Population Review

Poverty and Fertility Dynamics: A Comparative Analysis

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Abstract

In this paper we use unique longitudinal data sources to study the relationship between poverty and fertility at household level in Albania, Ethiopia, Indonesia and Vietnam. These countries differ greatly in their history, average income, social structure, economic institutions and demographic features. We find that there is a substantial difference in the relative importance of the determinants of poverty dynamics and fertility; the persistence of high levels of fertility and poverty in Ethiopia is driven by lack of economic growth, high demand of children and poor access to family planning; education is a crucial element in reducing poverty and fertility, as is clear from Vietnam, Indonesia and Albania.

Keywords

Fertility, Poverty dynamics, longitudinal surveys, Albania, Indonesia, Ethiopia, Vietnam

Introduction

The relationship between poverty and fertility is a long contested issue among demographers and economists. The general empirical observation that poorer countries tend to have higher population growth rates and that larger households tend to be poorer, underlies the presumption of a positive causal relation between poverty and fertility at the national and household levels respectively. The macro level argument relies on the neo-classical paradigm that higher population growth rate depresses capital accumulation and wages. Poverty in turn is considered a key factor driving high fertility and therefore high rates of population growth, consequently delaying the demographic transition. The standard micro argument is that households relying on primitive farming technologies have a greater need for cheap labour, and therefore a higher demand for children. Lack of state support and pensions may also increase demand for children as a means of insurance or security in old age. Consequently perceived costs and benefits of children, and thus fertility behaviour, depend on economic forces and institutional characteristics which include education, family planning and health services. Such factors do not remain constant over time, and over the last two decades developing countries have shown rather different paths in terms of the fertility transition and economic progress. Whereas some countries have witnessed sharp fertility decline and impressive economic growth (e.g. Indonesia), others, most importantly the sub-Saharan countries have remained stagnant with low economic growth and high and persistent fertility levels. These countries, strongly dependant on primitive farming and lacking investment, also maintain strong social norms and poor female empowerment, which ensemble traditional family organisations, in which high fertility is an important dimension.

There is a rather substantial literature concerned with the interaction of poverty and fertility[i]. However, the great majority has relied either on cross sectional or aggregate level data. We revisit this issue by exploiting recent longitudinal micro level data from Albania, Ethiopia, Indonesia and Vietnam, countries that have very different experiences in terms of economic growth and fertility decline. Only Ethiopia is still facing high levels of fertility, low economic growth, and extreme poverty. Comparing Ethiopia with the other three, which has fared considerably better, provide an excellent basis for assessing commonalities and differences of the various channels for which poverty and fertility interacts, emphasising how these relate to the country specific characteristics, such as religion, culture and political situation.

By emphasising the comparative and dynamic perspectives we produce new insights which cannot be derived from cross sectional data. In particular, we assess to what extent children are associated with changes in poverty among households over time, and the role of poverty on fertility behaviour in a dynamic perspective. Given the richness of the micro level data we also assess the role of human capital and other important background variables.

Of course the use of longitudinal data has also its drawbacks: available panel data for developing countries, which includes information both on fertility and consumption expenditure, are few and less comprehensive than panels available for developed countries. Demographic and Health Surveys (DHS) normally contain extremely good information on fertility histories but little information to assess poverty. For expenditure surveys, the problem is the opposite, in that demographic information is often limited. The surveys selected for our studies contain information on both aspects. For Albania and Vietnam we use available Living Standard Measurement Surveys, for Ethiopia we use the Ethiopia Urban Household Survey and the Rural Household Survey, and for Indonesia we use the Indonesian Family Life Survey. Crucially, all of these surveys are longitudinal (Appendix II gives an overview). The selected countries should be considered as case studies rather than a representative sample of developing countries. However, the use of longitudinal data fills an important gap in this literature, and our study should be seen as a first step until more and longer panels for developing countries become available.

The paper is outlined as follows: section II gives an outline of the literature emphasising the poverty/fertility relationship; section III gives a brief outline of the theoretical perspective and how it is related to the four countries; section IV presents the poverty measurement; section V the empirical analysis, whereas section VI provides discussion and conclusions.

Theoretical Background and Previous Research on Poverty and Fertility

A positive relationship between fertility and poverty is frequently explained in a micro-economic framework: children are considered as an essential part of the household's work force generating household income, and as insurance against old age. In rural underdeveloped regions, which largely rely on primitive farming technology and with no or little access to state support, this argument makes a great deal of sense. By acquiring children the share of household resources available for each member will decrease. Newly born children may even decrease the productivity of the mother either by taking more resources (such as food) from her or hampering her work prospects. Though childbearing may reduce a woman's working time or decrease her productivity in the short run, children may bring more resources through work as they grow older. As such the overall net effect of childbearing on poverty is not necessarily clear cut. However, a high number of children and their participation in household production are likely to impede investment in their human capital (i.e. education), maintaining the low-income status of the household, and thereby creating or perpetuating a poverty– fertility trap, keeping the demand for children high. As households gain higher income and wealth, they often tend to have fewer children either through quantity-quality trade-off suggested by Becker and Lewis (1973) or by higher opportunity cost of women associated with higher income suggested by Willis (1973).

  These demand side arguments rely on the fact that couples are first able to conceive the demand for children and then to make choices about their fertility. Crucial components in this respect regard knowledge, demand, affordability, psychological acceptability and access of family planning. Poor knowledge and availability of family planning means that women will not be able to plan their fertility career very well, implying a significant amount of unintended pregnancies (Easterlin and Crimmins 1985). There is a negative (though not always strong) relationship between availability of family planning and observed fertility levels (– just as there is a negative relationship between economic growth and fertility). In other words, family planning is often more prevalent in countries that have experienced a great deal of economic progress, which is reflected by a higher contraceptive prevalence rate among households with higher human capital and wealth. In particular, women with higher earnings and high education are more likely to use modern contraceptives. The upshot is that identification of supply side effects from demand side effects are difficult to establish. For instance, family planning tends to be lacking in rural areas which often rely of primitive farming technology. This is where we also observe higher fertility rates. But given their reliance on primitive farming, these households may also have higher demand for children[ii].

  The relative cost of children is a crucial determinant for fertility. Expansion of female education, thereby reducing women's willingness to give up work for childbearing, is possibly the most important driver behind increased opportunity cost and fertility decline. Consequently fertility decline is often seen as a direct result of improved empowerment of women through education. An often neglected issue in this context concerns educational infrastructure and educational policies. Adequate educational infrastructure is an essential requirement to enable women to increase their education. Likewise, for women to exercise their human capital through the labour market, their children need access to schools. Educational policies are equally important as higher compulsory childhood schooling will delay the onset of a young adult's working life, thereby reducing child labour (Livi Bacci, 2000; Kabeer, 2001). Lack of education opportunities for women is also a factor that reinforces social norms of women's role and position in society. In many traditional and primitive societies, men's status depends very much on their ability to foster a large family. The household head is considered successful if they have many children – and not having children is perceived as a failure. Such perceptions are likely to be stronger in rural and primitive areas, where there is also stronger gender bias in terms of education (boys go to school – girls stay at home). The consequence is that women's role tend to be limited to childrearing and other household activities. With economic progress and urbanisation, women gain higher education and independence and empowerment (Drovandi & Salvini, 2004). Social norms become weaker, and traditional demographic patterns fade, which is reflected by the demographic transition. Moreover, economic progress reduces labour intensive technologies, which reduces the demand for child labour.

