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I. Introduction

For several decades, research on population health in developing countries has debated the relative roles of female education and per capita income in the mortality decline. The literature has grown extensively since Caldwell (1979, 1986) established a theoretical basis for the mortality-education relationship and asserted that expanding female education was the fastest path to global morality decline. This framework, which also highlights the role of public health intervention in mortality reduction, breaks from the more traditional Malthusian premise that wealth-related factors play the central role in the in the reduction of mortality (e.g., McKeown 1976, 1979). Malthus (1798), who gave the field of economics its 'dismal' epithet, argued that if humans did not make an effort to restrain population growth, they were to face a future of what Malthus termed the 'positive' checks on population, including pestilence and famine. In this paradigm, population dynamics—including mortality—are economically determined, leaving little room for education to act as anything more than a means to greater lifetime wealth. With a focus on infant mortality and life expectancy at birth, this paper re-examines Caldwell's cross-national evidence for the relative importance of female education in his paper *Routes to Low Mortality in Poor Countries* (1986), and explores how it has evolved over the past twenty years.

In his pioneering study on the determinants of mortality in Nigeria, Caldwell (1979, pp. 409-410) set forth three hypotheses to explain the relationship between maternal schooling and child mortality, all of which continue to be widely cited today. First, more educated women are thought to be less "fatalistic" about illness, making them more likely to defy cultural traditions in order to take advantage of biomedical health technologies and new health-related skills and techniques. Second, education may confer upon women the abilities to communicate with health care professionals and demand their attention. The primary contention behind these first two hypotheses is that education makes women more adept caregivers and consumers of health care—by means of knowledge, improved cognitive skills, and augmented social position. The third hypothesis posits that education changes the intra-household balance of power, providing women more autonomy in the household decision-making process. With this added bargaining power, it is thought, educated women can make independent decisions that benefit the health of their children. Research at the micro-level continues to examine the specific mechanisms through which a woman's education affects her child's survival, if the relationship is indeed causal (Desai and Alva 1998; Cleland and Van Ginneken 1989; Behrnman and Wolfe 1987; Ware 1984).

Another causality question—perhaps a better known—surrounds the other focus of this study: the relationship between mortality and wealth. An extensive literature has documented this relationship both within and among countries. Although there is evidence that health improves productivity (see Strauss and Thomas 1998 and references therein; at the aggregate level, Bloom et al. 2004), most researchers agree that a substantial part of the relationship occurs in the other direction, particularly in the case of children—as Pritchett and Summers (1996) put it in their cross-country analysis, "wealthier is healthier." Causality in this direction has been demonstrated at the micro-level as well (e.g., Duflo 2000 on South Africa; Case et al. 2002 on the United States). Research on the relationship between the mortality decline and social and economic development continues to express reservations about exact causal mechanisms, but from a cross-country perspective, broad comparisons of the relative effects of maternal education and per capita income can inform policy makers and advocacy groups as they prioritize their efforts. A return to economic determinism would require a paradigm shift in development policy.

To assess how the relative roles of education and income as determinants of mortality have changed over time, I reconsider Caldwell's (1986) cross-national evidence for the importance of female primary education and then contrast it with more recent data. Caldwell demonstrated the relative importance of maternal education vis-א-vis per capita income by examining how 1982 mortality measures [infant mortality rate (IMR) and life expectancy at birth (e_0)] correlated with the two determinants of interest in 99 less-developed countries (LDCs). I follow these correlations over time and then present multivariate analyses using data from 1982 and 2002. My findings suggest that education and income have exchanged roles as determinants of infant mortality and life expectancy. Per capita income has become a more robust determinant of mortality over the past twenty years, while the role of female primary schooling has diminished considerably. The onset of the HIV/AIDS epidemic in the past two decades accounts for some, but not all, of the observed change. Although these results are not indicative of specific mechanisms, they highlight a broader shift towards economic determinism in mortality.

The paper proceeds as follows. The following section describes the data. Section III then reviews the evidence using Caldwell's correlation approach, followed by the introduction of a multivariate framework in Section IV. Section V considers the role of HIV/AIDS, and Section VI concludes.

