and Africa. A second issue is that fertility reduction may be more or less pro-poor than development, in general. This issue we explore in the next section.

### C. A MICRO-LEVEL PERSPECTIVE: FERTILITY AND POVERTY IN INDONESIA

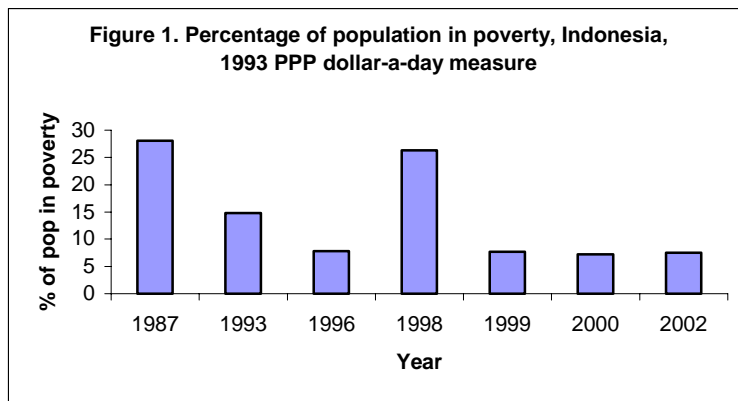
The demographic dividend analyzed at the aggregate level arises as a consequence of a decline in the number of children in the population relative to the number in the working ages. The same phenomenon can be analyzed for individual countries using household surveys. A full accounting of the effects of fertility is a complex and elusive goal, however. A change in the number of children may influence household behavior in many ways that will affect both current and future consumption. Unfortunately, the empirical methodology for estimating the full effects is far from obvious. Feedbacks, long-term effects, and direction of causation all enter the picture, as do institutional practices.

The approach that we take here is to consider only first order effects. Lower fertility leads to a decline in the number of household members. Total household income and, thereby total household consumption, will be directly affected because children contribute to family earnings by working. Per capita household income and consumption are affected because consumption is spread across fewer household members. The net effect on per capita consumption and the percentage in poverty depends on the magnitude of these two effects.

The Indonesian experience is instructive because of its considerable success during the 1980s and early 1990s. Income grew and fertility declined – both at a rapid pace during this period. By 1996 there were 3.3 children aged 0-14 for every couple aged 30-44. Currently, the total fertility rate is 2.6 births per woman. Between 1987 and 1996, Indonesia's poverty rate fell from 28% to about 8%. The Asian financial crisis hit Indonesia quite hard, however. The dollar-a-

day poverty rate rose to 26% during the crisis, but fell fairly quickly to about 7.5% in 2002 (Figure 1).

We use a quasi-experimental approach to estimate the net direct effect of fertility decline on poverty. Using a household survey we classify households with per capita expenditure of less than a dollar-a-day as impoverished. The poverty line is 911 *Rupiah* in 1996, calculated using the official exchange rate ratio (2,342 *Rupiah* per dollar) and PPP conversion factor to adjust the official exchange rate ratio (0.3889 per dollar).<sup>4</sup> Then, we randomly select 10 per cent of the children aged 0-14. We recalculate per capita household consumption and poverty rates excluding those children from the survey, reducing total household consumption by the income of the excluded children. The experiment is repeated for sub-groups of the population – female headed household and households distinguished by their urban-rural residence and by the educational attainment of the head. This allows us to assess whether fertility reduction targeted at particular sub-groups yields greater reductions in poverty.



Source: *Susenas*, each year. Cited from World Bank, Global Poverty Monitoring. [www.worldbank.org/research/povmonitor](http://www.worldbank.org/research/povmonitor)

We use the 1996 Indonesian Socio-Economic Survey (*Susenas*) and the matching Indonesian Labour Force Survey (*Sarkenas*). *Susenas* is a representative national survey which includes detailed information on household expenditure and income as well as households and individuals characteristics. *Sarkenas* is an annual national labour force survey which contains earnings of individuals at working age. Because these two data sets share the same identification variable, it is possible to impute individual earnings from *Sarkenas* to *Susenas*. Children’s labour income is defined as their earnings plus an estimated portion of the household’s entrepreneurial income. The estimated effects of a 10 per cent reduction in net fertility are presented in Table 3.

In 1996, 8.1% of the population lived below the poverty line. Poverty rates were higher among female headed households, rural households, and households whose heads had no more than a junior high school education. Poverty-reduction programs that *effectively* target these high poverty groups clearly have greater potential for reducing overall poverty rates.

The effect of a ten per cent reduction in the child population is to reduce poverty by to 7.2 per cent – a percentage reduction of 11 per cent. Targeted reductions in net fertility can yield substantially greater poverty benefits. In all instances, fertility reductions targeting female

<sup>4</sup> The poverty rate is slightly higher than the figure in Table 3 because we use the 1996 PPP measure which is a little higher than 1993 PPP measure used by the World Bank.

headed households yield greater benefits than programs targeting all households. The gains are particularly large for female headed households in rural areas and female headed households with less education. In percentage terms, the greatest gain is for households with educated female heads, but the before poverty rate is quite low for this group. We applied the experiment to 2002 *Susenas* (not reported) and found that the results and patterns are similar to those in 1996.

Table3. Change in percentage of population in poverty from a 10 per cent decline in the number of children, 1996. PPP dollar-a-day measure.

		<i>Before</i>	<i>After</i>	<i>Change</i>	<i>Percentage change</i>
Total	All HH	8.09	7.19	-0.90	-11.12
	Female HH	9.50	6.49	-3.01	-31.68
By residence					
Urban	All HH	2.52	1.70	-0.82	-32.54
	Female HH	2.78	1.62	-1.16	-41.73
Rural	All HH	14.79	12.06	-2.73	-18.46
	Female HH	15.01	9.60	-5.41	-36.04
By education of household head					
Junior high or less	All HH	9.78	7.12	-2.66	-27.20
	Female HH	9.51	6.45	-3.06	-32.18
More than junior high	All HH	1.15	1.00	-0.15	-13.04
	Female HH	0.91	0.48	-0.43	-47.25

Source: Calculated from 1996 *Susenas*.

#### D. CONCLUSION

Both the macro- and micro-level analyses support a single conclusion. In high fertility societies, fertility reduction is a potentially powerful tool for reducing poverty.

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