

ON THE WELFARE EFFECTS OF WORKING IN AGRICULTURE IN MOZAMBIQUE

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15 February 2005

Keywords: employment, poverty, labour markets, pro-poor growth, development, household surveys, instrumental variables, Mozambique

JEL codes: O12, C31, I32, J23

Abstract

Previous studies have shown clearly that education reduced poverty in Mozambique in the 1990s. What is less clear is if education had a direct or an indirect effect via employment on consumption. We address this issue by analysing various employment types (self- or wage-employment in the agricultural or non-agricultural sectors). Using national household survey data from 1996 and 2002, we find significant mobility across employment categories over time. Furthermore, using regression analysis, we find no direct welfare effect of employment in 1996 but a significant welfare effect of working in agriculture in 2002. We conclude by outlining policy implications.

Acknowledgements

We would like to thank Channing Arndt and his team at the Ministry of Planning and Finance in Maputo for their support and advice in carrying out this study. We also appreciate helpful comments from Riswanul Islam and from seminar participants at Sussex University, Humboldt University Berlin, and Hamburg University. Caroline Kip and Wolfgang Härle provided excellent research assistance. The research was financially supported by the International Labour Organisation (ILO). None of the findings or views expressed in this paper should be associated with any of the above organisations or individuals.

1. Introduction

This paper analyses the relationship between employment and poverty in post-war Mozambique. We provide a detailed and novel micro-economic assessment of the welfare effects of employment. The use of two household surveys from 1996-97 and 2002-03 allows us to establish the nationally-representative determinants of household welfare and household employment and their interdependence. Estimating the effect of employment outcomes on household welfare addresses an important linkage between growth, employment and poverty. Based on these findings, we derive policy recommendations for pro-poor growth in Mozambique.

Rural non-farm employment has often been considered relatively non-productive. In the views of many, the rural non-farm sector in Mozambique was contributing to neither growth nor welfare. The Lanjouw survey of non-farm data and policy experience was a crucial attempt to correct this view (Lanjouw and Lanjouw 2001). They argued that the rural non-farm sector can play a significantly positive role in promoting growth and welfare, for instance by slowing rural-urban migration, providing alternatives for those left out of agriculture or by increasing household security through income diversification. Using data from two years, we can test if their optimistic view of rural non-farm employment in Mozambique is valid or not.

In doing so, our analysis has a double focus. On the one hand, we aim to understand welfare, measured by household consumption, and the role employment patterns in the household can play. On the other hand, we also aim at identifying personal or household characteristics that actually allow for a certain pattern of employment. For this, we use a two-way classification of employments (which provide earned income). First, we distinguish by sector, i.e. agricultural versus non-agricultural employment¹, where the distinction only refers to the main activity of the site where the work is performed and not to the location, which could be rural or urban. Second, we distinguish income earners by function, i.e. self-employment versus wage employment.

Using this framework, all income earners are sorted by their main activity into one of these four categories. A fifth category consists of persons who are working but who do not get a monetary income. In most cases these will be helpers in the activities of other members of their household or family. Another definition we use is off-farm employment which broadens the non-agricultural

¹ Non-agricultural employment refers to employment in a sector other than agriculture, forestry or fishery. It does not only refer to employment off the household's farm. In the 2002-03 IAF survey activities related to either one of the three sectors (agriculture, fisheries, forestry) were grouped as one sector hence our definition of agriculture includes all three.

category to include wage work in the agricultural sector. So off-farm includes all employment that is held outside of the own farm.

Additionally, we make a distinction between rural and urban areas. In the empirical literature on welfare or employment choice the rural-urban distinction is widely used as a tool to divide the population (Gibson and Rozelle 2003, Heltberg and Tarp 2002, Justino and Litchfield 2002). Also the distinction between agricultural and non-agricultural sectors or the farm and non-farm sector is broadly applied (Barrett et al 2001). Some authors focus on one intersection of both which is usually the rural non-farm group (Isgut 2004, Mecharla 2002, Reardon 2000). The determination of where exactly lies the border between a rural and urban area may be subject to the survey designers' views. Other than rural urban differences, regional differences may also exist. Hence we opt to focus both on regional differences as well as on the rural-urban divide.

Our analysis shows significant mobility across employment activities. We find no direct effect of employment on consumption in 1996 but such effect exists in 2002. Therefore, the sector of employment also has a distinct effect on household welfare, which represents an important linkage between poverty and growth and which has important policy implications.

The paper is structured as follows. Section 2 describes the data and our econometric methods. Sections 3 and 4 provide the aggregate trends in employment and in poverty, respectively. Section 5 analyses the determinants of individual occupational choice while section 6 analyses the determinants of household consumption, including the effects of occupational choice. Section 7 concludes.

2. Data

The data used for the analysis are the IAF data (Inquérito aos Agregados Familiares), which represent the only nationally representative data on employment and consumption available in Mozambique. The first IAF dataset was collected in the period from February 1996 to April 1997 (Government of Mozambique 1998). The second survey ran from July 2002 to June 2003 (Government of Mozambique 2004). In both cases the survey was designed and organised by the Instituto Nacional de Estatística (INE).² In 1996-97 the emphasis was on the households' living conditions, whereas in the later survey it was not as much on living conditions as on expenditures. More details on sampling method and data collection can be found in the two reports that resulted from the surveys (Government of Mozambique 1998, 2004).

² Summary statistics on most of the variables collected in both surveys have been published in Mozambique (Instituto Nacional de Estatística 1999, 2004).

Both surveys cover both rural and urban areas and are nationally representative. All 10 provinces were included and Maputo City was considered separately, as an eleventh province. Within each province all districts are included. The household sampling of the 1996-97 survey was based on the latest census available i.e. the 1980 census while the 2002-03 sampling was based on the more recent census of 1997. For each of the primary sampling units the survey teams used simple random selection techniques for inclusion of households in the sample. In 1996-97 nearly 8300 households were interviewed and 8700 in 2002-03. The IAF data do not have a panel character but have to be used as two cross-section datasets.

Information was collected both at household and individual level. At the individual level, there is information on age, gender, health, education and employment status. The latter topic is more broadly tackled in the first survey. At the household level there is information on land- and tree holdings, livestock ownership, dwelling characteristics, asset ownership and agricultural production. In the second survey not all of these topics are as extensively treated as in the first one and some are even left out such as land and livestock ownership. Both surveys have sections on household expenditure, recorded in much more detail in the second survey. This slightly different focus entails some constraints for our empirical analysis since we decided for comparability reasons to use only data that were collected in both surveys. However, many interesting changes can be observed using only the variables that overlap.

Between both surveys the definition of rural and urban even changed, including some of the former rural areas in the urban category in the 2002-03 survey. Ten percent of the sample population living in urban areas in 2002 would have been living in rural areas under the 1996 rural-urban definitions. Obviously, the boundaries should change in the course of the urbanization process. For comparative reasons we applied the 2002-03 definition also to the 1996-97 sample.

Whenever we make the rural-urban division we use the 2002-03 definition for both surveys. By this definition the north and central regions are equally “rural” as the percentage of the sample living in rural areas was 65 and 64 percent respectively in 1996 and 60 and 61 percent respectively in 2002. The south is the “urban” region with 53 and 65 percent of its sample population living in urban areas in 1996 and 2002 respectively. In all regions we notice an increase in the urban population. In what follows all statistics are weighed to correct for sampling probabilities³.

We would have liked to assess the structure of real wages and earnings of wage-paid workers and real earnings of the self-employed in order to analyse another important element in the channel of

³ The weights are the inverse of the probability with which a particular household in the primary sampling unit could be selected for being interviewed.

transmission of benefits of growth to the poor. However, for two reasons this was not possible. First, the available data focuses on the analysis of household consumption levels but neither on household income data nor on wage rates. Second, the smallholder farm sector in Mozambique is characterised by a large share of auto-consumption and it accounts for the majority of employment in the country. Therefore data on wage rates are neither available nor would they be easy to calculate in principle. The methods of this section have therefore been adjusted to the needs of a dataset containing the consumption data of many rural, self-employed farm households.

3. Aggregate Trends in Employment

To develop a view of the employment status of the sample population and to show how it differs over time and across regions, we present some summary statistics in Figure 3.2. We restrict the sample population to include only active age persons, i.e. man and women between 16 and 65 years old, which exists of exactly 50 percent of the individuals in the sample in both surveys.

The percentage of working active age people rose slightly from 1996 to 2002 and is much lower in the south than in the rest of the country. The percentage of students in the active age category increased by some percentage points in all regions. Of the working people many are helpers in a family member's activity and do not earn a monetary income from their personal labour (38 percent of the working active age population in 1996 and 36 percent in 2002).

The percentage who actually earn an income is highest in the southern provinces and increased in the centre and the south by five percentage points. We observe a major increase in the percentage of persons who hold more than one activity. Nationally it increased from 6 to 19 percent. The percentage of persons with more activities is highest in the north and lowest in the south. Whether this increased diversification behaviour is the result of more opportunities or more need is difficult to tell from the available data.

Figure 1: Percentage of activity types, of active age population (16 to 65)

	1996-97				2002-03			
	Total	North	Centre	South	Total	North	Centre	South
Working	83	86	86	72	84	90	87	72
(Income earning)	62	61	60	66	64	59	64	71
(>1 Activity)	6	8	5	5	19	22	19	16
Domestic work	8	7	6	12	3	2	1	6
Students	5	3	5	8	8	5	7	11
Other	5	4	3	8	6	3	5	11

The importance of each of four the employment categories described above is reflected by the percentages in Figure 3.3. Differences by gender or location (rural-urban) can be found in appendix (Figure 15). In 1996, 75 percent of the active population claimed to have as their main activity self-employment in the agricultural sector (i.e. the farmers) whereas this dropped to 68 percent in 2002 but still remained by far the most important category of employment. The next to most important category in both years was wage employment in a non-agricultural sector, rising from absorbing 14 to 20 percent of the population. The proportion of men having a non-agricultural employment rose from 26 to 35 percent while the proportion of women rose from 13 to 21 which shows it is more a male category. The exodus out of self employed farming is stronger for men than women, decreasing by 8 and 5 percent respectively.

In the rural areas self employed farming remains the most widely chosen activity. We do observe an increase in the non-agricultural sectors from 8 to 13 percent. In the urban areas the increase in non-agricultural sectors is much larger going from 53 to 64 percent. Especially the non-agricultural wage sector increased strongly in urban areas.

Also regionally, a lot of changes have taken place. In 1996, the north and central regions were very similar in occupation structure having more than 80 percent of its population in self employment farming. The southern provinces show a radically different picture where only half of the population's main activity is engaged in self-employed farming. 32 percent is working for a wage in a non-agricultural sector. The south is the most urbanized area of the three hence its urban occupation pattern is not surprising. In 2002 also the other regions showed a more diversified pattern, having more than 20 percent of its population working in non-agricultural sectors. In the south this had risen to 54 percent.

Figure 2: Importance of employment categories, total and by region (income earning active age population)

Percentage ^a	1996-97				2002-03			
	Total	North	Centre	South	Total	North	Centre	South
Farmers	75	84	81	51	68	77	76	43
Agri wage	4	3	5	3	2	2	2	3
Non-agri self	7	5	5	14	10	5	10	17
Non-agri wage	14	8	9	32	20	16	12	37
Observations ^b	10223	2614	3614	3995	11509	2579	4291	4639

^a Percentages are calculated using sampling weights. ^b Observations presents actual numbers in the sample.

