Fertility and poverty in developing countries: a comparative analysis for Albania, Ethiopia, Indonesia and Vietnam

Arnstein Aassve [1]
Henriette Engelhardt [2]
Francesca Francavilla [3]
Abbi Kedir [4]
Jungho Kim [2]
Fabrizia Mealli [3]
Letizia Mencarini [3]
Stephen Pudney [1]
Alexia Prskawetz [2]

DRAFT – PLEASE DO NOT QUOTE

March 2005

Abstract: We report a comparative analysis of fertility and poverty, using household panel data from four developing countries: Albania, Ethiopia, Indonesia and Vietnam. We use a sequential conditioning approach to analyse the initial distribution of household characteristics in terms of demographic composition, economic activity and economic welfare; and then the pattern of change over time. We use various statistical methods, including non-parametric estimation and hazard rate analysis. The four countries differ greatly in their history, average income, social structure, economic institutions and demographic features and we consider whether it is possible to discern a common pattern of fertility and poverty correlations in this apparent diversity.

Keywords: Panel data, fertility, poverty, poverty dynamics.

Address for correspondence: Arnstein Aassve, ISER, University of Essex, Wivenhoe Park, Colchester CO4 3SQ. E-mail: aaassve@essex.ac.uk.

[1] Institute for Social and Economic Research, University of Essex; [2] Vienna Institute of Demography; [3] Department of Statistics, University of Florence; [4] Department of Economics, University of Leicester;

1   Introduction

The link between population growth and economic wellbeing is one of the most disputed research areas among economists and demographers (Birdsall et al. 2001). 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 on this issue relies on the neo-classical paradigm that a higher population growth rate depresses capital accumulation and wages. Poverty in turn is considered as a key factor in driving high fertility and therefore high rates of population growth. Consequently it is seen as a crucial element in delaying the demographic transition. However, as stressed in McNicoll (1997) these theoretical assertions are not sufficient: time-lags, feedback mechanisms, nonlinearities and reverse causation enter the picture. Moreover, the link between poverty and fertility is likely to be an institutionally contingent relationship. Consequently any generalisation that neglects those institutional settings is likely to fail. A similar argument applies at the micro-level. Individual level fertility behaviour adjusts to changes in perceived and actual costs and benefits of children. Economic forces, social organisations and cultural patterns in turn influence prices that determine costs and benefits of children. Not only will the poverty and fertility link be dependent on the social and institutional environment, there will also exist policy instruments that impinge on both processes. These include education, health services and family planning policies. Only a better understanding of those factors that are determinants of both processes will assist us in designing better policies in terms of breaking the negative poverty – fertility spiral (Birdsall and Griffin, 1988).

Whereas existing studies have relied on either cross sectional micro data or aggregate level data, this study revisits this long-standing issue by exploiting recent longitudinal data sets. The main benefit of longitudinal information is that it facilitates dynamic analysis of poverty and occurrence of life events, such as births, together with intermediate variables. Since only longitudinal surveys can provide information on the timing and duration of poverty spells, panels will provide much richer information on issues such as the permanent nature of the poverty, changes in poverty status of individuals over time and the events related to entry into and escape from income poverty (Muffels, 2000).

The paper is the first derived from an ongoing study, where ultimately the aim is to exploit the longitudinal nature of the surveys to assess the causality issue associated with fertility choice and poverty. Here we present a *descriptive* analysis of poverty and household structure, and changes thereof, for four countries: Albania, Ethiopia, Indonesia and Vietnam. The aim is to establish a rigorous understanding of differences and commonalities of household structure and poverty for the four countries. In particular we analyse correlations between levels of human capital, household size, child labour and fertility events on one hand, and poverty on the other. We also control for ethnicity, religion, and regional differences, though these aspects are given less emphasis in the present analysis.

The selected countries should obviously be considered as case studies rather than a representative sample of developing countries. Ethiopia is the only country where fertility levels are still very high, and poverty is still extremely severe. For the other three countries, the demographic transition has clearly taken place, though perhaps not completed in all three cases. At the same time they have experienced strong economic growth, followed by a significant reduction in poverty. Of course, the countries differ in many other respects, such as religion, culture and political situation, and they are at different stages of economic and demographic development. But these differences provide a good basis for a comparative analysis. Of particular interest is to see how Ethiopia – with persistent high fertility and poverty levels - compares with the other countries where fertility and poverty is on the decline. This aside, it is also clear that the choice of countries is data dependent. Longitudinal household surveys which include information on economics/financial situation of households, as well as demographic behaviour, for different time periods are still very rare.

The paper is outlined as follows: In section 2 we give a brief outline of the countries; section 3 describes the surveys and explains issues concerning poverty measurement; section 4 gives an outline of how we undertake our comparative analysis; section 5 presents a static view of poverty and household composition; section 6 presents the dynamic analysis of poverty and fertility, whereas section 7 concludes.

2   Background: the countries

Albania has experienced rapid political, social and economic changes since 1992, when democracy was re-installed. Between 1993-1996 GDP grew by about 9 percent annually in real terms, in 1997, with the collapse of the large pyramid scheme economic registered a negative growth of 7 percent in real terms but over the next three years after the crisis the economy bounced back to register an average growth rate of 7 percent. With the strong support form donor community in 1999 Albania was able to weather the storm of Kosovo refugees and by the end of the year Albania had roughly regained its 1990 GDP level. GDP growth continued in the following years, reaching a 7.3 percent growth in 2000 and started to decline only in the second half of 2001, reaching 4.7 percent in 2002. Several structural reforms have also characterized the period that followed the collapse of communist regime, involving banking, land market, and privatization of strategic sectors like telecommunications but also of small and medium enterprises.

Despite the impressive performance of the economy in the last years 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). There are features in common with both developing and developed countries. For instance, its total fertility rate of 2.2 and infant mortality rate of 26 per 1,000 live births are comparable with many medium developed countries (Human Development Report 2003 on data of 2002), whereas the high life expectancy at birth (currently 74 years) is comparable with European countries. Another important feature of Albania is the very high level of emigration. Migration is the most common livelihood against poverty and an important escape valve for unemployment. Albania has experienced an high internal migration from rural to urban areas. Moreover, since 1990 about one fifth of the total population has left the country and is living abroad mainly in Italy or Greece. Remittances are estimated to account for about 13 percent of total income among Albanian households with a higher share for urban households-16 percent against 11 of urban areas (INSTAT, 2002). Despite the economic benefits of remittances, migration also implied high social costs. According to INSTAT 2002 emigration was particularly evident among males, whose population dropped over 20 percent between

1989 and 2001. In the last decade emigration has deprived the country of the most active labour force[1].

Ethiopia had a population of 68 million in 2003, projected to grow by 2.3% per annum over the next 15 years. Life expectancy at birth is 42.3 years. Poverty is more severe than in the other three countries: more than two-thirds of the population live on less than $2 per day. The Ethiopian economy is agriculture-centred and in 2001 52.3% of GDP came from agriculture. The mode of production in the agricultural sector is primitive, and for this reason it is highly vulnerable to adverse weather conditions, and the country has seen several severe famines in the last two decades. Like many other African countries, the 1980s was a period of political unrest and upheavals. Until 1974 Ethiopia was ruled by a traditional monarchy. It was then replaced by a provisional military government and much of the Ethiopian economy was nationalised. However, the civil war continued, and a military offensive in Tigray led to the overthrow of the military government and, in 1993, the secession of Eritrea. During this period, parts of Ethiopia were plagued by a series of famines. The political turmoil and the civil wars had a devastating effect on the Ethiopian economy. However, by 1988 a series of economic reforms had been gradually introduced, leading to a more mixed economy. In 1992 the birr was devalued by 142 percent, and remarkably low inflation followed. Although economic reforms have had a profound impact on the Ethiopian economy, real consumption levels in 1995 in rural Ethiopia were still only 14 percent higher than in 1989 (Dercon, 2004). The problem of urban poverty has also been a serious concern in Ethiopia. Kedir and McKay (2004) have shown the presence of a large percentage of urban household experiencing chronic (persistent) poverty.

Indonesia is the fourth most populous country in the world, with an estimated population level at 214 million in 2003. Despite declining fertility rate, the country still has a positive net population growth. The population growth rate is 1.41 for the period 1995 to 2000 according to World Population Prospects (The 2000 revision, Vol. 1) by UN Population Division. The last decade has been a period in which Indonesia benefited from sustained high economic growth with average annual GDP

---

[1] Carletto, G., B. Devis, M. Stampini, Trento S. and Zezza A. (2004) and Uruçi, E. and I.Gedeshi,. (2003) for an analysis on internal mobility, international migration and remittances management in Albania. See World Bank report No. 36313-AL (2003) and Betti, G. (2003) for a detailed discussion on Albania poverty assessment.

growth 7.0% from 1990 to 1997, reducing the overall poverty rates, and increasing participation rates in education. In 1997 the Indonesian economy was exposed to a severe financial crisis (it experienced GDP growth –15.1% in 1998) which brought about a sharp increase in unemployment and increased poverty rates. The crisis affected poor through an increase in price on critical commodities and services. The depreciation of the rupiah and the fall in rice production due to the drought increased rice prices by almost 50 percent over 12 months[2]. The poverty rate increased from the lowest point of around 15 percent at the onset of the crisis in the mid of 1997 to the highest point of around 33 percent nearing the end of 1998. After the peak point, the poverty rate started to decline again and reached the pre-crisis level of around 15 percents at the end of 1999[3.] However, Indonesia still faces economic development problems as there is unequal resource distribution among regions, endemic corruption, an inadequate Judicial system and weaknesses in the banking system. These characteristics discourage foreign investment and economic growth.

Vietnam was one of the worlds' poorest countries in the beginning of the 1980s, but has since experienced strong economic growth in which poverty has been reduced substantially (Glewwe et. al. 2001). Much of this improvement has been attributed to the "Doi Moi" policy (translated in English as "renovation"). This was initiated in the late 1980s and roughly coincided with the collapse of the Soviet Union, on which Vietnam had been heavily dependent. There are also close parallels with the Chinese reforms of a decade or so earlier. 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 was achieved from 1986 to 1996 and form 1993 to 1997 economy growth averaged around 9% per year. The 1997 Asian financial crisis highlighted the problems in the Vietnamese economy, GDP growth of 8.5% in 1997 fell to 6% in 1998 and 5% in 1999. Growth then rose to 6% to 7% in 2000-02 even against the background of global recession. Like China, Vietnam remains under Socialist rule, but since the Party elected new leadership in 2001, Vietnamese authorities have reaffirmed their commitment to economic liberalization and have

---

[2] http://www.worldbank.org/eapsocial/countries/indon/pov2.htm
[3] Asep Suryahadi, Sudarno Sumarto (2003), "The evaluation of poverty during crisis in Indonesia" SMERU working paper

moved to implement the structural reforms. Life expectancy at birth is relatively high in Vietnam: 67.12 years for men, and 72.19 years for women, whereas infant mortality stood at 30.34 per thousand live births in 2001 – a decline from around 40 in 1990.

Table 1 gives summary data on the demographic and economic conditions prevailing in the four countries since 1980[4]. These statistics shows that the countries have indeed experienced rather different development paths over the last two decades. Indonesia and Vietnam are the countries with the most dramatic changes. Both countries have experienced tremendous growth in terms of GDP, though Indonesia is clearly at a higher level than Vietnam. At the same time we see that child labour has steadily declined, which suggests a higher school enrolment rate. We also see that during a period of strong economic growth, there has been a clear decline in the rural population (as percentage of the total), especially for Indonesia. This reflects important structural changes of the economy, where total production output is less dependent on rural economic activities, mainly represented in terms of farming. In contrast, Ethiopia has remained more or less static in terms of GDP growth. Though child labour (based on an age threshold of 14) has declined, it is still very much higher than the other countries, and remains critically important in an heavily agricultural based economy. Albania has shown substantial economic growth in the last decades. Interestingly we see that by the turn of the millennium, Indonesia bypassed Albania in terms of GDP per capita.

