

Fertility and the MDG: Does Fertility Decline Lead to Lower Poverty Rates?

Arnstein Aassve and Abbi Kedir¹

Abstract: Whereas poverty reduction is a critical goal in the Millennium Development Goals (MDG), very little is actually said about the role of demographic change. Yet all available trends suggest that fertility decline is closely related to economic growth and hence lower poverty. This paper provides a case study in that it takes longitudinal household level data from rural Ethiopia. We model child bearing and poverty as joint random effect models, controlling for initial conditions. The analysis indicates that childbearing indeed affects poverty where poverty itself appears to have little impact on fertility outcomes.

Key words: Poverty, fertility, Ethiopia, State-dependence, Simultaneous equations, Demography of developing countries

1 Introduction

The relationship between poverty and fertility is a long contested issue among demographers and economists. They are clearly related and in the 37th session of the UN Commission on Population and Development in 2004, the importance of reproductive health through family planning was key in achieving the poverty reduction as expressed by the MDG. However, the report also noted the relatively low importance of family planning initiatives and programs in the Country Poverty Reduction Plans (PRSP). The original argument holds that high fertility rates are a cause of poverty because high dependency ratios limit the amount of long-term investments that can be made in human capital and capital-building enterprises. However, the direction of causality asserted by demographers came under fire from economists by the 1980s. The 1986 report by the National Research Council highlights the primary criticism of the Malthusian argument, focusing on the importance of bad governance, economic policy, corruption, and lack of natural resources as more important determinants of economic growth than simply population growth. Citing India and other high population growth-high economic growth countries as proof, economists argued that there may be no correlation or reverse causality, in that poverty may induce high fertility levels as children are valued for their labour and as a source of economic security in old age. However, relatively recent advances in data availability have led to groundbreaking discoveries in demography that offer compelling evidence towards regional and country-level economic benefits from a reduction in the youth dependency ratio. While altering the age structure of a country is not panacea for poverty, given the proper timing and intensity of the demographic transition, good economic policy conditions, and solid implementing institutions, family planning can serve as one of the most important programs for achieving sustainable growth and progress towards the MDGs, including those referring to

¹ Arnstein Aassve, Department of Decision Sciences, Bocconi University, Via Roentgen 1, 20136 Milano, Arnstein.Aassve@unibocconi.it; Abbi Kedir, Department of Economics, University of Leicester, University Road, Leicester, UK, ak138@Leicester.ac.uk

poverty reduction. On the backdrop of this, our paper aims at tapping into the causality – possibly reversed causality – of poverty and fertility. In contrast to the vast amount of studies focusing on country variation over time, we take here a micro-econometric approach. We use data from rural Ethiopia, and as such, our analysis serves as a case study, where we observe how households evolve over time with respect poverty status and childbearing. Our econometric approach is a variant of random effect modelling, similar to that of Heckman (1981) and Wooldridge (2001). What differs in our application is that poverty and fertility are estimated as simultaneous equations, where the household random effects are allowed to be correlated. We also provide estimates of the state-dependence in poverty and fertility, whereby a suitable specification of the initial conditions are implemented. The analysis indicates that childbearing indeed affects poverty where poverty itself appears to have little impact on fertility outcomes. Our estimates lend support to the hypothesis that fertility indeed might reduce poverty in a modest way – but not vice versa.