In Figure 3.4 the different non-agricultural sectors and the percentage of active working people they absorb are presented for both survey years. In appendix (Figure 16) the sample is split up by those working for their own account and those working for a wage. The largest non-agricultural sector

was commerce and sales in 1996. It absorbed more than half of the self-employed workers. Another fourth of the self-employed were active in manufacturing. Commerce and sales gained much in importance. By 2002 36 percent of the non-agricultural workers could be found in this sector. If we focus on the self-employed we observe that the manufacturing sector crashed from employing 24 to only 3 percent of the self-employed. The commerce sector rocketed from 53 to 81 percent of the self-employed. In the wage sector we observe a decline in manufacturing whereas construction, education and especially services gained in importance as employers of the non-agricultural wage labourers.

Mozambique's large cashew processing factories stopped production in the late nineties as a result of the liberalisation of exports of raw cashew and they have been replaced by only some smaller firms in the north (Castel-Branco 2004). This can explain part of the fall in manufacturing. We see that the decline is largest in the north (-20% in manufacturing) where most of the cashew factories were located. The current local cashew nut processing sector is a growing business and labour intensive so possibly an increase in manufacturing labour can be expected in future surveys. The surge in construction is partly due to new mega projects such as the MOZAL factories in Maputo province, which is confirmed by the strongest construction employment increase in that region.

The increase in employment in the education sector could be due to increased government spending in this sector. From the regional decomposition can be observed that the increase in employment in the educational sector is mainly situated in the north. Increasing investment in education in the northern, or in general less educated, provinces is a deliberate strategy to close the educational gap between the different regions (Government of Mozambique 2001). In 1996 only 31% of the adults living in northern provinces were literate, compared to 42 in the centre and 64 in the south. In 2002 the gaps of both northern and central provinces with the southern was closing slowly, adult literacy being 39 percent in the north, 51 in the centre and 69 in the south.

Figure 3: Employment in non-agricultural sectors, total and by region (income earning active age)

Percentage ^a	1996-97				2002-03			
	Total	North	Centre	South	Total	North	Centre	South
Mining	5	2	1	8	3	2	4	3
Manufacturing	18	22	19	17	4	2	7	3
Construction	8	11	6	9	11	11	8	13
Transport	6	3	7	7	5	5	4	5
Commerce	25	23	24	27	36	34	42	34
Services	18	17	23	15	26	23	22	29
Education	6	9	7	4	8	13	7	5
Health	4	4	4	3	2	2	3	2
Public administration	8	7	8	7	6	9	4	5
Observations ^b	3360	401	719	2240	5106	664	1437	3005

^a Percentages are calculated using sampling weights. ^b Observations presents actual numbers in the sample.

The summary statistics shown so far are all at the individual level. But individuals do not act independently from one another. Within households there may be some clear division of tasks or employment types. As we can see from Figure 3.5, major employment type differences with respect to the position in the household exist. Only 33 percent of the spouses were engaged in an income earning activity whereas 61 percent of all household heads was. That number hardly changed for spouses but in 2002 all household heads were holding an income earning employment. 27 percent of all spouses was working in the self-employed agricultural sector in 1996. It decreased to 23 percent in 2002 and slightly more of them worked in non-agricultural employments. Also the household heads started working more in non-agricultural sectors. The movement away from agricultural into non-agricultural sectors was driven by household heads and other household members. The increase into non-agricultural employment was 6 percent for household heads, only 2 percent for spouses and 9 percent for other household members. Next, we check whether heads and spouses move out of agriculture together or whether they move in different directions (Figure 3.6) to diversify the household's income sources.

Figure 4: Intra-household division of employments

Percentage ^a	1996-97				2002-03			
	Total	Head	Spouse	Other	Total	Head	Spouse	Other
Farmers	46	74	27	17	43	71	23	15
Agri wage	2	3	2	2	1	2	0	2
Non-agri self	4	6	2	5	7	8	3	8
Non-agri wage	9	14	2	9	13	18	3	17
Helping	39	3	67	66	36	0	70	59
Observations ^b	18436	7425	5263	5748	18763	8177	5336	5248

^a Percentages are calculated using sampling weights. ^b Observations presents actual numbers in the sample.

An interesting evolution is observed in the households where the head is a farmer. In 1996, 17 percent of their spouses were helping while this was only 7 percent in 2002. At the same time the percentage of spouses also active in farming increased by 10 percent. This suggests that ever more spouses have a farming activity of their own. Having an own income could increase her bargaining position in the household. This is a positive evolution since the female income share is often found to positively affect child expenditure, health and education expenditure (Haddad and Hoddinott 1994, Hoddinott and Haddad 1995).

If the household head was working off the own farm, the percentages of spouses that were helping strongly increased. When looking at the percentages of spouses in non-agricultural self-employment, we found it increased for husbands who are earning a wage. It declined for husbands having the same type of employment. Possibly a diversification reason is driving this evolution. We also observe a nearly complete movement out of agricultural wage work for spouses. Only if their husbands are working in that category some spouses also do, but none of the other spouses will.

Figure 5: Activities of spouse by main activities of the household head

Percentage ^a	1996-97						2002-03					
	Farm	Agri wage	NA self	NA wage	Help	Obs ^b	Farm	Agri wage	NA self	NA wage	Help	Obs ^b
Spouse activity:												
Farmer	81	26	29	20	44	3024	91	22	21	7	4	3075
Agri wage	1	27	2	3	1	103	0	6	0	0	1	21
Non-agri self	0	1	11	10	4	181	1	4	6	13	5	316
Non-agri wage	0	1	2	13	1	170	1	1	4	14	2	287
Helping	17	44	56	53	50	1423	7	67	68	66	88	1367
Observations ^b	4944	221	584	1474	297		5026	174	890	2044	68	

^a Percentages are calculated using sampling weights. ^b Observations presents actual numbers in the sample.

From the figures presented here we can draw the following general conclusions. We find that a higher percentage of the working people hold more than one employment. A question that remains, is whether people respond to more opportunities or to a larger need to do engage in more than one

activity. With respect to what exactly people are doing, we find more engagement in non-agricultural activities especially in the wage sector.

Even within the non-agricultural sector, many changes have taken place. Noticeable are the extremely large drop in manufacturing opportunities and the increase in commerce and sales related activities. Although the trend manifests itself more clearly in the urban areas, we do find a higher participation in non-agricultural activities in the rural areas too. At the intra-household level we found that the movement out of agriculture is driven rather by household heads and other household members than by spouses. In the farming households we observed spouses being engaged more in independent farming activities rather than helping their husbands. Furthermore, spouses appear to have withdrawn completely from working in the agricultural wage sector.

4. Aggregate Trends in Consumption

The national poverty headcount of Mozambique dropped from 69.4 percent in 1996 to 54.1 percent in 2002 (Government of Mozambique 1998, 2004).⁴ In urban areas, poverty dropped by 10.5 percentage points whereas in rural areas it dropped by as much as 16 percentage points. This is a strong achievement suggesting that the central objective of the PARPA (Action Plan for the Reduction of Absolute Poverty, 2001) to reduce the incidence of absolute poverty to less than 60 percent by 2005 has been attained.

⁴ The poverty headcount of 54.1 percent is obtained with the flexible bundle approach poverty lines for 2002-03. When using the flexible bundle approach changes in consumption behaviour can also be taken into account, in addition to changes in prices. However, due to data restrictions many analysts are forced to use the fixed bundle approach despite its shortcomings. In that case, the national poverty headcount for Mozambique would have been 63.2 percent showing a much lower decline in poverty.

Figure 6: Poverty Headcount and Poverty Gap

	Poverty Headcount			Poverty Gap		
	1996-97	2002-03	Difference	1996-97	2002-03	Difference
National	69.4	54.1	-15.3	29.3	20.5	-8.8
Urban	62.0	51.5	-10.5	26.7	19.7	-7.0
Rural	71.3	55.3	-16.0	29.9	20.9	-9.0
North	66.3	55.3	-11.0	26.6	19.5	-7.1
Centre	73.8	45.5	-28.3	32.7	16.0	-16.7
South	65.8	66.5	0.7	26.8	29.1	2.3
Niassa	70.6	52.1	-18.5	30.1	15.8	-14.3
Cabo Delgado	57.4	63.2	5.8	19.8	21.6	1.8
Nampula	68.9	52.6	-16.3	28.6	19.5	-9.1
Zambézia	68.1	44.6	-23.5	26.0	14.0	-12.0
Tete	82.3	59.8	-22.5	39.0	26.3	-12.7
Manica	62.6	43.6	-19.0	24.2	16.8	-7.4
Sofala	87.9	36.1	-51.8	49.2	10.7	3.6
Inhambane	82.6	80.7	-1.9	38.6	42.2	3.6
Gaza	64.6	60.1	-4.5	23.0	20.6	-2.4
Maputo Province	65.6	69.3	3.7	27.8	31.1	3.3
Maputo City	47.8	53.6	5.8	16.5	20.9	4.4

Source: Government of Mozambique (2004: 24).

While the difference between urban and rural areas has been narrowed from 9.3 to 3.8 percentage points, the differences between geographical regions have been enlarged. A very large decline in poverty (28.3 percentage points) is observed in the centre, a much smaller decline in the north (11 percentage points) and an increase of 0.7 percentage points in the south. From being the poorest area in 1996 the centre showed the lowest incidence of poverty in 2002. The decline in poverty in the centre is strongly driven by a huge reduction in poverty in Sofala province (51.8 percentage points). Provinces where poverty actually increased are Cabo Delgado, the most northern province, Maputo Province and Maputo City, in the most southern part of the country.

In the following set of figures we present the bivariate link between the household's employment and welfare situation. To analyse the exact effect of employment on welfare, correcting for other factors, we refer to the multivariate approach later in the paper.

Although welfare has more than a monetary dimension we use household expenditure per capita to proxy it. From Figure 3.1 we learned that in 2002 rural areas showed a still higher poverty incidence than urban areas (55.3 compared to 51.5 percent) and the south showed the highest poverty incidence, whereas in 1996 the south was the least poor region. This region even showed a small increase in its poverty rate. We hope to be able to explain a part of what may have caused this

worsening of the south's situation by analysing employment. Because of different poverty evolutions, our summary statistics will present national but also regional and locational (rural-urban) averages.

Mozambique experienced relatively high growth rates over the last few years. But an often heard critique is that growth does not benefit all socio-economic groups equally. Although growth is necessary it is not sufficient to reduce poverty (in all groups of society). In the following bivariate tables we use our two-way employment division to create socio-economic groups based on the income earning activity of the household head. We present the change in average weighted consumption per capita for each poverty quartile and each employment category.

The figures show that the consumption of three poorest quartiles increased more or less by the same rate between 1996 and 2002 but the richest quartile grew much faster. Consumption per capita of the households in the agricultural sector increased by around 80 percent, while that of the self-employed in the non-agricultural sector grew by 102 and that of the wage earners in this sector by 127 percent. The group of households with a head who was not earning a monetary income, but helping in a family member's activity, were worst of in both years and experienced the lowest consumption growth.