---

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

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)

The first set of rows in Table 1 shows the Total Fertility Rates (TFR) in the four countries. It is clear that apart from Ethiopia, the countries have experienced a significant decline in fertility. Going further back (i.e. Figure 1) we see that all of the four countries have experienced very high fertility levels. The fertility decline in Vietnam started around 1970, whereas Albania and Indonesia started somewhat earlier. At the turn of the millennium the three countries are almost at the same level. Ethiopia differs from the other three countries in that it has not yet reached the transition stage, and as of yet there is little evidence to suggest a downward trend for Ethiopia. However, the Ethiopian TFR figures mask important urban/rural differences. For instance, the urban population in Ethiopia (about 15% of the total) has a TFR of 3.4, whereas in Addis Ababa it is as low as 1.9, below replacement level (Kinfu, 2000).
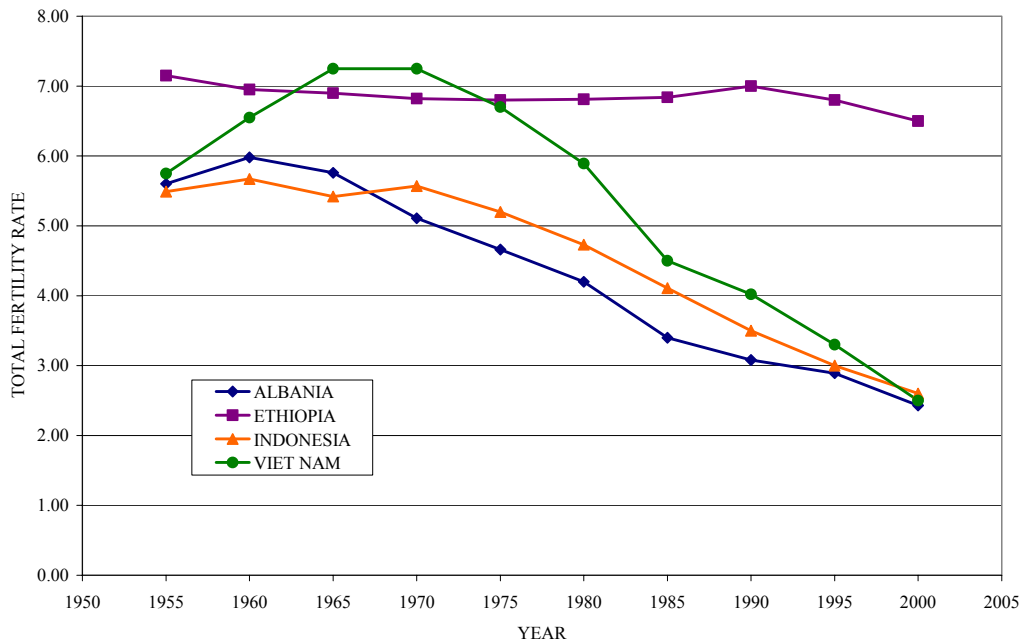
Figure 1 Trends in total fertility rates (Source: UN estimates and projections)

3 The surveys

Longitudinal surveys of developing countries are still rare and few of them cover more than two waves. They are also less extensive than typical panel studies from developed countries, and in general data quality is weaker. It is also difficult to find longitudinal surveys giving information on both fertility and income or consumption expenditure. 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, although there are weaknesses (see Appendix for details). Of course, the crucial element of the studies chosen here is that they are all longitudinal. Some of the surveys selected here have more than two waves. There is for instance one other wave for Ethiopia surveyed in 2001, and another wave surveyed for Indonesia in 2000. However, Ethiopia was however, plagued by civil war at the end of the 1990s. 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 have refrained from using these waves for our analysis. Table 2 summarises the main characteristics of the four surveys.

3.1   The Albanian Living Standards Measurement Survey (ALSMS)

The ALSMS is made up by three waves (2002, 2003 and 2004), with a fourth wave ongoing. The first survey was conducted in 2002, using a sample of 3,600 households. The panel component, however, only includes less than 1,800 households – precisely 1,682 if we put together 2002 and 2004 survey). The Republic of Albania is divided geographically into 12 Prefectures, divided into Districts which are, in turn, divided into Cities and Communes. The Communes contain all the rural villages and the very small cities, divided into Enumeration Areas (EAs), which formed the basis for the LSMS sampling frame. The sample is drawn from 450 EA, and in each of them eight households was selected. Household membership is defined as not having been away from the household for more than six months

The survey is of the standard LSMS format. It includes information on consumption expenditure, income, migration, health, education, employment, and fertility histories. However, the survey does not include consumption expenditure in the waves 2 and 3, which will have implication on the definition of poverty (see below for further details). The first wave contains complete fertility histories, whereas waves 2 and 3 provide additional information on any new births (through a household roster).

3.2   The Ethiopian Urban Household Survey (EUHS)

The EUHS contains four waves, covering the years 1994, 1995, 1997 and 2000. At present, we only have access to the urban sample. The panel includes useful information concerning demographics (household composition, religion, ethnicity, migration), employment and income (wages, hours worked, sector of employment and occupation), business income (own account worker, income from female business activity, income from child labour activities), assets and remittances and pension income (see further information in Kedir and McKay, 2004; Bigsten et al 2003). The survey also includes very detailed information on expenditure, including food consumption, education, health, short and long distance transport. Information on

income from livestock and crop sales are also included. It also covers questions regarding illness, morbidity, vaccination and health utilisation, subjective evaluation of health care and anthropometrics. The survey has also a credit and savings module, including the amount of loans and its purpose.

3.3   The Indonesian Family Life Survey (IFLS)

The IFLS consists of three waves in total, IFLS1 conducted in 1993/94, IFLS2 and IFLS2+ in 1997 and 1998, respectively, whereas IFLS3 in 2000. IFLS2+ included a 25% sub-sample of IFLS2 and was specifically aimed at capturing the effects of the financial crisis in Indonesia at the end of 1997. The survey has been conducted by RAND Corporation in collaboration with UCLA and Lembaga Demografi, University of Indonesia. The sample is representative of about 83% of the Indonesian population and contains over 30,000 individuals living in 13 of the 27 provinces in the country. IFLS1 has 7,224 households, and subsequent waves targeted all the split-off households as well as all the original households previously interviewed. Over 90 percent of original sample from 1993 has been re-interviewed in the second and third waves of IFLS. The survey contains a wealth of information collected at the individual and household levels, including multiple indicators of economic well-being such as consumption, income, and assets. It also includes information on education, migration, labour market outcomes, marriage, fertility, and contraceptive use. It also contains information about health, relationships among co-residents and non-co-resident family members and inter-generational mobility. Another notable feature of the IFLS is the quality of information provided at community level. The panel has information concerning the physical and social environment, infrastructure, employment opportunities, food prices, access to health and educational facilities, and the quality and prices of services available at those facilities.

3.4   The Vietnam Living Standards Measurement Survey (VLSMS)

The first Living Standard Measurement Survey in Vietnam was conducted in 1992/93 and included 4800 households. The second survey was conducted in 1997/98, and included 6000 households, whereas more than 4300 household from the first survey was re-interviewed. Both surveys are nationally representative. The

attrition rate is low and the overall quality is very good (see Flaris 2003, for details). The survey follows the LSMS format and just like the Albanian LSMS, includes rich information on education, employment, fertility and marital histories, together with rich information on household income and consumption expenditure. Community questionnaires were administered to rural regions only.

Table 2: Summary characteristics of the four panel surveys

	ALSMS	EUHS	IFLS	VLSMS
Target population and sample frame	Private households	Urban 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	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 policy	Unique cross-wave person identifier. New entrants included in sample. All exiting individuals tracked into new households.	No tracking of individuals leaving household. Cross-wave identifier constructed through relationship to household head.	Unique cross-wave person identifier. New entrants included in sample. All exiting individuals tracked into new households.	Unique cross-wave person identifier. New 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)	Income, expenditure, asset (all waves)	Income, expenditure (all waves)
Sample Size (Panel)	1682 panel households	1500 urban households + 1500 rural households	6,564 households, 4,216 women with birth history	4302 panel households

3.5. Poverty measurement

Typically poverty is measured over a household's consumption expenditure, which requires detailed information on consumption behaviour and its expenditure pattern. It is clear that the distribution of consumption expenditure within the household is unlikely to be uniform across household members, and it is probable that children consume less than adults. The standard solution is to impose an assumption on intra-household resources allocation, and adjustments can be done by applying an equivalence scale that is consistent with the assumption made – producing a measure of *expenditure per equivalent adult*. Unfortunately, there is no general consensus on the appropriate choice of equivalence scales. This is perhaps not surprising, since household allocation patterns may vary between countries, regions and cultures. As a result of this official poverty statistics are normally 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. However, we consider two avenues to deal with this issue in the future work. One is to estimate equivalent scales using Engel coefficient as in Lanjouw and Ravallion (1995). Although estimating the effect of household size on Engel coefficient requires a set of assumptions on the consumption behaviour of household, the theoretical foundation is certainly an advantage. The other is to examine how sensitive the correlation between fertility and poverty is 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. Given the empirical limitations on the choice of the equivalent scale, the sensitivity analysis will provide the robustness of our qualitative result.

The binary approach to measure poverty arguably represents an over-simplification by ignoring the *depth* of poverty. Low-income households might experience considerable welfare variations without crossing the poverty line whereas households close to the poverty threshold will tend to demonstrate largely random 'churning' of poverty status. We generalise therefore the binary approach by exploring alternative non-binary poverty measures in the FGT family of poverty

measures (Foster, Greer and Thorbecke, 1984), which encompasses the depth of poverty. Let v 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:

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

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. Note that $\alpha = 0$ gives the poverty headcount (the proportion of individuals living in households below the poverty line) and $\alpha = 1$ gives one form of the poverty gap (the cost of making good the consumption shortfall of all poor households, expressed as a proportion of aggregate "subsistence" income, $\tau E(v)$). The choice $\alpha = 2$ is a common choice for a measure more strongly targeted on those in deep poverty.

We specify the poverty line τ using a '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. The construction of the poverty level consists of two steps. First, a food poverty threshold is defined as the expenditure needed to purchase a basket of goods that will give the required minimum calorie intake (this is also referred to as the extreme poverty threshold). Following FAO recommendations this threshold is set 2288 calories for Albania, and 2100 calories for the other three countries[5]. Secondly, a general poverty line combines the food poverty threshold with an average non-food consumption expenditure of those households whose food consumption level represents the food poverty threshold. A quantitative comparison on the magnitude of poverty across four countries is difficult due to the difference in the details regarding the adjustment for food basket, reference group, and regional prices.[6] Nevertheless, we use a poverty

---

[5] This is an average amount, and obviously the minimum amount depends on age, gender, and physical work of the individual. In other words, correct poverty thresholds should strictly speaking take this issue into account. However, in official poverty estimates this issue is often ignored, and the poverty threshold is instead based on an average calorie intake.

[6] The poverty lines in ALSMS and VLSMS are constructed by the World Bank. The poverty line in IFLS is constructed so that the provincial poverty rates in IFLS2(1997) replicate those in Strauss *et al*

measure consistent within each country so that we can compare the poverty dynamics in the four countries at a qualitative level.

Again note that our implementation of the FGT measure operates at the individual, rather than household, level. This means that large poor households are given proportionately greater weight than small, equally poor, households. Estimation is relatively straightforward. If we have a sample of survey data, which are self-weighting at the household level, then FGT_α can be estimated as the weighted sample mean of $\delta_\alpha(y_i)$, using household size, v_i, as the weight.

4 The methodology of comparative analysis

In this section we give a more formal outline of the econometric approach which is being undertaken for the comparative analysis. Comparative work requires a method of describing households and their circumstances that is as uniform as possible across countries. We also need a sufficiently detailed division of household descriptors into classes reflecting: the household's structure; its qualitative pattern of involvement in economic activity; and the resulting outcome in terms of quantitative measures of economic welfare. We emphasise that our approach implemented here does not bring about a solution to the reversed causality issue concerning poverty and fertility choice. Instead the approach is meant to describe important differences and commonalities in terms of household structure and poverty for the four countries analysed.

Let s_t be a collection of variables describing the size and structure of any given household at time t; l_t is a set of variables describing the type of economic activity of its members; and w_t describes the welfare of the household. Let X represent the evolution in the macro-economic environment (prices, wages, employment opportunities, etc.) over the relevant period.

(2004). Strauss *et al* (2004) construct provincial poverty lines adjusted for regional prices and change in food basket of the reference group.