2 The policy setting of poverty and fertility in Ethiopia

Table 1 gives summary data on the demographic and economic conditions prevailing in Ethiopia since 1980¹. It is immediately clear that Ethiopia is a country where poverty is severe in which more than two-thirds of the population live on less than \$2 per day. Despite a series of economic reforms gradually being introduced in the late eighties, the Ethiopian economy remains heavily agriculture-centred with around 85% of households being classified as farmers and by any measure the mode of production is primitive and labour intensive. Provision of family planning services is also poor, especially in rural areas, and by 2000 the contraceptive prevalence rate (CPR) in rural Ethiopia was only six percent, whereas it was around 45 percent in urban areas². The political history of Ethiopia has obviously hindered progress in health provision and promoting economic reforms. After the traditional monarchy was replaced in 1974 by the provisional military government, much of the Ethiopian economy was nationalised. The 1980s followed with political unrest and upheavals, and the country was plagued by a series of famines, all with devastating effects (Lindstrom and Berhanu 1999). The fertility rates during this period remained high. However, fertility rates differ dramatically between urban and rural areas. For instance, TFR in Addis Ababa, by far the largest urban concentration in Ethiopia, is as low as 1.9, which is below replacement level. In rural areas, in contrast, the TFR is as high as 6.5 (Kinfu, 2000; Sibanda et al 2003). One issue concerns child labour which is still high in Ethiopia and remains critically important in a heavily agricultural based economy (Admassie, 2002). Moreover, school enrolment and literacy rates, though improving, remain critically low, especially in rural areas.

Table 1: Demographic and economic indicators, Ethiopia

	1980	1990	2000	2003
Total Fertility Rate (TFR)	6.6	6.9	5.7	5.7*
Life expectancy at birth (years)	42.0	45.0	42.3	42.1*
Population Growth (% annual)	2.7	3.7	2.4	2.1
Total Population (in millions)	37.7	51.2	64.4	68.6
Rural population (% of total)	89.5	87.3	85.1	84.4
GDP per capita (\$US in 1995 prices)	..	107.3	115.1	115.0
Child labour (% of 10-14 age group)	46.3	43.5	41.1	40.4

*Data refer to 2002, last year available (Source: *World Development Indicators* database)

The dire population problems facing Ethiopia were laid out in the National Population Policy of Ethiopia (NPPE) introduced in 1993. One of the main problems facing Ethiopian Society is that the population has been growing at a faster pace than the economy itself, and the major demographic factor behind this development is the high fertility rate. It also voices concern over the fact there is little indication that fertility rates are about to decline. A key element of the document is that the policy implications related to the ever growing population should not be limited to provision of health. Rather, population growth, and in particular high fertility rates, is a multifaceted issue that is both a cause and consequence of economic development issues, and is related to education, health provision, private investment, food insecurity, environmental problems, and last but not least, issue concerning social norms and traditions related to women's role in society. In fact, the document emphasises that the economic, social and political status of women have direct bearings on the level of fertility. In so far women's roles are defined in terms of

household management and matrimonial duties, fertility decisions lies primarily with the household head. Although there are no laws restricting women attending school, the traditional roles of women are reflected and reinforced through a strong gender bias in school attendance. The weak role of women and its relationship to high fertility rates are exacerbated through inadequate family planning. Inefficiency in its delivery together with restrictive legislation has certainly not encouraged the use and spread of modern contraceptives. Objectives of the Ethiopian NPPE encapsulate a range of issues, including closing the gap between population growth and low economic productivity, reducing current TFR from 7.7 down to 4.0, raising the social and economic status of women and increase women's participation in education and removing legal customary practices which currently restrict women's economic and social rights.

Whereas the NPPE emphasises the importance of economic growth and poverty reduction as a means to tackle population growth, mainly through high fertility rates, the Sustainable Development and Poverty Reduction Program (SDPRP) introduced in 2002, and followed up by another SDPRP in 2005, does not say much about the role of population and fertility for poverty reduction. In fact, reduction in population growth through reduced fertility does not appear as a crucial policy instrument to combat poverty. The SDPRP does however make a strong commitment to combat and reduce gender imbalances in Ethiopian society. The SDPRP also put strong focus on education, through increasing enrolment rates and educational infrastructure, though not much emphasis is put on how to reduce strong gender imbalances in education. The SDPRP also emphasises the importance of improving health provision at the community level, but it also states that the health programmes will give priority to prevention of diseases. Very little is said about improving family planning and increasing the use of modern contraceptives.