Figure 7a: Change in average consumption ^a per poverty quartile (nominal)

Poverty quartiles	1996-97	2002-03	Percentage change
Poorest quartile	2109	4061	93
2 nd poorest quartile	3763	7386	96
2 nd richest quartile	5747	11126	94
Richest quartile	13640	27839	104

^a Consumption is expressed in local currency, Meticaís (Mt)

Although there are differences between economic groups, the consumption growth rates are large. Even taken into account an average inflation rate of 8.4 percent over the last six years⁵ there is still substantial consumption growth in all groups. So we observe real consumption growth in all categories but the rich and the non-agricultural sectors grow faster. The agricultural (primary) sector is characterised on average by lower growth rates than the secondary and tertiary sectors which suggests lower benefits of total growth in the categories involved.

⁵ Total cumulative inflation of 50.4 percent from 1997 to 2002. Annual percentage inflation rates (of consumer prices) are 7.4, 1.5, 2.9, 12.7, 9.1 and 16.8 % from 1997 to 2002, respectively (World Bank 2004).

Figure 7b: Change in average consumption per employment category of the head (nominal)

Employment categories	1996-97		2002-03		Percentage change
	Observations	Cons	Observations	Cons	
Farmers	4969	5811	5026	10578	82
Agricultural wage	220	5889	173	10665	81
Non-agricultural self	583	8402	890	16992	102
Non-agricultural wage	1469	8569	2044	19471	127
Helping	202	5187	43	8938	72

The following figures (Figures 3.8 a-d) give a general overview of the change in the relative consumption position of locations and regions, general and split up by employment category of the household head. The enumerator of all ratios is weighted average national consumption per year. The numerators are weighted average consumption of the respective categories. So the numbers in the figures give the average relative position of the households in a certain category.

Figure 8a: Relative consumption position by location and region

National weighted average cons=1		1996-97	2002-03	Change position
Location	National	1	1	0
Location	Urban	1.12	1.24	+0.12
	Rural	0.95	0.90	-0.05
Region	North	1.02	0.93	-0.09
	Centre	0.90	1.08	+0.18
	South	1.15	0.96	-0.19

From Figure 8a we learn that urban dwellers have a relatively better consumption position in 1996 and the discrepancy between urban and rural citizens has even widened over the years. With respect to the region it used to be relatively better to live in the south but in 2002 the best region to live appeared to be the centre, which was the worst of the three regions in 1996.

Figure 8b: Relative consumption position by main activity category of household head

	1996-97			2002-03		
	Self-empl	Wage	Total	Self-empl	Wage	Total
Agricultural	0.92	0.93	0.92	0.84	0.85	0.84
Non-agricultural	1.33	1.36	1.35	1.35	1.55	1.48
Total	0.95	1.29	1	0.89	1.47	1

Figure 8b shows that households with a head working in a non-agricultural sector are relatively better off than households with a head working in agriculture. This holds in both years but the relative gap between both groups has widened. Also the relative gap between wage workers and

those working for their own account has widened. The most preferable category to be working in appears to be the non-agricultural and especially the non-agricultural wage sector. Next, we test whether this national observation holds in all regions and in rural versus urban areas.

Figure 8c: Relative consumption position by main activity category of household head, by region

		1996-97	2002-03	Change position
North	Agriculture, Self-employed	0.98	0.77	-0.22
	Agriculture, Wage	0.78	0.92	+0.14
	Non-agriculture, Self-employed	1.17	1.68	+0.51
	Non-agriculture, Wage	1.32	1.66	+0.34
Centre	Agriculture, Self-employed	0.89	0.96	+0.07
	Agriculture, Wage	0.67	0.94	+0.27
	Non-agriculture, Self-employed	0.95	1.41	+0.46
	Non-agriculture, Wage	1.24	1.64	+0.40
South	Agriculture, Self-employed	0.86	0.70	-0.16
	Agriculture, Wage	1.81	0.64	-1.17
	Non-agriculture, Self-employed	1.81	1.10	-0.71
	Non-agriculture, Wage	1.44	1.38	-0.06

In 1996, the non-agricultural wage jobs were associated with a relatively higher household consumption per capita in the north and the centre. In the south however, they did not and it were the households with a head working in either non-agricultural self-employment or in an agricultural wage jobs that had a relatively better consumption position. Nationally, living in the south and having a household head working in agricultural wage employment or non-agricultural self-employment was the best position to be in.

In 2002, however, these positions ranked much lower. Employment in the non-agricultural sector paid off more if the household was living in the north or the centre. No matter which type of employment a southern household head was holding, all southern job categories decreased in relative consumption rank. For those household heads living in the south, the relatively better jobs were to be found in non-agriculture, preferably wage employment. Living in the centre, the same holds. Living in the north, both types of non-agricultural employment are equally paying off in terms of household consumption. So more still in 2002 than in 1996 one would like to live in a household where the head was working in the non-agricultural sector.

From Figure 8d we find that this is the case both in rural and urban areas. However, we need to be careful in deriving premature conclusions from a bivariate analysis. Employment type may be strongly related to other characteristics of the individual, the household he resides in or the

community he is part of. In a multivariate analysis we can correct for other factors that affect household consumption per capita.

Figure 8d: Relative consumption position by main activity category of household head, by location

		1996-97	2002-03	Change position
Rural	Agriculture, Self-employed	0.95	0.85	-0.10
	Agriculture, Wage	0.71	0.71	0
	Non-agriculture, Self-employed	1.07	1.19	+0.12
	Non-agriculture, Wage	1.24	1.40	+0.16
Urban	Agriculture, Self-employed	0.78	0.76	-0.02
	Agriculture, Wage	1.36	1.01	-0.35
	Non-agriculture, Self-employed	1.55	1.47	-0.08
	Non-agriculture, Wage	1.40	1.59	+0.19

So far we neglected differences based on gender of the household head, on employer type (for persons working for a wage), or on the sector the household head is working in. Figures which reflect these type of differences in relative consumption ranking can be found in appendix (Figures A.3). In 1996 female headed households were doing slightly better than the national average whereas in 2002 they did worse. Hence the consumption growth of male headed households has been faster between the survey years compared to growth of female headed households' consumption.

This observation raises questions about whether there has been a narrowing of opportunities for female headed households and in what sense. With respect to the type of the employer in the wage workers' category, it was best to have an employer operating in the co-operative sector whereas this would be the last choice in 2002. In that year it was the public sector that gave rise to the relatively highest household expenditures followed by the private sector. In the non-agricultural sectors the ranking completely changed over both years. If it seemed best to be living in a household with a head working in the services, education or commerce and sales sectors in 1996, in 2002 it was better living with a head in public administration, health or manufacturing.

We can conclude from the summary statistics that working in the non-agricultural sector appears to result in relatively higher average consumption, in both urban and rural areas. Governments used to neglect the rural non-agricultural sector, but recently it has gained importance in poverty reduction strategies for example through stronger emphasis on the promotion of small-scale businesses and attempts to increase access to (micro)credit in rural areas. In Mozambique's PARPA too, the role of private initiatives is recognized, also for rural areas. For example, in the agricultural and rural development section, one of the six fundamental areas of action, increasing rural access to credit is

recognized as an important strategy to increase rural initiatives and the measures to do so include the creation of 30 micro-finance institutions in rural areas (Government of Mozambique 2001).

Although the average consumption in the non-agricultural sectors appears relatively higher, the percentages of people working in these sectors are much smaller than those in the agricultural sector indicating the existence of limited demand for such type of labour or other entry barriers. In what follows, we first identify the characteristics of individuals who work in non-agricultural sectors relative to those who choose to work in the agricultural sector and secondly how exactly employment type affects the household's per capita consumption.

5. Determinants of Employment Type

In the micro-econometric part we follow a two-step analysis. First, we look at the distribution of different types of employment. We aim to find those characteristics that yield a higher probability to end up in a non-agricultural employment as opposed to an agricultural one. Next we analyse how non-agricultural employment in the household affects the household's welfare, measured by expenditures per capita.

Following our division by sector and function, i.e. agricultural versus non-agricultural sector and self-employed versus wage worker, and adding the large category of family helpers (which consisted of 35 and 32 percent of the working people of active age in 1996 and 2002, respectively) there exist five occupations. The utility derived from each occupation is dependent on a set of individual I , household H and community characteristics Z , which could cover both supply and demand factors:

$$U_k = U(I, H, Z)$$

Occupation k is chosen if the utility derived from that occupation is larger than the utilities that could be derived from other occupations. Assume there are N possibilities, the choice can be represented by the indicator function I :

$$I_k = 1[U_k = \max(U_1, \dots, U_N)]$$

As the different possibilities do not follow any particular (objective) order, the estimation model we use is a simple multinomial logit model. The general form of the model can be presented as:

$$\Pr(\text{activity} = k) = \frac{e^{X\beta_k}}{e^{X\beta_1} + \dots + e^{X\beta_N}}$$

where the explanatory variables X are the same for all categories and β_k is the set of estimated coefficients in activity k . For identification purposes one category is chosen as the base category and $\beta_{base} = 0$. As we are interested in knowing how a change in the explanatory variables affects a

person's probability of choosing a certain category as opposed to choosing to work in the base category, we use relative risk ratios. They express:

$$\frac{\Pr(\text{activity} = k)}{\Pr(\text{activity} = \text{base})} = e^{x\beta_k}$$

We run the regressions on the active age subset of the sample separately for both survey years. As explanatory variables individual and household variables as well as regional dummies are included. At the individual level we use variables that represent human capital. Age and age squared are used to reflect experience. Dummy variables indicating whether the person has finished a certain level of education, more specifically one dummy for finishing primary school and one for secondary, are included. Also the gender of the person, marital status (being with or without a partner present), permanent health situation (whether the person has any disabilities), and whether the person is a household head are included to capture differential access to activities and culturally determined gender roles. At the household level we include the gender of the household head for the same reasons of differences in opportunities or culturally determined gender roles. The number of children (0 to 15 year olds) and the number of adults (over 16 of age) are included to capture time or physical constraints to engage for example in off-farm wage jobs.

In addition to individual or household characteristics location characteristics often play a significant role in employment decisions. For example, analysing agricultural supply response in Mozambique, the results of Heltberg (2002) are suggestive of a strong influence of area based characteristics. Mecharla (2002) for Andhra Pradesh and Isgut (2004) for Honduras find strong locational effects, more specifically from road infrastructure variables, on rural non-farm employment possibilities. We include provincial dummies to capture all type of differences between the provinces that could affect employment opportunities. Using a fixed effect model deals with possible biases due to omitted variables that could affect occupational choice at the provincial level.

The explanatory variables in the rural occupational choice analysis are different from those in the urban analysis only in two respects. On the one hand, secondary education is excluded since too few persons living in rural areas have completed their secondary education (5 persons in 1996 and 23 in 2002). On the other hand, the rural regressions include some community characteristics. These are a set of dummy variables, indicating whether a characteristic is present or not. The variables capture accessibility of the village and the presence of possible work sites such as health centres or schools. We included the presence of a market in the village (*market*), whether any form of transport reaches the villages (*transport*), the presence in the village of a health centre or a sanitary post (*health*), a primary and secondary school (*primary, secondary*) and a farmer information centre (*farminf*).