II. Data

The analysis is based primarily on data from the *World Development Indicators* (*WDI)* database (World Bank 2004), but the variables that appear in Caldwell's study are drawn from their original source (World Bank 1984). As a result, there is a slight discrepancy in the national income data; Caldwell uses gross national product (GNP) per capita, but most current sources offer data on only gross national income (GNI), which is conceptually identical to GNP but differs slightly in practice.[1] To balance my results with Caldwell's, I use 1982 GNP per capita, but due to the unavailability of current GNP data I substitute GNI per capita in 2002. Regardless, Caldwell's income data are unadjusted for purchasing power parity (PPP), which may have biased his results. Accordingly, in most of the following analysis, I consider 1982 and 2002 *WDI* data for PPP-adjusted GNI per capita. To measure maternal education, I match Caldwell's analysis by using lagged gross female primary school enrollment rates. Caldwell employs 1960 primary enrollment rates against 1982 mortality measures (thus a 22-year lag); I supplement these with 1980 primary school enrollment data for use with 2002 mortality measures.[2] For the dependent variables at hand, I employ infant mortality rates and life expectancy at birth from 1982 and 2002. Finally, because the onset of HIV/AIDS in the past two decades may have single-handedly confounded the relationships of interest, my analysis makes use of UN (2004) estimates for country HIV/AIDS prevalence among 15-49 year-olds in 2001.

Geopolitical instability (for example, in Yemen and the former Yugoslavia) and other sources of data unavailability limit me to a 68-country sub-sample of Caldwell's original 99 countries.[3] However, as I demonstrate in Section III, this sample restriction does not substantively change Caldwell's original results. Table 1 presents descriptive statistics for the

[1] GNP measures the total value of all goods and services produced by a country's citizens (regardless of current residence), whereas GNI is the aggregate income received by these citizens. The two measures are conceptually identical, but due to data irregularities, they often yield marginally different results.

[2] I attempted to further complement primary education data with secondary education data, but data on 1960 female secondary schooling are not available for all 68 countries. After limiting my sample size to only those countries with 1960 secondary school data, my results for other relationships changed substantially, so I have chosen to omit secondary schooling from my analysis.

[3] It is also worth noting that data are missing for many of Caldwell's 99 countries even in the source he cites (World Bank 1984). Presumably, this implies that his original correlations were also from a sub-sample of countries. Data here are from the following countries: Algeria, Argentina, Bangladesh, Benin, Bolivia, Brazil, Burkina Faso, Burundi, Cameroon, Central African Republic, Chile, Colombia, Congo (Rep.), Costa Rica, Cote d'Ivoire, Ecuador, Egypt, El Salvador, Ethiopia, Ghana, Greece, Guatemala, Haiti, Honduras, Hong Kong, China, India, Indonesia, Iran, Israel, Jamaica, Jordan, Kenya, Korea (Rep.), Kuwait, Lesotho, Malaysia, Mali, Mauritania, Mexico, Morocco, Mozambique, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Singapore, Sri Lanka, Sudan, Syrian Arab Republic, Thailand, Togo, Tunisia, Turkey, Uganda, Uruguay, Venezuela, Zaire (Dem. Rep. of Congo) Zambia, and Zimbabwe.

sample. As expected, per capita income and female primary school enrollment have risen in the past twenty years, accompanied by improvements in both infant mortality and life expectancy.

Before moving on to the analysis, we should make note of an important measurement caveat surrounding the use of gross (rather than net) female primary school enrollment data. The gross enrollment ratio relates the total number of females enrolled (regardless of age) to the female school-age population, so countries with pervasive grade repetition can have gross enrollment ratios above 100%. Consequently, education systems with high enrollment but low quality produce gross enrollment ratios larger than systems of higher quality. That is to say, mothers in Zimbabwe, which had a 1980 female gross enrollment ratio of 121, are not necessarily more effectively educated than mothers in Israel, where the corresponding figure stood at 96. Table 1 indicates that enrollment ratios in the 68-country sample have risen by nearly 30 percentage points on average. As this upward shift occurred, quality variables may have increasingly obscured the mortality-reducing effect of maternal schooling. Net enrollment ratios, which focus solely on enrollment within the school-age population, would eliminate the effect of grade repetition, but only gross enrollment data are available for 1960. The results of this study should therefore be considered cautiously, but they can nonetheless paint an informative picture of the evolution of mortality in the developing world.

