UNITED NATIONS UNIVERSITY

UNU-WIDER

World Institute for Development Economics Research

Research Paper No. 2006/145

Asset Portfolios in Africa

Evidence from Rural Ethiopia

Christian Rogg*

November 2006

Abstract

This paper considers asset holdings in rural Ethiopia. It shows that households own mostly non-financial assets and that the composition of asset portfolios varies significantly with the household's overall wealth and its exposure to uncertainty. As regards the distribution of assets, inequality is lowest for land holdings and much higher for all other assets. More generally, asset inequality is higher than consumption inequality but, somewhat surprisingly, lower than income inequality. Less surprising is the finding that asset holdings are positively correlated with income and consumption. An analysis of how asset holdings vary with key demographic variables shows that assets increase with the size of the household and the education of the household head. Finally, the paper concludes by exploring the role that assets play in marriage markets in rural Ethiopia.

Keywords: savings, asset portfolios, household wealth, asset distribution, poverty, inequality, Ethiopia
JEL classification: D1, D31, G11

*Centre for the Study of African Economies (CSAE), University of Oxford; and Department for International Development (UK).

This study has been prepared within the UNU-WIDER project on Personal Assets from a Global Perspective, directed by Jim Davies.

UNU-WIDER acknowledges with thanks the financial contributions to its research programme by the governments of Denmark (Royal Ministry of Foreign Affairs), Finland (Ministry for Foreign Affairs), Norway (Royal Ministry of Foreign Affairs), Sweden (Swedish International Development Cooperation Agency—Sida) and the United Kingdom (Department for International Development).

ISSN 1810-2611 ISBN 92-9190-929-7 ISBN-13 978-92-9190-929-2

Acknowledgements

Much of the evidence presented here is drawn from my doctoral thesis at the University of Oxford. The views in this paper are my own and should not be attributed to the institutions that I am affiliated with. I am grateful for comments received from Jim Davies and other contributors to this project at, and after, a UNU-WIDER seminar in May 2006 in Helsinki.

UNU World Institute for Development Economics Research (UNU-WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Camera-ready typescript prepared by Lorraine Telfer-Taivainen at UNU-WIDER

1 Introduction: asset holdings in rural Africa

This paper is concerned with the left-hand tail of the global asset distribution. In other words, it considers some of the poorest people in the world: agricultural households in Ethiopia. The objectives of this paper are to present a detailed picture of household-level asset portfolios in rural Ethiopia, to discuss some of the factors that shape the composition and size of asset holdings, and to shed light on the roles that assets play in the lives of these households. The paper stands alongside the investigation by Burger et al. (2006) which explores asset holdings amongst Ghanaian households. Relatively little work has been done on asset holdings in Africa. This is true for both rural and urban households. A number of studies have looked at specifc assets in isolation, particularly land, but very few have considered the gamut of assets that make up total household wealth. Even fewer studies have quantified the various assets and estimated total wealth. Hence, it is difficult to gain a clear picture of who owns what in Africa. This paper aims to give an overview of what we have learned to date and, more specifically, to provide detailed information on one particular country: Ethiopia. It focuses on rural areas, as this is where 63 per cent of African households are located (World Bank 2005).

There are several reasons why asset information has not been compiled in a systematic way. First, household data is notoriously poor in Africa, and not many surveys have collected information on assets. Second, the existing asset data is often not easily comparable. For example, some surveys include cash holdings while others only report physical assets; some quantify the value of land holdings while others only provide the size of plots. Third, the existing asset data was often collected as a by-product; e.g. to control for wealth in regression analyses, and is therefore only reported in passing in many studies.

I begin by discussing the motivations for asset accumulation before considering the types of assets that households in rural Africa own. The reasons for why households save have been categorized in several different ways. Keynes (1936) considered ‘eight main motives… which lead individuals to refrain from spending out of their incomes’. Gersovitz (1988: 382-424) distinguishes between four such considerations—the life cycle, precaution, investment and bequests. For each of these motivations, clear differences can be drawn between developing and developed countries. Concepts such as saving for retirement or bequests are sometimes of limited relevance in the context of rural Africa where formal employment is rarely available and several generations of the same family often cohabitate. The presence of borrowing constraints (and high interest rates) means that saving for self-financed investment is crucial. The high level of exposure to risk—e.g. droughts and illnesses, combined with an absence of formal insurance services—mean that the precautionary saving motive is of particular importance.

Households in rural Africa, as elsewhere in the world, own a variety of assets. But their choice of assets differs from that of households in more developed regions. The most important factor in explaining asset holdings in rural Africa is that households tend to derive the majority of their income from agricultural activities, either directly through farming or rearing of livestock, or indirectlythrough processing and selling agricultural produce, for example. Sinha and Lipton (1999) cite evidence that farm income accounts for 55-71 per cent of total income in developing regions around the world. The lowest share (55 per cent) is found in east and southern Africa, while it is significantly higher in west Africa at 64 per cent. Reardon et al. (1988) show that agricultural and livestock income accounted for 44-61 per cent of household income in rural Burkina Faso in the mid 1980s. In western Tanzania, farm income accounts for 79 per cent of total household income (Dercon and Krishnan 1996; Dercon 1998). In rural Ethiopia, the sum of net crop income and livestock income accounted for 83 per cent of total income in 1994, and 94 per cent in 1997 (Rogg 2005). Earlier research by Dercon and Krishnan (1996) showed that farm and livestock income accounted for 61-85 per cent of total income in 1989 for a smaller subset of Ethiopian villages.

As a result of the predominance of agricultural activities, land holdings tend to account for a significant share of total household wealth. Livestock holdings also play an important role and are usually the largest non-land asset in the portfolio. For example, Fafchamps et al. (1998) cite evidence that livestock accounts for 54 per cent of household wealth in Burkina Faso. Given the prominence of livestock in asset portfolios, it is important to disaggregate these holdings into their components. Cattle usually make up a significant share, if not the majority, of livestock wealth. For example, of the two-thirds of households in western Tanzania that owned livestock in 1989/90, 75 per cent owned cattle (Dercon and Krishan 1996). Depending on the season, households may also hold large stocks of harvested produce. Farm tools and other durable assets used in the agricultural production process account for much of the remaining wealth. On the other hand, cash and financial assets play only a very limited role. The same is true for consumer durables and other luxury goods, which are usually beyond the means of subsistence households. While there are good reasons for why we observe limited cash holdings—namely the fact that most households engage in subsistence farming and only carry out a limited amount of market transactions—it is also likely that financial assets are underreported by survey participants and therefore subject to measurement error. In fact, the notorious unreliability of cash data has led numerous researchers to exclude financial assets from their analyses.

Finally, let me highlight one other important characteristic of asset portfolios in rural areas of developing countries: they are strongly influenced by seasonal variations. In particular, crop and food stocks make up a much larger share of the portfolio after the harvest than before. Udry (1995) provides an indication of the magnitude of this effect for households in northern Nigeria. He shows that livestock accounts for 68 per cent of asset portfolios early in the harvest season, but falls to around 30 per cent after the

harvest is completed. This points to the importance of ensuring that panel data on assets are collected at approximately the same time each year.

The remainder of this paper is organized as follows. Section 2 introduces the data and provides an overview of asset holdings in rural Ethiopia. Section 3 moves beyond average asset holdings to explore the link between the size and the composition of asset portfolios. Section 4 is dedicated to a more formal treatment of asset inequality. Section 5 considers the links between wealth, income and consumption. Section 6 discusses a major factor of life in poor rual areas, namely exposure to uncertainty, and investigates how this affects asset portfolios. Section 7 analyses the extent to which the size of asset portfolios is linked to a series of demographic variables. Section 8 discusses the role that assets play in marriage decisions. Finally, Section 9 concludes the paper.