A problem our data may suffer from is the lack of physical and social capital variables (Narayan and Pritchett 1999). The latter are difficult to capture exactly and possibly endogenous but physical asset variables are often used in occupational choice analysis. Especially productive asset variables such as livestock and land could affect occupational choice. However, there were no questions asked relating to land or livestock in the IAF 2002-03 dataset, which focused on expenditures, so we find ourselves unable to use them as explanatory variables for either of the two years because of comparability reasons.

Although income portfolio theory stresses the importance of asset allocation (Barrett et al 2001) as they offer not only a store of wealth but also a source of income, sometimes they are found to be less significant in determining activity choice in empirical research. For example in Burkina Faso (Reardon et al 1992) land constraints do not drive income diversification. In Ethiopia and Tanzania, Dercon and Krishnan (1996) find that income portfolios are explained mainly by differences in ability, location and access to credit. Obviously income portfolio choice could be driven by asset ownership indirectly since access to credit is often determined by the ability to provide collateral. But examples of the opposite, where asset ownership does appear to affect occupational choice do exist.

Empirical evidence is supportive of both possibilities. Hence we can only hope that assets are not important in Mozambicans occupational choice and that our coefficients do not suffer from omitted variables biases. There are some observations in favour of the position that in Mozambique assets do not (yet) affect occupational choice. Unlike in many other African countries, land appears not to be a constraint so far. If households need more land to cultivate they would only have to clear it. Hence it is not the land that constitutes the constraint but labour, as it is the latter that is the key input in clearing land.

The results of the IAF 1996-97 poverty determinants analysis confirms the view that land is not important as a poverty determinant⁶. Moreover, the results show that the non-poor are more likely to use hired labour than the poor, both in rural and urban areas, which may indicate that the labour constraint plays a bigger role than the land constraint. Hence we may like to bear the omitted asset problem in mind while interpreting the results. For example, the coefficients of the provinces with higher population densities and binding land constraints may be biased towards off-farm employments due to the omitted land variable.

⁶ Based on empirical studies using the IAF 1996-97 data which found that land was insignificant as a poverty determinant, the question on land was not asked in the 2002-03 survey. Only for the northern areas land holdings did have a minor impact on the logarithm of consumption, a one percent increase in land holdings was found to have only a 0.05 percent increase in consumption per capita (Government of Mozambique 1998).

Figure 9 presents averages of the variables used in the regression. We observe few differences in demographic structure between urban and rural areas and between both years. The working persons between 16 and 65 years old (active age) are on average 35 years old, and they live in households with on average two or three children and two or three adults with the larger numbers in the urban areas. The share of female headed households increased by 4 and 3 percent in urban and rural areas respectively. The workforce appears to be more female in rural areas than in urban areas. In urban areas the workforce is characterised by a higher percentage of single persons (i.e. the never married, widowed or divorced), increasing strongly over the years whereas in the rural areas the percentage is lower and decreasing over the years. On average 2 percent is disabled, which could be physically or mentally disabled.

What did change between the years is the percentage of persons who reached the final year of primary and secondary school. In urban areas the former increased from 18 to 24 percent and in rural areas it remained the same being only around 4 percent. The percentage of workers with complete secondary schooling increased in urban areas from 2 to 4 percent while in rural areas it remained close to zero. The percentages of persons having gone to primary school for some years was 40 and 16 percent in 1996 for urban and rural areas respectively and 48 and 13 percent in 2002 so many drop out before reaching the final year. The percentages with some secondary education were 6 and 0 in 1996 and 9 and 1 in 2002 for urban and rural areas respectively.

Figure 9: Averages of variables used in employment regressions

Variables	1996-97		2002-03	
	Urban	Rural	Urban	Rural
Age (years)	35	35	34	35
Primary education (%)	18	4	24	3
Secondary education (%)	2	0	4	0
Sex (% male)	53	45	51	43
Single persons (%)	29	24	33	22
Disabled persons (%)	3	2	2	2
Sex of head (% male)	78	79	74	76
Children: age 0 to 15 (nr)	3	2	2	2
Adults: 16 and older (nr)	3	2	3	2
Market in the village (1/0)		25		45
Transport to the village (1/0)		27		46
Health infrastructure in the village (1/0)		24		24
Primary school in the village (1/0)		68		83
Secondary school in the village (1/0)		3		2
Farmer information centre in the village (1/0)		12		9

At the community level, there are significant changes with respect to infrastructure. In 1996 there was a market in only 25 percent of the sampled communities whereas in 2002 this had increased to 45 percent. The same occurred with transport going to the village. It existed in 27 percent of the communities in 1996 and in 46 percent in 2002. Also the percentage of villages with a primary school has strongly increased. For the other community variables no striking changes took place. It seems odd that the percentage of farmer information centres has gone down slightly since making rural areas more productive is explicitly promoted in the PRSP. Possibly there have been investment in enhancing the quality of the existent centres rather than creating additional ones. The same may hold for secondary schools.

We use separate models for different sub-samples. Figures 3.10 and 3.11 show the results of the multinomial regressions analysing the determinants of occupational choice in urban and rural areas respectively. We divide the sample based on location since the opportunities to get engaged in different types of employments may differ between rural and urban areas and different skills may be needed. Moreover, for the rural areas additional information was collected at the community level. Thus we include some of the community characteristics that were asked in both surveys in the rural part of the analysis. The results have to be interpreted towards the base category, which is the group of family helpers.

Urban analysis

Looking at some variables of interest, we find that age has an equal affect on all income earning categories, i.e. younger persons have a significantly higher chance to be helpers in the activity of another household member (Figure 10). In 2002 the discrepancy of the age effect between choosing to become a farmer or working off-farm⁷ has increased. The age effect being larger in off-farm employments could partly be explained by the fact that for an off-farm job one needs first to acquire some education (and possibly some social or informational network), making people older before they can actually try to obtain an off-farm employment. In 2002 more people study (cfr percentages in Figure 3.2) and start to work later which pushes the age effect upward.

This idea is confirmed by the results. Primary education increases access to all off-farm employments in 1996 and only to non-agricultural employment in 2002. Moreover, its effect became smaller. Having completed primary education, the ratio of choosing an income earning category as opposed to being a helper is largest for the non-agricultural wage category in both

⁷ The term off-farm is used to refer to activities other than being self-employed in the agricultural sector so it includes working for a wage in the agricultural sector, working for a wage in the non-agricultural sector and working for one's own account in the non-agricultural sector.

years. Surprisingly, secondary education is not very significant for selection into any of the income earning categories but it does appear to decrease the probability of becoming self-employed. So a person with secondary education living in an urban area will either be a family helper or working for a wage.

Figure 10: Determinants of occupational choice ^a, urban sample

	1996								2002							
	Agri-self		Agri-wage		Non-agri-self		Non-agri-wage		Agri-self		Agri-wage		Non-agri-self		Non-agri-wage	
	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.
Individual																
Age	1.170	***	1.167	**	1.180	***	1.265	***	1.174	***	1.444	***	1.316	***	1.310	***
	<i>0.032</i>		<i>0.078</i>		<i>0.053</i>		<i>0.046</i>		<i>0.045</i>		<i>0.101</i>		<i>0.055</i>		<i>0.058</i>	
Age ²	0.999	***	0.998	**	0.998	***	0.997	***	0.999	***	0.996	***	0.997	***	0.997	***
	<i>0.000</i>		<i>0.001</i>		<i>0.001</i>		<i>0.000</i>		<i>0.000</i>		<i>0.001</i>		<i>0.001</i>		<i>0.001</i>	
Primary	1.454		3.567	***	4.348	***	11.374	***	0.880		1.736		2.681	***	5.418	***
	<i>0.343</i>		<i>1.210</i>		<i>1.17</i>		<i>2.848</i>		<i>0.208</i>		<i>0.781</i>		<i>0.607</i>		<i>1.310</i>	
Secondary	0.850		9.475	*	0.829		4.600		0.120	**	2.131		0.217	*	2.843	
	<i>1.100</i>		<i>11.34</i>		<i>1.001</i>		<i>5.379</i>		<i>0.129</i>		<i>2.292</i>		<i>0.181</i>		<i>2.460</i>	
Sex	4.089	***	10.21	***	11.324	***	42.235	***	3.623	***	50.56	***	8.552	***	31.066	***
	<i>0.578</i>		<i>2.72</i>		<i>1.91</i>		<i>8.15</i>		<i>0.780</i>		<i>16.679</i>		<i>1.577</i>		<i>5.910</i>	
Single	0.680	**	0.725		0.851		0.853		0.309	***	0.495	*	0.532	***	0.662	
	<i>0.122</i>		<i>0.266</i>		<i>0.191</i>		<i>0.182</i>		<i>0.084</i>		<i>0.196</i>		<i>0.130</i>		<i>0.187</i>	
Disabled	0.982		0.291		1.209		0.397	**	0.675		0.107	**	0.695		0.335	**
	<i>0.264</i>		<i>0.278</i>		<i>0.506</i>		<i>0.173</i>		<i>0.254</i>		<i>0.115</i>		<i>0.322</i>		<i>0.156</i>	
Household																
Sex head	0.466	***	0.529		0.515	**	0.683		0.181	***	0.231	***	0.197	***	0.251	***
	<i>0.105</i>		<i>0.217</i>		<i>0.151</i>		<i>0.199</i>		<i>0.052</i>		<i>0.112</i>		<i>0.053</i>		<i>0.072</i>	
Children	1.015		0.910		1.016		1.056		1.007		0.888		1.024		0.977	
	<i>0.030</i>		<i>0.57</i>		<i>0.049</i>		<i>0.045</i>		<i>0.037</i>		<i>0.076</i>		<i>0.454</i>		<i>0.051</i>	
Adults	0.700	***	0.734	***	0.806	***	0.814	***	0.674	***	0.789	***	0.835	***	0.891	**
	<i>0.033</i>		<i>0.71</i>		<i>0.52</i>		<i>0.047</i>		<i>0.030</i>		<i>0.072</i>		<i>0.036</i>		<i>0.046</i>	
Provinces																
Fixed eff.																
Obs	5332								7324							
Pseudo R ²	0.306								0.272							

^a Base category : people working as helpers in a family member's activity. Robust standard errors in italic.

*** significant at 1%; ** significant at 5%; * significant at 10%

^b The estimations are pooled over all urban areas. Equality tests for common coefficients for each of the employment categories in each of the three geographical regions were performed. For the 1996-97 urban sample the hypothesis of equal coefficients in all regions was strongly rejected only for secondary education in all employment categories and for gender in both self-employment categories. In the 2002-03 urban sample equality was also rejected for primary education. We ran the same estimation with interaction terms for regions for secondary education and gender in 1996-97 and additionally for primary education in 2002-03. We found that the additional effects were significant but mostly small compared to the reference coefficients and would not change the conclusions drawn from the pooled estimations.

Being male results in a much higher probability of being an income earner, in 1996 in increasing order of being a farmer, working as a wage worker in the agricultural sector, being engaged in a non-agricultural self-employed activity and a 42 times higher probability of working for a wage in the non-agricultural sector. In 2002 the magnitudes of the effects of being male slightly decrease for all categories except for working in the agricultural sector for a wage. So the gender differences in

the probabilities of working off the own farm start to diminish only the agricultural wage sector appears to be reserved for men.

Further, the results are suggestive of lower probabilities for single household members to be working in agriculture. They will rather be helping or working for a wage in the non-agricultural sector. The wage category appears to offer low employment opportunities for disabled persons.