III. A Re-examination of Caldwell's Evidence

I begin by examining how Caldwell's correlations have changed between 1982 and 2002. Before doing this, however, it is useful to examine simple scatter plots for the relationship of interest, shown in Figure 1. For both infant mortality and life expectancy, the mortality-education plots have become more dispersed over the past twenty years, while the mortality-income plots have become more concentrated—the relationship is not linear, but it appears to have strengthened over time. The first two entries of Table 2 show the correlations as they appear in Caldwell's paper. To be sure, the correlation coefficients for female education appear unambiguously larger than those for per capita income. Section (ii) then continues with my own results from the 68-country sub-sample. We note at the outset that, despite the decreased sample size, my results for 1982 do not differ noticeably from those in Caldwell's paper. Just as in Caldwell's study, the mortality-education correlation coefficients lie between 0.8 and 0.9 (-0.8 and -0.9 for IMR), far stronger than the correlations between mortality and per capita income, which hover around 0.3 and 0.4 (-0.3 and -0.4 for IMR).

As a next step, I make several small but important adjustments to Caldwell's figures. Foremost, Caldwell analyzes the health-income relationship linearly, paying little attention to Preston's evidence (1975) that the marginal effect of income on health is decreasing in income: that is to say, that the health-income function is steep at low levels of income and then flattens as income rises. The scatter-plots in Figure 1 support this observation. Indeed, using the natural logarithm of per capita income raises the correlation coefficients by more than three decimal points. To further adjust Caldwell's figures, I substitute PPP-adjusted per capita income data, which results ultimately in log-linear correlations that lie within 0.15 of the corresponding figure for education. Nonetheless, these correlations tell little about the *relative* roles of education and income because the two measures are also related to one another. To help disentangle these relative roles, Section (iii) of Table 2 presents standardized coefficients from a multivariate framework, corresponding to the income-adjusted education correlation coefficient and the education-adjusted income coefficient. These joint specifications are consistent with Caldwell's basic premise; for both IMR and e_0, the adjusted coefficients for education are much higher than those for income in 1982. The relative differences are smaller than Caldwell originally suggested, but female education still holds the upper hand.

The corresponding results from 2002 reveal that education and income have rapidly crossed paths. The correlation between IMR and female education has contracted from -0.84 to -0.61, and more strikingly, the coefficient for life expectancy has nearly halved, from 0.86 to 0.48. In contrast, the relationships between mortality and log per capita income have risen drastically, both now approaching 0.9 (-0.9 for IMR). These changes are even starker from the multivariate perspective. The income-adjusted correlation between female education and e_0 has shrunk from 0.58 to a statistically insignificant 0.02 (p=0.84), with the IMR-education correlation following a similar—although, as expected, less drastic—trend. At the same time, the education-adjusted coefficients for income have swelled to at least twice their original size in 1980. It appears that the past twenty years have seen the mortality-education relationship weaken against a strengthening bond between mortality and wealth.

IV. Decomposing the Evolution of Mortality

A slightly more rigorous multivariate framework can provide us with a more quantifiable understanding of these changes. In this section, I consider female education and per capita income jointly over time, using the following OLS specification:

$$\begin{aligned} health_{it} = \beta_0 + \beta_1(income_{it}) + \beta_2(income_{it} * T_t) \\ + \beta_3(educ_{it}) + \beta_4(educ_{it} * T_t) + \beta_5(T_t) + \varepsilon_{it} \end{aligned} \quad (1)$$

where *health* indicates either of the two mortality measures (IMR and e_0) for country *i* in year *t*, *income* specifies the country's log GNI per capita, and *educ* is its lagged female primary school enrollment rate. *T* is a time effects dummy coded 1 when t = 2002 and 0 when t = 1982, and ε is the error term. The central coefficients here are β_2 and β_4, which correspond to the interaction terms for time and the covariates of interest; these will indicate whether the relative roles of education and income have changed. The results here should be intuitively similar to the standardized coefficients in the previous section, but this framework can better measure the scale of the presumed effects. Keeping simultaneous causality concerns in mind, however, the regressions here should be seen as rough explorations of relative relationships, not unbiased estimators of causal effects.