2 Asset holdings in rural Ethiopia

The previous section discussed asset portfolios in rural Africa. I now turn to a more in-depth analysis of one particular country, namely Ethiopia. The reason for focusing on Ethiopia is a pragmatic one: the data collected as part of the Ethiopia Rural Household Survey (ERHS) probably includes the most detailed and reliable asset information of all large panel datasets on African households.

2.1 Data and overview of key characteristics of sample households

The focus here is on household-level asset holdings in rural Ethiopia in the mid 1990s. More specifically, I focus on the period 1994-97. These were eventful, but comparatively stable, years for Ethiopia. In the words of Bigsten et al. (2003), it was 'a period of economic recovery driven by peace, good weather, and much improved macroeconomic management'. Civil war had come to an end in 1991, a structural adjustment programme was agreed in 1994 and parliamentary elections were held in 1995. This period of peace and progress lasted until war broke out with Eritrea in May 1998—see Marcus (2002) for a more detailed discussion of these events. As a result of the peace and stability in the mid 1990s, the economic conditions for most households improved significantly. Dercon (2004) finds that consumption in a subset of the 15 ERHS villages grew on average by 12 per cent per annum during 1989-97. Bigsten et al. (2003) and Bigsten and Shimeles (2004) study the period 1994-97 and show that poverty in rural areas fell from 42 per cent to 36 per cent. Bigsten and Shimeles (2004) find that poverty fell in 11 of the 15 ERHS villages.

For the following analysis, I employ rounds 1 to 4 of the ERHS.[1] The ERHS is a panel dataset with approximately 1,450 households in 15 villages. Dercon (2001) and Rogg

[1] Other data used here include rainfall information, village-specific price data to obtain money-metric values for livestock, grain and other assets (see Dercon and Krishnan 2000 for further details),

(2005) provide further information on the data and the key descriptive statistics. Dercon and Krishnan (1998) discuss the sampling methodology. Bevan and Pankhurst (1996) review the key socioeconomic aspects of the 15 village communities.

The ERHS sample is broadly representative of households in rural Ethiopia. Dercon (2001) compares it to the much larger Welfare Monitoring Survey and shows that the ERHS is reasonably representative in terms of key demographic variables; e.g. household size, percentage of female-headed households and levels of education. Another notable feature of the ERHS is its low attrition rate (7 per cent between 1989-94, and only 2 per cent between 1994-95 according to Dercon and Krishnan 1998). In part, this may be due to mobility constraints resulting from households' inability to buy or sell land. Finally, the data quality of the ERHS is generally considered to be very good in comparison to other household surveys in Africa. Dercon (2001) states that 'the panel provides highly comparable data on [food] consumption, assets, infrastructure, activity choice, household composition, etc.'.

The vast majority of the sample households are landholders and depend on rain-fed crop agriculture for a large share of their income. The remaining income is earned through the trading of livestock, the sale of livestock products, engagement in off-farm activities (such as crafts, petty trading, casual labour, food processing or the sale of collected firewood) and, to a very small degree, transfers (such as food aid and income from food-for-work programmes). Agricultural production consists of cereals, pulses and tubers, which are either consumed or traded in local markets. Surprisingly, most ERHS households are net buyers of food (Dercon 2001). Export crops, such as coffee and chat, are important in some villages, but only a minority of farmers in the sample grow such crops. Ploughing is usually done by oxen or by hand.

Given that savings are measured at the household level, and that demographic variables play an important role in determining saving behaviour (see Section 7), it is worthwhile to elaborate on what the typical household structure looks like. In rural Ethiopia, most households are nuclear, with five to six people, and monogamic (Dercon and Krishnan 2000). Bevan and Pankhurst (1996) provide more details on the regional variation of household structures among the survey villages. For example, kinship seems to play a more prominent role in determining household membership in the south than it does in the northern and central regions. There are also differences with respect to the trans-generational continuity of households. While there is little evidence of this in central and northern regions, households in the south tend to be more extended and often include three generations as well as the spouses of children and their offspring.

consumption data and income data. I am grateful to the Meteorological Institute of Ethiopia, Stefan Dercon, Bereket Kebede and Agnes Quisumbing for providing me with this data.

2.2 Average asset portfolios in rural Ethiopia

In line with the earlier discussion, the fact that most households in rural Ethiopia are farmers has a significant impact on the composition of their asset portfolios. Assets involved in the agricultural production process—land, livestock, farming tools and stored produce—account for the bulk of total household wealth. The ERHS collected information on all these non-financial assets. It paid less attention to financial assets. While lending and borrowing transactions were captured, cash holdings were not recorded. The available evidence indicates that financial assets and even cash play only a very limited role in these village economies. This is to be expected for subsistence farmers. For example, very few households had access to formal financial services: only 1 per cent of households had bank accounts in 1994. However, approximately 19 per cent were members of rotating savings and credit associations (*equbs*) over the survey period; see Ayalew (2003) for more detail.

For these reasons, the emphasis here is on non-financial assets, which account for nearly all household wealth. The discussion includes land holdings. But an important caveat is worth mentioning: there is no real market for land in Ethiopia, as land sales are illegal. The Ethiopian constitution states that 'ownership of rural and urban land is vested "in the state and in the peoples of Ethiopia… and [is] not subject to sale or to other means of transfer"' (Marcus 2002: 243). It is therefore difficult to quantify the monetary value of land as can be done for all other assets.[2] Kebede (2006) provides a more detailed account of land holdings among the ERHS households and shows that the current distribution of land is as much the result of the socialist redistribution agenda in the 1970s as of the feudal structures that existed before the reforms were implemented.

Tables 1, 2 and 3 provide information on the prevalence and value of key assets: land, livestock, durables and crop/food stocks. They show that very few households own no assets (less than 2 per cent), while nearly all households own land (95 per cent), which is either self-cultivated or rented out. The average land holding is 1.51 hectares. Nearly all households also own durable assets. It is important to distinguish between two types of durables. The first group (termed 'productive assets') is used in the production process and includes tools and equipment, such as ploughs and spinning wheels. The second group (referred to as 'unproductive assets') are consumer or luxury goods, such as furniture, electronic appliances and jewellery. In terms of value, durables account for approximately one quarter of total assets (see Table 2). As mentioned earlier, livestock plays an important role in asset portfolios in rural Ethiopia. Livestock is owned by approximately 80 per cent of sample households and accounts for more than half of the

[2] Note that one approach would be to impute a value for land holdings based on plot size and derived agricultural income. For an example, see Li and Zhao (2006). While this approach would make it possible to obtain a monetary value for land holdings, it also introduces potential problems. For example, the value of land holdings would automatically fall if agricultural earnings were to fall, even if the underlying quality of land and its income-generating capacity is unchanged (e.g. because the household merely decided to dedicate more time to off-farm work).

portfolio value (see Tables 1 and 2).[3] The ERHS collected information on 22 types of animals. Again, I will consider two different groups. The first is small livestock, which includes goats, sheep and chicken. The second is large livestock, which can be further subdivided into pack animals (horses, donkeys, mules and camels), traction animals (oxen) and cattle (bulls, cows, heifer and calves). Very few households own all types of livestock (only 12 per cent in 1994, rising to 24 per cent by 1997). In particular, around a quarter of sample households do not own large livestock, the purchase of which is beyond their means.