We have panel data relating to two (or more) years $t = 0, 1, \ldots$. Use $f(.)$ as a generic representation of any distribution. Then the distribution of initial conditions can be decomposed as follows:

$$
\begin{aligned}
f(s_0, l_0, w_0 \mid X) \quad = \quad & f_1(s_0 \mid X) \\
& \times f_2(l_0 \mid s_0, X) \\
& \times f_3(w_0 \mid s_0, l_0, X) \quad\quad\quad (3)
\end{aligned}
$$

Let the symbol H_{t-1} represent the household's history in periods $0 \ldots t\text{-}1$. Then, conditional on history, the changes experienced between years $t\text{-}1$ and t, can be decomposed as:

$$
\begin{aligned}
f(\Delta s_t, \Delta l_t, \Delta w_t \mid H_{t-1}, X) \quad = \quad & f_4(\Delta s_t \mid H_{t-1}, X) \\
& \times f_5(\Delta l_t \mid \Delta s_t, H_{t-1}, X) \\
& \times f_6(\Delta w_t \mid \Delta l_2, \Delta s_2, H_{t-1}, X) \quad\quad\quad (4)
\end{aligned}
$$

Expressions (3) and (4) constitute a completely general decomposition, imposing no constraint on the distribution of initial state and subsequent changes. However, (4) is a natural way of analysing change. The first component f_4 describes the long-term fundamental changes in the structure of the family itself, stemming from fertility, mortality, marriage and migration. The second component f_5 describes the medium-term structural responses of the family's economic activity, conditional on the demographic change that has been occurred. These economic responses include changes in labour force participation, agricultural production and investments in physical and human capital. Finally, component f_6 describes the change in welfare that has resulted from the changes in the family's demographic and economic structure. The statistical methods appropriate to the analysis of the distributions (3) and (4) depend on the nature of the variables involved.

Our analysis of demographic characteristics (distributions f_1 and f_4) proceeds as follows. We first summarise the distribution of initial demographic characteristics by tabulation and graphical methods (including non-parametric density estimation) applied to a range of variables including household size and household age structure.

We then describe the subsequent changes in demographic structure using simple statistical models of the occurrence of births, deaths, entry into and exit from the household; these methods include count data modelling (e.g. Poisson regression and its extensions) and logit analysis.

The analysis of economic activity conditional on demographic structure (distributions f_2 and f_5) is done at the individual level, but also using household-level variables to represent the family context. Statistical methods include: binary and multinomial logit models of economic status (education, work in domestic production, external employment, unemployment) in the initial period; and Markov-type transition models for change of economic activity between waves.

Finally, we summarise the initial distribution of welfare and subsequent changes (distributions f_3 and f_6) as follows. We first partition the sample of households into classes based on their demographic and economic characteristics in the initial period, then use tabular and graphical methods to describe and compare the initial distribution of welfare (measured alternatively by income or expenditure) and incidence of poverty for each group. We also use simple logit models to summarise the incidence of poverty across all households. We then summarise the distribution of changes in welfare for each household category, by analysing the rates of transition into and out of poverty for each.

5 Demographic characteristics, activity status, and household welfare: the static perspective

In this section we consider the relationship between household welfare (i.e. poverty), and the distribution of demographics and activity status of the household. We start by taking a static view, and move on to the dynamic perspective in section 6 (i.e. determinants of changes in poverty and demographic behaviour). Our analysis in this section is first concerned with simple descriptive statistics of the characteristics of the households. We are interested in establishing the correlates of poverty and demographic structures, and how these differ between the four countries.

5.1 Descriptive analysis

Comparative analysis requires variables that are meaningful in each of the countries, and we start by defining a simple classification of the demographic character of households. This classification gives a reasonably even distribution of household types, with sufficient households in each cell to allow meaningful

statistical analysis for all four countries. Households are classified by two criteria: their status as farm or non-farm households; and their composition in terms of the ratio, R, of children to adults within the household. The ten groups are as follows:

(i) Non-farm, $R = 0$

(ii) Non-farm, $0 < R < 50\%$

(iii) Non-farm, $50\% \leq R < 100\%$

(iv) Non-farm, $100\% \leq R < 150\%$

(v) Non-farm, $R \geq 150\%$

(vi) Farm, $R = 0$

(vii) Farm, $0 < R < 50\%$

(viii) Farm, $50\% \leq R < 100\%$

(ix) Farm, $100\% \leq R < 150\%$

(x) Farm, $R \geq 150\%$

For each country, the distribution of the base year sample across these groups is shown in Figure 2. Apart from Ethiopia, for which the rural sample is not yet available, and therefore a general lack of farm households, there are adequate sample numbers in each of the ten categories. Farm-based households are relatively more numerous in Vietnam than Indonesia and Albania. This 10-group classification represents a range of basic demographic characteristics very effectively.

In terms of poverty, we expect households mainly engaged in farming to have a higher rate of poverty since they are depending dominantly on food production which is vulnerable to many external risks like weather conditions, political instability, etc. Moreover, a high level of R implies that the household will have a high proportion of dependants (i.e. many children), and therefore be positively associated with poverty (though depending on the extent of child labour). As a result R is also a reflection of the household size since households with many children also tend to be larger. Table 3 gives the mean numbers of adult males and females and children, the proportion of female-headed households, the mean age of household heads, the proportion of household heads married, the mean number of generations within the household and the mean number of adults with post-compulsory education. We find that the child-adult ratio R is an efficient demographic classifier to differentiate between those characteristics. For all four countries there is a pattern of monotonic increase or decrease in the mean characteristics set out in Table 3, as R

rises. The only significant exception to this is the important distinction between childless households ($R = 0$) and others ($R > 0$). Relative to other types, childless households tend to be small, with older household heads and they are more likely to be female-headed, usually through widowhood. As R increases (i.e. the number of children in relation to adults) - the mean age of the household head declines. Table 3 also shows that the number of adult men and adult women declines with R, whereas the number of children under 14 increases. Finally, we see that the number of *adults* with post-compulsory education declines with R, which is what we would expect, arguing that fertility is negatively correlated with educational level of the parents. Overall, all countries show similar trends, though there are some differences in terms of magnitude.

Table 4 summarises the economic activity and welfare outcomes within the ten demographic groups for the base year of each survey. With the exception of childless households, larger child-adult ratios *R* are associated with smaller absolute numbers of working adults and consequently of earnings. The incidence of child labour tends to rise with *R*: also partly a consequence of the lower resources of human capital. Poverty rates also rise with *R* and are predominantly higher among farm than non-farm households. However, Indonesia is an exception to this pattern, with only modest variation in poverty rates across demographic groups.
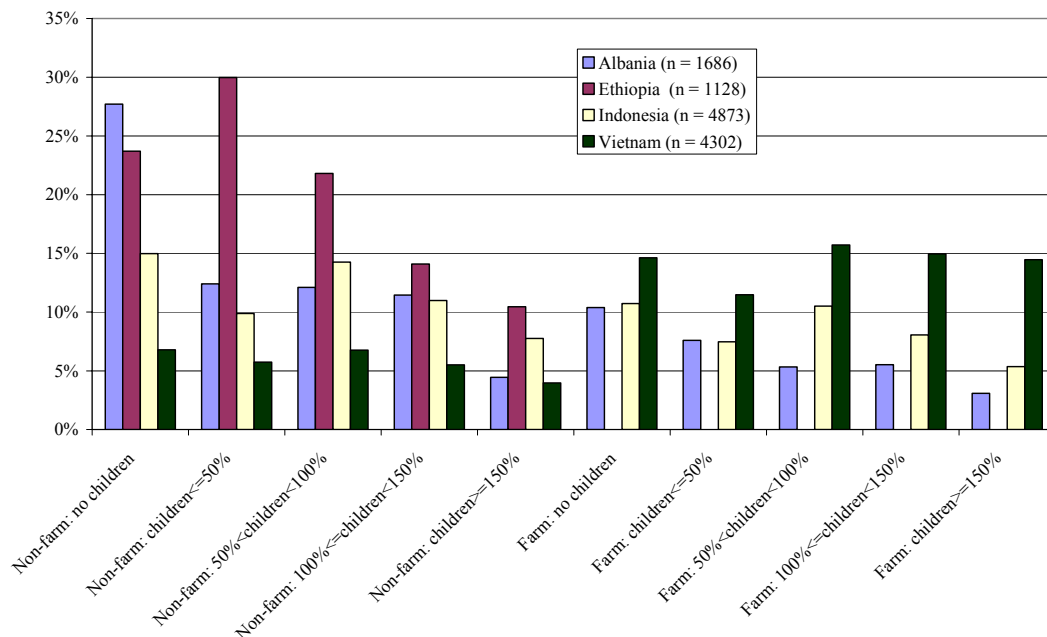

Figure 2: Demographic composition of households in the base year (rural households in Ethiopia not included).

Table 3: Demographic characteristics by household group: base year

Characteristic & country		Non-farm					Farm				
		$R = 0$	$0<R<.5$	$.5≤R<1$	$1≤R<1.5$	$R ≥1.5$	$R = 0$	$0<R<.5$	$.5≤R<1$	$1≤R<1.5$	$R ≥1.5$
No. of adult males	A	1.34	1.93	1.40	1.03	0.92	1.49	2.02	1.58	1.06	0.77
	E	1.75	2.78	1.91	1.29	0.88	-	-	-	-	-
	I	1.28	2.15	1.46	1.09	0.93	1.38	2.16	1.48	1.20	0.98
	V	1.56	2.35	1.40	1.03	0.92	1.49	2.20	1.58	1.22	0.96
No. of adult females	A	1.49	2.05	1.78	1.16	1.01	1.52	2.32	1.89	1.29	1.06
	E	2.24	3.03	2.38	1.86	1.24	-	-	-	-	-
	I	1.47	2.30	1.63	1.27	1.05	1.41	2.09	1.53	1.28	1.08
	V	1.82	2.77	1.74	1.25	1.04	1.59	2.45	1.83	1.37	1.06
No. of children under 14	A	-	1.15	1.83	2.23	3.29	-	1.16	2.20	2.43	3.19
	E	-	1.55	2.67	3.45	4.26	-	-	-	-	
	I	-	1.25	1.84	2.45	3.54	-	1.21	1.76	2.63	3.74
	V	-	1.40	1.86	2.34	3.42	-	1.28	2.05	2.73	3.76
% Female-headed households	A	21.8	8.6	17.6	4.7	8.0	8.6	3.9	3.3	5.4	25.0
	E	50.2	34.8	30.7	35.9	35.3	-	-	-	-	-
	I	34.5	14.3	10.5	13.8	12.7	18.2	7.7	7.8	8.7	8.8
	V	49.0	39.7	35.1	33.8	23.4	35.5	23.5	18.6	16.3	13.7
Age of household head	A	58.6	52.4	51.3	38.9	38.3	59.4	53.2	45.5	39.4	36.6
	E	52.4	51.2	47.2	45.1	40.3	-	-	-	-	-
	I	52.7	48.8	41.0	38.6	37.3	55.9	51.4	43.7	41.2	39.8
	V	56.9	52.6	42.7	37.5	36.0	58.9	53.0	43.2	37.9	35.6
% married household heads	A	74.1	89.5	79.9	96.4	98.7	88.6	96.9	98.9	98.9	96.2
	E	38.6	66.9	69.9	62.9	66.9	-	-	-	-	
	I	60.1	85.9	90.8	90.1	93.7	77.8	94.0	92.8	92.4	95.4
	V	60.6	78.5	82.8	87.3	95.3	65.2	79.6	86.1	88.6	93.7
No. of generations	A	1.83	2.48	2.47	2.09	2.01	1.85	2.46	2.50	2.13	2.04
	E	1.81	2.23	2.19	2.13	2.09	-	-	-	-	-
	I	1.57	2.48	2.26	2.13	2.04	1.61	2.52	2.31	2.18	2.07
	V	1.86	2.59	2.37	2.14	2.02	1.76	2.52	2.35	2.20	2.03
No. adults with post-compulsory education	A	1.49	1.78	1.37	1.18	1.04	0.58	0.81	0.61	0.61	0.33
	E	2.71	3.85	2.57	1.79	1.06	-	-	-	-	-
	I	1.14	2.02	1.24	0.81	0.54	0.63	1.27	0.73	0.47	0.33
	V	2.12	3.44	1.93	1.60	1.35	1.34	2.28	1.63	1.38	1.07