The existing empirical literature, mainly based on either cross sectional or aggregate data, shows that the relationship between poverty and fertility is not unidirectional. Whereas many studies suggest a positive relationship between poverty and fertility, others find it to be negative, and yet others find it to have an inverse J-shaped relationship. The literature has tried to reconcile these discrepancies by differentiating countries by their level of economic development and demographic transition. Within the poorest countries, the relationship between poverty and fertility is often negative. Fertility appears higher among "wealthier" households, which is a result of low reproduction capability and general higher rates of infertility among the poor (Lipton 1998; Livi-Bacci and di Santis 1998). Studies from the sixties and the 70s pointed to such patterns in rural areas of Bangladesh, India, Indonesia, Pakistan and Sierra Leone. The most common relationship between poverty and fertility in contemporary less developed countries is however positive. For instance countries with low fertility levels during the eighties and the nineties (TFR less than 3.5 – including Vietnam, Costa Rica, urban Paraguay, and urban South Africa) and with high fertility levels (TFR above 4.5, e.g. Guatemala, Cameroon, Bolivia, Calcutta in India, Belize), as well as medium level fertility (TFR between 3.5 and 4.5, e.g. Mexico, rural India, rural South Africa, Brazil, El Salvador, Ecuador, Paraguay), all show a positive relationship. Schoumaker (2004) using DHS surveys from sub-Saharan countries supports a general positive relationship.

There are however many cases where the positive relationship between poverty and fertility is rather weak. Examples include countries in demographic pre-transitional phases with very high TFR (e.g. Costa Rica, urban Sudan, Iran, Burkina Faso, Pakistan, urban India, rural Philippines) and also during the 90s in countries with relatively low fertility (TFR less than 3.5, such as in Maurice and urban Morocco). In some cases, such as rural areas of India and Cameroon where fertility rates are very high, the relationship takes the inverse "J shape", implying that both low and high-income households have lower rates of fertility, whereas medium level income households have higher fertility. It is argued that very low income households tend to be landless farmers, hence less reliant on children as cheap labour, whereas those with the highest income has lower fertility due to higher investment in child quality. The middle income families are landholding farms which depend on cheap labour, and therefore have a higher demand for child quantity, which explains the apparent inverse J-shape (see Schoumaker & Tabutin 1999 for further details).

Of course all of the studies referred to above are based on cross-sectional data, and as far as we are aware none have looked at the relationship in a dynamic perspective. However, with the emergence of longitudinal data, research on poverty dynamics for developing countries is now emerging, though emphasis on fertility is still limited. Examples of this literature include Jalan and Ravallion (2000) using a panel from rural China focussing on the issue of transient and chronic poverty; Mculloch and Baulch (2000) using a five-year panel of 686 households from rural Pakistan showing that large reductions in poverty can be achieved through policies aiming at smoothing household incomes – simply because a large part of poverty is indeed transitory; Dercon and Krishnan (2000) using three waves of the Ethiopian Rural Household Panel (ERHP) shows that individual consumption levels varies widely by year and season, and indicate that a much larger proportion of households are vulnerable to poverty than what cross sectional poverty statistics may suggest[iii]. Other examples of detailed analysis of poverty dynamics include Kedir and McKay (2004), using the Ethiopian Urban Household Panel (EUHP), Bigsten et al (2004) using both the ERHP and the EUHP, and Justino and Litchfield (2001) analysing poverty dynamics in Vietnam. However, none of these studies analyse the dynamics between poverty and fertility.

A Demo-Economic Description

Before analysing the link between poverty and fertility, it is useful to give a descriptive overview of the demo-economic situation of the countries considered in this analysis. Table 1 gives summary data on the demographic and economic conditions prevailing in the four countries since 1980[iv]. It is immediately clear that they have experienced rather different development paths over the last two decades, and that they are at very different levels in terms of economic development. Ethiopia stands out with more severe poverty than in the other three countries - 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, leading to a more mixed economy, 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 areas[v]. 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, as depicted in Figure 1, remained high. The pattern is in stark contrast to the other countries, all of which have experienced the demographic transition, here highlighted by dramatically declining fertility levels. At the same time they have experienced impressive rates of economic growth and development. Table 1 shows other interesting factors that are correlated both with fertility levels and economic development. One issue concerns child labour which has steadily declined in Vietnam and Indonesia and is now close to non-existent in Albania. But it is still high in Ethiopia and remains critically important in a heavily agricultural based economy (Admassie, 2002). Moreover, school enrolment and literacy rates, especially in rural areas, are extremely low in Ethiopia, whereas they have been on the increase in the other countries.
An important issue concerns urban/rural differentials. Periods of strong economic growth is often followed by a decline in the rural population due to migration (Table 1). In Indonesia the rural to urban migration is particularly noticeable and reflects important structural changes of the economy including reduced dependency of rural economic activities. At the same time the migration has made access to family planning easier. Consequently poverty and fertility has also declined, whereas education enrolment has increased. The agricultural sector has also seen significant reforms, most importantly in terms of private ownership, which currently stands at over 90%. Poverty in rural areas is only marginally higher than in urban areas, and there is little difference between urban and rural fertility levels.

In contrast Ethiopia has experienced only a very modest growth in GDP and rural to urban migration has been less pronounced. There have been few economic reforms in the Ethiopian agricultural sector, and the current system is still characterised by state control, with very limited private ownership. Moreover, land tenure arrangements are a highly contentious issue and there is still great uncertainty associated with future land redistribution. Such uncertainties may cause disincentives for farmers' own investment in enhancing farm productivity. It is also possible that future land distribution will depend directly on family size, and in so far this is a common consensus among agricultural households, this increases the incentives for childbearing (Lipton et al 2002). Though there is little difference between poverty in rural and urban areas (it is high everywhere), there is a dramatic difference in fertility levels. The TFR in urban areas is around 3.4, whereas in Addis Ababa, by far the largest urban concentration in Ethiopia, the TFR 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).

Vietnam was one of the worlds' poorest countries in the beginning of the 1980s, but has since the beginning of the nineties experienced strong economic growth followed by substantially reduced poverty (Glewwe et. al. 2001). Much of this improvement has been attributed to the "Doi Moi" policy[vi]. This was initiated in the late 1980s and roughly coincided with the collapse of the Soviet Union, on which Vietnam had been heavily dependent. The main elements of Doi Moi were replacement of collective farms by allocation of land to individual households, legalisation of many forms of private economic activity, removal of price controls, and legalisation and encouragement of Foreign Development Investment (FDI). Substantial progress has been achieved, reducing poverty rates from around 56 percent in 1992 to 36 percent in 1997, reaching a level around 29 percent in 2004. Despite this substantial reduction, there are still significant differences between urban and rural areas, both in terms of fertility and poverty.

Albania is somewhat different in our analysis, given its rather modest population of 3.4 million in 2001 and close proximity to Europe. However, it shares many similarities in demographic and economic development as Vietnam and Indonesia. The country has experienced rapid political, social and economic changes since 1992, when democracy was re-installed. Between 1993 and 1996 GDP

grew by about 9 percent annually, followed by slightly lower growth thereafter, though the growth has been sustained. There has also been important structural adjustment following the collapse of the communist regime, involving banking, land market, and privatization of strategic sectors like telecommunications but also of small and medium enterprises. Nevertheless Albania is by far the poorest country in Europe and is ranked only 65th of 177 countries by the human development indicator of 2002 (Human Development Report 2003). Figure 1 indicates the decline in fertility which stood at 2.2 in 2003 (Human Development Report 2003 on data of 2002), whereas the high life expectancy at birth (currently 74 years) is comparable with European countries. An important feature of Albania is the very high level of emigration. Since 1990 about one fifth of the total population has left the country and is living abroad mainly in Italy or Greece. As a result remittances are estimated to account for about 13 percent of total income among Albanian households (INSTAT, 2002).