With respect to the gender of the household head, we find for 1996 that members of a male headed household have lower probabilities to be working in a self-employment category. They will either be helping or working for a wage. In 2002 the members of a male headed household have lower probabilities to be income earning at all but will rather be helpers.

The number of children (0 to 15 years old) do not seem to affect occupational choice. Adults present in the household do, but they only seem to have a downward effect on the choice to become an income earner in general. The effect is more or less the same in both years.

The location dummies (not represented in the figure) are often highly significant determinants of the probability to chose for an occupation type. For example, living in Maputo City in 1996 resulted in a extremely higher probability to be in non-agricultural wage or self-employment than to be a family helper. In 2002 the probabilities to be in a non-agricultural employment dropped in magnitude and were equal to those in Maputo Province but both were still much higher than those of any other province. Other provincial effects worth noticing are for example that in 1996 the probability of being an agricultural wage labourer was highest living in Maputo City whereas in 2002 it is highest in Maputo Province. The probability of being in non-agriculture plummeted in Maputo City while it strongly increased in Maputo Province and Sofala.

For 1996 we ran the regression including two dummies, one which indicates the landless households and one which indicates whether the household owns livestock. They often appeared insignificant and if they were it was in a negative way, decreasing the probability of having an employment off the own farm. The dummies never acted positive e.g. to increase the probability of having a non-agricultural employment, where they may have proven their collateral value. Moreover, including the dummies did not change any of the results discussed, except for the Maputo City dummies. When the land dummy was included their magnitude dropped considerably. So the large effect that living in Maputo has on the probability of being engaged in non-agricultural activities is partly explained by the household's smaller land holdings that create a need to look for off-farm employment.

Concluding, we found that education and gender appear to be the strongest determinants of which type of employment is held. They offer strong opportunities to work in off-farm employments especially in non-agricultural wage employment. But the effects appear to be decreasing over time.

Rural analysis

We mainly comment on the results that are different from those in the urban sample. The effect of age was the same in rural as in urban areas, increasing the probability of ending up in any income earning category, but declining with increasing age (Figure 11). The results show that also in the rural areas primary education gives a significantly higher probability of choosing a non-agricultural employment in both years. Although the education effects were smaller in rural than in urban areas in 1996, in 2002 they were higher for both non-agricultural categories.

Figure 11: Determinants of occupational choice ^a, rural sample

	1996								2002							
	Agri-self		Agri-wage		Non-agri-self		Non-agri-wage		Agri-self		Agri-wage		Non-agri-self		Non-agri-wage	
	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.	RRR	Sig.
Age	1.146	***	1.078	*	1.170	***	1.197	***	1.261	***	1.431	***	1.323	***	1.304	***
	<i>0.020</i>		<i>0.042</i>		<i>0.058</i>		<i>0.050</i>		<i>0.024</i>		<i>0.094</i>		<i>0.060</i>		<i>0.066</i>	
Age ²	0.999	***	0.999		0.998	***	0.998	***	0.998	***	0.995	***	0.996	***	0.997	***
	<i>0.000</i>		<i>0.001</i>		<i>0.001</i>		<i>0.001</i>		<i>0.000</i>		<i>0.001</i>		<i>0.001</i>		<i>0.001</i>	
Primary	1.274		0.910		2.286	***	10.934	***	0.936		1.276		3.035	***	17.105	***
	<i>0.231</i>		<i>0.429</i>		<i>0.753</i>		<i>2.608</i>		<i>0.228</i>		<i>0.633</i>		<i>0.986</i>		<i>4.784</i>	
Sex	11.346	***	6.866	***	42.016	***	174.024	***	27.086	***	95.433	***	104.891	***	151.560	***
	<i>1.131</i>		<i>1.267</i>		<i>9.015</i>		<i>52.671</i>		<i>3.108</i>		<i>33.133</i>		<i>23.397</i>		<i>38.356</i>	
Single	0.634	***	0.685		0.507	***	0.438	***	0.644	***	1.468		0.671		0.582	**
	<i>0.074</i>		<i>0.172</i>		<i>0.133</i>		<i>0.016</i>		<i>0.090</i>		<i>0.449</i>		<i>0.167</i>		<i>0.150</i>	
Disabl	1.076		1.284		0.769		0.407		0.748		0.813		0.638		0.180	***
	<i>0.234</i>		<i>0.581</i>		<i>0.356</i>		<i>0.255</i>		<i>0.166</i>		<i>0.503</i>		<i>0.325</i>		<i>0.120</i>	
Sex head	0.253	***	0.536	*	0.308	***	0.307	***	0.129	***	0.210	***	0.217	***	0.177	***
	<i>0.039</i>		<i>0.194</i>		<i>0.091</i>		<i>0.104</i>		<i>0.021</i>		<i>0.830</i>		<i>0.070</i>		<i>0.054</i>	
Child	1.034	*	1.023		1.066		1.136	***	1.052	**	0.969		1.059		1.026	
	<i>0.020</i>		<i>0.058</i>		<i>0.058</i>		<i>0.054</i>		<i>0.026</i>		<i>0.062</i>		<i>0.044</i>		<i>0.052</i>	
Adult	0.713	***	0.862	*	0.719	***	0.786	***	0.733	***	0.797	***	0.833	***	0.831	***
	<i>0.026</i>		<i>0.069</i>		<i>0.054</i>		<i>0.050</i>		<i>0.031</i>		<i>0.074</i>		<i>0.054</i>		<i>0.054</i>	
Market	1.207	**	1.571		1.421		1.792	***	1.065		1.368		1.043		1.348	
	<i>0.108</i>		<i>0.449</i>		<i>0.339</i>		<i>0.376</i>		<i>0.093</i>		<i>0.333</i>		<i>0.216</i>		<i>0.254</i>	
Transp	1.141		1.681	*	2.119	***	1.941	***	0.938		1.201		1.213		1.107	
	<i>0.105</i>		<i>0.471</i>		<i>0.503</i>		<i>0.384</i>		<i>0.083</i>		<i>0.360</i>		<i>0.251</i>		<i>0.226</i>	
Health	1.113		0.914		1.124		2.016	***	1.320	***	1.232		1.080		1.651	**
	<i>0.098</i>		<i>0.220</i>		<i>0.258</i>		<i>0.417</i>		<i>0.138</i>		<i>0.381</i>		<i>0.243</i>		<i>0.379</i>	
Primary	1.015		1.026		0.855		0.990		1.005		2.598	**	1.602	*	1.248	
	<i>0.077</i>		<i>0.252</i>		<i>0.183</i>		<i>0.210</i>		<i>0.104</i>		<i>1.060</i>		<i>0.427</i>		<i>0.354</i>	
Sec sch	0.645		2.829	*	1.101		2.256	*	0.964		1.708		0.690		2.834	**
	<i>0.143</i>		<i>1.756</i>		<i>0.601</i>		<i>1.056</i>		<i>0.193</i>		<i>1.058</i>		<i>0.484</i>		<i>1.391</i>	
Farminf	0.776		1.184		0.825		0.725		0.860		3.516	***	1.434		1.621	*
	<i>0.079</i>		<i>0.336</i>		<i>0.220</i>		<i>0.174</i>		<i>0.118</i>		<i>1.550</i>		<i>0.417</i>		<i>0.435</i>	
Prov. Dumm.																
Obs	9879								9216							
Ps. R ²	0.246								0.328							

^a Base category : people working as helpers in a family member's activity. Robust standard errors in italic.

*** significant at 1%; ** significant at 5%; * significant at 10%

^b The estimations are pooled over all rural areas. For the 1996-97 rural sample the hypothesis of equal coefficients in all regions was rejected for gender in all employment categories and for some of the community characteristics. In the 2002-03 rural sample equality of the coefficients was mostly rejected for primary education and gender. We ran the same estimation with regional interaction terms for gender and community characteristics in 1996-97 and additionally for primary education in 2002-03. We found that the interaction effects were significant but small, not changing the conclusions drawn from the pooled estimations.

Gender is also in rural areas an important determinant of occupational choice. Being a man provides a much higher probability of choosing any income earning employment compared with helping in other household members' activities, but especially for non-agricultural wage employment the risk ratios are extremely high. Moreover, unlike in the urban areas where the risk ratios are declining, they are increasing in rural areas for most categories. A very high increase can be observed in the probability of ending up in the agricultural wage sector. Although a lot lower, the same occurred in urban areas.

The effect of being single in a rural community is more or less equal to the effect in urban areas offering a lower probability of being an income earner. Disabled persons did not encounter more difficulties in their occupational choice than the fully able persons in 1996 but in 2002, as in the urban areas, it has a serious downward effect on their chances of finding non-agricultural wage employment.

In the rural analysis the provincial dummies remain important, even correcting for community characteristics. We focus on the latter but there are still some unobserved characteristics at the provincial level that affect employment choice. The factor that appeared in 1996 to make a difference in increasing the probability for all employment types as opposed to helping was transportation to the village for off-farm employment and the presence of a market in the village for being a self-employed farmer. Both were not significant in 2002. It could be that roads have been upgraded between both years which makes markets in other communities easier accessible and there is less need for having one in the own community. On average the community characteristics appear to be most important in determining access to wage employment. Where it concerns non-agricultural wage employment, the presence of health infrastructure and a secondary school are important community determinants of this type of employment (in addition to the market and transport dummies in 1996 and the dummy for the presence of a farmer information centre in 2002). They could work through the labour demand side by offering employment or through the supply side by offering the opportunity to increase the quality of labour. The secondary school demand effect became larger in 2002, which could be either because of increased demand for secondary school teachers or by higher demand for secondary educated workers (which mostly those living in a community with a secondary school present can offer).

Concluding, education and gender are the most crucial determinants of employment choice. Their effects are much stronger in rural areas. The evidence even suggests an increased effect over time (except for non-agricultural wage employment) unlike in urban areas where it appears to be diminishing. The regressions revealed that disabled persons have significantly lower probabilities to choose for non-agricultural wage employment and the negative effect is much larger in rural than urban areas. We also found that infrastructure was greatly important as determinants of any income earning employment in 1996 but was not in 2002 which may suggest that it has been upgraded between both years. What was more significant in 2002, was the presence of health infrastructure, a secondary school or a farmer information centre.

The information revealed by the regressions on the determinants of occupational choice is used to predict for each working person the probabilities of ending up in the five respective categories. We assume that the occupation chosen is that one with the highest probability. When we aggregate the individually predicted occupations to the household level we obtain predicted numbers of household members in each of the five categories. This variable is carried over to the next step where we explain household consumption by regressing it on a set of variables including the predicted employment figures.

6. Determinants of Household Consumption

A key feature of the analysis of this section is that it tests the effects of the employment outcomes on household welfare in both 1996-97 and 2002-03, thus identifying and differentiating between the direct and the indirect effects of, for example, education and gender on employment and poverty over the years and the regions.

We use household survey data to compare the consumption effects of holding a certain type of job over both survey years. As the surveys do not include the same households, we analyse both cross-section datasets separately. The welfare measure we use throughout the analysis is daily household expenditures per capita (which was constructed by the poverty research team at the MoFP). Comparing the change in the effects of employment on consumption we will analyse how employment may have affected the incidence of poverty.