Table 4: Economic activity, welfare and household group: base year

Characteristic & country		Non-farm					Farm				
		$R=0$	$0<R<.5$	$.5\leq R<1$	$1\leq R<1.5$	$R\geq1.5$	$R=0$	$0<R<.5$	$.5\leq R<1$	$1\leq R<1.5$	$R\geq1.5$
No. of working men	A	0.64	1.05	0.90	0.88	0.84	1.25	1.70	1.34	1.03	0.77
	E	0.70	1.01	0.84	0.62	0.57	-	-	-	-	-
	I	0.77	1.31	1.03	0.88	0.77	1.00	1.51	1.16	0.96	0.89
	V	1.09	1.67	1.17	0.95	0.88	1.26	1.94	1.44	1.14	0.95
No. of working women	A	0.44	0.70	0.66	0.46	0.37	1.01	1.52	1.24	1.03	0.88
	E	0.67	0.76	0.67	0.69	0.43	-	-	-	-	-
	I	0.65	0.84	0.63	0.50	0.42	0.77	0.93	0.78	0.73	0.72
	V	1.31	1.89	1.34	1.03	0.97	1.31	2.05	1.53	1.20	1.00
No. of working male children	A	-	-	0.01	0.04	0.01	-	0.05	0.13	0.23	0.12
	E	-	0.01	0.00	0.01	0.01	-	-	-	-	-
	I	-	0.01	0.02	0.02	0.04	-	0.03	0.04	0.04	0.05
	V	-	0.04	0.08	0.07	0.06	-	0.19	0.22	0.27	0.37
No. of working female children	A	-	0.00	0.01	0.01	-	-	0.06	0.14	0.26	0.15
	E	-	0.01	0.03	0.01	0.02	-	-	-	-	-
	I	-	0.01	0.02	0.02	0.04	-	0.02	0.02	0.02	0.05
	V	-	0.04	0.10	0.11	0.18	-	0.13	0.23	0.25	0.38
Within-class poverty FGT(0) × 100	A	14.7	22.2	19.2	22.4	29.1	22.8	38.9	39.6	63.8	60.2
	E	32.7	50.7	54.0	60.1	68.3	-	-	-	-	-
	I	14.8	18.6	18.6	17.8	23.0	13.0	19.9	23.6	27.3	25.6
	V	15.7	21.1	31.6	37.8	58.0	46.4	59.9	70.9	76.0	82.7
Within-class poverty FGT(1) × 100	A	9.6	12.3	10.1	12.7	16.9	9.4	16.8	19.7	32.3	31.7
	E	10.8	21.2	24.2	29.5	31.0	-	-	-	-	-
	I	4.1	5.4	5.3	5.4	6.5	3.4	5.0	5.9	8.3	6.5
	V	3.2	5.8	8.0	10.5	16.1	11.8	17.7	22.1	25.2	31.2
Within-class poverty FGT(2) × 100	A	8.1	9.8	7.6	10.0	12.7	5.7	10.6	12.3	21.2	21.1
	E	5.0	11.8	13.4	18.1	17.9	-	-	-	-	-
	I	1.6	2.2	2.0	2.4	2.6	1.3	1.8	2.2	3.5	2.3
	V	1.1	2.2	2.8	3.9	6.5	4.3	7.4	9.1	11.0	14.6

5.2 Regression Analysis

We complement the descriptive analysis by regression analysis. Some of the associations shown in previous sections may be spurious, and it is thus useful to take a look at some of them also conditional on other variables. We start by estimating a probit model of poverty status on a simple set of explanatory variables. These estimates are reported in Table 5.

Table 5: Probit estimates of poverty status (CBN) in first wave
(t-statistics in parenthesis)

	Albania	Ethiopia	Indonesia	Vietnam
Number of men	0.1518	0.0402	0.1022	0.0103
	(3.16)	(1.25)	(3.73)	(0.39)
Number of women	0.2119	-0.0299	0.0746	-0.0272
	(4.16)	(0.84)	(2.20)	(0.97)
Number of children	0.2191	0.2126	0.1211	0.2805
	(6.25)	(7.70)	(6.85)	(15.29)
Ratio of working men	-0.4407	-0.4172	-0.1078	0.0655
	(4.36)	(3.69)	(1.78)	(0.93)
Ratio of working women	-0.3642	-0.1775	-0.0769	0.0560
	(3.78)	(1.43)	(1.43)	(0.73)
Ratio of working children		-1.7300	0.4492	-0.1248
		(1.80)	(2.42)	(1.53)
Age of Household Head	-0.0221	0.0002	0.0025	-0.0115
	(6.28)	(0.05)	(1.33)	(5.90)
Years of education of Household Head	-0.0475	-0.0587	-0.0396	-0.0667
	(3.59)	(5.30)	(4.06)	(8.64)
Ratio of HH members with post-compulsory education	0.1855	-0.3931	-0.7655	-0.4834
	(1.38)	(2.04)	(6.37)	(5.24)
Ratio of HH members with compulsory education		0.5546	-0.1658	-0.2609
		(1.70)	(1.68)	(2.17)
Number of generations living in the household	-0.2040	0.2492	0.0664	0.0002
	(2.42)	(2.62)	(1.34)	0.00
Farm household	0.7101		-0.1310	0.6653
	(7.44)		(2.64)	(13.21)
Constant	0.5150	0.0323	-1.0036	1.0904
	(1.23)	(0.10)	(5.87)	(4.55)
Observations	1,686	1,061	4,873	4,302

Regression includes control for ethnicity, religion and region.

In general we would expect poverty to increase with the number of dependants, and decrease with the number of adult individuals in the household working – i.e.

individuals who bring resources to the households. In order to assess this we include the number of men, women and children present in the household. This in effect controls for household size, and in so far these individuals are *not* working the covariates will be positively associated with poverty. In order to control for the importance of work, we include the ratios of working men to total number of men, the ratio of working women to total number of women, and that of working children to the total number of children. Since these variables reflect the amount of resources brought into the household, they should all be negatively associated with poverty. These predictions are largely reflected in the probit estimates in Table 5. Households with many children are particularly exposed to poverty. Moreover, the higher the ratio of working adults to the total number of adults, the lower is the incidence of poverty. Vietnam represents here an exception in that these ratios have a positive sign (though not significant). This is explained by the very high rates of work participation in Vietnam, which is close to 90 percent for both men and women. Thus, there are very few households that have low work ratios, which are here reflected by the insignificance of the estimates. In contrast, unemployment in Albania and urban Ethiopia is rife, and as a result the covariates reflecting the work ratios distinguish the poor from the non-poor to a much greater extent.

For Ethiopia and Vietnam the child work ratio is negatively associated with poverty, implying that in these countries working children are an important economic resource for the household. The coefficient is particularly strong for Ethiopia, which again reflects that around 40 percent of children are recorded as working in this country (i.e. Table 1). Of course, it is not necessarily the case that child labour should have a negative sign with respect to poverty. It can be the case that households are forced to make their children work if they face extreme poverty. If this is the case, then the child work ratio may in fact be positively associated with poverty. From the simple probit regression in Table 5, this might seem to be the case for Indonesia. In Albania child labour is extremely low in (i.e. Table 1), and the ratio of working children is therefore omitted from the regression

Another very important predictor for poverty is accumulated human capital. Here this is measured by the educational level of the household head (number of years in education), and the ratio of individuals in the household with post-compulsory education, and the ratio of individuals who have obtained compulsory education. All of these covariates are negatively associated with poverty. However, the covariates

reflecting the educational ratios do not distinguish well the poor from the non-poor in Albania. The reason is that the level of individuals completing compulsory education is very high, hence omitted from the regression, and would be highly collinear with the variable reflecting the ratio of individuals with post-compulsory education. But in Albania also the number of individuals that go beyond the 8 years of compulsory education is high. As a result the covariate is collinear with several other covariates – including the number of men and women in the household, and also the educational level of the household head[7]. The positive and insignificant coefficient on the ratio of individuals with compulsory education in Ethiopia suggests that the return to compulsory education is very low compared to the other countries.

The association between the number of generations present in the household and the household poverty status for the four countries is mixed: it is negative in Albania, positive in urban Ethiopia, and insignificant in Indonesia and Vietnam. A possible explanation is that in very poor countries like Ethiopia, intergenerational in-kind transfers still play a major role. Thus the more generations living in one household the more likely these transfers will take place. In contrast, there is less need for such dependencies in Vietnam and Indonesia any longer.

In the three countries where rural samples are included - farmers are always poorer, though in Indonesia the difference between farmers and non-farmers is small. A possible explanation for this is that the great majority of farm households in Indonesia hold a higher share of ownership (average household share of ownership is 92%.), and more efficient and productive than farm units in for instance Vietnam. Though the higher poverty among farmers in Vietnam and Albania are clearly reflected in our probit estimates, it is not for Indonesia: here we see the estimate is negative, though the coefficient is small. Thus farming households in Indonesia, net of education and the other covariates, are less exposed to poverty. However the raw data indicates that poverty is slightly higher among farmers (20%) than non-farmers (17%). The estimation of different specifications (not shown) suggests that poor farmers tend to be less educated and are geographically concentrated.

We examine the pattern of poverty in greater detail by analysing the conditional expectation of the household-specific FGT indicator, $E[\delta_\alpha(y)|x)]$,

---

[7] In order to assess this we estimated a series of regressions for Albania. In the case when poverty status is regressed on the educational ratio only, the effect of accumulated household level of human capital has a negative sign, which is what we would expect.

conditional on the demographic characteristics and economic activity of the household, *x*, using Ordinary Least Squares regression, where FGT(0) refers to the head count measure of poverty and FGT(2) is a measure of the depth of poverty. The results are given in Table 6.

In contrast to the estimates in Table 5, we here control explicitly for *R*, the ratio of children to adults in the household by farm and non-farm households (the indicator for farm household is consequently left out) in the base year, leaving out the indicator for farming. Again we control for ethnicity, religion and regions, though this is not reported in the table.

Most of the results in Table 6 confirm the simpler regression in table 5. We also see that estimates associated with poverty status (i.e. FGT(0)) are similar to the FGT(2) measure, which reflects the depth of poverty. In other words, factors explaining the rate of poverty are also important drivers for the depth of poverty.

Of interest in Table 6 is the role of the child/adult ratio on our two measures of poverty. In general we expect a higher poverty rate the larger the ratio of children to adults. This is indeed the case for Albania, Ethiopia and Vietnam. As the ratio becomes larger, poverty increases more or less monotonically. Such a monotonic increase is less evident when we consider the depth of poverty. For Albania and Vietnam, the depth of poverty does not change dramatically with increasing R, though there is a significant jump from non-farm to farm households. Similarly for the urban Ethiopian sample, the depth of poverty does not increase much with R. The pattern for Indonesia is again quite different from the other countries. In essence there is not much of a gradient in poverty with increasing values of R, and there is not much difference between farm and non-farm households. Moreover, increasing values of R does not seem to have any significant impact on the depth of poverty. The fact that the measure of depth of poverty is much less sensitive to R as compared to the crude measure of poverty indicates that the household composition may have only a small effect on poverty in quantitative terms (i.e. in terms of the extend of poverty). By using a binary measure of poverty we are in fact inflating the measurement of poverty and this may cause the significant results obtained for FGT(0) index.

Basically, for Indonesia, a country which has seen tremendous economic growth, and sharply declining fertility rates, there is not much evidence to suggest a strong relationship between the number of children and poverty.