Table 1: Asset ownership

	Percentage of households owning the respective asset		
	1994	1995	1997
Land[1]	95	N/A	N/A
Durable assets	97	97	98
productive	89	91	96
unproductive	86	89	86
Livestock	78	82	85
small stock	50	53	60
large stock	72	75	77
pack	29	31	38
oxen	40	41	52
cattle	62	64	67
Crop/food stocks	61	82	76
No assets	2	1	0
Observations	1463	1460	1401

Note: [1]Given that there is no market for land and that land transactions are illegal, this figure is only provided for the first survey year.

Source: Author's calculations based on the Ethiopia Rural Household Survey.

Two further features of livestock portfolios are worth noting. First, the percentage of households that own livestock rises during the survey period. This increase is particularly significant for pack and traction animals. Second, the value of livestock holdings also rises significantly over the survey period. Dercon (2004) documents a similar increase in the volume of livestock holdings. He shows that the number of livestock units held by a sub-sample of the ERHS households rose by 16 per cent per annum between 1989 and 1997.

Food/crop stocks are the last asset category that is considered here. The most frequently kept stocks are teff, barley, wheat, maize, sorghum/millet and horse beans. They are held by 61 per cent—82 per cent of sample households, depending on the survey year. The value of such assets is difficult to compute, as they are highly dependent on the

[3] Dercon (2004) indicates that 75 per cent of households owned livestock before the great famine in the mid 1980s, but lost or sold many animals during the crisis. As a result, only 50 per cent had livestock in 1989.

season in which the data is collected. As mentioned above, they account for a higher share of the total asset portfolio after the harvest than before the harvest. This difference might well be large.[4] For the ERHS households, crop/food stocks account for 25 per cent—35 per cent of the portfolio value. In summary, nearly all households own durables, around 80 per cent own livestock, and three-quarters hold crop/food stocks. In terms of value, livestock accounts for more than half, while crop/food stocks and durables account for much smaller shares.

Tables 1 and 2 show that the value of individual asset holdings, and consequently the composition of asset portfolios, varies over time. Rogg (2005) carries out an analysis of asset transactions during the survey period and shows that nearly all households were net purchasers of durable goods (96 per cent), while only a small minority were net sellers (4 per cent). The picture is very different for livestock: 59 per cent of households were net sellers, while only 40 per cent were net purchasers (for 1 per cent of households, the value of their livestock holdings remained constant). This is true for all types of livestock: the number of net sellers is larger than the number of net purchasers. This is to be expected if rearing and trading of livestock is an income-earning activity.[5]

3 How do asset portfolios vary with wealth?

So far, I have only explored average asset portfolios. The next step is to consider the distribution of assets across the sample households. I will do so by disaggregating the sample into quartiles for each of the two key asset categories (land and non-land wealth). Table 3 presents the results. While 86-100 per cent of households in the wealthiest quartile own the various assets considered here, the figures are much lower for households in the poorest quartile. The differences between the top and bottom

[4] It is difficult to tease these differences out of the ERHS data because information on crop/food stocks is only available at one point in time for two of the three survey years. A simple correction is carried out: I assume a linear decrease in crop/food stocks over the period after the harvest and adjust the value of such stocks depending on how much time has lapsed between the harvest and the interview date. More complicated consumption rules were experimented with, but yielded similar results.

[5] Information on sales of crop/food stocks is not provided here, as it is difficult to account for the trading of such stocks. Such an assessment would require detailed information on harvests, own consumption, trading, wastage and storage for all crop/food subcategories.

Table 2: Value of asset holdings[1]

	1994			1995			1997		
	Mean	Std Dev.	Median	Mean	Std Dev.	Median	Mean	Std Dev.	Median
Land (hectares)[2]	1.51	1.61	1.00	N/A	N/A	N/A	N/A	N/A	N/A
Durable assets	350.2	1702.3	81.0	399.9	1722.5	110.5	400.7	1158.3	175.0
productive	62.1	166.6	28.0	82.9	235.7	43.0	101.0	210.9	58.0
unproductive	288.1	1666.1	40.5	317.0	1675.8	55.0	299.7	1109.7	101.0
Livestock	1721.8	2398.5	891.3	1704.3	2338.8	850.0	2050.3	2941.1	1127.5
small stock	180.7	451.2	0.0	168.8	428.9	13.8	287.3	907.6	20.0
large stock	1541.1	2159.6	800.0	1535.5	2117.7	785.0	1763.0	2448.8	1000.0
pack	154.9	570.1	0.0	158.4	552.7	0.0	213.9	760.6	0.0
oxen	471.2	853.2	0.0	476.5	883.6	0.0	672.7	1013.2	0.0
cattle	914.9	1510.3	400.0	900.5	1487.2	400.0	876.4	1270.9	500.0
Crop/food stocks	735.9	1756.2	138.5	1192.7	2098.8	402.0	859.1	2361.8	120.0
TOTAL	2807.9	4103.1	1331.2	3330.1	4383.9	1726.0	3493.8	4690.1	1932.0

Note: Values in birr, except land which is measured in hectares. Figures are calculated only for those households holding the respective assets; i.e. not for all households. [1]For comparison, the average income per adult was 447 birr in 1994 (Dercon 2001). This figure is for six villages only. The exchange rate at the time was approximately 5 birr = US$1, i.e. the income per adult was around US$90 per year. [2]Given that there is no market for land and that land transactions are illegal, this figure is only provided for the first survey year.

Source: Author's calculations based on the Ethiopia Rural Household Survey.

Table 3: Asset ownership: comparison of wealth quartiles

	Percentage of households owning the respective asset								
	1994			1995			1997		
Proxy for wealth	Durables	Crop/food stocks	Livestock	Durables	Crop/food stocks	Livestock	Durables	Crop/food stocks	Livestock
1. Land									
lowest quartile	93	33	61	94	74	69	99	67	69
second quartile	95	46	71	96	74	77	98	64	75
third quartile	100	82	88	100	87	89	98	74	84
top quartile	99	86	94	100	90	96	99	86	94
2. Non-land assets									
lowest quartile	88	18	26	92	52	44	95	55	43
second quartile	99	49	88	98	80	87	99	74	95
third quartile	100	82	99	100	94	98	100	80	99
top quartile	100	96	99	100	98	99	99	96	100
AVERAGE	97	61	78	97	81	81	98	71	79

Source: Author's calculations based on the Ethiopia Rural Household Survey.

