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Stephan Klasen & Silke Woltermann
University of Goettingen
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Stephan Klasen
and
Silke Woltermann
Department of Economics
University of Göttingen
Platz der Göttinger Sieben 3
37073 Göttingen
Germany
Email: sklasen@uni-goettingen.de

Abstract:
In this paper, we analyze whether current demographic dynamics in Mozambique are likely to reduce per capita growth and poverty reduction. The findings suggest that population dynamics do not appear to be a major driver of changes in growth of per capita incomes, poverty, or inequality. At the macro level this can be seen at the off-setting effects of population growth on the one hand and the potential to reap the benefits of a demographic gift and higher population density on the other. At the micro level, it is clear that household size has not changed drastically and the existing negative impact of household size on poverty and inequality appears to have fallen in recent years, particularly in rural areas. Thus demographic dynamics have helped support rising per capita incomes and falling poverty rather than hindering it.

Keywords: poverty, inequality, population growth, Mozambique
JEL classification: J1, I32, O15

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1. Introduction

Given the combination of high poverty rates, persistently high population growth rates, and low per capita economic growth in most African countries, the link between demography and economic development as well as poverty reduction has received renewed attention. In particular, the question is being asked whether the slow pace of the fertility decline observed in Africa is one of the reasons for its poor economic performance and possibly also responsible for stagnant poverty and rising inequality in many countries. If such a link was indeed of relevance, then the question of what can be done to reduce Africa's high fertility levels (beyond current initiatives).

In a paper on population dynamics and economic growth and poverty in Uganda, Klasen (2004) had argued that the very high population growth there (3.3% per year in an already very densely populated landlocked country) was putting a break on per capita economic growth and was partly responsible for the slowing of poverty reduction and the rise in inequality in Uganda.

In this paper, we undertake some related analysis for Mozambique to determine whether demographic dynamics in Mozambique are similarly problematic for growth and poverty reduction. In contrast to the Uganda paper, we focus less on the impact of population growth as the macro level and concentrate on the impact of household size as a determinant of poverty and inequality.

The paper is structured as follows. The next section reviews and analyzes some demographic dynamics and projections in Mozambique. There, we will also briefly comment on the likely implications of Mozambique's population dynamics on per capita economic growth. Section 3 then assesses the impact of household size on poverty and inequality using the 1996 and 2002 household surveys. It asks the question to what extent household size constitutes a poverty risk and whether this risk has changed over time.

In contrast to the findings about Uganda we find that the population dynamics in Mozambique are not nearly as problematic. While large household size generates an elevated poverty risk, that risk has declined over time, particularly in rural areas. Also, Mozambique's macro demographic dynamics suggest that the adverse effects of high population growth are likely to be much smaller and partly off-set by benefits of rising population density and urbanization along the coast.

2. Demographic Dynamics

2.1 Population Projections

The demographic development of Mozambique is largely influenced by three decades of war that ended only in 1992. During war time, a large proportion of the population migrated within the country and into neighboring countries. From 1993 to 1995, about 1.7 million external refugees and 3 million internally displaced persons returned, inducing a process of increasing urbanization (Gaspar, 2002).

Table 2.1 reports demographic projections for Mozambique's population until 2050 using data provided by the UN Population Division. The data are taken from the medium variant of the UN projections which is assumed to be the most probable one. UN population projections are performed in several variants, differing in the underlying assumptions concerning a country's dynamics of fertility (United Nations Population Division, 2003). Basically, four different variants of projections are available: a low, a medium and a high variant, and one assuming constant fertility. Countries are divided in three groups according to their fertility rate development over the last years. Those who showed prevailingly high levels of fertility in 2000 with no or only a minor decline are considered as high fertility countries. Those countries showing declining fertility numbers in the period from 1995 to 2000, but are still on a level above 2.1 children per woman, are considered as medium fertility countries and only those with less than 2.1 children per woman in the period from 1995 to 2000 are allowed in the group of low fertility countries. Future fertility rates are then modeled "*relating the level of total fertility during a period to the average expected decline in total fertility during the next period*" (UN Population Division, 2004).[1] The models assume that the number of children in the high variant remains 0.5 higher than for the medium variant; the difference between the medium and the low variant is also 0.5 children per woman. Fertility is allowed to drop until reaching a floor value of 1.85 children per woman until 2050 in both the high and medium variant, so that a woman that reaches a TFR of 1.85 in the medium variant will have a projected TFR of 2.35 in the high variant and a TFR of 1.35 in the low variant. The (highly implausibly) constant-fertility variant assumes that fertility will stay at the level obtained for 1995-2000.