Table 6: OLS regression of FGT(0) and FGT(2) for first wave
(t-statistics in parenthesis)

	Albania		Ethiopia		Indonesia		Vietnam	
	FGT(0)	FGT(2)	FGT(0)	FGT(2)	FGT(0)	FGT(2)	FGT(0)	FGT(2)
Number of men	0.0603	0.0290	0.0218	0.0106	0.0206	0.0031	0.0156	0.0017
	(4.17)	(3.25)	(1.73)	(2.20)	(2.70)	(2.38)	(1.72)	(0.77)
Number of women	0.0834	0.0183	-0.0026	-0.0011	0.0138	0.0023	0.0085	0.0026
	(5.28)	(1.88)	(0.20)	(0.23)	(1.56)	(1.48)	(0.87)	(1.11)
Number of children	0.0124	-0.0005	0.0515	0.0181	0.0340	0.0059	0.0454	0.0097
	(0.55)	(0.04)	(3.10)	(2.85)	(4.04)	(4.10)	(4.62)	(4.07)
Ratio of working men	-0.1103	-0.0322	-0.1421	-0.0667	-0.0236	-0.0048	0.0150	-0.0115
	(4.04)	(1.91)	(3.82)	(4.70)	(1.69)	(1.98)	(0.70)	(2.20)
Ratio of working women	-0.1090	-0.0560	-0.0664	-0.0242	-0.0142	0.0010	-0.0060	-0.0010
	(4.34)	(3.61)	(1.60)	(1.53)	(1.14)	(0.46)	(0.25)	(0.17)
Ratio of working children			-0.3397	-0.0723	0.1518	0.0158	-0.0582	-0.0207
			(1.97)	(1.10)	(3.06)	(1.84)	(2.26)	(3.31)
Age of HH head	-0.0043	-0.0021	0.0001	-0.0012	0.0004	0.0000	-0.0024	-0.0006
	(4.35)	(3.55)	(0.05)	(2.56)	(0.94)	(0.12)	(3.85)	(3.70)
Years of edu of HH head	-0.0105	-0.0014	-0.0198	-0.0055	-0.0070	-0.0006	-0.0182	-0.0038
	(3.16)	(0.68)	(5.44)	(3.96)	(3.31)	(1.70)	(8.28)	(7.16)
Ratio of HH members - post-compulsory educn.	0.0200	0.0438	-0.1316	-0.0893	-0.1438	-0.0197	-0.1673	-0.0601
	(0.55)	(1.96)	(2.05)	(3.66)	(5.51)	(4.37)	(6.03)	(8.93)
Ratio of HH members - compulsory education			0.1696	0.0086	-0.0548	-0.0085	-0.0853	-0.0488
			(1.61)	(0.22)	(2.41)	(2.18)	(2.36)	(5.56)
Number of generations	-0.0565	-0.0247	0.0690	0.0055	0.0151	0.0019	-0.0246	-0.0052
	(2.50)	(1.76)	(2.16)	(0.45)	(1.15)	(0.85)	(1.49)	(1.30)
Non-farm 0<R<.5	0.0184	0.0110	0.0319	0.0244	-0.0221	-0.0058	0.0414	0.0089
	(0.44)	(0.42)	(0.70)	(1.40)	(0.89)	(1.35)	(1.04)	(0.93)
Non-farm .5£R<1	0.0313	0.0076	0.0357	0.0220	-0.0209	-0.0076	0.0778	0.0055
	(0.57)	(0.22)	(0.58)	(0.93)	(0.78)	(1.64)	(1.81)	(0.53)
Non-farm 1£R<1.5	0.1203	0.0310	0.0952	0.0495	-0.0442	-0.0067	0.1461	0.0214
	(1.72)	(0.72)	(1.20)	(1.64)	(1.36)	(1.20)	(2.94)	(1.77)
Non-farm R ³ 1.5	0.1413	0.0434	0.1477	0.0399	-0.0381	-0.0119	0.2755	0.0286
	(1.43)	(0.71)	(1.51)	(1.07)	(0.91)	(1.66)	(4.58)	(1.96)
Farm R = 0	0.0993	0.0102			-0.0483	-0.0067	0.1857	0.0070
	(2.51)	(0.42)			(2.23)	(1.81)	(6.02)	(0.94)
Farm 0<R<.5	0.1904	0.0373			-0.0722	-0.0158	0.3184	0.0379
	(3.86)	(1.23)			(2.67)	(3.39)	(8.97)	(4.40)
Farm .5£R<1	0.2382	0.0634			-0.0362	-0.0114	0.3627	0.0444
	(3.39)	(1.46)			(1.28)	(2.33)	(9.23)	(4.66)
Farm 1£R<1.5	0.5294	0.1607			-0.0287	-0.0019	0.3906	0.0549
	(6.62)	(3.25)			(0.82)	(0.32)	(8.44)	(4.89)
Farm R ³ 1.5	0.4773	0.1672			-0.0809	-0.0211	0.4060	0.0778
	(4.62)	(2.62)			(1.80)	(2.72)	(7.29)	(5.76)
Constant	0.4693	0.1977	0.4987	0.2613	0.1847	0.0143	0.7639	0.1896
	(4.14)	(2.82)	(4.54)	(6.24)	(4.42)	(1.99)	(10.11)	(10.34)
Observations	1,686	1,686	1,061	1,061	4,873	4,873	4,302	4,302

Regression includes control for ethnicity, religion and region.

We have also undertaken a series of regressions to assess the relationship between household composition on one hand (i.e. the dependent variable) and various economic resource variables, such as educational attainment and human capital accumulation within the household. Here we present a simple poisson regression of the number of children present in the household, in which one of the covariates is the poverty status. One should be aware that this includes any children present in the household, and as such it does not capture children having left the parental home, nor does it distinguish own children from other children living in the household. Consequently the regressions should not be considered as a relationship between fertility and poverty. However, it is of interest to establish to what extent poverty is correlated with the number of children, which normally are considered as dependants. The results are presented in Table 7. The age of the household head is negatively associated with number of children, and this is not unexpected, since this reflects the fact that for older households heads it is more likely that the children have left the parental home. This relationship is also reflected by the variable capturing the number of generations living in the household. Households with more than two generations living are in most cases where grand parents still resides in the household. Despite this, it is still often the case that it is one of the grand parent that is recorded as the household head.

Table 7: Poisson regression of number of children in first wave
 (t-statistics in parenthesis)

	Albania	Ethiopia	Indonesia	Vietnam
Age of household head	-0.0347	-0.0147	-0.0196	-0.0211
	(17.36)	(7.45)	(20.95)	(22.71)
Years of education of household head	-0.0176	0.0154	0.0123	0.0094
	(2.05)	(2.66)	(2.77)	(2.40)
Ratio of HH members with post-compulsory education	0.0606	-0.1933	-0.2424	0.0218
	(0.75)	(1.99)	(4.49)	(0.47)
Ratio of HH members with compulsory education		0.0656	-0.0411	0.2022
		(0.43)	(0.87)	(3.40)
Number of generations	0.6387	0.4087	0.5666	0.4057
	(15.33)	(9.15)	(28.99)	(18.76)
Poverty status	0.2479	0.4083	0.1696	0.4340
	(5.07)	(8.46)	(5.90)	(16.69)
Constant	0.1894	0.4272	0.3056	0.1621
	(0.69)	(2.67)	(4.06)	(1.56)
Observations	1,686	1,061	4,873	4,302

Regression includes control for ethnicity, religion and region.

Table 7 also shows that poverty status is positively associated with the number of children present in the household. Again this is not unexpected since children are largely, though to a varying degree, dependent upon their parents. Though the effects are significant for all four countries, we note again that the magnitude of the effect is lowest for Indonesia, which is consistent with Tables 6 and 7 where the ratio of children to adults was only weakly related to poverty. The relationship between children and education is somewhat mixed. The educational level of the household head is positively related with the number of children in Ethiopia, Indonesia and Vietnam, whereas there is a negative relationship in Albania. This last finding seems interesting with Albania possibly following behaviours similar to those of more developed countries.

6   Demographic change and poverty dynamics

The regressions reported so far have provided information about the association between household composition and poverty at a certain point in time. We now move on and ask the questions: 1) what determines a change in poverty between the two observed waves, and 2) what are the determinants of childbearing between the waves? We investigate the former by estimating a probit model of poverty transitions (i.e. poverty entry and poverty exit). The latter is estimated by a poisson regression where the dependent variable is the recorded number of newborn children to the household head between the waves.

6.1   Changes in demographic structure

Table 8 reports simple descriptive statistics of demographic changes for the four countries, where a change is defined by taking the difference between the number of men, women and children in waves 2 and 1. The same is done for the number of men, women, and children working, and also the number of individuals with post compulsory education. All changes are listed by the child/adult ratio as given in the first wave. One should note that one cannot compare countries directly since the time span between waves is different. In particular we will observe smaller changes for

Albania, which has only a two year gap between waves, and large changes for households in Vietnam, which has a five year gap between waves.

In general we see that households with a high child/adult ratio R in base year, are more likely to experience an increase in the number of men and women, whereas childless households are more likely to experience an increase in the number of children. However, as R increases we also see here that the number of children in most cases declines (this includes non-biological children of the household head).

Overall, it is clear that over time, more children leave the household than children entering, possibly due to lower levels of fertility. Of course an important feature is that as people in the household get older, parents thus give up having children and grown up children leave the household. The number of new births occurring between the waves is of course non-negative. But it is interesting to see that the number of newborns is lower for low values of R. Thus, household, which already have a large number of children, are more likely to have more children between the two waves.

When it comes to changes in the number of working men, working women, and number of working children, the pattern is more mixed. What is clear however is that households with high child/adult ratios are more likely to see an increase in the number of working men and women. This is partly due to the fact that between the observed waves, children become recorded as adults. The statistics also show that the change in the number of working children is declining, which is consistent with figures presented in Table 1.

Table 8: Changes in demographic characteristics and economic activity

Characteristic & country		Non-farm					Farm				
		$R = 0$	$0<R<.5$	$.5≤R<1$	$1≤R<1.5$	$R ≥1.5$	$R = 0$	$0<R<.5$	$.5≤R<1$	$1≤R<1.5$	$R ≥1.5$
Change in number of adult males	A[1]	-0.04	-0.03	0.09	0.10	0.11	-0.11	0.05	0.14	0.06	0.12
	E[2]	-0.19	-0.19	-0.03	0.23	0.39	-	-	-	-	-
	I[3]	-0.08	-0.30	0.07	0.24	0.38	-0.17	-0.31	0.01	0.21	0.31
	V[4]	-0.33	-0.32	0.05	0.27	0.38	-0.40	-0.47	-0.07	0.22	0.37
Change in number of adult females	A[1]	-0.05	-0.07	0.01	0.11	0.23	-0.06	-0.08	0.04	0.17	0.15
	E[2]	-0.16	-0.02	0.13	0.18	0.45	-	-	-	-	-
	I[3]	-0.03	-0.19	0.07	0.24	0.42	-0.03	-0.18	0.04	0.23	0.24
	V[4]	-0.39	-0.64	-0.13	0.12	0.51	-0.43	-0.78	-0.34	-0.02	0.35
Change in number of children	A[1]	0.11	-0.14	-0.31	-0.16	-0.24	0.06	-0.22	-0.33	-0.23	-0.15
	E[2]	0.26	-0.16	-0.36	-0.58	-0.72	-	-	-	-	-
	I[3]	0.35	-0.17	-0.25	-0.42	-0.67	0.34	-0.23	-0.26	-0.50	-0.67
	V[4]	0.39	-0.56	-0.41	-0.52	-0.81	0.45	-0.36	-0.48	-0.55	-0.79
New births	A[1]	0.03	0.02	0.04	0.08	0.07	0.01	0	0.08	0.11	0.04
	E[2]	0.06	0.05	0.09	0.10	0.17	-	-	-	-	-
	I[3]	0.24	0.35	0.38	0.28	0.33	0.21	0.30	0.36	0.34	0.37
	V[4]	0.08	0.09	0.32	0.21	0.23	0.16	0.17	0.38	0.33	0.34
Change in number of working adult males	A[1]	0.04	-0.04	0.06	0.01	0.01	-0.23	-0.20	-0.06	-0.01	0.06
	E[2]	-0.01	0.01	-0.04	0.01	0.05	-	-	-	-	-
	I[3]	0.08	-0.07	0.09	0.14	0.20	-0.05	-0.22	0.00	0.09	0.12
	V[4]	-0.14	-0.20	0.00	0.09	0.18	-0.28	-0.35	-0.02	0.17	0.36
Change in number of working adult females	A[1]	0.03	0.01	-0.05	0.06	0.13	-0.25	-0.26	-0.01	-0.05	0.08
	E[2]	0.12	0.08	0.10	0.02	0.18	-	-	-	-	-
	I[3]	-0.02	-0.08	0.00	0.11	0.13	-0.19	-0.20	-0.21	-0.19	-0.13
	V[4]	-0.14	-0.33	-0.14	0.08	0.26	-0.11	-0.42	-0.04	0.14	0.42
Change in number of working children	A[1]	-	-	-	-	-	-	-	-	-	-
	E[2]	0.01	0.02	0.05	0.09	0.04					
	I[3]	0.00	-0.01	-0.02	-0.04	-0.06	0.00	-0.04	-0.04	-0.04	-0.05
	V[4]	0.00	-0.07	-0.12	-0.07	0.09	0.01	-0.25	-0.26	-0.16	-0.10
Change in number of adults with post-compulsory education	A[1]	-	-	-	-	-	-	-	-	-	-
	E[2]	-0.24	-0.30	0.07	0.20	0.48	-	-	-	-	-
	I[3]	-0.02	-0.11	0.25	0.47	0.57	0.00	-0.01	0.16	0.37	0.44
	V[4]	-0.31	-0.35	0.27	0.43	0.75	-0.17	-0.33	0.13	0.43	0.70

[1] Period of change ≈ 2 years; [2] period of change ≈ 3 years; [3] period of change ≈ 4 years; [4] Period of change ≈ 5 years;

In the regression analysis we focus on the determinants of childbearing. The dependent variable is here the number of new children born to the household head. Clearly, the identity of the household head may change between waves. This is a problem if a son or a daughter of the household head in the first wave, becomes the new household head in the second wave. However, there are not many of these households, and in the regression presented below such households are omitted.