Table 1: Demographic and economic indicators

		1980	1990	2000	2003
Total Fertility Rate	Albania	3.6	3.0	2.4	2.2*
	Ethiopia	6.6	6.9	5.7	5.7*
	Indonesia	4.3	3.0	2.5	2.3*
	Vietnam	5.0	3.6	2.5	1.9*
Life expectancy at birth (years)	Albania	69.3	72.3	74.0	73.99*
	Ethiopia	42.0	45.0	42.3	42.1*
	Indonesia	54.8	61.7	66.0	66.7*
	Vietnam	60.1	64.8	69.0	69.7*
Population growth (% annual)	Albania	2.0	1.2	0.4	0.6
	Ethiopia	2.7	3.7	2.4	2.1
	Indonesia	2.1	1.8	1.3	1.3
	Vietnam	2.1	2.2	1.3	1.1
Total population (mill.)	Albania	2.7	3.3	3.1	3.2
	Ethiopia	37.7	51.2	64.4	68.6
	Indonesia	148.3	178.2	206.3	214.5
	Vietnam	53.7	66.2	78.5	81.3
Rural population (% of total)	Albania	66.3	63.9	58.1	56.2
	Ethiopia	89.5	87.3	85.1	84.4
	Indonesia	77.9	69.4	58.0	54.5
	Vietnam	80.6	79.7	75.7	74.2
GDP per capita ($US 1995 prices)	Albania	910.0	841.9	1008.0	1190.4
	Ethiopia	..	107.3	115.1	115.0
	Indonesia	503.0	776.7	1014.6	1089.8
	Vietnam	..	211.2	369.5	437.9
Child labour (% of 10-14 age group)	Albania	3.6	1.9	0.3	0.2
	Ethiopia	46.3	43.5	41.1	40.4
	Indonesia	13.5	11.3	7.8	6.8
	Vietnam	21.8	13.0	5.2	2.6

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

Figure 1: Trends in total fertility rates (Source: UN estimates and projections)
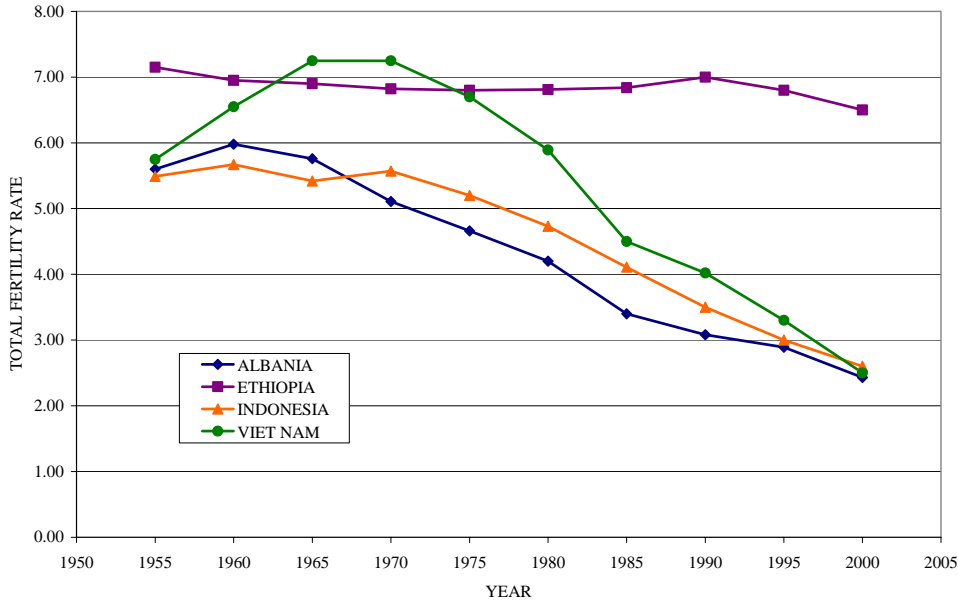
Poverty Measurement

Since we are primarily interested in analysing fertility and household welfare for households with subsistence level of income, we compare poor households with non-poor households rather than treat expenditure as a continuous variable. 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). Let ν be the number of household members, y be the household's welfare indicator (per capita consumption) and let τ be the poverty line. In population terms, the FGT index is defined as follows:

$$FGT_\alpha = \frac{E(\nu \delta_\alpha(y))}{E(\nu)} \tag{1}$$

where E is the expectations operator and $\delta\alpha(y)$ is the function:

$$\delta_\alpha(y) = \begin{cases} (1 - y/\tau)^\alpha & \text{if } y < \tau \\ 0 & \text{if } y \geq \tau \end{cases} \tag{2}$$

and $\alpha \geq 0$ is the coefficient of poverty aversion. For simplicity we focus here on the headcount which is given by $\alpha = 0$.

The distribution of consumption expenditure within the household is unlikely to be uniform across household members, and children tend to consume less than adults. The standard solution is to impose an assumption on intra-household resources allocation, and adjustment is done by applying an equivalence scale that is consistent with the assumption made – producing a measure of expenditure per adult equivalent. Unfortunately, there is limited consensus on the appropriate choice of equivalence scales, which are partly due to different patterns of household allocation between countries, regions and cultures. As a result official poverty statistics are frequently based on per capita household income or expenditure, which in effect means that in terms of household allocation, each household member is given equal weight. An implication of this approach is that households with a large number of dependent children are more likely to be recorded as being poor. In the present paper we maintain consistency with official poverty statistics, and define poverty over per capita

consumption expenditure[vii]. Clearly this assumption needs to be taken into account in interpreting the estimates.

The poverty line τ 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 2288 calories for Albania, and 2100 calories for the other three countries[viii].

Empirical Analysis

Given the interaction between fertility and poverty, we first examine the effect of poverty on fertility and second the effect of fertility on poverty. We do so by analysing both static and dynamic perspectives. Our econometric strategy consists of first estimating a poisson[ix] model of children and a probit regression of poverty, respectively, in the initial wave. These regressions provide a snapshot or a cross sectional view of the pattern of poverty and fertility for the four countries. We then implement dynamic models by estimating a poisson regression of the number of newborn children[x] recorded between waves. In contrast to the cross sectional regression this informs us about how the rate of childbearing differs by background characteristics. Finally we estimate the rates of poverty entry and exit. In order to avoid endogeneity issues, we control for background variables that are recorded in the initial wave only. Throughout we take the household as the unit of analysis, implying that fertility decisions are implicitly assumed to be made at the household level, and as a result we concentrate on the characteristics of the household and the household head in explaining poverty and fertility patterns. The approach has a direct impact on the way the dependent variable is defined in the econometric framework detailed in the section below. For the static analysis this is taken to be the number of children living in the household. Thus it does not capture the number of children that might have died or left the household. For the dynamic analysis, the dependent variable is defined as the number of births occurring between the two waves.

Of interest for us is to depict the impact of those variables which reflects the resources, or lack thereof, available to the household. The educational attainment of the household head is here defined by four groups, the lowest (the reference group) referring to no education and the highest refers to college/university education. Whereas the educational level of the household head is likely to reflect an income effect, and therefore be positively associated with fertility, the effect of education of other household members is less clear. A high educational level of the spouse will reflect higher opportunity costs whereas high education among children reflects a preference for parent's investment in child quality. Education of the household members (other than the household head) is implemented by counting the number of individuals who had more than compulsory education, the number having just compulsory education, and the number of individuals having less than the compulsory level. We also make control for the profession[1] of the household head, which is likely to be related to household income, marital status, the number of generations living in the household, regions, religion, and ethnicity.