3 Empirical Framework

3.1 Data

The aim of this paper is to provide an econometric case study where we highlight the causal mechanisms between poverty and fertility. We do so by taking three waves from the Ethiopian Rural Household Survey conducted in 1994, 1995 and 1997. Ethiopia was at war with neighbouring Eritrea from 1998 – 2000. This represents important shock to the economy, and as a result we did not include the fourth wave conducted in 2000. Poverty status is specified as a discrete state, and is derived from the more general FGT family of poverty measures (Foster, Greer and Thorbecke, 1984). Consequently, we use the World Health Organisation (WHO) equivalence scale. The poverty line is constructed using the 'cost of basic needs' approach following Ravallion and Bidani (1994). In brief this involves estimating the cost of a certain expenditure level which corresponds to a minimum calorie requirement. A food poverty threshold is defined as the expenditure needed to purchase a basket of goods that will give the required minimum calorie intake. Following FAO recommendations this threshold is set at 2100 calories³. Consumption expenditure includes auto-consumption.

A drawback of the surveys is that it does not include full retrospective fertility histories. Instead we rely on the household roster which gives the number and ages of children living in the household in addition to recording new births between waves. For the initial conditions (to be explained shortly) we use the number of children as the dependent variable. Clearly this is an approximation to the number of children actually born to the household head, and is strictly speaking not a direct measure of fertility. Children might have died or moved away from the household head, which is not well controlled for in a retrospective sense. However, childbearing between waves refer to actual births and are a reasonable precise measure of fertility outcomes.

3.2 The econometric specification

There are numerous studies tackling the issue of state dependence and heterogeneity. Examples range from unemployment issues (e.g. Heckman 1978, 1981; Arulampalan et al. 2000), studies of persistence in low pay (Stewart and Swaffield 1999) and analysis of poverty persistence (Biewen 2004). A common approach in these studies is to employ a dynamic binary response model with controls for unobserved heterogeneity. The approach taken here is based on Wooldridge (2005), but we make

extensions in order to facilitate possible reversed causality between fertility and poverty, and as such the approach is similar in spirit to that of Biewen (2004). We start by specifying a simple dynamic random effect probit model for poverty²:

$$\Pr(p_{it} = 1 | x) = \Phi(\beta^p x_{it}^p + \delta^p p_{it-1} + \gamma^p k_{it-1} + \eta_i^p) \quad (1)$$

where x_{it}^p is the set of assumed exogenous variables, p_{it-1} is the lagged poverty status, k_{it-1} is an indicator for lagged child bearing events, possibly endogenous with respect to poverty status, whereas η_i^p is the time-invariant and unobserved household effect. In order to ensure consistent and unbiased parameter estimates, η_i^p is assumed independent of the observed covariates. This assumption implies that there is no feedback from the dependent variable onto future values of the explanatory variables, including children and future child bearing events³. Another issue concerns the time dimension of our sample. The observed fertility and poverty histories are certainly incomplete since our sample only includes three waves. As pointed out in Heckman (1981), with lagged response variable and unobserved heterogeneity, a small time dimension relative to the cross-sectional dimension produces inconsistent maximum likelihood estimates. This is commonly known as the initial condition problem and is certainly an issue that needs addressing in this application. Moreover, the random effect η_i^p is unlikely to be independent of the initial values of the poverty process p_{i0} . Rather than simply specifying an auxiliary regression for the initial condition we estimate its distribution, together with the processes itself, integrating out over the random effect.