Table 9 presents the results. The covariates measuring the number of men, women and children in combination with the work ratios for these groups, reflect the economic resources available to the household. A high number of dependants (independent of whether they are adult men and women, or children) are associated with a lower level of household resources. The work ratios should have the opposite impact, since a high work ratio reflects a higher income stream to the household. There are however, mixed results for the four countries. The most consistent result concerns the work ratio for adult men. This is positive and significant in all countries, and is consistent with our expectations: men's labour earnings can be seen as an income effect, and the higher the income, the more likely child bearing takes place between waves. For women the estimates are less well defined, and may reflect a higher opportunity cost of having children among those women who work. In Indonesia, this effect is negative and significant at the 10 percent level. The ratio of working children is an important determinant in Indonesia, and especially in Vietnam.

In both cases the effect is negative, implying that households with a large number of children working are considerably less likely to have further children between waves. However, it is somewhat difficult to make a clear interpretation of this result. There are two important effects at work her. First, a high ratio of working children is likely to be a reflection of the age of the children currently present in the household. Older children are more likely to work than younger ones, and household heads with older children are less likely to have more children. Secondly, the ratio of working children may reflect the cost of having further children in that older children may be less likely to care for younger siblings if they work.

The role of human capital accumulation (i.e. education) on childbearing is also mixed. In Indonesia and Vietnam household heads with high level of education is less likely to have children. However, when looking at the ratio of household members with post-compulsory or compulsory education, the two countries differ. In Vietnam the effect is insignificant, whereas it is positive and significant for Indonesia.

Certainly it is possible that educational attainment of household head and other members have different impact on number of children in a household. The result can be understood as the difference between magnitude of income effect and substitution effect of education in the production of child good across countries.

We next consider the role of poverty. If the conjecture that poor households tends to have more children, we should here observe a strong and significant effect. However, the effect is quite different for the four countries. Surprising perhaps, we find that poverty is not associated with childbearing in Ethiopia. It is however important to bear in mind that here we have only included the urban sample, and as we know fertility in urban areas of Ethiopia is generally low, and in Addis Ababa, which represents around two thirds of the sample, TFR is below replacement. In Vietnam we find a positive and significant effect, though the magnitude of the coefficient is not huge. In Albania we also find a positive effect, but it is not significant, whereas in Indonesia the relationship is negative, though insignificant.

Table 9: Poisson regression of number of newborn children between waves (t-statistics in parenthesis)

	Albania	Ethiopia	Indonesia	Vietnam
Number of men	-0.0705	-0.0876	0.0262	-0.1204
	(0.21)	(0.65)	(0.68)	(2.13)
Number of women	-0.7272	-0.1929	0.0335	-0.2523
	(1.83)	(1.34)	(0.75)	(3.90)
Number of children	1.1007	0.3087	-0.3251	-0.4354
	(1.08)	(0.78)	(3.50)	(4.64)
Number of children - squared	-0.1834	-0.0085	0.0464	0.0558
	(1.00)	(0.20)	(4.15)	(6.59)
Ratio of working men	0.9287	0.9107	0.2373	0.7035
	(2.07)	(3.02)	(3.24)	(5.20)
Ratio of working women	0.1188	-0.1324	-0.1138	0.0371
	(0.36)	(0.42)	(1.83)	(0.32)
Ratio of working children		0.7792	-0.6008	-1.3426
		(0.86)	(1.85)	(7.13)
Age of HH head	-0.1742	-0.0584	-0.0275	-0.0441
	(8.56)	(4.63)	(11.37)	(13.23)
Years of education of HH	0.0116	0.0427	-0.0388	-0.0298
	(0.17)	(1.27)	(3.75)	(2.48)
Ratio of HH members with post-compulsory education	-0.1873	-1.1378	0.4573	-0.1626
	(0.36)	(2.29)	(3.60)	(1.23)
Ratio of HH members with compulsory education		0.0570	0.2615	-0.1461
		(0.09)	(2.39)	(0.91)
Number of generations	0.2254	0.0106	0.3263	0.2253
	(0.46)	(0.04)	(4.95)	(2.42)
Poverty status	0.5374	-0.0675	-0.1026	0.1603
	(1.70)	(0.26)	(1.41)	(2.16)
Non-farm 0<R<.5	-1.4163	-0.1752	0.2475	0.5402
	(1.35)	(0.31)	(1.74)	(1.75)
Non-farm .5≤R<1	-2.1827	-0.6292	0.3176	0.9698
	(1.85)	(0.80)	(1.91)	(3.58)
Non-farm 1≤R<1.5	-2.4059	-1.1376	0.0626	0.5260
	(1.60)	(1.25)	(0.30)	(1.65)
Non-farm R ³ 1.5	-2.5970	-1.1573	0.3158	0.4994
	(1.47)	(1.08)	(1.25)	(1.33)
Farm R = 0	-1.8208		-0.0245	0.4201
	(1.66)		(0.20)	(1.82)
Farm 0<R<.5	-15.1503		0.1728	0.8746
	(0.02)		(1.11)	(3.41)
Farm .5≤R<1	-2.0792		0.3138	0.9950
	(1.65)		(1.82)	(3.82)
Farm 1≤R<1.5	-2.5205		0.3412	0.8361
	(1.60)		(1.56)	(2.79)
Farm R ³ 1.5	-3.6826		0.4831	0.8844
	(1.92)		(1.83)	(2.50)
Constant	4.1807	-0.0903	-0.5111	-0.0611
	(3.31)	(0.10)	(2.42)	(0.15)

Observations	1,686	1,061	4,873	4,302

Regression includes control for ethnicity, religion and region.

6.2   Changes in welfare outcomes

We now change the focus onto the determinants of changes in welfare outcomes. We start by presenting simple descriptive statistics of key variables where the change is defined as the difference between waves 2 and 1. These statistics are presented in Table 10.

We consider the hazard rates first (first four columns Table 10), and see large differences both within and between countries. The most noticeable feature is the large entry rate present in Ethiopia. This is of course a result of the fact that poverty has remained high in Ethiopia during the nineties. In the other countries the poverty entry rate is considerably lower. In Albania and Indonesia this is caused by lower poverty rates in general, and in Vietnam poverty declined substantially over the observed period. These patterns are also evident when we look at the exit rates. In Albania and Vietnam exit rates are particularly high, implying that households entering poverty, on average do not remain poor for long. The pattern is somewhat different in Indonesia in that the exit rate is not so much higher than the entry rate, implying that households entering poverty remain poor longer than in the Vietnam and Albania. Interestingly there is not much difference between farm-and non-farm households either, which again is in contrast to Albania and Vietnam. Table 10 shows that the poverty situation in Ethiopia is particularly bad. In fact, for high levels of child/adult ratios we see that the exit rate is in fact lower than the entry rate, implying that any entry into poverty tend be associated with a prolonged stay in poverty.

The next three variables measure the total change in poverty over the period. Ethiopia stands out, and by any measure the data suggests that poverty has increased over the period. For the other countries we know that poverty has declined (though only modestly so for Indonesia), but we can see a difference between farm and non-farm households: poverty among farm households has declined at a slower rate compared to non-farm households. The difference is only small for Indonesia, but here we need to take into account that poverty was quite low at the outset.

Table 10: Changes in welfare outcomes
(t-statistics in parenthesis)

Characteristic & country		Non-farm					Farm				
		$R = 0$	$0<R<.5$	$.5≤R<1$	$1≤R<1.5$	$R ≥1.5$	$R = 0$	$0<R<.5$	$.5≤R<1$	$1≤R<1.5$	$R ≥1.5$
Hazard rate into poverty (%)	A [1]	5.5	6.1	11.0	11.9	8.1	13.6	24.0	16.0	24.8	22.3
	E [2]	24.9	34.1	26.6	33.8	43.6	-	-	-	-	-
	I [3]	8.6	5.4	6.3	5.6	9.5	9.8	12.6	11.9	9.2	12.6
	V [4]	4.9	2.6	5.9	3.9	2.7	16.9	15.9	19.9	16.3	9.6
Hazard rate out of poverty (%)	A [1]	76.7	81.7	74.7	80.4	85.9	52.7	45.2	54.7	23.9	44.1
	E [2]	36.6	24.1	18.9	21.3	22.8	-	-	-	-	-
	I [3]	9.6	11.4	11.9	10.7	12.4	9.0	12.6	12.9	18.1	15.3
	V [4]	70.2	75.9	58.1	64.3	57.3	55.9	56.3	43.7	46.4	36.5
% change in measured volume of poverty: FGT(0) × 100	A [1]	-39.8	-51.9	-30.8	-36.4	-56.0	8.1	-7.5	-10.1	-6.5	-14.7
	E [2]	8.0	11.2	5.3	5.8	2.4	-	-	-	-	-
	I [3]	-8.7	-28.2	-22.1	-32.6	-12.7	28.9	19.4	-7.7	-31.7	-4.7
	V [4]	-36.7	-63.8	-40.3	-53.5	-49.2	-23.0	-38.3	-31.5	-38.1	-30.8
% change in measured volume of poverty: FGT(1) × 100	A [1]	-57.2	-46.8	-35.6	-47.3	-74.4	23.4	9.6	26.8	19.8	7.0
	E [2]	29.7	17.9	3.1	0.5	17.2	-	-	-	-	-
	I [3]	-11.6	-42.0	-36.7	-47.7	-20.3	25.6	40.3	-10.4	-41.7	0.2
	V [4]	-45.4	-66.1	-51.1	-61.5	-62.6	-24.9	-53.7	-45.59	-49.7	-48.6
% change in measured volume of poverty: FGT(2) × 100	A [1]	-66.5	-55.1	-46.3	-50.4	-77.0	9.0	17.9	64.0	47.4	27.7
	E [2]	58.4	23.8	8.0	-2.2	29.7	-	-	-	-	-
	I [3]	-14.2	-53.4	-36.7	-57.4	-21.7	29.5	57.4	-14.5	-47.4	5.3
	V [4]	-54.5	-69.9	-56.9	-61.2	-71.2	-22.7	-63.5	-53.2	-54.7	-56.3

[1] Period of change ≈ 2 years; [2] period of change ≈ 3 years; [3] period of change ≈ 4 years; [4] period of change ≈ 5 years.

6.3   Regressions analysis

We investigate the determinants of these changes by estimating probit regressions of entry into poverty and exit rate out of poverty. 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, defined as $|y_0 - \tau|/\tau$. 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. The covariates include changes in demographic characteristics and demographic and economic status of the base year. The results are given in Table 11.

We start by considering the role of the number of men, women and children present in the household in the first wave, and the work ratio of these three groups (i.e. the estimates associated with the first six variables). The estimates suggest that households with many children in Indonesia and Vietnam have a higher rate of poverty entry as well as poverty exit, that households with many children in urban Ethiopia has lower exit rate. As for the work ratio variables we less of an impact. For instance, the ratio of working children does not have a significant relationship to poverty entry and exit, whereas the work ratio of men has a negative impact on poverty entry in Albania and Ethiopia. Overall however, none of the household characteristics in the first wave has a large impact on the transition rates.

Moving onto considering the impact of changes in these variables (measured by difference in those household composition variables between waves), we see much more pronounced effects. The most consistent impact comes from an increase in the number of children present in the household, which increases the entry rate and decreases the exit rate. In contrast, any change in the number of working children, does not have much effect on the transition rates. There is also a significant effect of an increase in the number of women entering the household. In particular we see that this has a positive impact on the entry rate and negative effect on the exit rate in Indonesia. A change in the number of working women has the opposite effect, as we would expect.

For Vietnam we get some non-intuitive estimates: an increase in the number of working men increases the entry rate into poverty and decreases the exit rate. 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.

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 for the educational ratio variables. The ore individuals with post-compulsory education in the household, the lower are the transition into poverty and higher id the exit rate. Interestingly these variables do not have huge impacts in urban Ethiopia.

Finally we consider the impact of being a farm household and the child/adult ratio on poverty transitions. For both Albania and Vietnam we see that farm households have a slightly higher entry rate, and a considerably lower exit rate compared to non-farm households, whereas in Indonesia the difference is not noticeable. The estimates referring to the different child/adult ratios does not show a sharp gradient, though there is some indication that those households with high child/adult ratios are more likely ot enter poverty and less likely to escape poverty.