Fertility: The Static Perspective

The cross sectional regression is useful in assessing to what extent the poverty/fertility association in the four countries analysed here is consistent with the existing literature. The regression results presented in Table 2 show no surprises. First we find that in all four countries household defined as poor are associated with a higher level of fertility. To a large extent this is a result of our definition poverty which is based on per capita household expenditure. Thus the more children, the lower is the per capita expenditure, and the higher is the likelihood of experiencing poverty. The correlation is strongest for Vietnam both in terms of magnitude and significance. Educational level of the household head shows a mixed pattern. In Vietnam those with medium level of education (the

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[1] Note however, that the professional codes differ somewhat in the different surveys. Appendix I provides the details of these codes.

Table 2: Poisson regression of number of children in first wave (z-values in parenthesis)

	Albania	Ethiopia	Indonesia	Vietnam
Poverty status	0.155	0.246	0.247	0.331
	(2.65)	(7.72)	(7.63)	(11.33)
Age of HH head	0.348	0.206	0.26	0.307
	(12.24)	(18.34)	(24.91)	(29.20)
Age of HH head squared	-0.005	-0.002	-0.003	-0.004
	(-13.94)	(-19.09)	(-26.87)	(-31.32)
# adults	-0.134	-0.024	-0.086	-0.008
	(-2.88)	(-1.83)	(-4.43)	(-0.47)
HHH low education	-0.042	0.043	0.096	0.126
	(-0.2)	(1.02)	(2.54)	(2.10)
HHH medium education	0.253	0.015	0.074	0.204
	(1.15)	(0.29)	(1.42)	(3.47)
HHH high education	0.228	-0.067	0.034	0.105
	(0.94)	(-1.01)	(0.61)	(1.47)
#post compulsory ed.	-0.252	-0.023	-0.025	-0.078
	(-4.39)	(-1.40)	(-1.19)	(-4.74)
#compulsory ed.	0.005	0.018	-0.021	-0.025
	(0.1)	(0.56)	(-0.88)	(-1.05)
HH head married	1.182	0.727	1.111	1.048
	(6.32)	(15.16)	(15.76)	(17.90)
# generations	0.297	0.209	0.327	0.086
	(4.0)	(6.23)	(10.65)	(2.57)
Activity status 1	0.198	0.099	-0.263	-0.020
	(1.27)	(1.88)	(-1.99)	(-0.29)
Activity status 2	0.134	0.474	0.073	-0.098
	(0.81)	(2.77)	(1.49)	(-0.95)
Activity status 3	0.16	0.251	0.091	-0.241
	(0.92)	(3.92)	(1.73)	(-1.33)
Activity status 4	0.256	-0.071	0.037	0.006
	(0.89)	(-1.13)	(0.82)	(0.11)
Activity status 5	0.066	0.246	-0.033	-0.153
	(0.6)	(2.71)	(-1.05)	(-1.64)
Activity status 6	0.177	0.088	-	0.104
	(2.25)	(0.75)	-	(1.87)
Farm household	0.138	0.146	-0.279	0.151
	(1.9)	(2.58)	(-1.41)	(4.44)
Constant	-7.461	-4.778	-5.716	-6.570
	(-10.72)	(-17.33)	(-24.23)	(-26.39)
Observations	1503	2251	4497	4020

Regression includes control for ethnicity, religion and region.

reference group being those with no education) have higher fertility than those with very high education, whereas there are no significant effects in Ethiopia and Albania. The latter finding might be due to a high level of homogeneity in education. For instance, educational levels in Ethiopia are by any standard extremely low, and there is modest within variation (at least compared to other countries). Thus, in a context of strong social norms and important supply side factors, our measure of education might not be a very powerful predictor for fertility levels. A similar argument can be put forward for Albania: although education in Albania is much higher than in Ethiopia, it is rather homogenous across the population, which might affect the predictive power of education variables. In

Indonesia, those with low education have the highest rate of fertility. Accumulated human capital of remaining household members shows a negative relationship with fertility, which is what we would expect. But again the effects are not always significant (e.g. Ethiopia). The controls for activity and occupational status of the household head also show some significant effects with respect to overall fertility (the reference group are those out of the labour force, single mothers, disabled or casual workers), though the effects vary from country to country. Another consistent result is that farm households tend to have higher fertility, though Indonesian farm households are here an exception.

Fertility: The Dynamic Perspective

Next we estimate the Poisson regression[xi] of number of newly born children between two waves using household observable characteristics in the first wave as explanatory variables. In contrast to the static perspective, this regression reflects differences in the childbearing intensity. The results, presented in Table 3, tell us a different story from that in the static framework. At a conventional level of significance, poor households in the first wave do not have more newborn children between two waves than non-poor households in each of four countries. The effect is particularly weak for the Ethiopian sample, and suggests that poor and non-poor households tend to have similar spacing between birth events. The fact that wealthier households have fewer children in general, which is clear from the static analysis, means that childbearing careers for these women are on average shorter[xii]. Poor households in contrast, give births over a longer period of time.

   While poverty status itself has little impact on the birth hazard, other variables which certainly reflect the resource level of the household do. We consider first the work ratios for men, women and children. The first hypothesis to test is that a high work ratio among adult men reflects an income effect, and should be positively associated with childbearing. This is indeed the case in Albania, Indonesia and Vietnam, but not in Ethiopia – the effect being insignificant. For women, a high work ratio reflects a higher opportunity cost of having children. The negative impact (though not significant at five percent level) found for Ethiopia would be consistent with this view, and suggest that increased (formal) labour market participation among women might reduce fertility. The effects are however not significant for any of the other three countries, which might be driven by differences in child care arrangements and availability, which in turn will have an impact on the perceived opportunity cost of children. Considering the role of education we find again different results for the countries analysed. Table 3 shows that in Vietnam both the household head's educational level and those of the remaining household members have a clear negative effect on fertility. It seems therefore clear that parents, who themselves have high education tend to invest in education for their children, which is reflected by a lower fertility rate. In Ethiopia the pattern is different in that household heads with very high education have a higher fertility rate. It is important to be aware that the number of individuals with post-compulsory education in Ethiopia is very low – much lower than the other countries – and as such the positive effect might be a reflection of small group of households, not necessarily representative of a general pattern. Nevertheless, the impact of high education of remaining household members is clearly negative, indicating that those households investing in education also have a lower fertility rate[xiii]. Overall these findings do suggest that improving education and employment opportunities for women is a route to control fertility.

   The activity status of the household head is also of importance, but by far the strongest effect comes from farm households in Ethiopia. This is consistent with the high Total Fertility Rate (TFR) in rural Ethiopia. The effects for farm households in the other countries are either insignificant (Albania and Indonesia) or much weaker in magnitude (Vietnam). Of course we cannot easily identify demand from supply side effects in this case. Farm technology in rural Ethiopia is more labour intensive than in the other countries (demand side effects), but it is also the case that accessibility and information concerning family planning in rural Ethiopia is considerably lower than in the other countries (the contraceptive prevalence rate in rural Ethiopia being around 6 percent). The insignificant effects of farm households in Indonesia and Albania are consistent with their respective TFR figures, as they are not much higher in rural areas than in urban areas. The urban/rural differential in terms of fertility is less pronounced in Vietnam than in Ethiopia, but more so compared to Albania and Indonesia, both of which have experienced great economic progress and substantial rural to urban migration.