Mortality is projected using models based on the development of life expectancy, assuming a medium pace mortality decline for developing countries. In countries affected by HIV-pandemic, the pace is adjusted to lower levels. Following UNAIDS-models on HIV prevalence data (UNAIDS, 2003), the UN Population division additionally assumes for these countries that, starting from 2010, the rate of newly infected persons will decline by a third "over intervals of increasing length", and the force of infection will decline by 15 % over the same intervals, explained by a change of behavior in the risk groups.

It is useful to compare the projections of the UN with those made by the Mozambique Institute of Statistics (INE, 1999). In the INE-population projections of 1997 the AIDS pandemic has not been taken into account, a decision explained with the lack of reliable data (INE, 1999). In 2000, INE estimated that 68 000 children, 443 000 men, and 597 000 women were infected by HIV (INE, 2002). The fact that the number of infected women exceeds the male infected by almost a third is explained by the higher vulnerability of women, but the term "vulnerability" is not defined in more detail. Reasons for higher female vulnerability may be polygamous relationships, frequent changes of sexual partners and the fact that women have a higher infection risk because of biological reasons. The different treatment of the AIDS pandemic by the UN Population division and the INE are reflected in the lower UN-population projection numbers for women shown in Figure 2.3. In addition, the INE data seem to imply lower fertility decline than the more recent projections of the UN.

Due to the omission of AIDS and the higher assumed fertility, data from the 1997 census and population projections based on these data are not consistent with the figures provided by the UN Population division for all age groups. This is shown in Figures 2.1 to 2.3 below. For the young age groups from 0 to nine years, the INE projections are similar to the high variant UN projections and considerably higher than the most probable medium variant. This is due to

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[1] This is what the UN says about their fertility assumptions: "Fertility in high-fertility and medium-fertility countries is assumed to decline following a path derived from models of fertility decline established by the United Nations Population Division on the basis of the past experience of all countries with declining fertility during 1950-2000. The models relate the level of total fertility during a period to the average expected decline in total fertility during the next period. Under the medium variant, whenever the total fertility projected by a model falls below 1.85 children per woman, the value actually used in projecting the population is set to 1.85. That is, 1.85 children per woman represents a floor value below which the total fertility of high and medium-fertility countries is not allowed to drop before 2050. However, it is not necessary for all countries to reach the floor value during by 2050. If the model of fertility change used produces a total fertility above 1.85 children per woman for 2045-2050, that value is used in projecting the population." (UN Population Division 2004)

the higher assumed fertility. For the age groups from 30 to 49 years, the INE projections are also considerably higher than the UN projections (here, both the medium and high variant deliver the same projection values); this is due to the higher assumed AIDS mortality in the UN projections. As already stated, this problem is particularly severe on the female side. As shown in Figure 2.3, the UN assumes that by 2010, there will be some 500,000 fewer females aged 30-55 than INE has assumed.