Table 11: 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
Distance from poverty line	0.0000	-0.0012	-0.0001	-0.0066	-0.0003	-0.0040	-0.0004	-0.0092
	(2.39)	(1.31)	(1.53)	(7.11)	(7.98)	(4.22)	(4.72)	(12.86)
Number of men	0.0114	-0.0223	-0.0048	-0.0191	0.0024	-0.0480	0.0027	-0.0486
	(1.15)	(0.49)	(0.25)	(1.04)	(0.41)	(1.90)	(0.43)	(2.43)
Number of women	-0.0103	-0.0821	-0.0411	0.0021	0.0037	-0.0648	0.0142	-0.0269
	(0.86)	(1.93)	(2.01)	(0.11)	(0.54)	(2.05)	(2.05)	(1.23)
Number of children	0.0132	-0.0871	0.0437	-0.0532	0.0197	-0.0648	0.0183	-0.1137
	(0.84)	(1.61)	(1.66)	(2.45)	(3.22)	(2.62)	(2.32)	(6.10)
Ratio of working men	-0.0496	0.0156	-0.1413	0.0648	-0.0131	-0.0493	0.0219	0.0403
	(2.45)	(0.16)	(2.54)	(1.16)	(1.15)	(0.94)	(1.45)	(0.92)
Ratio of working women	0.0001	-0.0150	-0.0386	0.0217	-0.0064	0.0619	-0.0001	-0.1691
	0.00	(0.15)	(0.65)	(0.36)	(0.62)	(1.29)	(0.01)	(3.25)
Ratio of working children			-0.6355	-0.2353	0.0198	0.0967	-0.0216	-0.0246
			(1.52)	(0.26)	(0.38)	(0.51)	(0.87)	(0.41)
Change in #men	0.0477	-0.0539	0.0077	-0.0647	0.0147	-0.0609	-0.0086	0.0006
	(3.47)	(0.84)	(0.27)	(2.36)	(2.25)	(2.10)	(1.02)	(0.03)
Change in #working men	-0.0570	0.1786	-0.0510	0.0538	0.0000	-0.0174	0.0263	-0.0524
	(4.42)	(3.29)	(1.11)	(1.21)	0.00	(0.53)	(3.03)	(2.15)
Change in #women	0.0104	0.0048	0.0654	-0.0027	0.0240	-0.0966	0.0148	0.0157
	(0.72)	(0.07)	(2.42)	(0.11)	(4.24)	(3.43)	(2.19)	(0.73)
Change in #working women	-0.0233	0.0119	-0.0418	-0.0743	-0.0074	0.0489	0.0128	-0.0820
	(1.87)	(0.26)	(1.08)	(1.58)	(1.29)	(1.90)	(1.73)	(3.49)
Change in #children	0.0287	0.0628	0.0878	-0.0552	0.0296	-0.1311	0.0408	-0.1729
	(2.49)	(1.26)	(3.41)	(2.15)	(7.57)	(6.59)	(8.63)	(12.25)
Change in #working children			-0.1229	-0.0025	0.0009	0.0505	-0.0022	-0.0134
			(1.28)	(0.03)	(0.04)	(0.49)	(0.20)	(0.69)
Age of HH head	-0.0018	0.0000	0.0001	0.0018	0.0004	-0.0041	-0.0006	-0.0003
	(2.64)	0.00	(0.07)	(1.08)	(1.22)	(2.77)	(1.64)	(0.26)
Years of edu of HHH	-0.0017	0.0246	-0.0197	0.0088	-0.0050	0.0186	-0.0051	0.0091
	(0.73)	(2.03)	(3.74)	(1.67)	(3.20)	(2.31)	(3.32)	(1.88)
Ratio of HH members with post-compulsory education	-0.0621 (2.50)	0.0543 (0.48)	0.0097 (0.11)	0.1344 (1.48)	-0.0450 (2.39)	0.1473 (1.47)	-0.0347 (1.93)	0.2101 (4.03)
Ratio of HH members with compulsory education			0.0570 (0.33)	-0.0352 (0.28)	-0.0077 (0.48)	0.0807 (1.01)	-0.0221 (0.96)	0.2339 (3.66)
Number of generations	0.0005	0.1042	0.0146	-0.0008	0.0270	0.0442	-0.0188	0.0126
	(0.03)	(1.34)	(0.32)	(0.02)	(2.97)	(1.10)	(1.80)	(0.41)
Non-farm 0<R<.5	-0.0265	0.0326	0.1541	0.0963	-0.0433	-0.1065	-0.0089	0.0409
	(0.98)	(0.22)	(2.29)	(1.34)	(3.05)	(1.18)	(0.34)	(0.34)
Non-farm .5≤R<1	0.0040	-0.0407	0.0285	0.0812	-0.0384	-0.0417	0.0198	-0.1309
	(0.10)	(0.23)	(0.32)	(0.84)	(2.42)	(0.45)	(0.65)	(1.19)
Non-farm 1R<1.5	-0.0106	0.0025	0.0806	0.1230	-0.0498	-0.0982	0.0091	-0.0106
	(0.23)	(0.01)	(0.64)	(1.00)	(2.92)	(0.85)	(0.26)	(0.09)
Non-farm R ≥ 1.5	-0.0329	0.1975	0.0867	0.2675	-0.0360	-0.1916	-0.0112	-0.0178
	(0.62)	(0.75)	(0.55)	(1.60)	(1.57)	(1.37)	(0.27)	(0.14)

Farm R ≥ 0	0.0404	-0.1839			-0.0068	-0.0383	0.0627	-0.1365
	(1.39)	(1.33)			(0.48)	(0.47)	(2.67)	(1.57)
Farm 0<R<.5	0.0726	-0.2006			-0.0120	-0.0797	0.0874	-0.0809
	(1.75)	(1.34)			(0.70)	(0.86)	(2.62)	(0.86)
Farm .5≤R<1	0.0138	-0.1288			-0.0117	-0.1270	0.0918	-0.1489
	(0.27)	(0.64)			(0.64)	(1.31)	(2.43)	(1.51)
Farm 1≤R<1.5	0.0709	-0.4604			-0.0397	-0.0434	0.0413	-0.0723
	(0.97)	(2.18)			(2.13)	(0.39)	(1.05)	(0.66)
Farm R ≥ 1.5	0.0613	-0.1515			-0.0342	-0.0808	-0.0076	-0.0657
	(0.67)	(0.55)			(1.41)	(0.55)	(0.21)	(0.54)
Observations	1,286	400	566	495	3,994	879	1,890	2,412

Regression includes control for ethnicity, religion and region.

7   Conclusions

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. All of the countries have experienced rather dramatic economic and political changes over the last decades, though of varying success. The existence of longitudinal information at household level for these countries facilitates highly interesting case studies, in which poverty dynamics can be studied in conjunction with household dynamics. As such this study goes further than the long array of past studies considering this issue.

This paper presents a descriptive analysis of the relationship between household composition and fertility, on one hand, and poverty, and changes thereof, on the other hand. The analysis suggests that these relationships are not uniform across the four countries. We find that for Ethiopia, by far the poorest country of the four, most of the results are consistent with economic development theory. Of particular interest is the role of children in Ethiopia. The number of children, and changes thereof, is positively associated with poverty, whereas the number of children *working* plays an important role in alleviating poverty. This reflects a common perception of childbearing patterns in very poor countries: children are considered to be an important economic resource for the

household. As a result there is a clear incentive for the household head to increase the number of children present[8].

The role of child labour is very different for the other countries. In Albania child labour is pretty much non-existent and school enrolment remains very high, despite the recent crisis in the educational system during the nineties. Also in Vietnam and Indonesia school enrolment has increased, and child labour is low and declining. These patterns are reflected in our analysis, and there is little evidence to suggest that households in these two countries choose to have many children as a means to boost available household resources. If anything, the trend seems to be the opposite. In Indonesia child labour seems to be important only for very poor households, and as such is possibly considered as a "last resort" considered as a means to avoid extreme poverty. The changing role of children in Vietnam and Indonesia are also related to important structural shifts in the economy at large. In Indonesia in particular, the urban population has increased quite dramatically over the last decades, implying decreasing numbers of households being involved in labour intensive farming. Hence, the strong economic growth in Indonesia has brought about important structural changes, with obvious implications for the role of children. However, it is interesting to see that poverty among farmers in Indonesia is not much different to poverty levels of non-farming households. Though economic growth has also been strong in Vietnam, it is clear the country lags behind Indonesia significantly, and there is not a similar level of urban migration as we have seen in Indonesia, implying a continued importance of farming. In Vietnam, however, there is a much larger difference between farmers and non-farmers in terms of poverty, and the reduction in poverty during the nineties has certainly benefited the non-farming sector more.

From all the regressions we have undertaken (together with many regressions not included in this paper), only a handful of variables show consistent signs and significant effects across all four countries. The most consistent finding across countries relates to the number of children. In the static perspective it is always the case that households with many children are poorer. Moreover, additional children are consistently associated with an increase in poverty, either in terms of increased entry rate into poverty or decreased exit rates. Of course, part of this may be explained by the fact that we have been using per capita expenditures to define poverty status. Future work requires therefore similar

---

[8] Unfortunately we have so far only been able to analyse the urban sample of Ethiopia. The rural sample is

analysis, but with alternative measures of poverty. One approach concerns estimation of equivalent scales using Engel coefficient as in Lanjouw and Ravallion (1995). Another approach concerns alternative measures of poverty all together, where deprivation indices are used instead of consumption expenditure. This overcomes to some extent the problems associated with using equivalence scales. The other consistent finding relates to education. In particular we find that the educational level of the household head is almost always negatively associated with poverty. Often, but certainly not always, do we find accumulation of educational levels of household members to have a similar effect. Admittedly, the definition of accumulated education among household members is not a perfect measure. This is particularly the case for Albania, where the majority completes compulsory education, and a large proportion goes on to post-compulsory education. As a result, this variable does not distinguish well poor households from non-poor households.

A crucial element of our analysis involves of course an investigation of the determinants of childbearing. Also here our analysis showed heterogeneity between the four countries. Educational attainment does not always have the same effect, though it clearly plays an important role. We also find that poverty is important, though the effect differs between countries. In Albania and Vietnam we find some evidence from our dynamic analysis to suggest that poor households choose to have more children, whereas in Indonesia it is not significant, and if anything, very poor individuals choose to have fewer children. Unfortunately we were not able to include the rural sample of Ethiopia in our analysis in this round, but clearly it will be of great interest to see what patterns emerge from this sample.

The effect of other variables is found to vary across the countries examined. Admittedly, the four countries differ tremendously in geographical location, cultural background, political history, and economic development, and the fact that only a few variables show a common pattern in terms of the poverty-fertility relationship, suggests caution in terms of making general conclusions.

Furthermore, though longitudinal analysis of poverty and its relationship to fertility is novel, it is nevertheless crucially important to be aware that the present study is only descriptive. All regression results will necessarily reveal correlations, rather than

---

under preparation, and will bring an invaluable source of information for the further analysis

causal effects. Obviously this invokes restrictions in terms of what conclusions can be made in terms of policy advice.[9].

References

Aassve, A., Burgess, S. and C. Propper (2003a) Modelling poverty transitions as the outcome of employment, family unions, and childbearing decisions in the United Kingdom, Department of Economics, University of Leicester, *mimeo*.

Aassve, A., Mazzuco, S., Mencarini, L. (2005), Childbearing and wellbeing: A comparative Analysis of Welfare Regimes in Europe, *Journal of European Social Policy*, vol.15, n.3, 2005.

Bane, M. J. and D. Ellwood (1986). Slipping into and out of Poverty: The Dynamics of Spells. *Journal of Human Resources* 21:1-23.

Baulch, B. and Hoddinott, J. (Eds.) (2000) Economic mobility and poverty dynamics in developing countries, *Journal of Development Studies*, Vol 36(6).

Betti, G. (2003). *Poverty and Inequality Mapping in Albania: Final Report*, Washington, DC and Tirana, World Bank and INSTAT (mimeo).

Bigsten, A., B. Kebede, and A. Shimeles, (2003), "Growth and Poverty Reduction in Ethiopia: Evidence from household Panel Surveys", *World Development*, **31**(1): 87 − 106.

Birdsall, N. M. and C. C. Griffin (1988) Fertility and Poverty in Developing Countries, *Journal of Policy Modeling*, Vol. 10(1), 29-55.