Table 3, which presents the IMR results from equation (1), confirms the results from the previous section. Column (3.1) offers estimates of how maternal education and per capita income relate to infant mortality, and the coefficients for both variables are highly significant. The incorporation of the time effects dummy in column (3.2) does not change the results significantly, but when column (3.3) adds the interaction terms, the shift in the global determinants of mortality becomes clear. All five coefficients are significant at 1%, and the interaction terms reveal sizeable shifts in the relative roles of income and education. The results imply that, while a 10% increase in 1982 per capita income corresponded to a 13-point drop in IMR, by 2002 this reduction had grown to 33 points. Conversely, the mortality-reducing effect of a ten percentage-point increase in female primary school enrollment fell from 8 to 2 IMR-points.

Turning to life expectancy, Table 3 reveals even more striking changes. The education coefficient begins in column (3.4) significant at only 10%, but with the addition of the time dummy in (3.5), education rises to 5% significance. When (3.6) incorporates the interacted regressors, all five coefficients are significant at 1%. These results indicate that, in 1982, a 10% rise in per capita income was related to a 5-year increase in life expectancy, whereas by 2002, this figure had increased to over 12 extra years of life. On the other hand, the sum of the coefficients for education and its time-interaction term is not significantly different from zero, suggesting that the life-extending effect of maternal education had disappeared by 2002, much as the previous section implied. This finding should be regarded with caution, as it may reflect an aging mortality schedule. Nonetheless, both infant mortality and life expectancy point to the same trend. Does this signify Malthus' return?

V. Is HIV/AIDS to Blame?

A likely fallback explanation for this shift is the HIV/AIDS pandemic, which has heightened mortality levels in the world's poorest regions. To examine whether the changes are concentrated in countries affected by HIV/AIDS, I use a binary variable for countries that are vulnerable to the pandemic: coded 1 for t = 2002 if more than 5% of the country's adult population (aged 15-49) is estimated to be living with the disease, 0 otherwise. The model now takes the following form:

$$\begin{aligned} health_{it} = \beta_0 + \beta_1(income_{it}) + \beta_2(income_{it} * T_t) + \beta_3(income_{it} * AIDS_{it}) \\ + \beta_4(educ_{it}) + \beta_5(educ_{it} * T_t) + \beta_6(educ_{it} * AIDS_{it}) \\ + \beta_7(T_t) + \beta_8(AIDS_{it}) + \varepsilon_{it} \end{aligned} \qquad (2)$$

This specification expands equation (1) to include *AIDS* and its interacted regressors. Here, the AIDS-interaction coefficients (β_3 and β_6) and the time-interaction coefficients (β_2 and β_5) are our primary interests. Table 4 contains these results alongside models (3.3) and (3.6) from the previous section as a means for comparison.

As Table 4 shows, introducing AIDS to the model alters the structure to some extent, but the basic implications remain unchanged. In the new infant mortality estimation [column (4.1)], the incorporation of the AIDS-income interaction more than halves the coefficient for its corresponding time-interaction, which also decreases in significance from 1% to 10%. However, the coefficient for the AIDS-income term is not statistically significant, nor, as the F-test reveals, are the two interaction terms are jointly significant. In the case of education, we observe a similar fall in the time-interaction coefficient; here, both interaction coefficients remain at least marginally significant (at 5% and 10%), and they are jointly significant at the 1% level. The cumulative effect of education and its time-interaction term on infant mortality is now significantly different from zero, but adding the AIDS-interaction eliminates this significance. This finding implies that a 10 percentage-point increase in 1960 enrollment corresponded to an 8-point decrease in 1982 IMR, but by 2002, this decrease had fallen to 5 IMR-points among countries without high HIV/AIDS prevalence, and 0 points among AIDS-stricken countries.