In our application concern lies in whether fertility decisions are exogenous with respect to poverty and vice versa. If there is feedback from fertility onto future poverty status, then this violates the strict exogeneity assumption, implying that the random effect is not independent from the explanatory variable measuring fertility. The same will be the case of course if there is feedback from poverty onto future fertility outcomes. As a result we specify a model where poverty and fertility processes are estimated jointly. Whereas the specification of poverty is given according to equation (1), the specification of the fertility process is given the probit specification as follows:

$$\Pr(k_{it} = 1 | x) = \Phi(\beta^k x_{it}^k + \delta^k k_{it-1} + \gamma^k p_{it-1} + \eta_i^k) \quad (2)$$

where x_{it}^k is the set of exogenous covariates, which may or may not be the same as x_{it}^p in equation (1), k_{it-1} is the lagged birth event variable, p_{it-1} is the lagged poverty status and potentially endogenous with respect to childbearing, and η_i^k is the time-invariant household random effect related to childbearing. The initial condition for poverty status is also implemented by a probit model:

$$\Pr(p_{i0} = 1 | x_0) = \Phi(\beta^{p0} x_{i0}^{p0} + \gamma^{p0} K_{i0-1} + \eta_i^p) \quad (3)$$

Whereas a probit model can suitably be used for the poverty status in the initial time period, the same is not true for childbearing. Here the initial value will refer to the *number* of children in the first time period and as result we use the Poisson model. In general the Poisson regression model specifies that each outcome, K_{i0} , here the number of children in the initial period, is drawn from a Poisson distribution with

² With information on the history of poverty and childbearing events, we could (in theory) estimate hazard models in a simultaneous estimation framework. Clearly, in a panel of three waves the poverty history will necessarily be incomplete. Moreover, none of our data sets contain fertility histories, though they could be (incompletely) reconstructed from the household roster.

³ This is also known as the strict exogeneity assumption.

parameter λ_i , that is related to the covariates. Using the log-linear model we specify the initial condition for fertility as:

$$\lambda_{i0}^K = \exp(\beta^{k0} x_{i0}^{k0} + \gamma^{k0} p_{i0} + \theta \eta_i^k) \quad (4)$$

Identification and estimation of equations (1) - (4) entail several important issues. First, equation (3) and (4) require exclusion restrictions over equations (1) and (2) respectively, which implies that for the poverty process some of the variables contained in the set x_{i0}^{p0} are excluded from x_{it}^p . Similarly has to be true for the fertility process. Second, note that the initial conditions for poverty, as specified in equation (3), and the poverty process itself, equation (1), contain the same random effect η_i^p . This is also the case for the initial condition for childbearing and the childbearing process, but since the parameters of the Probit enter in a different way than the parameters in the Poisson model, we allow for a scale parameter θ . The lagged variable of the number of children in the household is included in the poverty process, and lagged poverty status is included in the childbearing process, both of which likely to be endogenous, and therefore correlated with the random effects. In order to encompass the correlation, we estimate equations (1) - (4) in a joint Maximum Likelihood procedure, in which then random effects are specified with a joint normal distribution:

$$\begin{pmatrix} \eta_i^F \\ \eta_i^p \end{pmatrix} \sim N \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_k^2 & \rho_{pk} \\ \rho_{pk} & \sigma_p^2 \end{pmatrix} \right) \quad (5)$$

In order to ensure identification, rather than including the contemporaneous poverty status, we use the lagged value (see Maddala 1983 for details on identification of simultaneous discrete choice models). By integrating out over the random error components, the observed outcomes are independent and can therefore be estimated by Full Information Maximum Likelihood (FIML).

4 Results

4.1 Random effects

For the sake of brevity, we omit here the reporting of the parameters associated with the initial conditions equations. For details, see Aassve et al (2006). The initial conditions require exclusion restrictions with respect to the dynamic poverty and fertility processes expressed by equations (3) and (4). We construct variables from the first wave that describes characteristics of the household which are of a semi-permanent nature. These include a deprivation index based on possessions of durables and physical characteristics of the household and control for land size and the amount of livestock, and whether the income situation worsened over the last five years (prior to the measurement in the first wave).