Table 3: Poisson regression of number of newborn children between waves (z-values in parenthesis)

	Albania	Ethiopia	Indonesia	Vietnam
Poverty status in wave 1	0.581	-0.013	-0.122	0.117
	(1.8)	(-0.14)	(-1.62)	(1.50)
Age of HH head	-0.148	-0.043	-0.027	-0.055
	(-7.18)	(-8.59)	(-9.73)	(-14.34)
#children 0 - 4	-0.035	0.329	0.116	0.071
	(-0.16)	(5.98)	(2.67)	(1.50)
#children 5 - 9	0.036	0.079	-0.019	-0.191
	(0.17)	(1.63)	(-0.47)	(-4.52)
#children 10 - 14	-0.637	-0.042	-0.192	-0.219
	(-2.01)	(-0.69)	(-4.86)	(-3.91)
Other children	-0.044	0.025	0.047	0.113
	(-0.06)	(0.37)	(1.00)	(1.77)
# adults	-0.003	0.034	0.052	-0.053
	(-0.01)	(0.84)	(1.32)	(-1.12)
Male work ratio	0.909	0.008	0.377	0.776
	(2.02)	(0.04)	(3.77)	(5.14)
Female work ratio	0.006	-0.309	-0.018	0.007
	(0.02)	(-1.55)	(-0.27)	(0.06)
Child work ratio	-1.646	-0.103	-0.699	-0.908
	(-0.89)	(-0.55)	(-1.91)	(-4.48)
HHH low education	0.431	-0.138	-0.007	-0.080
	(0.4)	(-1.17)	(-0.09)	(-0.62)
HHH medium education	0.398	0.138	-0.107	-0.296
	(0.35)	(0.91)	(-0.99)	(-2.25)
HHH high education	1.26	0.417	-0.184	-0.280
	(1.0)	(1.95)	(-1.62)	(-1.67)
#post compulsory ed.	-0.202	-0.289	0.051	-0.146
	(-0.55)	(-4.02)	(1.22)	(-3.02)
#compulsory ed.	0.013	0.010	0.034	-0.007
	(0.04)	(0.10)	(0.70)	(-0.10)
HHH married	1.077	0.509	-0.007	0.074
	(1.02)	(3.03)	(-0.07)	(0.58)
# generations	-0.256	0.081	0.168	-0.082
	(-0.67)	(0.78)	(2.65)	(-0.94)
Activity status 1	-0.142	-0.089	0.008	0.343
	(-0.16)	(-0.54)	(0.04)	(2.11)
Activity status 2	-0.171	1.034	-0.392	0.121
	(-0.21)	(1.66)	(-3.31)	(0.39)
Activity status 3	-0.598	0.247	-0.271	-0.216
	(-0.53)	(0.85)	(-2.15)	(-0.43)
Activity status 4	-13.138	0.093	-0.35	-0.160
	(-0.01)	(0.35)	(-3.06)	(-0.91)
Activity status 5	0.009	0.609	0.021	0.040
	(0.02)	(1.71)	(0.30)	(0.16)
Activity status 6	0.063	0.711	-	0.020
	(0.15)	(2.39)	-	(0.13)
Farm household	-0.428	0.698	-0.304	0.171
	(-0.94)	(3.78)	(-1.02)	(1.88)
Constant	-11.365	-1.134	-0.22	0.815

Poverty: The Static Perspective

The results of the probit estimates of poverty status in the initial wave are given in Table 4. Similar to the cross sectional regression of fertility, we find clear positive correlations between number of children and poverty incidents in all four countries, and the age distribution of children matters. In Albania, Indonesia, and Vietnam, the number of young children (age 0-4) is associated with higher poverty, and the association becomes monotonically smaller for older children (age 5-9, age10-14). It is positive in Ethiopia as well, though here the effects are not monotonic with respect to the children's age. High work ratio of adults gives lower poverty in all countries apart from Vietnam, where the coefficient is positive (though not significant at 5 percent level). A possible explanation is the very high rates of work participation in Vietnam, which is close to 90 percent for both men and women. The raw data shows that a few households with low work ratios actually have lower poverty rates, implying that household members (normally of higher age) work less if they can afford to.

For Ethiopia the child work ratio is negatively associated with poverty[2]. Given that 40 percent of children in Ethiopia are recorded as working (see Table 1) underpins the importance of child labour as a household resource. The high rate of child labour in Ethiopia is of course linked with its very low school enrolment rates. But there is also an important link to the poor level of technology and development, which in itself generates a high demand for low skilled workers – among them children. Since both manufacturing and farming are primitive and labour intensive, families with their own business or farm will have a higher demand for child labour. Consequently, families with large businesses or sizeable land holdings are less poor, but tend to have more children as a result of a higher demand for child labour. As such, wealthier families (relatively speaking) in rural areas tend to demand child quantity over child quality (Becker 1960). It is of course difficult to identify the extent to which the relationship between poverty and the supply of child labour operates through material factors, such as affordability of school fees, lack of educational infra-structure or a general demand for low skilled workers, from more ideological ones in that education is often perceived as irrelevant, a mentality commonly present in backward rural and agricultural societies (Kabeer, 2001).

It is interesting to compare the pattern of child labour in Ethiopia with those of the other countries where poverty and fertility rates have fallen, but enrolment rates have remained high. In these countries child labour is positively related to poverty, which is in contrast to Ethiopia. But the prevalence of child labour is low compared to Ethiopia, and suggests that it is common only among a small number of very poor households. Given that child labour and poverty are so much more prevalent in Ethiopia suggests that it is poverty itself that creates a strong demand for child labour. Of course, differences in educational infra structures across countries, which also reflect the level of poverty, are important factors behind the prevalence of child labour.

High education is associated with a lower probability of being poor, and in most cases there is monotonic gradient: the higher the level, the lower the poverty. The only discrepancy to this pattern is in Ethiopia, where we find those with medium level education not to have lower poverty rates than those without any education. As for the human capital accumulation of remaining household members, we also find a negative association. In particular, high proportions of individuals with post-compulsory education are strongly associated with lower poverty.

In Vietnam and Albania we find that farm households are significantly poorer, whereas there is no effect in Indonesia. A possible explanation is that the great majority of Indonesian farm households hold a higher share of ownership (average household share of ownership is 90%.), and over the last two decades farming in Indonesia has seen steady reforms that has increased productivity and efficiency. Though the raw data indicates that poverty is slightly higher among farmers (20%) than non-farmers (17%), other regressions (not shown here) also indicate that poor farmers tend to have lower education and are geographically concentrated. Thus, net of education and regional dummies, we cannot find that farmers are poorer than non-farmers.

More interesting is perhaps the negative (though not significant) effect for farm households in Ethiopia. This might at first seem surprising, but it is important to bear in mind that the reference group includes casual workers, female headed household, and those out of the labour force, or

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[2] Though not significant at the 5% level.

disabled. A large part of those households in the reference group are located in urban areas, where poverty is almost as high as in rural areas (Kedir and McKay, 2004).

Table 4: Probit estimates of poverty status in first wave (z-values in parenthesis)