Table 4: Composition of asset portfolios: comparison of wealth quartiles

	Share of the portfolio that is held in the respective asset								
	1994			1995			1997		
Proxy for wealth	Durables	Crop/food stocks	Livestock	Durables	Crop/food stocks	Livestock	Durables	Crop/food stocks	Livestock
1. Land									
lowest quartile	0.40	0.12	0.48	0.25	0.34	0.41	0.36	0.18	0.46
second quartile	0.31	0.16	0.53	0.23	0.33	0.44	0.28	0.17	0.55
third quartile	0.19	0.27	0.54	0.16	0.36	0.48	0.23	0.21	0.56
top quartile	0.12	0.22	0.66	0.11	0.29	0.60	0.12	0.20	0.68
2. Non-land assets									
lowest quartile	0.68	0.11	0.21	0.42	0.29	0.29	0.58	0.20	0.22
second quartile	0.17	0.15	0.68	0.13	0.32	0.55	0.20	0.13	0.67
third quartile	0.12	0.22	0.66	0.12	0.33	0.55	0.12	0.16	0.72
top quartile	0.10	0.27	0.63	0.10	0.38	0.52	0.10	0.27	0.63
AVERAGE	0.26	0.19	0.55	0.19	0.33	0.48	0.25	0.19	0.56

Source: Author's calculations based on the Ethiopia Rural Household Survey.

quartiles are particularly striking for livestock and crop/food stocks. As regards livestock, the results are driven by substantial inequality in the holdings of large animals. Taking 1997 as an example, Table 3 indicates that 43 per cent of households in the lowest quartile and 100 per cent of households in top quartile owned livestock (using the non-land wealth classification). For cattle, which account for around half the value of the average livestock portfolio, the respective figures are 18 per cent and 93 per cent; for oxen, they are 3 per cent and 91 per cent (results not reported here; see Rogg 2005 for details).

In addition to considering the prevalence of asset holdings, it is also interesting to explore the composition of asset portfolios. This is done in Table 4. As before, I disaggregate the sample into wealth quartiles (using both land and non-land assets as proxies). Table 4 shows that the portfolio share of individual assets varies greatly across wealth quartiles. In general, the portfolio shares of livestock and food/crop stocks increase with wealth, while the share of durable assets decreases with wealth. The differences are most striking for durables and livestock. Durable assets account for 25-68 per cent of the portfolios of households in the poorest quartile, depending on the year and proxy that is used. But they account for only about 10 per cent of the portfolios of households in the wealthiest quartile. Conversely, the share of livestock is much greater for the wealthiest households (53-68 per cent) than for the poorest (21-48 per cent).

4 Asset inequality

The previous sections shed some light on the distribution of asset holdings. I will now turn to a more formal exploration of asset dispersion in rural Ethiopia by employing two standard inequality measures: the coefficient of variation and the Gini coefficient (see Cowell 1995 for a comprehensive overview of approaches to measuring inequality; Litchfield 1999 and McKay 2002 for shorter introductions). As before, I will consider both the total portfolio and disaggregated asset categories.[6] To ensure robustness of the results, I treat the three survey years as repeated cross-sections. As before, the assessment of inequality in land holdings is limited to the first survey year.

[6] The discussion here concentrates on wealth inequality. See Fafchamps (2003) for a discussion of how different types of inequality are related.

Table 5: Coefficients of variation for consumption, income and assets (full sample)

	Consumption			Income	Assets						
	total	food	non-food	harvest	total	durables	livestock total	livestock large	livestock small	food stocks	land
1994	0.90	0.93	1.30	2.23	1.37	4.86	1.39	1.40	2.50	2.39	1.07
1995	0.93	0.95	1.95	1.84	1.25	4.31	1.37	1.40	2.54	1.76	---
1997	0.87	0.91	1.39	1.92	1.34	1.99	1.43	1.39	3.16	2.75	---

Source: Author's calculations based on the Ethiopia Rural Household Survey; consumption and income data compiled by Stefan Dercon.

Table 6: Coefficients of variation for consumption, income and assets (weighted avg. of village CVs)

	Consumption			Income	Assets						
	total	food	non-food	harvest	total	durables	livestock total	livestock large	livestock small	food stocks	land
1994	0.75	0.80	1.05	1.55	1.23	2.44	1.19	1.25	1.99	2.52	0.77
1995	0.78	0.83	1.13	1.43	1.10	2.24	1.17	1.24	1.96	1.74	---
1997	0.79	0.84	1.28	1.37	1.05	1.44	1.17	1.20	2.34	2.25	---

Source: Author's calculations based on the Ethiopia Rural Household Survey; consumption and income data compiled by Stefan Dercon.

Table 7: Gini coefficients for consumption, income and assets (full sample)

	Consumption			Income	Assets						
	total	food	non-food	harvest	total	durables	livestock total	livestock large	livestock small	food stocks	land
1994	0.43	0.44	0.58	0.69	0.63	0.78	0.63	0.64	0.79	0.77	0.53
1995	0.43	0.43	0.62	0.65	0.59	0.75	0.63	0.64	0.79	0.70	---
1997	0.42	0.43	0.58	0.72	0.59	0.65	0.62	0.62	0.80	0.82	---

Source: Author's calculations based on the Ethiopia Rural Household Survey; consumption and income data compiled by Stefan Dercon.

Table 8: Gini coefficients for consumption, income and assets (weighted avg. of village Gini coefficients)

	Consumption			Income	Assets						
	total	food	non-food	harvest	total	durables	livestock total	livestock large	livestock small	food stocks	land
1994	0.38	0.40	0.50	0.56	0.55	0.68	0.56	0.58	0.77	0.72	0.38
1995	0.37	0.38	0.50	0.56	0.52	0.65	0.56	0.58	0.77	0.61	---
1997	0.37	0.38	0.52	0.55	0.49	0.54	0.55	0.57	0.77	0.71	---

Source: Author's calculations based on the Ethiopia Rural Household Survey; consumption and income data compiled by Stefan Dercon.

The coefficient of variation (CV) is the standard deviation divided by the mean. The CVs for the full sample are presented in Table 5. Given that the sample consists of 15 villages, it may be more appropriate to calculate the average of the 15 village-level CVs (denoted CV'), i.e. $CV'_j = \frac{1}{V}\sum_{v=1}^{V} CV_{jv}$, where V=15 is the number of villages and subscript j denotes the asset under consideration. The resulting CVs are shown in Table 6.[7] Note that CV_j captures both variations within and between villages, while CV'_j calculates the average of within-village variations. As a result, the values in Table 5 (CV_j) are generally larger than those in Table 6 (CV'_j).

The second inequality measure used is the Gini coefficient—calculated as per Deaton (1997: 139). As for CVs, Gini coefficients are calculated for both total wealth and individual asset subcategories. The three years are treated as repeated cross-sections. Table 7 provides Gini coefficients for the full sample (γ). Table 8 presents averages of the 15 village-level Gini coefficients (γ'), where $\gamma'_j = \frac{1}{V}\sum_{v=1}^{V} \gamma_{jv}$.[8] As expected, the latter are larger than the former ($\gamma_j > \gamma'_j$ for all assets and years).[9]

Both the coefficients of variation (Tables 5 and 6) and the Gini coefficients (Tables 7 and 8) tell a similar story. All inequality measures are comparatively stable over time, with some evidence of decreasing asset inequality over the survey period. As regards the various asset subcategories, land is by far the most equally distributed asset. Both the coefficients of variation and the Gini coefficients for land are much lower than those for total wealth and all other asset subcategories. This could be attributed to the aforementioned prohibition of land sales, which is a heritage of Ethiopia's socialist past. However, Kebede (2006) shows that land inequality among ERHS households is at least as high as in other African countries, if not higher.[10] Note also that our discussion here focuses on the size of land holdings and therefore ignores the quality of the land. In hilly countries like Ethiopia, for example, households in low-lying villages may have larger plots of lower quality, while households higher up may have smaller plots of better quality. Kebede (2006) tests whether there is a systematic link between the size and quality of land holdings for ERHS households and finds that there is no statistically significant correlation between them.

---

[7] Note that the CVs in Table 6 are weighted by the number of households in each village. This is done to ensure that each household carries equal weight (a standard value judgement) independent of which village it is located in. In most cases, the weighted averages are very similar to the simple averages.