The life expectancy estimation in column (4.2) has similar implications. The time-interaction terms for both per capita income and education fall sharply, although all coefficients of interest remain individually significant at a level of at least 10%. It appears that HIV/AIDS lies behind much of the disappearance of the relationship between longevity and schooling. The effect of a 10-point increase in maternal education declined from 1.6 extra years of life in 1982 to 0.9 years among non-AIDS countries in 2002, but in AIDS-ravaged countries, maternal schooling no longer appears to be related to life expectancy. Interestingly, the sum of the coefficients for per capita income and its interacted regressors is not significantly different from zero, implying that, among AIDS-stricken countries, the current level of per capita income has no association with longevity.

VI. Discussion

A shift towards economic determinism, while certainly daunting from a policy perspective, offers an interesting puzzle to researchers. Although population health had in recent times appeared to move away from economic determinism, the past century of mortality decline in the developing world may have been a mere upward fluctuation in Malthus' "perpetual oscillation between happiness and misery" (1798, p. 1). We may now stand at the juncture where disease and hunger return as positive checks on population.

Before further examining the Malthusian possibility, note that one could interpret my findings as evidence that Caldwell's methodology—using country-level data to capture micro-level phenomena—is flawed. Certainly, the use of gross enrollment ratios should raise eyebrows, but even past this, with potential endogeneity and aggregation bias, the approach may have more fundamental problems. Were this the case, my results should raise important reservations about the accuracy of Caldwell's initial analyses, which largely inspired the current literature.

If the results do represent a real phenomenon—and this remains an important possibility—then they merit a closer look at potential mechanisms. The HIV/AIDS epidemic does appear to explain part of the shift in infant mortality. Whether the pandemic reflects a positive Malthusian check is unclear; although this argument has value, a number of other epidemiological factors might make the epidemic relatively exogenous. As mortality indicators have worsened in the poor countries of sub-Saharan Africa, they have improved in slightly wealthier countries unaffected by HIV/AIDS, and this divergence may or may not have its roots in income levels. Consequently, the crisis may have magnified the global mortality-income relationship for partially exogenous reasons; the poorest have now also become the unhealthiest (which may, in turn, have made them even poorer). This possibility can help account for the insignificance of both income and education in the life expectancy results for AIDS-stricken countries, which reflect the general state of the population (across age groups) better than infant mortality—AIDS has attacked African countries rich and poor, educated and uneducated, alike.

In addition, particularly in the case of per-capita income, simultaneous causality is likely to be a problem.

Furthermore, education itself may affect the epidemiological dynamics of HIV/AIDS. Cleland and Van Ginneken (1989) identify the expansion of social networks as one conduit through which widespread female education may benefit child health. In this day of HIV/AIDS, however, wider social networks may actually increase mortality risk. This idea defies most of the current literature, which tends to couch education as a "social vaccine" (Vandemoortele and Delamonica 2000), noting, for example, that education improves the effect of the dissemination of AIDS-information within countries (De Walque 2004). Nonetheless, recent epidemiological research on the transmission of HIV/AIDS has advanced the idea that long-standing networks of concurrent sexual partnerships provide rapid pathways for the spread of the virus (Garnett and Johnson 1997; Morris and Kretzchmar 1997). By expanding social networks, education may have also widened webs of concurrent sexual partnerships, putting more educated populations at greater risk of transmission. Educated women may be better off than their less educated counterparts *within* a given society, but social externalities may undercut any individual-level advantages. In societies less exposed to education, women make fewer social ties outside their immediate communities, arguably protecting themselves from HIV/AIDS.

AIDS aside, however, the remaining portion of the shift is puzzling. The explanation may include a combination of new globalization dynamics and evolving socio-cultural norms. As health care and public health education have become more prevalent, and as access to health technology has increased, societies and cultures have undoubtedly adapted. For example, at the time of Caldwell's initial work on the link between education and mortality (1979), oral rehydration therapy (ORT)—now a major deterrent of infant death—was still a nascent technology; in fact, the WHO did not officially endorse ORT as a treatment of diarrheal disease until 1978 (Greenough 2004). The following year, Caldwell hypothesized that education allows women to overcome 'fatalistic' cultural norms that keep them from giving their children optimal care. Two decades later, these norms may have adapted to then-breakthrough technologies such as ORT, thus eliminating the need for education to overcome fatalism. Without new and available breakthrough health technologies, the complementary effect of education may have diminished. And while medical and public health research continues to make progress, it is unclear whether the current state of globalization will make the new fruits of research available to LDCs. For instance, pointing to the world's failure to tackle the AIDS crisis, Deaton (2004) argues, "among the poorest countries, the gifts of global health have been diminishing or otherwise limited in the 1990s" (p. 30).