From the descriptive part we learned that the households with a household head employed in a non-agricultural sector have on average a higher expenditure pattern. In this section we discuss the effect of employment and other household characteristics on poverty. The modelling approach often taken is either:

$$poor_i = f(X_i, E_i) \quad (X.1)$$

where the poverty status of household i (being poor or non-poor) is explained by a vector of household characteristics including employment in different sectors or activity types. Other authors use the logarithm of household consumption:

$$\ln(\text{cons}_i) = f(X_i, E_i) \quad (\text{X.2})$$

There are reasons to prefer model (X.2) over model (X.1). First, it uses more information which make sit more efficient. In model (X.2) a household is either poor or non-poor but all poor and all non-poor households are treated in the same way. Second, the definition of being poor or non-poor is subject to the choice of the poverty line. Sometimes the one dollar per day measure is used or more subtle national or even regional poverty lines can be calculated. But there is always some arbitrariness attached to the choice of the poverty line.

From the empirical work on the determinants of poverty in Mozambique we learned that education, gender of the household head and employment, especially non-agricultural employment positively affect household consumption per capita (Government of Mozambique 1998, Tschirley and Benfica 2001, Tschirley and Weber 1994). In these studies the number of workers in different sectors are included as explanatory variables. But as this is mostly a choice variable it may depend on the other household characteristics used to explain consumption. If this is the case, the coefficients of the variables may be over- or underestimated dependent on their indirect effect through occupational choice. Especially where it concerns education and gender of the household head, which are strong determinants of occupational choice (or access), the coefficients may be biased. Therefore we aim to isolate the direct effects that explanatory variables may have on consumption by correcting for the indirect effects through access to certain employment types. Hence our model takes the following shape, which is an extension of model (X.2):

$$\ln(\text{cons}_i) = f(X_{1i}, E_i(X_{1i}, X_{2i})) \quad (\text{X.3})$$

We can not use a straightforward instrumental variables approach since the employment data are at the individual level and consumption is observed at the household level. Hence we manually predict what type of employment a household member will choose (using the model in part 2.1), aggregate it to the household level and consequently use the predicted number of household members in different occupation categories as explanatory variables in the household consumption regressions.

Our choice of explanatory variables is limited by the fact that we only include those that appear in both questionnaires. The 1996-97 survey includes information on land and livestock ownership, which are typically used in welfare analysis (though not always significant), but in the 2002-03 survey these questions were not repeated.

In the consumption analysis we use the gender of the household head (*sexhead*) because it may reflect differences in opportunities and may even capture part of the land ownership effect as male

headed households tend to have larger landholdings than female headed households. Further we include age of the household head (*agehead*) as it may capture life cycle effects, experience or social networks. Especially for the households with significant auto-consumption experience in farming may influence household production hence consumption. We also include the number of adults and children in the household (*adults, children*): larger households typically show lower consumption per capita. Especially in our case it may be relevant because consumption also includes use value of durable goods and imputed rent values for housing. We also include the squared terms of these household composition variables to capture non-linearities. Next, we include the number of adults in the households who completed primary education, divided by men and women (*primary men, primary women*). The number of disabled persons in the household is also included as an explanatory variable because they may need additional care (*disabled person*)

In empirical research on welfare locational characteristics often prove crucial determinants For example, Justino and Litchfield (2002) find that changes in households' poverty status in Vietnam are strongly correlated with locational characteristics such as access to key institutions and infrastructure. To capture all possible unobserved differences related to the location of the household we include district level fixed effects. Additionally, in the rural analysis we include the village characteristics that were used in the occupational choice regressions.

Since all these variables could have not only a direct effect on consumption but also an indirect one through their effect on non-agricultural employment opportunities⁸, we use the predicted number of adults in non-agricultural (*non-agri adults*) and agricultural employments (*agri adults*). In Figure 12 we present averages for the variables used in the regressions, divided by urban and rural areas.

As we found before, the number of female headed households increased in both urban and rural areas. We find very low and only marginally increasing numbers for men and women who completed primary education. In rural areas they do not appear to be increasing which may be due to rural-urban migration by those who obtained secondary education. The numbers are much lower for women than for men in all areas. Besides education there are also large differences in the number of household members holding non-agricultural and agricultural employments. The former type can be found much more in urban households and the gap is even larger in 2002.

⁸ The Durbin-Wu-Hausman endogeneity tests on the actual numbers of household members working in non-agricultural and on those working in agricultural employment both suggested endogeneity at the 1 percent level in all regions for both rural and urban areas.

Figure 12: Averages of regression variables, by location

Variables	1996		2002	
	Urban	Rural	Urban	Rural
Male headed households (%)	78	79	74	76
Age of household head (years)	42	42	42	43
Number of adults (>15yrs)	3	2	3	2
Number of children (0-15)	3	2	2	2
Number of adult men finished primary	0.36	0.07	0.49	0.06
Number of adult women finished primary	0.18	0.02	0.28	0.02
Number of disabled adults	0.07	0.07	0.08	0.07
Number of adults working in non-agriculture	0.66	0.10	0.93	0.15
Number of adults working in agriculture	0.64	1.14	0.58	1.11
Predicted number of adults in non-agriculture	0.54	0.01	0.87	0.04
Predicted number of adults in agriculture	0.70	1.03	0.55	1.02

As the three geographic regions north, centre and south, differ strongly with respect to poverty incidence and the change therein over both survey years (both in poverty headcount ratios and poverty gaps) we performed a pooling test. Equality of coefficients was strongly rejected for all explanatory variables (except for the number of adult men with primary education) in either the 1996-97 or the 2002-03 survey for rural areas. In the urban areas only few coefficients differed. For consistency and comparability reasons we ran the regressions separate for all regions in both survey years and in both the rural and urban analysis. Figure 13 presents the urban and Figure 14 the rural analysis. The left hand side variable is the logarithm of household consumption per capita per day. In appendix (Figures A.4 and A.5 for urban and rural respectively) we present the regressions with actual, non-predicted, numbers for household members working in the non-agricultural versus the agricultural sector.

Urban analysis

The significant household composition variables, representing the number of adults and children, show the expected signs (Figure 13): they have a negative effect on household consumption per capita which is decreasing in magnitude for additional persons. The child effects do not differ much over both years but the adult effects do. They are negative in 2002 but they were not in 1996. This may be slightly worrisome if it would mean that opportunities for adults to add to household income are fewer. However, it could also originate from the fact that in 2002 more adults are studying and cannot contribute to household income in the short run.

Figure 13: OLS regressions ^a with individual level predicted occupations, dependent variable: log(consumption per capita). Urban sample.

	1996-97						2002-03					
	North		Centre		South		North		Centre		South	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Non-agri adults ^b (predicted)	-0.157 <i>0.150</i>		0.004 <i>0.063</i>		0.040 <i>0.314</i>		0.191 <i>0.097</i>	**	0.108 <i>0.054</i>	**	0.058 <i>0.017</i>	***
Agri adults ^b (predicted)	-0.041 <i>0.059</i>		0.012 <i>0.037</i>		-0.12 <i>0.065</i>	*	0.089 <i>0.094</i>		-0.029 <i>0.420</i>		-0.026 <i>0.034</i>	
Sexhead	0.276 <i>0.067</i>	***	0.183 <i>0.057</i>	***	0.042 <i>0.069</i>		0.189 <i>0.132</i>		0.192 <i>0.539</i>	***	0.157 <i>0.032</i>	***
Agehead	-0.005 <i>0.002</i>	**	-0.001 <i>0.001</i>		-0.001 <i>0.002</i>		-0.004 <i>0.002</i>	**	-0.001 <i>0.002</i>		-0.003 <i>0.001</i>	**
Adults	-0.039 <i>0.112</i>		-0.082 <i>0.069</i>		-0.068 <i>0.055</i>		-0.218 <i>0.100</i>	**	-0.207 <i>0.038</i>	***	-0.174 <i>0.030</i>	***
Adult square	-0.006 <i>0.016</i>		-0.001 <i>0.009</i>		-0.006 <i>0.007</i>		0.010 <i>0.009</i>		0.009 <i>0.004</i>	**	0.005 <i>0.003</i>	**
Children	-0.289 <i>0.041</i>	***	-0.289 <i>0.345</i>	***	-0.255 <i>0.033</i>	***	-0.264 <i>0.056</i>	***	-0.290 <i>0.033</i>	***	-0.263 <i>0.201</i>	***
Child square	0.021 <i>0.006</i>	***	0.022 <i>0.005</i>	***	0.022 <i>0.004</i>	***	0.020 <i>0.008</i>	***	0.027 <i>0.004</i>	***	0.020 <i>0.003</i>	***
Primary men	0.427 <i>0.125</i>	***	0.216 <i>0.044</i>	***	0.201 <i>0.026</i>	***	0.273 <i>0.084</i>	***	0.152 <i>0.036</i>	***	0.215 <i>0.023</i>	***
Primary women	0.290 <i>0.123</i>	**	0.298 <i>0.066</i>	***	0.268 <i>0.042</i>	***	0.443 <i>0.069</i>	***	0.416 <i>0.066</i>	***	0.235 <i>0.028</i>	***
Disabled person	0.075 <i>0.114</i>		0.032 <i>0.056</i>		-0.259 <i>0.103</i>	***	-0.172 <i>0.100</i>	*	0.072 <i>0.100</i>		-0.048 <i>0.041</i>	
District fixed effects												
Constant	9.193 <i>0.182</i>	***	9.540 <i>0.164</i>	***	8.998 <i>0.232</i>	***	9.718 <i>0.221</i>	***	10.159 <i>0.108</i>	***	9.339 <i>0.070</i>	***
Observations	765		981		1515		815		1176		2013	
R ²	0.424		0.463		0.366		0.502		0.390		0.412	

^a Regressions with robust standard errors, corrected for clustering at community level. Standard errors in italic.

*** significant at 1%; ** significant at 5%; * significant at 10%

When the gender of the household head proves significant it appears to be in favour of the male headed households. In 1996 there is a very large effect in the north which has disappeared in 2002 but in the other regions the positive effect of living in a male headed household has even increased.

The education variables have a very significant positive impact on household consumption per capita. For men they are strongest in the north but decreasing over both years. For women they do not differ strongly over the regions but they increased significantly over the years except in the southern urban areas where they actually decreased. In general the effect of women's primary education appears to be larger than that of men's.

Turning to the employment variables we do not observe strong effects in 1996 but in 2002 having more adults who work in a non-agricultural environment significantly increases household per capita consumption. The effect of non-agricultural employment is strongest in the northern towns and smallest in the southern ones. So some changes have taken place for the households that have

members working in non-agriculture. Where it did not differentiate them from others in 1996 it does so in 2002. To conclude that in urban areas the growth in industry or services has actually started to affect the households involved in that sector may be preliminary but our results are at least suggestive of it.

In the regressions shown in appendix (A.4) we find much lower coefficients for education in the north and central region and higher effects of having non-agricultural workers in 1996. This suggests that the variables are positively correlated and that part of the education effect is captured by employment. This may cause wrong conclusions to be drawn on the effect of both. The effect is larger with respect to men's education as it more strongly affects non-agricultural employment. The effects are less striking in 2002 and but more pronounced for women's education. This complies with our findings in the individual occupational choice regressions where both education and gender effects in access to employment were decreasing in urban areas.