[8] As the CVs before, the Gini coefficients presented in Table 8 are not simple averages of the village-level Gini coefficients, but are weighted by the number of households in each village.

[9] Note that these results are somewhat at odds with those presented by Bigsten et al. (2003). They find a very similar expenditure-based Gini coefficient for 1994 (0.39), but identify a significant increase in inequality by 1997 (Gini of 0.43). This increase in expenditure inequality is somewhat puzzling given that none of the other inequality measures presented above shows a similar trend.

[10] By comparison to most other regions in the world, the Gini coefficients for land inequality presented here are relatively low (Torche and Spilerman 2006).

Inequality is surprisingly high for all other assets in the portfolio, with Gini coefficients well over 0.5 in most cases. Small livestock, crop/food stocks and durables tend to be most unequally distributed, while large livestock have the most equal distribution. This picture is confirmed by the standard deviations presented in Table 2. In general, inequality appears to increase with asset liquidity: more liquid assets, like crop/food stocks and small livestock, are more unequally distributed than less liquid assets, such as land and large livestock (but note that the 1994 and 1995 figures for durables do not fit this pattern).

Tables 5 to 8 provide not only information on asset inequality but also on consumption and income inequality. The picture that emerges is consistent across survey years and across the two measures of inequality. Not surprisingly, consumption inequality is much lower than the other two types of inequality. The Gini coefficient is around 0.4, with inequality in food consumption much lower than inequality in non-food consumption. Surprisingly, income inequality is higher than both consumption and asset inequality. The income data presented here is limited to harvest income. To check the robustness of this result, I also computed the Gini coefficients for another income data series, which includes a broader set of income sources.[11] The respective Gini coefficients for 1994, 1995 and 1997 are 0.67, 0.64 and 0.69; i.e. slightly lower than those presented in Table 7. However, the overall picture is unchanged: income inequality is higher than asset inequality.

This finding is in contrast to the general belief that asset inequality is higher than both consumption and income inequality. When considering the various asset subcategories, it becomes obvious that the usual pattern also holds for most assets in rural Ethiopia. If we leave aside land because of the aforementioned measurement issues, then we see that three of the four monetized assets (small livestock, food/crop stocks and durables) are more unequally distributed than income. It is the comparatively low inequality in large livestock which accounts for the majority of the portfolio that lowers overall asset inequality significantly.

5 Asset holdings, income and consumption

It was stated above that most of the assets held by sample households are involved in the production process. As a result, we would expect that households with more assets generate more income and enjoy higher levels of consumption.[12] However, one could

[11] The data on harvest income was provided by Stefan Dercon (University of Oxford). The more comprehensive income dataset was provided by Agnes Quisumbing (International Food Policy Research Institute). Given that I am using consumption figures that were computed by Stefan Dercon, I am using the corresponding income data, albeit limited to harvest income, to ensure consistency.

[12] I use households as the unit of analysis. A correction for adult-equivalent units in all key variables (i.e. assets, income and consumption) changes only the magnitude of the values but not the overall conclusions (see Rogg 2005 for more details).

also argue that causality runs the other way; i.e. that households with more income are able to invest more and acquire more assets. A detailed analysis of this two-way causality is beyond the scope of this paper. Here, I will limit myself to a discussion of correlation coefficients. We would expect that there is a clear positive correlation between assets on the one hand and income or consumption on the other. This hypothesis is confirmed by the data. Table 9 provides the correlations between the value of asset holdings and income and consumption. Land and non-land assets are treated separately in light of the different measurement units (as mentioned above, land is measured in terms of the size of land holdings while non-land assets are measured in terms of their monetary value).

The correlations presented in Table 9 indicate clearly that the two main asset categories—land and non-land wealth—have a significant positive correlation (between 0.41 and 0.44 for the three survey years). It also shows that both have a very strong possitive correlation with household income. This is particularly true for harvest income. Note that wage income and aid (which tends to take the form of food aid or income from public works projects)—two relatively unimportant sources of income—show a small negative correlation with both asset categories. This is not surprising: households with large handholdings are less likely to dedicate labour to non-farm employment, and aid is usually received by poorer households. Table 9 also provides clear evidence that households with greater land holdings and non-land assets enjoy higher consumption levels. Finally, the correlation coefficients for land are consistently lower than for non-land assets. This is not surprising given that there is much less variation in land holdings than in non-land holdings (see standard deviations in Table 2).

Table 9: Correlations between asset holdings, income and consumption

	1994		1995		1997	
	Non-land assets	Land	Non-land assets	Land*	Non-land assets	Land*
Non-land assets	1.00	0.44	1.00	0.41	1.00	0.43
Total income	0.62	0.34	0.60	0.30	0.45	0.40
Crop income	0.56	0.24	0.62	0.22	0.49	0.41
Wage income	-0.10	-0.07	-0.03	-0.07	-0.06	-0.04
Aid	-0.02	-0.03	-0.02	-0.02	-0.02	-0.03
Total consumption	0.40	0.21	0.33	0.17	0.38	0.25
Food consumption	0.30	0.21	0.30	0.19	0.34	0.25
Non-food consumption	0.43	0.13	0.20	0.05	0.32	0.11

Note: The number of observations is: 1361 (1994), 1355 (1995) and 1252 (1997). *As discussed previously, land holdings were only computed for 1994. In the absence of an active land market, it is unlikely that there was any significant change over the three-year period.

Source: Author's calculations based on the Ethiopia Rural Household Survey; consumption and income data compiled by Stefan Dercon.

This evidence points not only to a clear link between asset wealth and higher income/consumption, but also to the strong correlation between low asset holdings and consumption/income poverty. Indeed, numerous empirical studies have shown that the value of a household's asset holdings is an important determinant of its probability of being chronically or transiently poor. McKay and Lawson (2003) provide a survey of the literature and conclude that the characteristics most commonly associated with chronic and transient poverty include limited physical assets and human capital (alongside demographic composition, location and occupation).

Evidence for rural Ethiopia confirms this link between asset holdings and income or consumption poverty. It also shows that asset ownership seems to place households in a better position to reap the benefits from economic reforms. Dercon (2001) and Dercon and Krishnan (1998) assess the impact of reforms introduced in Ethiopia in the early 1990s. They find that the reforms led to significant welfare gains in rural areas, but that these gains were very unevenly distributed. Households with more physical assets (particularly better land) and more human capital were the main beneficiaries of the reforms, alongside households with better market connections.

Finally, it is worth highlighting the importance of threshold effects in this context. The acquisition of many assets is very 'lumpy'; i.e. the indivisibility of key assets means that households either need to have sufficiently high incomes or access to a safe facility for storing savings in order to be able to purchase such assets. Neither may be the case. Let me provide an example. The acquisition of cattle is a 'lumpy' investment that is beyond the means of many rural households. For example, Dercon (1996, 1998) and Dercon and Krishnan (1996) find that the 'lumpiness constraint' prevents rural households in Ethiopia and Tanzania from adopting cattle-rearing as a livelihood strategy and forces them to resort to other, usually less profitable, income-earning activities. This constraint is most binding for the poorest households. Table 4 indeed indicates that the asset portfolios of the poorest households differ significantly from those of richer ones.

6 The impact of uncertainty on asset holdings

Uncertainty is a key aspect of life in rural areas of developing countries. Households are exposed to a plethora of risks, ranging from illnesses and theft to flooding and price changes. While all households around the world are subject to risks, poor rural households in low-income countries are particularly affected—see World Bank (2000); Fafchamps (1999) and Sinha and Lipton (1999). For example, they are more exposed to diseases, while often having only very limited access to medical facilities. And their incomes tend to be highly dependent on favourable weather outcomes, while having no recourse to hedging such risks on insurance markets.