As the 21st century unfolds, the current generation may bear witness to a return to the Malthusian constraints on population. Further research is needed to more carefully examine the evolution of mortality, but my findings give reason to believe that a shift toward economic determinism may be occurring. If the crossover in the determinants of mortality represents a genuine change and not an empirical anomaly, policy makers will be forced to rethink health efforts at both the national and global levels. Two centuries ago, Malthus argued that subsistence constraints would preclude "the perfectability of the mass of mankind" (1798, p. 17). This disturbing prospect may represent the central policy challenge of the years to come.

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Tables and Figures

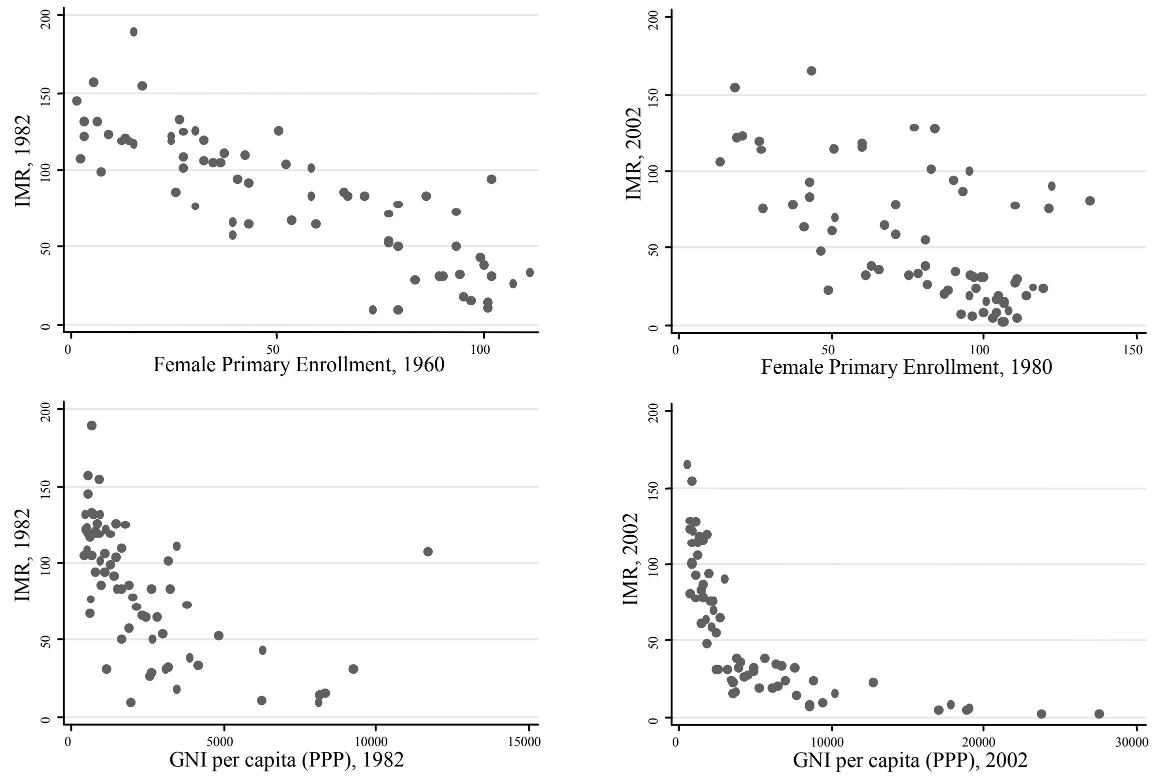
Table 1: Descriptive Statistics

	1982		2002	
	Mean	**Stan. Dev.**	**Mean**	**Stan. Dev.**
Gross female primary school enrollment (22-yr lag)	51.5	34.0	79.2	30.4
GNI per capita (Atlas)*	1738.4	3132.3	2764.0	4840.4
GNI per capita (PPP)	2348.2	2346.6	5053.2	5694.2
AIDS Rate>5%	0	0	0.26	0.44
Infant Mortality Rate	85.2	41.7	56.4	42.7
Life Expectancy at Birth	57.6	9.6	61.2	13.5

Notes: N=68. * To make these results more comparable to Caldwell's, I use 1982 GNP (Atlas) as presented in Caldwell's data source (World Bank 1984). All other national income data (Atlas and PPP) are in the form of GNI from the *WDI* database.