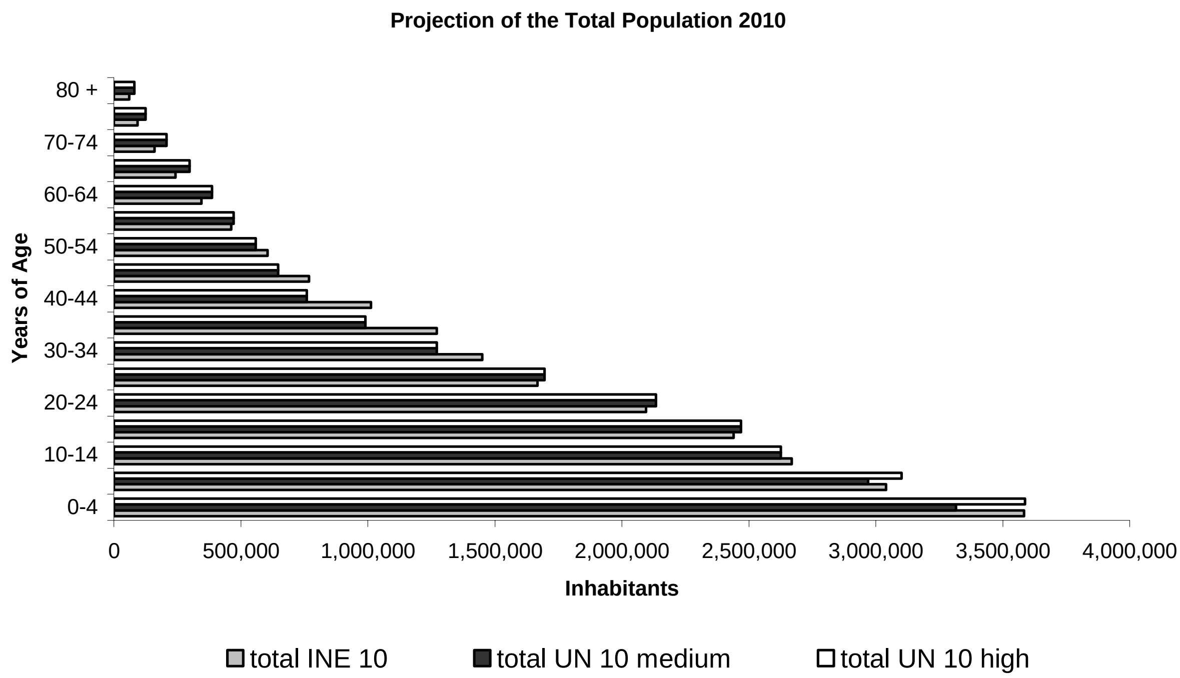
As far as economic consequences are concerned, the two differences lead to contrasting biases. The higher fertility assumption would likely lower per capita economic growth, while the omission of AIDS works in the opposite direction. Omitting the impact of AIDS not only affects total population numbers, but also increases the dependency rate with potentially serious implications for economic development as fewer working age people will have to provide for essentially the same number of dependents.[2] Having particularly high mortality on the female side is likely to be particularly devastating as it will have serious repercussions for the care and investment in children (World Bank, 2001).

Given the considerable divergence in projections between the UN and INE, it is well worth updating INE's population projections and incorporating newer information about fertility and the demographic impact of AIDS.[3]

[2] Channing (2003) uses a computable general equilibrium modeling approach to study the impact of HIV/AIDS on human capital accumulation and economic growth in Mozambique. The impact is estimated for three AIDS scenarios differing in the assumptions concerning the impact of HIV/AIDS on (1) productivity, (2) on population, labor and human capital accumulation and (3) on physical capital accumulation effects. Additionally, a hypothetical no-AIDS scenario is computed for comparison purposes. The first AIDS scenario assumes strong impacts of the pandemic in all three areas. The second scenario halves the effects on productivity and human capital accumulation, elasticity values for foreign savings inflows and domestic savings rates are assumed to be flexible but only with values half as high as in the no-AIDS scenario. The third scenario uses the same assumptions as the first scenario but includes a rise in spending in the education sector. Channing projects the per capita GDP growth rates of the four scenarios until 2010 and finds a reduction of per capita GDP of about 4.3 % using the first and third scenario and a reduction about 2.8 % using the second scenario compared to a projected growth rate without AIDS.