Economic theory tells us that exposure to risk will affect the choice of asset holdings. More specifically, it predicts that households in riskier environments will hold a lower

share of their portfolio in assets with risky returns; e.g. Pratt and Zeckhauser (1987); Kimball (1991, 1993). While the theoretical underpinnings are well developed, little empirical work has been carried out to explore whether this prediction holds for poor rural households in developing countries.[13]

Rogg (2005) tests this hypothesis for the ERHS households, exploring whether residing in a village with more uncertainty provides a disincentive to holding assets with riskier returns. The analysis employs a standard (two-asset) portfolio model with a 'safe' asset (that has certain returns) and a 'risky' asset (that has uncertain returns). The analysis focuses on crop/food stocks and livestock, the two most important liquid assets for households in rural Ethiopia. Following Fafchamps et al. (1998), the returns to crop/food stocks are treated as constant and the returns to livestock as (relatively) uncertain. The hypothesis is that households exposed to more background risk will hold a smaller share of their portfolio in the riskier asset; i.e. that the portfolio share of livestock holdings decreases as uncertainty increases. Table 10 shows that, on average, livestock accounts for 56 per cent of the asset portfolio. This share is significantly lower for households that are most exposed to uncertainty (here measured by rainfall variability) than for those least exposed.

Table 10: Portfolio composition measures (1997)

	Overall	Rainfall Variability	
		bottom quartile	top quartile
(1) Livestock as % of total portfolio	56.1	66.8	44.8
(2) Livestock as % of sum of livestock and crop/food stocks	66.9	73.2	58.0

Source: Author's calculations based on the Ethiopia Rural Household Survey and rainfall data provided by the Meteorological Institute of Ethiopia.

The figures in Table 10 provide strong support for the hypothesis, which is confirmed by regression analysis on portfolio composition measures. Following the approach of Jalan and Ravallion (2001), Rogg (2005) also shows that there are important differences across wealth quintiles. In particular, the impact of uncertainty is greatest for the poorest households. These results, which are robust across different years and different proxies for uncertainty and wealth, confirm that households exposed to more uncertainty hold a smaller share of their portfolio in risky assets.

[13] This is primarily due to limited data availability. Some researchers who have endeavored this type of analysis are Rosenzweig and Binswanger (1993) for India, Jalan and Ravallion (2001) for China, and Fafchamps et al. (1998) for Burkina Faso.

7 How do asset portfolios vary with demographic variables?

The empirical literature consistently finds that demographic variables play an important role in shaping asset portfolios. This is in line with the predictions of the underlying theoretical literature on saving and asset holdings, which puts demographic variables at the heart of the analysis. Here, I will concentrate on four such variables: (i) the age of the household head, (ii) the eduction of the household head, (iii) household size, and (iv) the extent to which the household is subject to illnesses. The relevance of these four variables will be discussed in turn, before presenting the key descriptive statistics and assessing the links to asset holdings.

A person's *age*, often referred to as their position in the life cycle, plays a central role in the savings literature. The life-cycle/permanent-income hypothesis stipulates that people aim to smooth consumption over their lifetime. They will do so by saving during their adult (or working) years, borrowing when they are young and in education, and running down their savings when they are old and in retirement; see Attanasio and Banks (2001) for a fuller discussion. There is clear empirical support for the assumption that age has a significant impact on saving patterns in developing countries. For example, Deaton (1990: 61-96) shows that consumption and saving patterns vary with the age of the household head in each of the five developing countries that he has data on.

The link between *education* of the household head and the shape and size of the household's asset portfolio is less intuitive. One possible channel of influence is via the income variable. More educated household heads are likely to earn higher incomes and become wealthier. A second channel is through investment decisions. There is some evidence that more educated people invest in different assets than less educated people; e.g., see Browning and Lusardi (1996). The evidence presented above indicates that the asset portfolios of wealthier households indeed differ systematically from those of their poorer neighbours. Hence, even if education did not lead to income differentials, it would lead to different portfolio allocation decisions. A third channel, which is likely to be of importance in agricultural settings, is the choice of income-generating activity. More educated households are likely to be better placed to find off-farm employment. As a result, they may own less land and livestock.

Household size and composition are also likely to be important in explaining saving behaviour. It is more difficult to save out of a given income draw if more mouths need to be fed. The link between household size and wealth is likely to be particularly evident in developing countries due to the high degree of uncertainty and the resulting strength of the precautionary saving motive. It has long been argued that larger households can internalise more risk than smaller ones (Kotlikoff and Spivak 1981). For example, falling ill is less likely to be a problem for someone who is part of a large household than for the sole income-earner in a family. Similarly, it is easier to diversify the household's income sources if there is more than one working-age adult. In extreme, households can be considered as infinitely lived units ('dynastic households').

The final demographic variable considered here is the proneness of households to be subject to *illness*. Again, there are several channels through which this variable may affect the size and composition of asset portfolios. Let's start again with the income channel. Ill health is likely to have a negative impact on household income. Not only does it result in foregone income, particularly if the illness strikes a working-age adult, but it also necessitates some financial outlay to cover medical costs such as a visit to the nurse or medications. Another channel is through risk aversion. There are several theoretical motivations for why greater exposure to uninsurable background risk, such as prevalence of diseases, should orient portfolio allocations away from assets whose uncertain returns introduce additional risks; see Pratt and Zeckhauser (1987), Kimball (1991, 1993) and Gollier and Pratt (1996).

Table 11: Demographic characteristics

	Age of household head			Education of head (yrs)		
	mean	std dev.	median	mean	std dev.	median
1994	46.5	16.3	45	1.79	3.11	0
1995	47.4	16.1	46	1.78	3.11	0
1997	48.4	15.7	48	1.75	3.09	0

	Household size			Share of working days lost to illness[1]		
	mean	std dev.	median	mean	std dev.	median
1994	6.1	3.0	6	23.1%	N/A	0
1995	6.0	3.0	6	13.9%	N/A	0
1997	5.8	2.7	5	15.8%	N/A	0

Note: [1]The survey asked interviewees to indicate how many days they have been off due to illness over the preceding four weeks. The percentages presented are derived by dividing the answer by 28. This is clearly not a comprehensive measure of the household's proneness to illness, but a good proxy nonetheless. Given the derived nature of the percentages, standard deviations are not presented.

Source: Author's calculations based on the Ethiopia Rural Household Survey.

Table 11 provides an overview of the key demographic variables for the sample households. It shows that on average household heads are around 47 years old and have less than two years of formal education. The average size of households is around 6. Households affected by illness lose between 13 per cent and 23 per cent of their working days. The figures also indicate that the average age of household heads increased over the survey period, while average household size fell. These trends are to be expected in mostly poor rural areas where at least some of the younger generations are attracted to migrate to urban areas.

How do the size and composition of asset portfolios vary with these demographic variables? This question is answered in Table 12, which provides correlations between the four demographic variables and the various asset holdings. I also carried out regression analysis to ascertain that the story told by the individual correlation coefficients still stands after controlling for non-linearities and the simultaneous effect

of the other demographic variables. More specifically, I regressed the various types of assets on the group of four demographic variables, included squared terms and controlled for heteroscedasticity. The results (not shown here) give a similar picture.