The estimated standard deviations of the random effects and its correlations are presented in Table 2. The estimated standard deviations of the random effects are highly significant for both processes. There is also a strong positive correlation between the poverty and fertility processes. The correlations between the poverty and fertility random effects also reflect the way poverty is defined, and in particular it depends on the equivalence scale used. Comparing columns (2) and (3) in Table 2 demonstrates this point clearly. Column (2) shows the correlation when using per capita (or head count) poverty, whereas column (3) shows the correlation when imposing the WHO equivalence scale. Since it gives a smaller weight to younger children, the correlation naturally declines, and in general, the smaller weight assigned to children, the smaller the correlation between the two processes.

Table 2: Random effects

	Without IC (Per capita)	With IC (Per capita)	With IC (who Eq.Sc.)
	(1)	(2)	(3)
S.D. of RE in fertility process	0.9857*** (0.0888)	1.0164*** (0.0907)	0.9986*** (0.0896)
S.D. of RE in poverty process	0.3908*** (0.1033)	0.6360*** (0.0656)	0.6043*** (0.0671)
Correlation of RE	0.0000	0.3326*** (0.0873)	0.2383** (0.0935)
Theta (scale parameter)		0.2342*** (0.0337)	0.2349*** (0.0342)

It is also worth noting the significance of the scale parameter θ . Specifications where the scale parameter is omitted (not shown here) produces very different correlations between the random effects (generally much stronger).

4.2 Fertility and poverty processes

We move next to analysing the fertility and poverty processes. Table 3a and 3b provide estimates for the fertility and poverty processes, respectively. We start by considering the fertility process reported in Table 3a. The dependent variable is birth events occurring between waves and is estimated by probit according to equation (4). Of particular interest, is to assess the effect of lagged childbearing events (state dependence) and the lagged poverty status, the latter reflecting a possible feedback mechanism of poverty on future values of childbearing events. It is immediately clear that controlling for the initial conditions is important; the effect of previous children (i.e. state dependence) changes significantly once IC is estimated jointly with the process itself. In general we find presence of young children to have a strong effect on having another child, whereas the presence of older children has a negative effect. The effect of introducing the IC is not unexpected. Recall that the dependent variable of the IC is the number of children present in the household. Controlling for the IC should therefore weaken the effect of the children in the fertility process, as they themselves reflect the initial conditions. However, independent of the IC, lagged poverty status has no significant effect on childbearing events, suggesting that there is no causal feedback mechanism from poverty onto childbearing. Out of the other variables, we find child labour (here measured by the ratio of children working) to have a positive and significant association with fertility. We also find household composition to matter, in particular, households with higher number of women present, have a lower likelihood of experiencing a childbearing event. This somewhat counterintuitive result is driven by the positive correlation between household composition and the number of generations living in the household, which has a positive effect on childbearing events. Other important variables include education, and in general we find those with higher education, net of other factors, to have a higher likelihood of experiencing a childbearing event.

Table 3b shows that there is positive state dependence in poverty, though the estimate is sensitive both to the IC and the equivalence scale. Without the IC, state dependence in poverty is over-estimated, whereas it is underestimated when using the head count poverty status. We also see some evidence of feedback from children onto poverty. Introduction of the IC has important effect on the estimates. For instance, most of the children effects disappear, whereas the effect of having a child birth in the previous time period remains significant. Interestingly, the effect is negative which would suggest that there is some degree of planning of fertility decisions. In other words, child bearing might be more likely if the household experiences more favourable economic circumstances.

It is clear however, after controlling for state dependence and unobserved heterogeneity, only a limited of covariates have powerful explanatory power on poverty. Household composition is again important, larger households measured by the number of men and women, and also the number of generations living in the households, have higher poverty risk. The mechanisms underlying the significant

effects are less clear. The use of equivalence scales is behind part of the story, but not all. Larger households may be a reflection of economic hardship. If it is the case that individuals choose to share the dwelling as a means to cope economically, then this would explain the positive relationship to poverty. To some extent this would also explain the negative effect with respect to fertility, since couples might try to reduce their fertility during extreme economic hardship. Certainly, in an environment where family values are important and where there are no social support schemes run by the state, living arrangement in extended families are common. As a coping mechanism relatives and friends who face economic hardships rely on each other for support, one solution being shared accommodation. The fact that extended families (again measured by the number of generations living in the households) are positively associated with poverty is therefore not unexpected. Interestingly, these households also face higher fertility levels (i.e. Table 3).