	Albania	Ethiopia	Indonesia	Vietnam
Age of HH head	-0.02	0.001	0.005	-0.005
	(-4.54)	(0.34)	(2.53)	(2.31)
#children 0 - 4	0.336	0.154	0.323	0.523
	(3.93)	(3.53)	(8.05)	(12.16)
#children 5 - 9	0.288	0.096	0.122	0.344
	(4.20)	(2.76)	(3.34)	(10.53)
#children 10 - 14	0.109	0.189	0.053	0.133
	(1.85)	(5.38)	(1.65)	(4.09)
#children 15 plus	-0.021	0.097	0.061	0.046
	(-0.39)	(3.19)	(1.52)	(1.20)
Other children	0.163	0.103	0.092	0.251
	(2.49)	(2.76)	(2.32)	(6.35)
# adults	0.16	-0.016	0.175	0.136
	(2.52)	(-0.55)	(4.60)	(3.47)
Male work ratio	-0.238	-0.190	-0.095	0.065
	(-2.14)	(-2.16)	(-1.21)	(0.92)
Female work ratio	-0.369	-0.120	-0.06	0.116
	(-3.69)	(-1.23)	(-1.07)	(1.47)
Child work ratio	0.221	-0.157	0.416	0.141
	(1.01)	(-1.42)	(2.06)	(1.54)
HHH low education	-0.244	-0.130	-0.125	-0.331
	(-1.62)	(-1.70)	(-2.09)	(-3.98)
HHH medium education	-0.424	-0.073	-0.177	-0.383
	(-2.30)	(-0.75)	(-1.99)	(-4.42)
HHH high education	-0.539	-0.512	-0.338	-0.835
	(-2.32)	(-4.50)	(-3.24)	(-7.37)
#post compulsory ed.	0.085	-0.118	-0.237	-0.224
	(1.39)	(-4.06)	(-6.39)	(-8.00)
#compulsory ed.	0.089	0.024	-0.081	-0.105
	(1.68)	(0.40)	(-1.95)	(-2.51)
HH head married	-0.085	-0.001	-0.215	-0.197
	(-0.66)	(-0.01)	(-2.67)	(-2.70)
# generations	-0.194	0.156	0.019	-0.068
	(-2.12)	(2.57)	(0.35)	(-1.20)
Activity status 1	-0.576	0.168	-0.223	-0.330
	(-1.90)	(1.68)	(-1.55)	(-2.48)
Activity status 2	-0.154	-1.699	-0.251	-0.391
	(-0.64)	(-3.94)	(-2.67)	(-1.94)
Activity status 3	-0.55	-0.545	-0.352	-0.071
	(-1.60)	(4.61)	(-3.41)	(-0.24)
Activity status 4	-	-0.398	-0.055	-0.341
	-	(-3.53)	(-0.59)	(-3.26)
Activity status 5	-0.187	-0.246	0.25	-0.460
	(-1.10)	(-1.35)	(4.28)	(-3.00)
Activity status 6	-0.699	-0.200	-	-0.198
	(-5.03)	(-1.02)	-	(-1.85)
Farm household	0.418	-0.154	0.01	0.547
	(3.62)	(-1.57)	(0.04)	(9.78)

Constant	0.434	-0.773	-1.26	0.651
	(0.93)	(-3.15)	(-6.07)	(2.46)
Observations	1676	2459	4797	4302

Regression includes control for ethnicity, religion and region

Poverty: The Dynamic Perspective

Table 5 presents the results from our poverty dynamics regression. These are essentially the hazard rates of either entering or exiting poverty, and are implemented by estimating simple probit models of the two rates. The entry model has dependent variable equal to 1 if the household makes a transition into poverty, and is estimated from the sub-sample of households who are initially not in poverty in the first wave. The dependent variable in the exit model is equal to 1 if the household moves out of poverty, and is estimated from the sample of households who are initially classified as poor. A critical variable in these models is the household's proportionate distance from the poverty line at the initial wave. Including this variable adjust for the fact that households located close to the poverty line in the base year are more likely to make a poverty transition.

   Consistent across countries, bar Albania, where the estimates are less significant, households with young children are more likely to enter poverty and less likely to exit. Given that young children are normally classified as dependants, this is what we would expect. However, the estimates become more mixed when we consider the older children, and curiously for Ethiopia – children in the age group 4 – 9 do not have much impact on changes in poverty, whereas households with more grown up children (10 to 14) are more likely to experience poverty. Interestingly a similar pattern seems evident for Albania, where households with many older children have significantly lower exit rates. A possible explanation is that many of these older children are in the school leaving age and therefore entering the labour market. Unemployment is high both in Albania and Ethiopia (especially in urban areas) and youth wages are in any case very low, and this might drive the significant poverty entry rates. Unemployment in Vietnam and Indonesia, in contrast, are lower, which is for these countries reflected by insignificant effect.

   We consider next the work ratios of men, women and children, all of which being measures of the extent household members contribute to the overall level of resources in the household. The estimates for Vietnam show that a high male work ratio does not always reflect lower poverty. We would of course expect the opposite effects in so far an increase in the ratio of working men implies an increase in the disposable household income. A simple tabulation of poverty rates for households with different numbers of working men (not shown here) reveals indeed that households with one or more non-working male household members have lower poverty. These households are characterised by a higher age of the household head, and a higher educational attainment. It seems though that in Vietnam, male household members might retire from work if they consider that the household can afford such an arrangement.

   The effects of child labour reflect the finding of the static perspective, at least for Ethiopia, where child labour significantly reduces poverty entry as well as increasing the exit rate. There are similar effects for Vietnam, though the magnitude of the estimates is more modest. In Indonesia, the estimates are not significant, whereas for Albania child labour is associated with a lower exit rate. Child labour in Albania is very low, but the estimate suggests that some very poor households may encourage child labour as a result of economic hardship, which is reflected by the lower exit rates. Overall child labour is an important source of income for Ethiopia and to some extent in Vietnam, suggesting a poverty trap where child labour and lack of investment in human capital might be mutually reinforcing factors (Kabeer, 2001; Moav, 2005). Again it is difficult to identify the extent to which the supply of child labour in a particular context is due to the poverty of households itself from inadequate provision of education within that particular context.

   Education and human capital accumulation of household members are important predictors for poverty dynamics. In general high educational level of the household head is associated with lower transition into poverty, but if entering poverty, they have a higher exit rate. The same relationship is evident when considering the number of household members with post compulsory and compulsory education: the higher the number the lower is the transition rate into poverty and the higher is the exit

rate. The education variables are particularly important for Indonesia and Vietnam, whereas they appear less important for Ethiopia.

As for farm households we find rather differing results across countries. Interestingly we find that farm households in Ethiopia are more likely to exit poverty compared to many of the other work categories (i.e. activity status1 to 6). This is explained by the fact that poverty in rural Ethiopia fell between 1994 and 1997[xiv], whereas in urban areas the poverty rates increased slightly. Though poverty fell sharply in Vietnam from 1993 to 1997, it did so in a disproportionate fashion by benefiting urban areas more than rural areas. These patterns are reflected in the poverty transition regression, where we see that farm households have a higher entry and lower exit rate. In Indonesia, in contrast, there is no significant difference in poverty transitions for farm households compared to other groups.

Table 5: Poverty dynamics - entry into and exit from poverty - probit estimation
(t-statistics in parenthesis)