Table 12: Correlations between asset holdings and demographic variables

	1994		1995		1997	
Type of asset	Age of head	Education of head	Age of head	Education of head	Age of head	Education of head
Land (plot size)	0.08	0.01	N/A	N/A	N/A	N/A
Durables	-0.02	0.09	-0.02	0.10	-0.03	0.14
Livestock	0.11	0.04	0.12	0.04	0.07	0.08
Crop/food stocks	0.01	0.08	0.00	0.11	0.01	0.07
Total portfolio	0.06	0.10	0.06	0.11	0.04	0.12

	1994		1995		1997	
Type of asset	Size	Days lost to illness	Size	Days lost to illness	Size	Days lost to illness
Land (plot size)	0.13	0.02	N/A	N/A	N/A	N/A
Durables	0.06	-0.03	0.07	-0.02	0.12	-0.01
Livestock	0.24	-0.02	0.22	-0.02	0.27	-0.07
Crop/food stocks	0.12	-0.07	0.15	-0.03	0.15	-0.02
Total portfolio	0.21	-0.05	0.22	-0.03	0.28	-0.06

Source: Author's calculations based on the Ethiopia Rural Household Survey.

Table 12 shows that the only correlations that are consistently negative are those for the number of working days lost to illness. This is not surprising. As mentioned, households that are more prone to illnesses are likely to earn lower incomes. In turn, households with lower incomes tend to own fewer assets than households with higher incomes.

The remaining three sets of correlations tend to be positive across the board (the few exceptions with negative correlations are insignificantly low). By far the strongest positive correlations are found for household size. Larger households tend to own more land and more of any of the other assets. In fact, regressing land or non-land assets on household size, while controlling for non-linearities and the impact of the other demographic variables, yields significance at the 1 per cent level across all three years, with the largest coefficients being recorded for livestock. The high positive association for livestock holdings points to the importance of household labour in looking after the animals.

The correlations for characteristics of the household head (age and education) also tend to be positive, but of a smaller magnitude. More educated heads of household tend to be wealthier. This effect has high statistical significance in the regression analysis. Durables and crop/food stocks are the main causes for this positive association. The

near-zero correlation between education and land holdings, and the (unreported) insignificant regression coefficients, are in line with the aforementioned possibility that more educated household heads derive a greater share of their income from off-farm activities. While older heads of household tend to be wealthier, this effect was often not statistically significant in the regression analysis. In fact, much of this positive association is driven by an increase in livestock holdings as the head of household gets older.

8 The role of assets in marriage decisions

A person's wealth, or lack thereof, has a fundamental impact on most aspects of life. While this paper has focused mostly on economic aspects relating to asset holdings, the sociological literature provides rich insights into other functions of assets, e.g. in determinig a person's status in society; see Bevan and Pankhurst (1996) for a sociological survey of the ERHS villages. Here, I will concentrate on one such function, which is often overlooked, namely the role that assets play in marriage markets. The discussion draws on three recent studies by Fafchamps and Quisumbing (2002, 2005a, 2005b), who investigate this issue for the ERHS households. A more comprehensive overview of the issues is provided in the paper by Deere and Doss (2006). Marriages in rural Ethiopia tend to be arranged by the couple's parents, often without consulting their children. Two thirds of the survey respondents indicated that they had never spoken to their future spouse before the marriage (Fafchamps and Quisumbing 2002). Furthermore, remarrying is comparatively frequent, with 43 per cent of husbands and 32 per cent of wives having been married more than once (Fafchamps and Quisumbing 2005b).

In rural areas of developing countries, a marriage is not only the union of two people and the formation of a family. As most households are engaged in farming, a marriage also constitutes the formation of a new 'production unit'. The assets that a couple is endowed with at the time of marriage can thus be considered as the 'start-up capital' with which this new enterprise gets established. Such assets therefore do not only have an effect on a household's immediate income, but also on its long-term prosperity (Fafchamps and Quisumbing 2002, 2005a, 2005a).

The extent to which newly married couples receive assets at the time of marriage, and the type of assets they receive, varies across cultures. In rural Ethiopia, marriage is identified as an occasion for substantial asset transfers—in fact intergenerational asset transfers take place primarily at the time of marriage (Fafchamps and Quisumbing 2005b). These transfers do not usually take the form of ritual gifts, such as dowries or bride prices. Instead, the wealth transferred takes the form of assets that will enable the new household to earn an independent income. The most important asset that the new couple inherits is land, which is usually brought to the marriage by the groom. Indeed, grooms may have to wait until they are allocated land before they are able to marry. As

a result, the value of assets that the groom brings to the marriage is ten times greater than what the bride contributes: 4,270 birr versus 430 birr (Fafchamps and Quisumbing 2002, 2005a). In fact, two-thirds of brides bring no assets to the marriage. If they do contribute assets, they usually take the form of livestock rather than land. The value of assets brought into the marriage is shown to have a significant effect on the control over assets during the marriage and the distribution of assets upon divorce.

Family wealth also plays an important role in the selection of marriage partners (Fafchamps and Quisumbing 2005b). In particular, it can be shown that households in rural Ethiopia engage in 'assortative matching'. In other words, the rich marry the rich while the poor marry the poor. In line with such behaviour is the finding that the value of assets brought to the marriage is positively correlated with parents' wealth. Finally, there is also evidence that the parents of brides act strategically in endowing their daughters with assets. For example, they tend to give more to daughters if it raises their chances to marry a wealthy groom. Parents do not, however, compensate for outcomes in the marriage market, i.e. they do not allocate more assets to those siblings that were less successful in finding wealthy spouses (Fafchamps and Quisumbing 2005a).

In summary, the distribution of assets at the time of marriage plays an important role in the matching of spouses and is likely to have a significant impact on the household's future prosperity. The positive correlation between parental wealth and transfers to spouses as well as the positive correlation between the wealth of the groom's family and of the bride's family imply a perpetuation of wealth inequality and constitute a limitation on intergenerational mobility. However, Fafchamps and Quisumbing (2005b) show that the Gini coefficient for current asset holdings is significantly lower than for asset holdings at the time of marriage. This could be the result of continuing asset accumulation by less wealthy households, parental bequests after marriage or public redistribution policies. Furthermore, it is worth pointing out that schooling and other measures of human capital are likely to become more important than physical asset holdings as a country becomes more developed.

9 Conclusions

Evidence on household-level asset holdings in Africa is scarce. We know much more about consumption and income patterns of African households than we know about their wealth. This paper contributes to filling this gap by investigating the distribution of asset holdings in rural Ethiopia. It is one of only a few efforts to provide a detailed and disaggregated analysis of household-level asset portfolios in Africa. I show that non-financial assets make up the majority of household wealth. Furthermore, the composition of asset portfolios varies significantly across sample households. For example, it depends on the size of the portfolio and the household's exposure to uncertainty. Finally, asset holdings are positively correlated with income and consumption.

I show that asset inequality is lowest for land and much higher for all other assets. Asset inequality is found to be higher than consumption inequality but, somewhat surprisingly, lower than income inequality. The paper also explores the importance of demographic variables in shaping asset portfolios and demonstrates that asset holdings increase with household size and with the education of the household head. Finally, it is shown that assets play a critical role in marriage markets in rural Ethiopia.

References

Attanasio, O., and J. Banks (2001). 'The Assessment: Household Savings: Issues in Theory and Policy', *Oxford Review of Economic Policy* 17(1): 1-19.