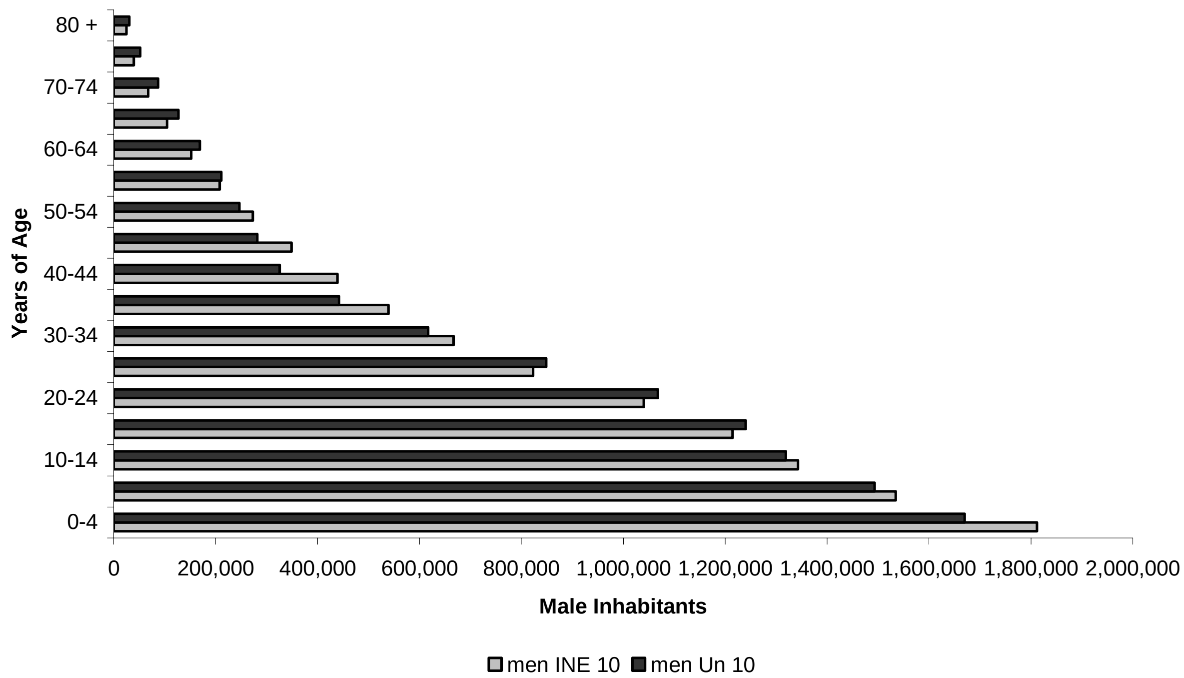
[3] It should be pointed out that the UN projections are not the ‚gold standard' to be followed. They have the advantage of incorporating a wealth of cross-country experience, but they may not capture local circumstances in sufficient detail. But clearly the fertility assumptions and AIDS assumptions are closer with current trends in Mozambique so that a revision would likely be more in the direction of the UN projections. In fact, it may even be the case that even the Medium Variant still overstates fertility (compare the fertility rates in Table 2.1 with Table 2.2)

FIGURE 2.1: Projection of the Total Population 2010



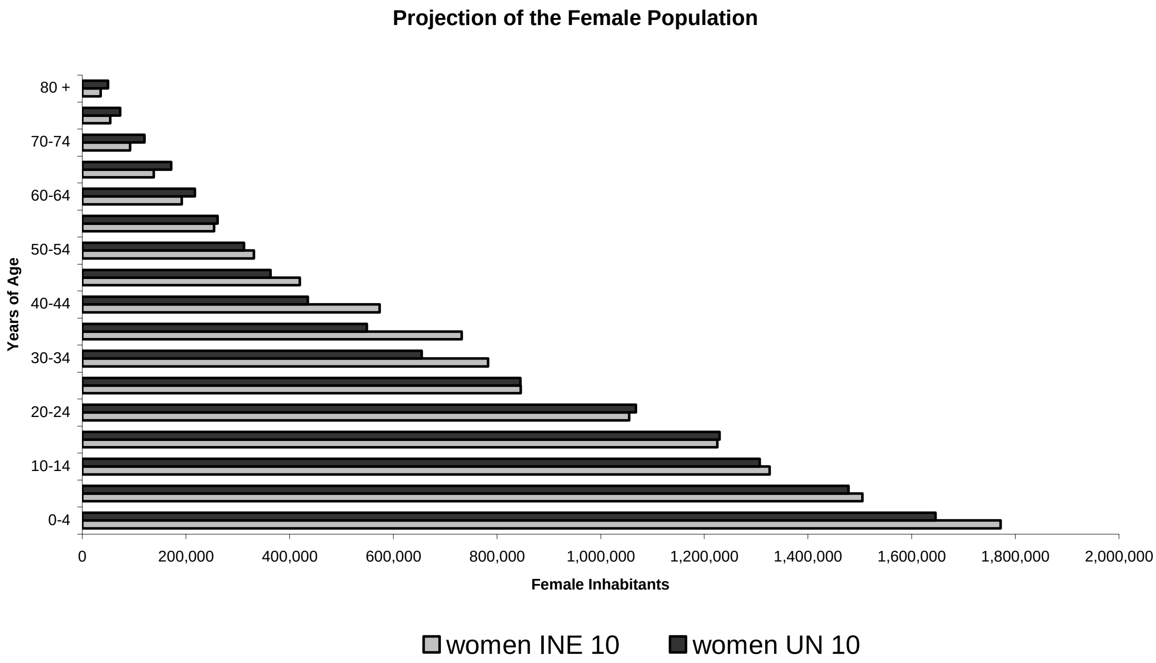
Source: INE (1997), United Nations Population Division (2004)