	Albania		Ethiopia		Indonesia		Vietnam	
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
Age of HH head	-0.014	-0.016	0.002	-0.002	0.005	-0.008	-0.012	0.001
	(-2.41)	(-1.59)	(0.47)	(-0.63)	(2.02)	(-1.74)	(-2.90)	(0.39)
#children 0 - 4	0.045	-0.193	0.124	-0.093	0.194	-0.173	0.178	-0.259
	(0.34)	(-1.24)	(1.81)	(-1.50)	(3.73)	(-2.22)	(1.95)	(-5.35)
#children 5 - 9	0.018	-0.194	0.013	-0.031	0.062	-0.193	-0.189	-0.040
	(0.17)	(-1.6)	(0.24)	(-0.62)	(1.32)	(-2.71)	(-2.41)	(-1.06)
#children 10 - 14	0.105	-0.24	0.151	-0.095	-0.05	0.037	-0.126	0.025
	(1.27)	(-2.06)	(2.83)	(-1.90)	(-1.20)	(0.59)	(-1.83)	(0.60)
Other children	-0.02	0.035	0.112	-0.042	0.057	-0.002	0.010	-0.057
	(-0.2)	(0.27)	(1.96)	(-0.83)	(1.11)	(-0.03)	(0.13)	(-1.23)
#men	0.13	0.012	0.006	-0.053	0.100	-0.057	0.098	-0.083
	(1.39)	(0.1)	(0.14)	(-1.21)	(1.99)	(-0.78)	(1.48)	(-1.83)
#women	-0.011	-0.197	-0.094	-0.056	0.063	-0.122	0.139	-0.031
	(-0.11)	(-1.67)	(-1.97)	(-1.33)	(1.13)	(-1.59)	(2.13)	(-0.69)
Male work ratio	-0.068	-0.643	-0.111	0.074	-0.245	-0.024	0.315	0.172
	(-0.44)	(-2.7)	(-0.83)	(0.59)	(-2.48)	(-0.15)	(2.20)	(1.65)
Female work ratio	0.105	-0.189	0.008	-0.211	-0.052	0.107	-0.086	-0.078
	(0.8)	(-0.84)	(0.06)	(-1.46)	(-0.71)	(0.93)	(-0.58)	(-0.72)
Child work ratio	-0.259	-0.903	-0.310	0.486	0.038	-0.334	-0.266	0.231
	(-0.76)	(-2.27)	(-1.84)	(3.15)	(0.13)	(-0.92)	(-1.41)	(1.98)
HHH low education	-0.137	0.144	-0.096	-0.172	-0.100	-0.014	-0.199	0.232
	(-0.69)	(0.47)	(-0.86)	(-1.60)	(-1.31)	(-0.12)	(-1.28)	(2.20)
HHH medium edu.	-0.011	0.147	0.176	-0.136	-0.195	0.381	-0.340	0.334
	(-0.04)	(0.38)	(1.19)	(-0.98)	(-1.72)	(2.11)	(-2.07)	(3.05)
HHH high education	-0.29	1.152	-0.456	-0.046	-0.268	0.52	-0.963	0.415
	(-0.83)	(1.5)	(-2.83)	(-0.26)	(-2.07)	(2.08)	(-3.95)	(2.68)
#post compulsory ed.	-0.217	0.086	-0.007	0.025	-0.152	0.083	-0.179	0.235
	(-2.21)	(0.69)	(-0.15)	(0.59)	(-3.19)	(1.11)	(-3.36)	(6.50)
#compulsory ed.	0.064	-0.003	-0.101	0.052	-0.028	0.04	-0.071	0.171
	(0.87)	(-0.03)	(-1.04)	(0.62)	(-0.53)	(0.50)	(-0.94)	(3.22)
HHH married	-0.424	-0.22	-0.075	-0.289	-0.27	-0.026	-0.031	0.204
	(-2.46)	(-0.74)	(-0.68)	(-2.50)	(-2.76)	(-0.15)	(-0.23)	(2.11)
# generations	-0.004	0.112	0.072	0.055	0.108	0.028	-0.096	0.143
	(-0.04)	(0.51)	(0.81)	(0.60)	(1.57)	(0.26)	(-0.90)	(1.85)
Activity status 1	0.188	-	-	-	-0.108	0.361	0.141	0.145
	(0.44)	-	-	-	(-0.61)	(1.09)	(0.54)	(0.71)
Activity status 2	0.023	-	-0.363	-	0.148	0.028	-0.202	0.301
	(0.06)	-	(-1.06)	-	(1.23)	(0.15)	(-0.53)	(0.95)

Activity status 3	-0.448	-	-0.200	0.322	0.008	-0.097	0.022	-
	(-0.86)	-	(-1.23)	(1.72)	(0.06)	(-0.469	(0.04)	-
Activity status 4	-0.101	-	-0.617	0.060	0.161	-0.002	-0.065	0.234
	(-0.16)	-	(-3.71)	(0.33)	(1.31)	(-0.01)	(-0.34)	(1.39)
Activity status 5	-0.284	1.022	0.087	0.336	0.239	0.063	-0.577	0.428
	(-1.0)	(2.31)	(0.34)	(1.25)	(3.22)	(0.53)	(-1.56)	(1.31)
Activity status 6	-0.331	1.229	0.396	0.893			-0.233	0.122
	(-1.79)	(2.91)	(1.49)	(3.14)			(-0.93)	(0.76)
Farm household	0.281	-0.128	0.033	0.495	0.153	0.2	0.522	-0.186
	(1.82)	(-0.52)	(0.23)	(3.75)	(0.50)	(0.42)	(4.61)	(2.23)
Distance to poverty line	0.00	-0.005	-0.001	-0.011	-0.002	-0.01	0.000	-0.025
	(2.02)	(-1.78)	(-2.95)	(-6.72)	(-7.85)	(-3.72)	(0.36)	(6.34)
Constant	-0.985	2.75	0.698	-0.585	-1.155	1.788	-0.143	0.994
	(-1.5)	(2.5)	(2.24)	(-1.36)	(-4.389	(4.01)	(0.29)	(2.53)
Observations	1286	384	1164	1293	3937	860	1890	2404

Regression includes control for ethnicity, religion and region. z-values in parenthesis

Discussion and Concluding Remarks

The existence of longitudinal information at household level has facilitated highly interesting case studies, in which poverty dynamics can be studied in conjunction with demographic changes at the household level. The great majority of past studies have considered poverty from a static perspective. Studies concerned with the dynamic side of poverty are few, and none of these have explicitly considered the link with fertility behaviour. Our analysis shows that the relationship between fertility and poverty is a complex one and certainly not uniform across countries. The four countries included in this study vary greatly in terms of the demographic and economic transition. Ethiopia is by far the poorest country and has still low economic growth and a persistent degree of poverty. Indonesia and Vietnam have made great strides in boosting economic activity and thereby reducing poverty. At the same time these countries have experienced sharp declines in fertility rates.

   Focussing on the relationship between poverty and fertility both in static and dynamic perspectives, we find that from a cross sectional view there is always a positive association between poverty and number of children. However, our dynamic analysis shows that poor households do not necessarily have a higher rate of fertility, but households with many children (i.e. high fertility) tend to have a higher rate of entering poverty and lower rate of exiting poverty. We also find that for the countries considered, there is a substantial difference in the relative importance of the determinants of poverty and fertility dynamics.

   For Ethiopia most of the results are consistent with economic development theory. The number of children, both very young ones and older ones, is positively associated with poverty. However, an important finding is that the number of working children plays an important role in alleviating poverty. The dynamic analysis of fertility showed that poor households in Ethiopia do not have a higher birth hazard than non-poor households. Rather, the birth hazard is driven by human capital variables, and occupation – in particular whether the household was in the agriculture sector or not. As such, high fertility in Ethiopia is largely a phenomenon related to rural communities, which constitutes around 85 percent of the population. There are several crucial factors at play. The agriculture sector is highly primitive and labour intensive, which generates a high demand for children and child labour. Clearly, fertility will remain high as long as the demand for children is high. Moreover, parents' demand for children is unlikely to diminish since the cost of raising children remains low in these rural areas. Children may even constitute a net gain for their parents and often perceived as an insurance of economic and material assistance in old age. There are also important cultural aspects. Often a large number of children are required for the affirmation of the family and generational continuation. All these factors, coupled with ignorance or unavailability of birth control[xv], perpetuates a serious poverty –fertility trap (Lee and Bulatao, 1983). The central role of child labour confirms the importance of demand side incentives. Not surprisingly the literature

suggests that sound education policies work most effectively together with policies which protect household livelihoods (Kabeer, 2001). Our analysis shows that although improved labour and educational opportunities – preferably both – should have a significant impact on reducing poverty, much more is required to break the poverty – fertility trap in rural Ethiopia.