Ayalew, D. (2003). 'Risk-Sharing Networks among Households in Rural Ethiopia', mimeo, Katholieke Universiteit Leuven: Belgium.

Bevan, P., and A. Pankhurst (1996). *Report on the Sociological Dimension of the Ethiopian Rural Economies Project: CSAE and AAU Research Report*, March, Centre for the Study of African Economies, University of Oxford: Oxford.

Bigsten, A., B. Kebede, A. Shimeles, and M. Taddesse (2003). 'Growth and Poverty Reduction in Ethiopia: Evidence From Household Panel Surveys', *World Development* 31(1): 87-106.

Bigsten, A., and A. Shimeles (2004). 'Dynamics of Poverty in Ethiopia', *WIDER Research Paper* 2004/39, UNU-WIDER: Helsinki.

Browning, M., and A. Lusardi (1996). 'Household Saving: Micro Theory and Micro Facts', *Journal of Economic Literature* 34(4): 1797-855.

Burger, R., F. Booysen, S. van der Berg, and M. von Matitz (2006). 'Marketable Wealth in a Poor African Country: Using an Index of Consumer Durables to Investigate Wealth Accumulation by Households in Ghana', *WIDER Research Paper* 2006/138, UNU-WIDER: Helsinki.

Cowell, Frank A. (1995). *Measuring Inequality*, Harvester Wheatsheaf: Hemel Hempstead.

Deaton, A. (1990). 'Saving in Developing Countries: Theory and Review', *Proceedings of the World Bank Annual Conference on Development Economics 1989*, World Bank: Washington DC.

Deaton, A. (1997). *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*, Johns Hopkins University Press: Baltimore.

Deere, C.D., and C.R. Doss (2006). 'Gender and the Distribution of Wealth in Developing Countries', *WIDER Research Paper* 2006/115, UNU-WIDER: Helsinki.

Dercon, S. (1996). 'Risk, Crop Choice, and Savings: Evidence from Tanzania', *Economic Development and Cultural Change* 44 (3): 485-513.

Dercon, S. (1998). 'Wealth, Risk and Activity Choice: Cattle in Western Tanzania', *Journal of Development Economics* 55(1): 1-42.

Dercon, S. (2001). 'The Impact of Economic Reforms on Households in Rural Ethiopia 1989-1995', mimeo, University of Oxford: Oxford.

Dercon, S. (2004). 'Growth and Shocks: Evidence from Rural Ethiopia', *Journal of Development Economics* 74(2): 309-29.

Dercon, S., and P. Krishnan (1996). 'Income Portfolios in Rural Ethiopia and Tanzania: Choices And Constraints', *Journal of Development Studies* 32(6): 850-75.

Dercon, S., and P. Krishnan (1998). 'Changes in Poverty in Rural Ethiopia 1989-1995: Measurement, Robustness Tests and Decomposition', *CSAE Working Paper* 98-7, Centre for the Study of African Economies, University of Oxford: Oxford.

Dercon, S., and P. Krishnan (2000). 'Vulnerability, Seasonality and Poverty in Ethiopia', *Journal of Development Studies* 36(6): 25-53.

Fafchamps, M. (1999). 'Rural Poverty, Risk and Development', *FAO Economic and Social Development Paper* 144, Food and Agriculture Organisation: Rome.

Fafchamps, M. (2003). 'Inequality and Risk', *Department of Economics Discussion Paper* 144, University of Oxford: Oxford.

Fafchamps, M., and A. Quisumbing (2002). 'Control and Ownership of Assets within Rural Ethiopian Households', *Journal of Development Studies* 38(6): 47-82.

Fafchamps, M., and A. Quisumbing (2005a). 'Assets at Marriage in Rural Ethiopia', *Journal of Development Economics* 77(1): 1-25.

Fafchamps, M., and A. Quisumbing (2005b). 'Marriage, Bequest, and Assortative Matching in Rural Ethiopia', *Economic Development and Cultural Change* 53(2): 347-80.

Fafchamps, M., C. Udry, and K. Czukas (1998). 'Drought and Saving in West Africa: are Livestock a Buffer Stock?', *Journal of Development Economics* 55(2): 273-305.

Gersovitz, M. (1988). 'Saving and Development', in H.B. Chenery and T.N. Srinivasan, (eds) *Handbook of Development Economics*, Vol. 1, North Holland: Amsterdam.

Gollier, C., and J.W. Pratt (1996). 'Risk Vulnerability and the Tempering Effect of Background Risk', *Econometrica* 64(5): 1109-23.

Jalan, J., and M. Ravallion (2001). 'Behavioral Responses to Risk in Rural China', *Journal of Development Economics* 66(1): 23-49.

Kebede, B. (2006). 'Land Reform, Distribution of Land and Institutions in Rural Ethiopia: Analysis of Inequality with Dirty Data', mimeo, University of East Anglia: Norwich.

Keynes, J.M. (1936). 'The General Theory of Employment Interest and Money', Macmillan: London.

Kimball, M. (1991). 'Precautionary Motives for Holding Assets', *NBER Working Paper* 3586, National Bureau of Economic Research: Cambridge MA.

Kimball, M. (1993). 'Standard Risk Aversion', *Econometrica* 61(3): 589-611.

Kotlikoff, L.J., and A. Spivak (1981). 'The Family as an Incomplete Annuities Market', *Journal of Political Economy* 89(2): 372-91.

Li, S., and R. Zhao (2006). 'The Changes in Distribution of Wealth in China, 1995-2002', paper presented at WIDER project meeting on Personal Assets from a Global Perspective, 4-6 May, UNU-WIDER: Helsinki.

Litchfield, J.A. (1999). 'Inequality: Method and Tools', mimeo, World Bank: Washington DC.

Marcus, H.G. (2002). *A History of Ethiopia*, University of California Press: Berkeley CA.

McKay, A. (2002). 'Defining and Measuring Inequality', *ODI Inequality Briefing Paper* 1/2002, Overseas Development Institute: London.

McKay, A., and D. Lawson (2003). 'Assessing the Extent and Nature of Chronic Poverty in Low Income Countries: Issues and Evidence', *World Development* 31(3): 425-39.

Pratt, J.W., and R.J. Zeckhauser (1987). 'Proper Risk Aversion', *Econometrica* 55(1): 143-54.

Reardon, T., P. Matlon, and C. Delgado (1988). 'Coping with Household-Level Food Insecurity in Draught-Affected Areas of Burkina Faso', *World Development* 16(9): 1065-74.

Rogg, C. (2005). 'Precautionary Saving and Portfolio Management in Uncertain Environments: Evidence from Rural Ethiopia', PhD thesis, University of Oxford.

Rosenzweig, M.R., and H.P. Binswanger (1993). 'Wealth, Weather Risk and the Composition and Profitability of Agricultural Investments', *Economic Journal* 103: 56-78.

Sinha, S.H., and M. Lipton (1999). 'Damaging Fluctuations, Risk and Poverty: A Review', background paper for the *World Development Report* 2000/2001, University of Sussex: Brighton.

Torche, F., and S. Spilerman (2006). 'Household Wealth in Latin America', *WIDER Research Paper* 2006/114, UNU-WIDER: Helsinki.

Udry, C. (1995). 'Risk and Saving in Northern Nigeria', *American Economic Review*, 85(5): 1287-300.

World Bank (2000). *World Development Report 2000/2001: Attacking Poverty*, World Bank and Oxford University Press: New York.

World Bank (2005). *World Development Indicators*, World Bank: Washington DC.