FIGURE 2.2: Projection of the Male Population 2010



Note: UN projection is based on the medium variant scenario.
Source: INE (1997), United Nations Population Division (2004)

FIGURE 2.3: Projection of the Female Population 2010



Note: UN projection is based on the medium variant scenario.
Source: INE (1997), United Nations Population Division (2004)

TABLE 2.1: Demographic Projections for Mozambique

	Population ('000)	Pop. Growth	Population Density	TFR	Dependency Rate	Population Aged 15 - 64	Growth of Pop 15-64	Life Expectancy Male	Life Expectancy Female
1995	15 949	2.26	20	5.90	91	8,360		39.2	43.8
2000	17 861	1.75	22	5.88	90	9 416	2,41	36.6	39.6
2005	19 495	1.5	24	5.60	88	10 358	1,93	37.2	38.6
2010	21 009	1.40	26	5.18	85	11 384	1,91	39.1	39.5
2015	22 537	1.26	28	4.59	81	12 468	1,84	40.9	40.9
2020	24 004	1.09	30	3.46	76	13 671	1,86	42.7	42.4
2025	25 350	0.98	32	3.07	70	14 907	1,75	45.0	44.5
2030	26 620	0.91	33	2.79	65	16 178	1,65	47.4	46.9
2035	27 861	0.85	35	2.59	60	17 463	1,54	49.8	49.4
2040	29 068	0.77	36	2.43	56	18 676	1,35	52.1	51.7
2045	30 211	0.69	38	2.29	53	19 806	1,18	54.4	54.0
2050	31 275		39		50	20 815	1,00		

Note: The growth rate and the Total Fertility Rate (TFR) refer to the annual growth rate in the 5-year interval between the row where they are given and the following row. The life expectancy rates also refer to the annual life expectancy rates in the 5-year interval between the year of the row the numbers are entered and the subsequent one. The population density is persons per square km). The dependency rate is the ratio of dependent persons (below 15 and above 64 years) to the working age population (times 100). Life expectancy is in years at birth.
Source: United Nations Population Division (2004).

Turning to an assessment of Table 2.1, a few points are worth noting. First, compared to other East African countries, population growth rates in Mozambique are rather low with 1.75 % per year for the interval 2000-2005 (Uganda 3.3 % in the same interval (UN Population Division, 2004)) and seemingly already decreasing. While Uganda's population is assumed to quadruple by 2050, Mozambique's will 'only' double by 2050 and then grow quite slowly. This is partly due to high mortality, particularly in the early decades of this century (female life expectancy will only move beyond the 1995 level in 2025), but mostly due to falling fertility. The total fertility rate (TFR) and the dependency rate are projected to be decreasing at a moderate pace. Given the findings from the 1997 DHS, the fertility decline might actually be understated even in these UN projections.

The fall in the dependency rate can also be seen when considering the growth of the working age population which grows considerable faster than the total population. The opportunities this generates will be briefly considered below.

Population density is one of the lowest world-wide with 22 inhabitants per square kilometer in 2000. Even by 2050, the population density will be still be comparatively low, particularly given the high availability of arable land. The distribution of the population though is quite uneven, the UN project that by 2010 almost half of the population will be living in the few urban areas, projections on the base of the 1997 census (INE, 1997) suggest that one third of the population will be urban by 2010. Given that most urban centers are at or close to the coast, much of the rising population density will be coastal density.