Figure 1: Scatterplots

Infant Mortality:



Life Expectancy:

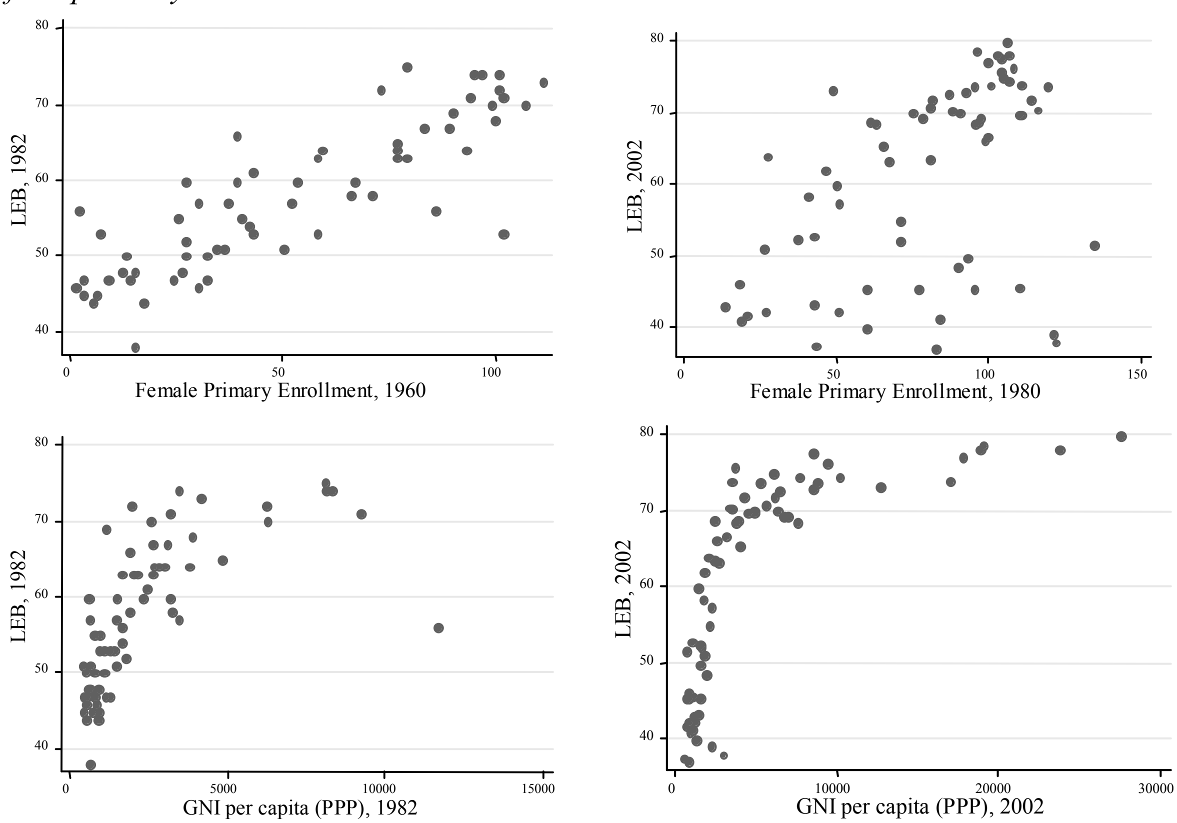


Table 2: Correlations

	1982		2002	
	Infant Mortality	**Life Expectancy**	**Infant Mortality**	**Life Expectancy**
i. Caldwell's Correlation Coefficients (99 countries)[†]				
Female primary school enrollment (22-year lag)	-0.86	0.87		
GNP per capita (Atlas)	-0.31	0.39		
ii. New Correlation Coefficients (68 countries)				
Female primary school enrollment (22-year lag)	-0.84*	0.86*	-0.61*	0.48*
GNI per capita (Atlas)[a]	-0.36*	0.41*	-0.54*	0.55*
Log GNI per capita (Atlas)[a]	-0.68*	0.76*	-0.86*	0.86*
GNI per capita (PPP)	-0.58*	0.65*	-0.66*	0.67*
Log GNI per capita (PPP)	-0.71*	0.80*	-0.89*	0.87*
iii. Adjusted [Standardized] Correlation Coefficients (68 countries)				
Female primary school enrollment (22-year lag)	-0.67*	0.58*	-0.20*	0.02
Log GNI per capita (PPP)	-0.26*	0.41*	-0.78*	0.86*

Notes: [†] From Caldwell (1986), p. 179: "Correlation between mortality and various other measures, 99 Third World countries." [a] In 1982, Atlas method GNP data is used in place of Atlas method GNI. * Significant at 1%. (Caldwell did not indicate significance levels in his paper.)

Table 3: Baseline Regression Results

	Infant Mortality			Life Expectancy		
	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(3.6)
ln(GNI per capita)	-25.72***	-25.87***	-12.76***	8.85***	9.13***	4.58***
	(2.96)	(3.01)	(3.89)	(0.94)	(0.94)	(0.86)
ln(GNI per capita)×T			-20.50***			7.11***
			(4.67)			(1.31)
Maternal Education	-0.50***	-0.51***	-0.82***	0.05*	0.07**	0.16***
	(0.09)	(0.09)	(0.11)	(0.03)	(0.03)	(0.02)
Maternal Educ×T			0.54***			-0.16***
			(0.14)			(0.02)