Child labour also play an important role, as we find a strong and significant relationship of child labour on poverty. As we have already seen households with high levels of child labour also have high fertility. The effect of child labour in rural areas is particularly interesting. It is positive, and become stronger once we control for the IC. The estimates suggest that higher child labour produces higher poverty, and is interesting given that child labour is also associated with higher fertility.

Table 3a: Parameter estimates for fertility outcomes

	Without IC	With IC	With IC	
		Per capita Pov.	WHO Eq.Sc.	
Constant	-0.6760 (0.4177)	-0.6518 (0.4300)	-0.7279 (0.4232)	*
Lagged poverty status	-0.0039 (0.0057)	-0.0049 (0.0053)	-0.0051 (0.0053)	
Children 2 to 4	0.1990 *** (0.0513)	0.1251 ** (0.0521)	0.1409 *** (0.0517)	
Children 5 to 9	0.2064 *** (0.0505)	0.0172 (0.0523)	0.0230 (0.0513)	
Children 10 to 14	0.0035 (0.0567)	-0.1822 *** (0.0578)	-0.1921 *** (0.0572)	
Age of HH head	-0.0432 *** (0.0039)	-0.0465 *** (0.0039)	-0.0453 *** (0.0038)	
Number of men in HH	-0.0826 * (0.0479)	-0.0751 (0.0466)	-0.0789 * (0.0461)	
Number of women in HH	-0.2028 *** (0.0557)	-0.1825 *** (0.0564)	-0.1703 *** (0.0558)	
Ratio of working men	-0.1582 (0.1736)	-0.1234 (0.1706)	-0.0699 (0.1656)	
Ratio of working women	0.0715 (0.1905)	0.0816 (0.1930)	0.0714 (0.1903)	
Ratio of working children	0.3787 *** (0.1439)	0.5005 *** (0.1459)	0.4586 *** (0.1418)	
HH head low education	0.2300 * (0.1299)	0.2108 (0.1303)	0.2183 * (0.1268)	
HH head medium education	0.3554 ** (0.1471)	0.3448 ** (0.1428)	0.3555 ** (0.1386)	
HH head high education	0.1893 (0.1515)	0.1944 (0.1485)	0.1829 (0.1409)	
HH head married	1.4523 *** (0.1722)	1.5590 *** (0.1729)	1.5440 *** (0.1686)	
Number of generations	0.4118 *** (0.1019)	0.4744 *** (0.1014)	0.4883 *** (0.1006)	
Farm household	0.0256 (0.1578)	0.0455 (0.1541)	-0.0012 (0.1521)	
Fhhhamh	-0.1799 (0.2381)	-0.1779 (0.2381)	-0.2184 (0.2298)	