From being a very poor country back in the seventies and the early eighties, Indonesia has seen tremendous economic growth, followed by important structural changes of the economy, which is reflected by the massive rural/urban migration – reducing the numbers of households being involved in labour intensive farming and giving farmers private ownership. School enrolment has been steadily increasing, child labour declining, and family planning substantially improved. These changes have obvious implications for the role of children and parents' fertility choices, and are reflected in our analysis. In contrast to Ethiopia we find that farm households do not have more children than non-farm households and that child labour is positively related to poverty, suggesting that only very poor households use child labour a last resort to cope with financial distress. Though economic growth has also been strong in Vietnam over recent years, it is clear that the country lags behind Indonesia significantly both in terms of fertility and poverty reduction. Vietnam has not experienced a similar level of urban migration as Indonesia, implying a continued importance of the agricultural sector. Though there is still a significant difference between farmers and non-farmers in terms of poverty, it is also clear that farm households benefited significantly from the economic progress that was prompted by the "Doi-Moi" policy. Our analysis demonstrates that compared to Ethiopia, the other countries have important distinguishing features. One is that active family planning programs were initiated already back in the 1960s, the second is that all of these countries have been pro-active in terms of providing educational infra-structure. At present day family planning and school enrolment in these countries are quite extensive and play important roles both in terms of limiting fertility and helping economic growth.

Although our analysis reveals that the poverty/fertility relationships tend to be complex, it is also the case that there are certain important commonalities. Perhaps the most important one is the role of human capital. In particular we find that the educational level of the household head is almost always negatively associated with poverty. Often, though not always, we find accumulation of educational levels of other household members to have a similar effect. But there are differences in magnitude, and we find that education has the lowest impact on fertility and poverty in Ethiopia. This is not to say that education among Ethiopian households is less important in reducing poverty and fertility compared to the other countries. It is the sheer lack of education, especially in rural areas, that dominates Ethiopian society, and contributes to keep the demand for children high, maintaining high fertility in a context of poor availability of family planning. Based on the insight of Indonesia, Vietnam, and Albania – to what extent can we expect poverty and fertility decline in Ethiopia? In order to see similar developments several elements of Ethiopian society needs to be addressed. Key fundamentals concern of course educational infra structures, rising the cost of children and therefore decreasing their demand, together with family planning – both of which are established, or at least well in progress, in the other three countries. A similar replication in Ethiopia will take time and effort, and will certainly require long term commitments in more than one area of societal developments.

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APPENDIX I: DEFINITION OF THE HOUSEHOLD HEAD'S ACTIVITY STATUS

	Albania	Ethiopia	Indonesia	Vietnam
Activity Status 0 (Reference Category)	Unskilled, seasonal, disabled, not working	Seasonal, occasional, not working.	Not working	Unskilled, seasonal, disabled, not working
Activity Status 1	Manager	Employer	Housekeeping	Manager
Activity Status 2	Professional (medical & life sciences)	Self employed	Self-employed	Professional (medical & life sciences)
Activity Status 3	Professional (teachers & other public)	Professional (civil/public sector)	Self-employed with help	Professional (teachers & other public)
Activity Status 4	Professional (others)	Professional (in private or international enterprise)	Employee	Professional (others)
Activity Status 5	Family worker, personal services, sales.	Skilled worker	Family worker	Family worker, personal services, sales.
Activity Status 6	Skilled manual worker.			Skilled manual worker.

APPENDIX II: THE SURVEYS

Summary characteristics of the four panel surveys

	ALSMS (Albanian Living Standards Measurement Survey)	EUHS (Ethiopian Urban Household Survey)	ERHS (Ethiopian Rural Household Survey)	IFLS (Indonesian Family Life Survey)	VLSMS (Vietnam Living Standard Survey)
Target population and sample frame	Private households	Urban households	Rural households	Private households, and selected individual (for detailed information), and community	Private households
Dates of fieldwork	Three waves: Apr-Sep 2002, May-July 2003, May 2004	Four waves: Sep 1994 Nov-Dec 1995 Jan-Feb 1997 March 2000	Five waves: Two waves in 1994, then subsequent waves in 1995, 1997 and 1999.	Three waves: Aug 1993 – Feb 1994 Aug 1997 – Jan 1998 Aug 1998 – Dec 1998 Jun 2000 – Nov 2000	Two waves: Sept 92 – Oct 93 Dec 97 – Dec 98
Panel entry, exit and tracking	Unique cross-wave person identifier. New	No tracking of individuals leaving	No tracking of individuals leaving	Unique cross-wave person identifier. New entrants	Unique cross-wave person identifier. New

policy	entrants included in sample. All exiting individuals tracked into new households.	household. Cross-wave identifier constructed through relationship to household head.	household. Cross-wave identifier constructed through relationship to household head.	included in sample. All exiting individuals tracked into new households.	entrants included in sample. Split-off households are not tracked
Welfare measures available	Income and subjective indicators (all waves); expenditure (wave 1 only);	Income, expenditure (all waves), some subjective measures.	Income, expenditure (all waves), some subjective measures.	Income, expenditure, asset (all waves)	Income, expenditure (all waves)
Sample Size (Panel)	1682 panel households	1500 urban households	1477 rural households	6,564 households, 4,216 women with birth history	4302 panel households

Our analysis is based on two waves, omitting surveys conducted in urban Ethiopia in 2000, rural Ethiopia in 1999, and third wave surveyed in Indonesia in 2000. Ethiopia was at war with neighbouring Eritrea from 1998 – 2000 and Indonesia was rocked by the East-Asian financial crisis in mid 1997 (after the field work of the second wave). Both events represent important shocks to the economies, and as a result we did not include these waves.

Notes

[i] Birdsall and Griffin (1988), Birdsall et al (2001), and Martín-Guzmán (2005) provide excellent overviews of the issue of poverty and fertility.

[ii] See Rosenzweig and Schultz (1985) for an approach where supply side effects are separated from demand side effects.

[iii] Baulch and Hoddinott (2000) summarises these findings by suggesting that the pool of poor households consist of both chronic poor and transitory poor, where the latter is surprisingly large, and this is the case independent of whether poverty is measured in relative or absolute terms.

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

[v] The urban population in Ethiopia is fifteen percent of the total.

[vi] Doi Moi can be translated as "renovation".

[vii] Equivalent scales can be estimated by using Engel coefficient as in Lanjouw and Ravallion (1995). Although estimating the effect of household size on Engel coefficient requires a range of assumptions on the consumption behaviour of household, the theoretical foundation is certainly an advantage. Another avenue is to examine how sensitive the results are to the choice of equivalent scale. The weight on a child's consumption relative to that on an adult and the scale of economy are two dimensions to be considered.

[viii] The poverty lines in ALSMS and VLSMS are constructed by the World Bank. The poverty line for Ethiopia is based on the World Bank Approach and controls for regional prices, including controls for urban and rural areas. The poverty line for IFLS is constructed so that the provincial poverty rates in IFLS2(1997) replicate those in Strauss *et al* (2004). Strauss *et al* (2004) construct provincial poverty lines adjusted for regional prices and change in food basket of the reference group.

[ix] We also estimated Negative Binomial models, but these produced very similar parameter estimates.

[x] Newborn children refer to new children of the Household Head.

[xi] We also estimated negative binomial regressions, but these provided very similar estimates to the Poisson regressions.

[xii] However, the different signs of the coefficients on poverty in Table 4 also suggest more investigation into income profile, composition of income, and access to credit market among poor and non-poor households in four countries.

[xiii] The overall literacy rate in Ethiopia was by 2000 around 30 percent. The literacy rate in urban areas is considerably higher than in rural areas.

[xiv] This decline in poverty among farmers during the period has been attributed to particularly good harvests (see Bigsten et al 2003; Dercon 2004).

[xv] The contraceptive prevalence rate in rural Ethiopia is as low as 4 percent, whereas in urban areas it is round 45 percent.