T = Time effects dummy		2.24	123.16***		-4.36***	-48.72***
		(4.02)	(3.87)		(1.03)	(8.25)
Adjusted R^2	0.77	0.77	0.80	0.71	0.74	0.78
F-Tests for Joint Significance (p-values):						
Educ + Educ×T = 0			0.00			0.83

Notes: N=68 LDCs. OLS estimates with robust standard errors in parentheses. Maternal education refers to lagged female primary school enrollment. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 4: Accounting for HIV/AIDS

	Infant Mortality		Life Expectancy	
	(3.3)	(4.1)	(3.6)	(4.2)
ln(GNI per capita)	-12.76***	-12.77***	4.58***	4.58***
	(3.89)	(3.94)	(0.86)	(0.87)
ln(GNI per capita)×T	-20.50***	-8.94*	7.11***	2.54*
	(4.67)	(5.40)	(1.31)	(1.34)
ln(GNI per capita)×AIDS		-7.19		-5.34*
		(12.15)		(2.93)
Maternal Education	-0.82***	-0.82***	0.16***	0.16***
	(0.11)	(-7.66)	(0.02)	(0.02)
Maternal Educ×T	0.54***	0.33**	-0.16***	-0.07*
	(0.14)	(0.17)	(0.02)	(0.04)
Maternal Educ×AIDS		0.35*		-0.10**
		(0.19)		(0.04)
T = Time effects dummy	123.16***	39.29	-48.72***	-15.12*
	(3.87)	(38.36)	(8.25)	(9.08)
HIV/AIDS dummy		57.97		30.71
		(82.79)		(20.02)
Adjusted R^2	0.80	0.84	0.79	0.89
F-Tests for Joint Significance (p-values):				
ln(GNIpc)×T and ln(GNIpc)×AIDS		0.16		0.07
Educ×T and Educ×AIDS		0.01		0.00
ln(GNIpc) + ln(GNIpc)×T + ln(GNIpc)×AIDS = 0		0.00		0.52
Educ + Educ×T = 0	0.00	0.00	0.83	0.01
Educ + Educ×T + Educ×AIDS = 0		0.31		0.84

Notes: N=68 LDCs. OLS estimates with robust standard errors in parentheses. Maternal education refers to lagged female primary school enrollment. The HIV/AIDS dummy captures those countries with adult (15-49) HIV/AIDS prevalence greater than 5%. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.