So when predicted numbers are used, which capture the effect of education through giving access to certain types of employment, the effects of employment are weaker while those of education are stronger. By not correcting for the employment access effect of education in 1996 the wrong conclusions could have been drawn with respect to the consumption effect of having persons in non-agricultural employments. It was not the type of employment that made the difference but within each type it was primary education that created a positive effect.

Rural analysis

The effect of male headed households exists in rural areas only in the north and the centre, decreasing in the north but increasing in the centre (Figure 14). In the south, unlike in urban areas the effect does not exist in the rural areas.

With respect to the effects of education we observe a very different picture in the rural areas as compared to the urban areas. Firstly, there are only weak effects in the northern rural areas whereas in northern urban areas we find the strongest effects of education. Only men's education shows positive effects on household consumption, but it is smaller than in the other regions. In urban areas women's education has generally a much larger effect than men's but in the rural areas this does not always hold.

As in urban areas, in 1996 there is only a marginal effect of having household members doing non-agricultural activities and no effect whatsoever of agricultural employment. In 2002 the effects have gained in importance but in a quite different way than it does in the urban areas. In the north, non-agricultural household members have a crucial effect on the household's consumption per capita. In the other regions' rural areas they do not have any effect on consumption (for the south this even means a decrease in its effect).

Figure 14: OLS regressions ^a with individual level predicted occupations, dependent variable: log(consumption per capita). Rural sample.

	1996-97						2002-03					
	North		Centre		South		North		Centre		South	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Non-agri adults (predicted)	0.089 <i>0.360</i>		0.154 <i>0.104</i>		0.140 <i>0.078</i>	*	0.496 <i>0.148</i>	***	-0.118 <i>0.112</i>		0.072 <i>0.095</i>	
Agri adults (predicted)	0.010 <i>0.029</i>		0.017 <i>0.028</i>		0.013 <i>0.029</i>		0.113 <i>0.030</i>	***	0.087 <i>0.031</i>	***	-0.040 <i>0.039</i>	
Sexhead	0.181 <i>0.046</i>	***	0.178 <i>0.034</i>	***	0.017 <i>0.034</i>		0.172 <i>0.032</i>	***	0.182 <i>0.047</i>	***	-0.051 <i>0.050</i>	
Agehead	-0.000 <i>0.001</i>		-0.003 <i>0.001</i>	***	-0.003 <i>0.001</i>	***	-0.000 <i>0.001</i>		0.001 <i>0.001</i>		-0.003 <i>0.001</i>	**
Adults	-0.277 <i>0.050</i>	***	-0.290 <i>0.053</i>	***	-0.131 <i>0.042</i>	***	-0.292 <i>0.061</i>	***	-0.253 <i>0.037</i>	***	-0.054 <i>0.046</i>	
Adult square	0.021 <i>0.005</i>	***	0.023 <i>0.007</i>	***	0.010 <i>0.005</i>	**	0.026 <i>0.001</i>	***	0.018 <i>0.004</i>	***	0.002 <i>0.005</i>	
Children	-0.304 <i>0.022</i>	***	-0.318 <i>0.023</i>	***	-0.283 <i>0.021</i>	***	-0.313 <i>0.017</i>	***	-0.219 <i>0.029</i>	***	-0.271 <i>0.030</i>	***
Child square	0.026 <i>0.026</i>	***	0.025 <i>0.003</i>	***	0.026 <i>0.003</i>	***	0.026 <i>0.004</i>	***	0.012 <i>0.005</i>	***	0.023 <i>0.004</i>	***
Primary men	0.104 <i>0.065</i>		0.139 <i>0.049</i>	***	0.198 <i>0.058</i>	***	0.233 <i>0.072</i>	***	0.354 <i>0.061</i>	***	0.256 <i>0.102</i>	***
Primary women	-0.179 <i>0.135</i>		0.315 <i>0.105</i>	***	0.304 <i>0.100</i>	***	0.152 <i>0.150</i>		0.381 <i>0.159</i>	**	0.130 <i>0.080</i>	*
Disabled person	0.012 <i>0.075</i>		-0.015 <i>0.042</i>		-0.124 <i>0.052</i>	**	-0.092 <i>0.034</i>	***	0.015 <i>0.042</i>		-0.114 <i>0.057</i>	**
Market	0.060 <i>0.098</i>		-0.033 <i>0.069</i>		0.074 <i>0.063</i>		0.072 <i>0.069</i>		0.108 <i>0.058</i>	*	0.053 <i>0.068</i>	
Transport	0.043 <i>0.086</i>		0.193 <i>0.083</i>	**	-0.060 <i>0.063</i>		-0.049 <i>0.046</i>		-0.013 <i>0.065</i>		-0.012 <i>0.075</i>	
Health	0.089 <i>0.084</i>		0.017 <i>0.128</i>		0.062 <i>0.055</i>		-0.006 <i>0.074</i>		0.020 <i>0.086</i>		0.088 <i>0.074</i>	
Primary school	-0.035 <i>0.077</i>		-0.071 <i>0.065</i>		-0.166 <i>0.061</i>	***	0.014 <i>0.064</i>		0.043 <i>0.080</i>		0.045 <i>0.112</i>	
Sec. school	-0.065 <i>0.060</i>		-0.033 <i>0.210</i>		-0.214 <i>0.066</i>	***	0.253 <i>0.128</i>		-1.575 <i>0.112</i>	***	0.138 <i>0.132</i>	
Farmer info	-0.145 <i>0.111</i>		0.002 <i>0.124</i>		0.035 <i>0.086</i>		-0.028 <i>0.087</i>		0.094 <i>0.087</i>		0.125 <i>0.124</i>	
District fixed effects												
Constant	8.788 <i>0.130</i>	***	9.655 <i>0.119</i>	***	8.903 <i>0.137</i>	***	9.661 <i>0.285</i>	***	10.284 <i>0.159</i>	***	9.116 <i>0.159</i>	***
Observations	1562		1763		1435		1458		1897		1204	
R ²	0.405		0.575		0.398		0.524		0.431		0.395	

^a Regressions with robust standard errors. Standard errors in italic.

*** significant at 1%; ** significant at 5%; * significant at 10%

Additional to the effect of non-agricultural employment, agricultural employment also positively affects consumption in the northern and central rural areas. This is encouraging for poverty reduction reasons since most of the population lives and works in agriculture and the highest poverty rates are still observed in rural areas. What caused the effect is not immediately clear from

the data. It could be an income, expenditure or production effect. Prices for the crops these farmers grow may have increased or prices of the crops they eat may have dropped. Productivity could have increased or the marketing situation improved e.g. through better market and road infrastructure which decreases the transportation costs of getting the harvest to regional or international markets.

Again, when looking at the regressions in appendix (A5) including actual instead of predicted employment variables the results presented there would lead to different conclusions. The effect of non-agricultural employment shows significantly positive in all regions and the effect of agricultural employment is never significant. Additional to the employment variables, the education variables, especially for men, have different coefficients.

The effects of the community dummies are not straightforward. We find that infrastructure variables positively affects household consumption in the central rural areas, in 1996 through transport to the village and in 2002 through having a market in the village. Other than those, the effects are not significant or showing a puzzling sign.

7. Conclusions

A key driver of poverty reduction in Mozambique in the 1990s was education, judging from the 1996 first national household survey. Yet little is known about poverty-employment linkages and the determinants of employment status during this period of rapid economic growth. In particular, the empirical literature on pro-poor growth in Mozambique does not address the mechanisms by which higher educational attainments reduce household poverty. This mechanism may operate through an indirect channel (better employment opportunities and higher productivity) or a direct channel (an improved ability to contract goods and services).

This paper addresses this distinction by investigating the linkages between employment status and poverty at the household level in Mozambique for the period 1996 to 2002. Two different employment categories are considered: agricultural versus non-agricultural employment and self-employment versus wage employment. We analyse employment status and consumption decisions as well as the effect of the former on the latter, using nationally representative household survey data from 1996 and newly available follow-up survey from 2002.

First, we estimate the determinants of individual employment status. We find that while agricultural activities dominate in both years, the agricultural share of total employment is declining. Furthermore, mobility across different activity types is large as households are diversifying their activity base within and between sectors. This mobility is driven by education and gender. Although the importance of these variables is decreasing in urban areas, it is increasing in rural areas.

Second, we find that different groups share in the reduction of poverty to varying degrees. Poorer households benefit less from growth than better-off households, raising the issue of widening

inequality. We estimate the determinants of household consumption, demonstrating for the new data set that education has positive effects on consumption in aggregate.

Third, we use instrumental variable techniques to control for the joint determination of employment status (aggregated to the household level) and household consumption. Once we correct for variables affecting both employment status and consumption, we find no direct effect of employment on consumption at the household level in 1996. However, in 2002 such effect is noticeable in some regions. For instance, non-agricultural employment has significant positive effects on household consumption in urban areas. In northern rural areas, in contrast, it is agricultural employment that has significant positive consumption effects.

These findings suggest that is no single national strategy which can strengthen the pro-poor growth effects of employment. Instead, regionally and sectorally differentiated responses are needed, consisting of efforts to improve the quality of human capital, to increase the demand for off-farm labour in rural areas, and to strengthen inter-sectoral and inter-regional labour mobility (including rural-urban mobility). These policies may be augmented by targeted interventions to assist specific groups caught in poverty traps, such as female-headed households in rural areas.

Appendix

Figure 15a: Importance of employment categories, by gender of household head (income earning active age population)

^a Percentages are calculated using sampling weights.

Percentage ^a	1996-97			2002-03		
	Total	Men	Women	Total	Men	Women
Farmers	75	70	83	68	62	78
Agri wage	4	3	4	2	3	1
Non-agri self	7	7	7	10	10	11
Non-agri wage	14	19	6	20	25	10

Figure 15b: Importance of employment categories, by rural-urban (income earning active age population)

^a Percentages are calculated using sampling weights.

Percentage ^a	1996-97			2002-03		
	Total	Urban	Rural	Total	Urban	Rural
Farmers	75	44	88	68	34	86
Agri wage	4	3	4	2	3	2
Non-agri self	7	16	3	10	19	6
Non-agri wage	14	37	5	20	45	7

Figure 16: Employment in non-agricultural sectors, by self-employed and wage workers (income earning active age)

^a Percentages are calculated using sampling weights.

Percentage ^a	Self-employed		Wage workers	
	1996-97	2002-03	1996-97	2002-03
Mining	0	2	6	3
Manufacturing	24	3	15	5
Construction	9	4	8	15
Transport	1	2	9	7
Commerce	53	81	11	13
Services	9	7	23	32
Education	0	-	9	13
Health	4	1	4	3
Public administration	0	-	12	9

Figure 17: Relative consumption position by main activity category of household head

		1996-97	2002-03	Change position
By gender of head:	Male headed HH	0.99	1.02	+0.03
	Female headed HH	1.02	0.92	-0.10
By employer type: (for wage workers)	Public sector	1.34	1.85	+0.51
	Private sector	1.21	1.42	+0.21
	Co-operative sector	1.66	0.96	-0.70
	Own account	0.95	0.89	-0.06
	Boss/entrepreneur	1.30	1.13	-0.17
By sector: (non-agriculture)	Agriculture	0.92	0.84	-0.08
	Mining	1.12	1.10	-0.02
	Manufacturing	1.00	1.67	+0.67
	Construction	1.11	1.28	+0.17
	Transport	1.44	1.57	+0.13
	Commerce	1.51	1.35	-0.16
	Services	1.63	1.42	-0.21
	Education	1.54	1.59	+0.05
	Health	1.31	1.85	+0.54
	Public administration	1.32	2.24	+0.92

Figure 18: OLS regressions ^a with observed occupations, dependent variable: log(consumption per capita). Urban sample.