Birdsall, N.A.C. Kelley and S. W. Sinding (2001) Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World, Oxford University Press, Oxford, Part III. Fertility, Poverty, and the Family.

Carletto, G., B. Devis, M. Stampini, Trento S. and Zezza A. (2004), "Internal Mobility and International Migration in Albania", ESA Working Paper No. 03-13, Agriculture and Development Economics Division, FAO

Cerioli, A. and S. Zani, (1990), "A fuzzy approach to the measurement of poverty", In C. Dagum and M. Zenga (eds), Income and Wealth Distribution, Inequality and Poverty, Studies in Contemporary Economics, Springer Verlag, Berlin.

Cheli, B. and G. Betti, (1999) Fuzzy analysis of poverty dynamics on an Italian pseudo panel 1984 − 1994, *Metron* 57:83-103.

Dercon, s. (2004) Growth and Shocks: evidence from Rural Ethiopia, *Journal of Development Economics*, vol 74 (2): 309-29.Dercon, S. and P. Krishnan (2000) Vulnerability, Seasonality and Poverty in Ethiopia, *Journal of Development Studies*, Vol.:36(6).

---

[9] The priority for our study is therefore to develop and apply statistical techniques that can be used to inform us about such causal relationships. We have two approaches in mind. The first concerns the application of matching techniques, whereas the second concerns structural modelling of fertility choice and consumption expenditure, from which poverty is derive. These two avenues of research are underway.

Falaris, E.M. (2003) The effect of survey attrition in longitudinal surveys: evidence from Peru, Côte d'Ivoire and Vietnam, *Journal of Development Economics*, 70:133-157.

Foster, James, Greer, Joel and Thorbecke, Erik, (1984) "A Class of Decomposable Poverty Measures," *Econometrica*, Econometric Society, vol. 52(3), 761-66.

Glewwe, P., M. Gragnolati, and H. Zaman, (2001), "Who gained from Vietnam's boom in the 1990s? An analysis of poverty and inequality trends, World Bank working paper.

Huff Stevens, A. (1999). Climbing out of poverty, falling back in: measuring the persistence of poverty over multiple spells. *Journal of Human Resources* 34(3):557-588.

INSTAT, 2002. The Population of Albania in (2001): Main Results of the Population and Housing Census. Tirana, INSTAT.

Jalan, J. and M. Ravallion, (2000), Is transient poverty different? Evidence for rural China, *Journal of Development Studies*, Vol.: 36(6)

Jenkins, S (2000) Modelling Household Income Dynamics. *Journal of Population Economics* 13 (4).

Justino, P. and J. Litchfield, (2003), "Welfare in Vietnam during the 1990s: Poverty, Inequality and Poverty Dynamics, PRUS Working paper No. 8.

Kedir, A. and A. McKay (2004) Chronic Poverty in Urban Ethiopia: Panel Data , Evidence, mimeo, University of Leicester, UK.

Kinfu, Y. (2000) Below-Replacement Fertility in Tropical Africa? Some Evidence from Addis Ababa, Journal of Population Research, 17(1): 63-82.

Lanjouw, P. and M. Ravallion, (1995), "Poverty and Household Size", *The Economic Journal*, **105**(433): 1415 – 1434.

Lillard, L., (1993), Simultaneous Equations for Hazards, *Journal of Econometrics*, Vol:56 (189 – 217).

Lindstrom, D. and B. Berhanu, (1999), "The impact of war, famine, and economic decline on marital fertility in Ethiopia, *Demography*, **36**(2):247 - 261

Lipton, M. (1998), *Successes in Anti Poverty*, International Labor Organization, Geneva.

Livi-Bacci, M. and G. de Santis (1998) Population and Poverty in the Developing World, Clarendon Press, Oxford.

Mcculloch, N. and Baulch, B., (2000), Stimulating the impact of policy upon chronic and transitory poverty in rural Pakistan, *Journal of Development Studies*, Vol.: 36(6)

McNicoll, G. 1997. "Population and poverty: A review and restatement." Policy Research Division Working Paper No. 105. New York: Population Council.

Mencarini, L (1999), "An Analysis of Fertility and Infant Mortality in South Africa based on 1993 LSDS data", in *Pre-conference proceedings of Third African Population Conference, African Population in the 21st Century, Durban, Sudafrica il 6-10 Dicembre 1999,* UAPS, Dakar, Senegal, 1999, pp.109-128.

Muffels RJA (2000) "Dynamics of poverty and determinants of poverty transitions: results from the Dutch socioeconomic panel" in Rose D. (ed.), *Researching social*

and economic change. The use of household panel studies, Routledge, London and New York.

Panis, C. and Lillard, L. (1995) "Child mortality in Malaysia: Explaining Ethnic Differences and the recent decline", Population Studies, 49:463 – 478.

Ravallion M. (1996), Issues in measuring and modelling poverty, *The Economic Journal,* v.106, n.438, 1328-1343.

Ravallion, M. and Bidani, B. (1994) "How Robust Is a Poverty Profile?", *World Bank Economic Review*, Oxford University Press, vol. 8(1), 75-102.

Rose D. (ed.). *Researching social and economic change. The use of household panel studies,* Routledge, New York.

Rosenbaum, Paul T. and Donald B. Rubin (1983) The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, 70(1): 41-55.

Schoumaker, B and D. Tabutin, (1999), Relationship between poverty and fertility in Southern countries. Knowledge, methodology and cases, WP.2, Dept of science of population and development, Université catholique de Louvain.

Sibanda, A. Z. Woubalem, D. P. Hogan, and D. P. Lindstrom, (2003), "The proximate determinants of the decline to below-replacement fertility in Addis Ababa, Ethiopia, *Studies in Family Planning*, **34**(1):1 – 7.

Strauss, J., Beegle, K., Dwiyanto, A., Herawati, Y., Pattinasarany, D., Satriawan, E., Sikoki, B., and Witoelar , F. (2004). *Indonesian Living Standards Before and After the Financial Crisis: Evidence from the Indonesia Family Life Survey*, RAND Corporation, Santa Monica, U.S.A.

Uruçi E. and Gedeshi, I. (2003). Remittances management in Albania, Working Papers 5/2003,CeSPI, Rome.

UNDP (2003) Human Development Report 2003 Millennium Development Goals: A compact among nations to end human poverty

United States National Research Council. (1986) Rapid Population Growth and Economic Development: Policy Questions. Washington DC: National Academy Press.

World Bank (2003). "Albania: Poverty Assessment", Report No. 26213-AL, Washington, DC

**APPENDIX: Data quality assessment**

There are always serious concerns about data quality and the four surveys vary considerably in this respect. For example, although they all include information on household composition that can be used to track birth events, the Ethiopian survey does not have separate fertility histories. Another issue concerns the reporting of the timing of childbearing events. For the Ethiopian sample fertility events have to be constructed on the basis of the reported age of the children (and the age of the mother). In the other surveys, date of births are given, though it is clear that when asked for the month of the birth a substantial fraction of the sample is unable to provide reliable answers. All four surveys give some reason for concern over reported ages and year of births.

Many respondents are unable to report their year of birth but are able to give their age. However, the distributions of reported age suggest some measurement error, in the form of 'heaping': age is often reported only to the nearest five years. The four panels of Figure A1 give an indication of the varying degrees of age misreporting (for household heads at wave 1) in the four countries. It is apparent that high degrees of misreporting are particularly evident in Ethiopia, which has a relatively weak system of birth registration, and in Indonesia.

One of the advantages of longitudinal surveys is that they give an opportunity to assess the accuracy of responses, by comparing answers to questions which are repeated across waves and which should, in principle, generate the same answer. Date of birth is a critical example. The question on year of birth is not repeated in the Ethiopian survey but Table A1 reports the frequency of between-wave discrepancies in the year of birth in different waves for Albania, Indonesia and Vietnam. Discrepancies of more than one year are rare for Albania (1%), more serious for Vietnam (2.6%) and still more serious for Indonesia (7.5%). Accurate timing of events is important for demographic research, so it is important to bear in mind this source of measurement error.

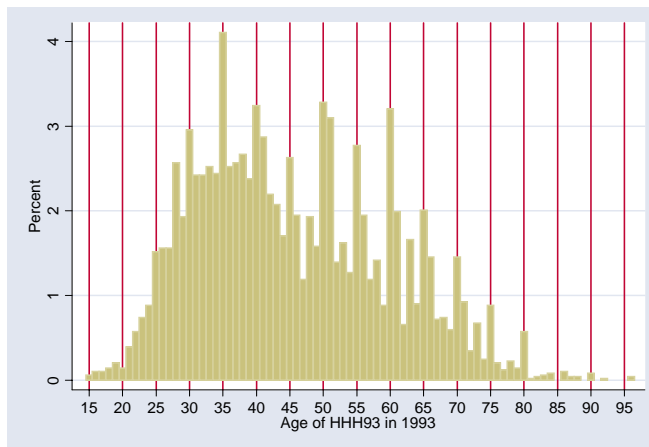**Table A1:** Internal consistency of repeat responses on year of birth

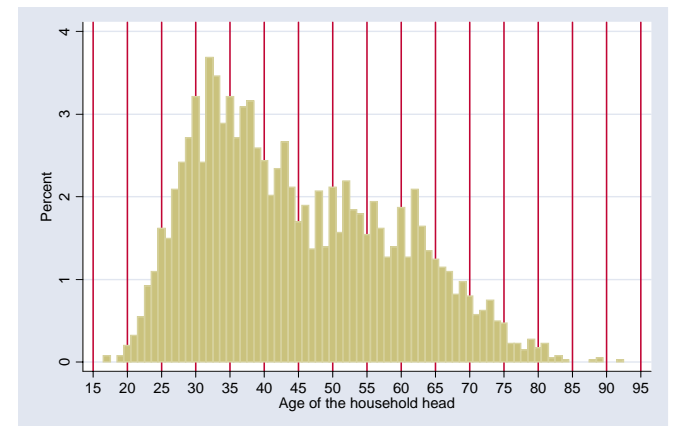|	Albania	Indonesia	Vietnam
Proportion with no discrepancy	90.1%	80.1%	90.7%
Proportion with 1-year discrepancy	9.0%	12.4%	6.5%
Proportion with 2-year discrepancy	0.4%	3.7%	1.6%
Proportion with discrepancy of 3+ years	0.6%	3.8%	1.1%
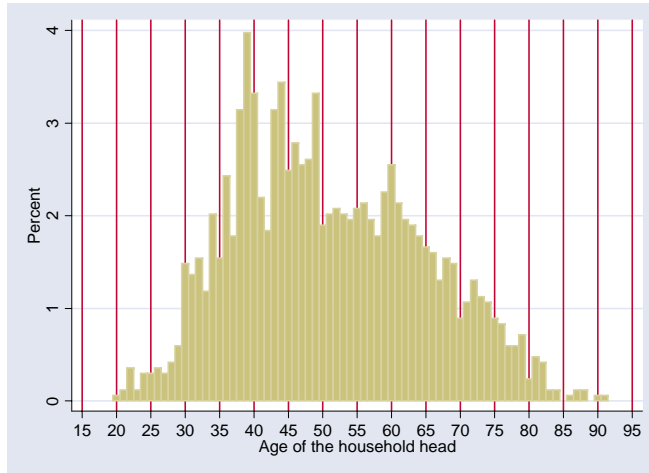
Albania 2002
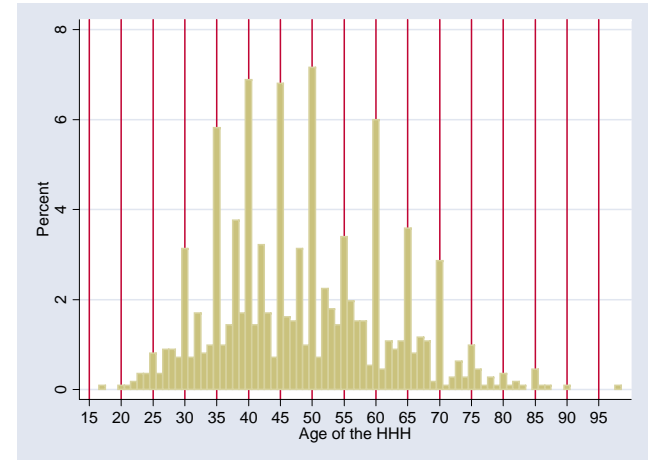
Ethiopia 1994

Indonesia 1993-4

Vietnam 1992-3

Figure A1   Heaping in the age distributions