Table 3b: Parameter estimates for poverty outcomes

	(1)		(2)		(3)
	Without IC		With IC		With IC
			Per capita Pov.		WHO Eq.Sc.
Constant	0.4884		0.6477	*	0.4675
	(0.3212)		(0.3713)		(0.4125)
Lagged poverty status	0.2049	***	0.0076		0.1396
	(0.0566)		(0.0809)		(0.0764)
Children 0 to 1	-0.1787	***	-0.0701		-0.1422
	(0.0541)		(0.0673)		(0.0644)
Children 2 to 4	-0.0948	**	-0.0231		-0.0430
	(0.0483)		(0.0542)		(0.0545)
Children 5 to 9	0.0750	**	0.0924	**	0.0511
	(0.0366)		(0.0419)		(0.0414)
Children 10 to 14	0.0879	**	0.0395		0.0670
	(0.0400)		(0.0474)		(0.0454)
Age of HH head	-0.0038	*	-0.0026		-0.0008
	(0.0021)		(0.0024)		(0.0024)
Number of men in HH	0.0341		0.0292		0.0927
	(0.0352)		(0.0395)		(0.0390)
Number of women in HH	0.0845	**	0.0876	**	0.0872
	(0.0346)		(0.0392)		(0.0376)
Ratio of men working	-0.0151		0.0089		0.0262
	(0.1030)		(0.1173)		(0.1111)
Ratio of women working	0.1456		0.1746		0.0868
	(0.1151)		(0.1293)		(0.1303)
Ratio of children working	0.1765	**	0.3127	***	0.3422
	(0.0868)		(0.0955)		(0.0953)
HH head low education	0.0062		-0.0351		-0.0044
	(0.0873)		(0.1020)		(0.1039)
HH head medium education	0.1658		0.1154		0.0914
	(0.1080)		(0.1237)		(0.1264)
HH head high education	0.0919		0.0209		0.0972
	(0.1179)		(0.1340)		(0.1275)
# of other members with high education	-0.1505	***	-0.1435	***	-0.1534
	(0.0392)		(0.0434)		(0.0429)
# of other members with medium level education	-0.0965		-0.0845		-0.1168
	(0.0676)		(0.0777)		(0.0766)
HH head married	0.1734	*	0.1657	*	0.0409
	(0.0892)		(0.1001)		(0.0961)
Number of generations	0.2624	***	0.2780	***	0.1870
	(0.0598)		(0.0672)		(0.0640)
Farm household	-0.2217	**	-0.2597	**	-0.2178
	(0.0908)		(0.1062)		(0.1041)

4 Concluding remarks

Our estimates show that there is positive state dependence in poverty. Experiencing poverty today appears to have a causal effect on poverty in the future. Not unexpected, there is also state dependency in childbearing, in that past fertility events tend to influence further childbearing. Essentially, recent childbearing events tend to encourage more children in rural areas. However, we find very little evidence of any causal feedback mechanism from poverty onto fertility, whereas the feedback from childbearing onto poverty is significant, though the effect is modest.

We also find that household composition matters. In particular we find that the more adults present in the household, the higher is poverty. We also find that extended households where there are more than two generations living in the household (e.g. presence of grand parents) are not always more likely to be poor, but also have higher fertility. On one hand large families might simply reflect traditional coping mechanisms where friends and relatives pool resources to deal with economic hardship. However, our measure of extended family relations might also reflect more traditional attitudes and social norms, in which men are perceived successful if they have many children, and women are expected to specialise in household production and rearing of children. In so far as this is the case, presence of social norms is potentially important in explaining both higher fertility and higher poverty.

The role of education does not appear very strong in rural Ethiopia. This is perhaps not unexpected. First, the distribution of education in rural areas is highly skewed in that very few have any formal education. Illiteracy rates are still extremely high in rural areas. Another issue is related to the fact that rural Ethiopia is dominated by primitive agriculture, in which the return to schooling might not be particularly high. Consequently, our study suggests that there is a great need to increase enrolment rates partly to offset the high incidence of child labour, but also that investment in higher education might not yet be the most sensible policy. In other words, in terms of policy implication, it is important that the government ensure that not only more children attend school, but also that they reduce the drop out rate. Our analysis also shows that both improved labour market and educational opportunities and improvements in family planning – preferably both – should have a substantial impact on reducing poverty in Ethiopia.

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Endnotes

¹All figures quoted in this section come from the *World Development Indicators* database (see <http://www.worldbank.org/data/wdi2004/>)

² The urban population in Ethiopia is about 15 percent of the total.

³ This paper is based on "State Dependence and Causal Feedback of Poverty and Fertility in Ethiopia", *Working Paper of Institute for Social and Economic Research Paper No 2006-30* Colchester: University of Essex, GB, authored by A Aassve A, AM Kedir and HT Weldegebriel (July 2006). A different version of that working paper was published in the *Ethiopian Journal of Economics* in 2007.