^aRegressions with robust standard errors, corrected for clustering at community level. Standard errors in italic.

*** significant at 1%; ** significant at 5%; * significant at 10%

	1996-97						2002-03					
	North		Centre		South		North		Centre		South	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Non-agri adults ^b (observed)	0.190 <i>0.071</i>	***	0.169 <i>0.042</i>	***	0.033 <i>0.031</i>		0.250 <i>0.067</i>	***	0.202 <i>0.045</i>	***	0.061 <i>0.018</i>	***
Agri adults ^b (observed)	-0.009 <i>0.068</i>		-0.009 <i>0.039</i>		-0.057 <i>0.054</i>		-0.090 <i>0.138</i>		-0.167 <i>0.044</i>	***	-0.125 <i>0.042</i>	***
Sexhead	0.251 <i>0.067</i>	***	0.162 <i>0.580</i>	***	0.059 <i>0.066</i>		0.194 <i>0.104</i>	*	0.135 <i>0.048</i>	***	0.157 <i>0.031</i>	***
Agehead	-0.004 <i>0.002</i>		-0.000 <i>0.001</i>		-0.002 <i>0.002</i>		-0.003 <i>0.002</i>	*	0.001 <i>0.002</i>		-0.003 <i>0.001</i>	*
Adults	-0.103 <i>0.096</i>		-0.100 <i>0.073</i>		-0.064 <i>0.056</i>		-0.167 <i>0.010</i>	*	-0.205 <i>0.038</i>	***	-0.165 <i>0.292</i>	***
Adult square	0.001 <i>0.013</i>		-0.001 <i>0.010</i>		-0.006 <i>0.007</i>		0.004 <i>0.008</i>		0.008 <i>0.004</i>	**	0.005 <i>0.003</i>	*
Children	0.292 <i>0.036</i>	***	-0.298 <i>0.034</i>	***	-0.253 <i>0.033</i>	***	-0.243 <i>0.053</i>	***	-0.283 <i>0.032</i>	***	-0.265 <i>0.021</i>	***
Child square	0.022 <i>0.005</i>	***	0.023 <i>0.005</i>	***	0.211 <i>0.004</i>	***	0.015 <i>0.007</i>	**	0.026 <i>0.005</i>	***	0.020 <i>0.003</i>	***
Primary men	0.313 <i>0.075</i>	***	0.179 <i>0.038</i>	***	0.202 <i>0.027</i>	***	0.218 <i>0.082</i>	***	0.157 <i>0.030</i>	***	0.209 <i>0.024</i>	***
Primary women	0.271 <i>0.128</i>	**	0.300 <i>0.066</i>	***	0.269 <i>0.043</i>	***	0.360 <i>0.060</i>	***	0.369 <i>0.058</i>	***	0.226 <i>0.028</i>	***
Disabled person	0.074 <i>0.110</i>		0.044 <i>0.056</i>		-0.270 <i>0.102</i>	***	-0.103 <i>0.088</i>		0.076 <i>0.087</i>		-0.067 <i>0.040</i>	*
District fixed effects												
Constant	9.212 <i>0.177</i>	***	9.579 <i>0.159</i>	***	9.047 <i>0.223</i>	***	9.702 <i>0.214</i>	***	10.068 <i>0.107</i>	***	9.438 <i>0.070</i>	***
Observations	765		981		1515		815		1176		2013	
R ²	0.439		0.475		0.364		0.535		0.438		0.419	

Figure 19: OLS regressions ^a with observed occupations, dependent variable: log(consumption per capita). Rural sample.

^a Regressions with robust standard errors. Standard errors in italic. *** significant at 1%; ** significant at 5%; * significant at 10%

	1996-97						2002-03					
	North		Centre		South		North		Centre		South	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Non-agri adults (observed)	0.216 <i>0.070</i>	***	0.144 <i>0.045</i>	***	0.063 <i>0.038</i>	*	0.178 <i>0.058</i>	***	0.188 <i>0.053</i>	***	0.203 <i>0.054</i>	***
Agri adults (observed)	0.005 <i>0.024</i>		-0.051 <i>0.024</i>	**	-0.022 <i>0.022</i>		-0.070 <i>0.047</i>		-0.009 <i>0.030</i>		-0.021 <i>0.040</i>	
Sexhead	0.174 <i>0.046</i>	***	0.165 <i>0.031</i>	***	0.006 <i>0.033</i>		0.120 <i>0.031</i>	***	0.140 <i>0.046</i>	***	-0.068 <i>0.046</i>	
Agehead	-0.000 <i>0.001</i>		-0.003 <i>0.001</i>	***	-0.003 <i>0.001</i>	***	-0.001 <i>0.001</i>		0.001 <i>0.001</i>		-0.002 <i>0.001</i>	
Adults	-0.281 <i>0.049</i>	***	-0.277 <i>0.049</i>	***	-0.125 <i>0.041</i>	***	-0.251 <i>0.057</i>	***	-0.220 <i>0.035</i>	***	-0.071 <i>0.042</i>	*
Adult square	0.022 <i>0.005</i>	***	0.022 <i>0.007</i>	***	0.010 <i>0.005</i>	**	0.025 <i>0.010</i>	***	0.015 <i>0.003</i>	***	0.001 <i>0.005</i>	
Children	-0.305 <i>0.022</i>	***	-0.316 <i>0.022</i>	***	-0.285 <i>0.020</i>	***	-0.308 <i>0.017</i>	***	-0.214 <i>0.029</i>	***	-0.283 <i>0.028</i>	***
Child square	0.026 <i>0.004</i>	***	0.025 <i>0.003</i>	***	0.026 <i>0.003</i>	***	0.026 <i>0.004</i>	***	0.012 <i>0.005</i>	***	0.024 <i>0.004</i>	***
Primary men	0.062 <i>0.064</i>		0.134 <i>0.045</i>	***	0.222 <i>0.052</i>	***	0.353 <i>0.073</i>	***	0.224 <i>0.059</i>	***	0.253 <i>0.073</i>	***
Primary women	-0.206 <i>0.149</i>		0.276 <i>0.086</i>	***	0.289 <i>0.097</i>	***	0.153 <i>0.145</i>		0.319 <i>0.161</i>	**	0.113 <i>0.084</i>	
Disabled person	0.009 <i>0.073</i>		-0.020 <i>0.043</i>		-0.126 <i>0.514</i>		-0.101 <i>0.041</i>	***	0.013 <i>0.042</i>		-0.114 <i>0.058</i>	**
Market	0.059 <i>0.098</i>		-0.027 <i>0.067</i>		0.074 <i>0.063</i>	**	0.073 <i>0.069</i>		0.104 <i>0.058</i>	*	0.056 <i>0.066</i>	
Transport	0.033 <i>0.085</i>		0.187 <i>0.082</i>	**	-0.058 <i>0.064</i>		-0.069 <i>0.046</i>		-0.024 <i>0.066</i>		-0.012 <i>0.073</i>	
Health	0.083 <i>0.083</i>		0.016 <i>0.128</i>		0.066 <i>0.055</i>		0.006 <i>0.073</i>		0.021 <i>0.084</i>		0.081 <i>0.071</i>	
Primary school	-0.020 <i>0.076</i>		-0.074 <i>0.065</i>		-0.159 <i>0.061</i>	***	0.036 <i>0.068</i>		0.045 <i>0.081</i>		0.041 <i>0.109</i>	
Sec. school	-0.100 <i>0.161</i>		-0.040 <i>0.204</i>		-0.221 <i>0.072</i>	***	0.268 <i>0.128</i>	**	-1.685 <i>0.119</i>	***	0.175 <i>0.122</i>	
Farmer info	-0.147 <i>0.110</i>		-0.026 <i>0.124</i>		0.043 <i>0.086</i>		.		0.074 <i>0.085</i>		0.125 <i>0.122</i>	
District fixed effects												
Constant	8.792 <i>0.137</i>	***	9.706 <i>0.126</i>	***	8.931 <i>0.132</i>	***	9.779 <i>0.268</i>	***	10.405 <i>0.151</i>	***	9.113 <i>0.154</i>	***
Observations	1562		1763		1435		1458		1897		1204	
R ²	0.412		0.581		0.399		0.522		0.435		0.411	

Figure 20: Summary of Household Data

Variables	1996			2002		
	All	Poor	Non-Poor	All	Poor	Non-Poor
male-headed households (%)	78.50	79.99	76.39	75.23	73.00	77.19
age of the head (years)	42.35	43.16	41.16	42.72	43.10	42.39
literate head (%)	47.69	44.83	51.91	48.76	45.68	51.47
size of the household (number)	4.84	5.63	3.68	4.81	5.56	4.14
male aged between 0-6 (number)	0.53	0.66	0.35	0.58	0.74	0.44
female aged between 0-6 (number)	0.53	0.68	0.31	0.60	0.77	0.45
male aged between 7-15 (number)	0.65	0.81	0.40	0.61	0.74	0.49
female aged between 7-15 (number)	0.62	0.79	0.38	0.56	0.71	0.44
male aged between 16-60 (number)	1.08	1.15	0.97	1.01	1.04	0.98
female aged between 16-60 (number)	1.24	1.35	1.08	1.22	1.34	1.12
male senior (number)	0.11	0.11	0.10	0.12	0.12	0.11
female senior (number)	0.08	0.08	0.08	0.11	0.12	0.11
male adults working (number)	0.96	1.03	0.86	0.94	0.95	0.92
female adults working (number)	1.07	1.17	0.92	1.12	1.23	1.02
male children (7-15) working (number)	0.13	0.17	0.07	0.08	0.10	0.06
female children (7-15) working (number)	0.14	0.19	0.07	0.07	0.09	0.05
head is waged and farming (%)	2.55	2.91	1.99	0.02	2.44	1.55
head is self-employed and farming (%)	74.69	76.94	71.45	0.73	77.73	68.43
head is waged and off-farming (%)	13.23	11.32	15.97	0.17	12.67	20.33
head is self-employed and off-farming (%)	5.77	4.86	7.12	0.08	6.55	9.12
head employed in agriculture (%)	80.66	83.50	76.55	75.26	80.73	70.50
head employed in mining (%)	1.15	1.15	1.12	0.83	0.06	0.99
head employed in manufacturing (%)	3.81	3.55	4.19	1.16	1.00	1.31
head employed in construction (%)	1.68	1.60	1.73	3.02	3.09	2.96
head employed in transports (%)	1.47	1.27	1.74	1.47	0.90	1.98
head employed in sale (%)	3.63	2.82	4.83	7.89	5.96	9.57
head employed in services (%)	3.48	2.65	4.70	5.43	4.85	5.94
head employed in education (%)	1.12	0.88	1.49	2.29	0.99	3.44
head employed in health (%)	0.81	0.82	0.79	0.67	0.53	0.79
head employed in public (%)	1.83	1.42	2.45	1.95	1.31	2.51
head employed in others (%)	0.36	0.35	0.39	0.00	0.00	0.00

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