2.2 Fertility

The Demographic and Health Survey (DHS) Mozambique contains questions on fertility measures; data is available for the year 1997. Gaspar et al. (1998) provide an assessment of the 1997 DHS Survey and report fertility rates by age groups and area of residence, and total fertility rates (TFR) as displayed in Table 2.2 below.

Table 2.2: Fertility in Mozambique in 1997

		Area of Residence	
Age	Urban	Rural	Total
15-19	175	173	173
20-24	235	281	270
25-29	223	238	235
30-34	172	207	198
35-39	130	124	126
44-45	82	98	95
45-49	6	29	25
TFR 15-49	5.12	5.75	5.61
TFR 15-44	5.09	5.61	5.48
Fertility	185	200	197

Note: TFR: Total Fertility Rate, see explanation in the text. Fertility: births divided by number of women aged 15-49, by '000 women. Rates for the 45-49 age group may be slightly biased due to truncation.
Source: DHS Survey 1997.

The DHS fertility estimates are based on the five years preceding the survey, covering roughly the years 1992 to 1997. The results obtained during these years are centered to the year 1995. The TFR combines the age-specific fertility rates for the selected period and can be interpreted as the average number of children a woman will give life to during her reproductive age, if the determinants of fertility would remain constant. The TFR is calculated by summing up the specific fertility rates of each of the quinquennial groups multiplied by five and then divided by 1000.

Gaspar et al. (1997) also report TFRs of previous surveys, 7 in 1950, 6.4 in 1984 and 6.2 in 1991, that indicate a rapid decline in fertility during the last decade after remaining almost constant for a long period of 40 years. The rural-urban difference is not very large and highest for the age-group of 20-24; Gaspar et al suggest migration as a possible cause.

2.3 Likely Impact of the Demographic Dynamics on Per Capita Economic Growth

It is useful to briefly asses the likely impact of the reported demographic dynamics on per capita economic growth in Mozambique. Klasen (2004) surveyed the theoretical and empirical growth literature on the impact of demographic dynamics on per capita economic growth. The main findings were that high population growth is likely to have a negative impact on per capita economic growth, that these effects are likely to be particularly problematic in land-locked countries with high population density, and that a slowing population growth might generate a considerable economic benefit in the form of a demographic gift associated with falling dependency rates. While these factors all would lead to declining per capita growth in a country like Uganda (where fertility is hardly declining from very high levels, population density is high, and the country is land-locked), the situation is quite different in Mozambique for several reasons.

First, population growth is already slowing considerably, thus reducing the problems associated with it, while at the same time hastening the arrival of the demographic gift of falling dependency rates which Mozambique may benefit from in coming decades (see Bloom and Williamson, 1998).

Second, partly off-setting the capital-diluting effects of high population growth are the potential benefits of rising population density. As a sparsely populated country, Mozambique has very high per-capita infrastructure costs, the possibilities for trade and exchange of technologies and ideas are sharply circumscribed, and it might even be the case that technological progress and diffusion in agriculture is hampered by low population density (Boserup, 1965; Klasen and Nestmann, 2004).

Third, Mozambique's population growth will sharply increase its coastal population density, thereby generating considerable opportunities of further integration with the world economy through trade and technological exchange (Gallup and Sachs, 1998).

Thus it is unlikely that Mozambique will have the same negative effects from its current rates of population growth as many other African countries. In fact, there might be some benefits that partly off-set potential costs.

Before concluding on too positive a note, it is important to point out two clear problems associated with Mozambique's demographic dynamics. First, the impact of AIDS will sharply reduce the demographic gift as it will largely kill working age people. Any efforts to reduce the spread of AIDS or prolong the life in good health of those affected will likely carry high economic benefits (apart from the obvious gain in life expectancy). Secondly, overall mortality in Mozambique quite apart from AIDS is very high and is likely to put a break on economic development. The slow population growth due to high mortality is not going to have the same beneficial effect as slow population growth due to falling fertility. Thus efforts to reduce overall mortality will remain critical. While they will, in the short term, push up population growth rates, they will probably not affect the demographic trends significantly as healthier people tend to have smaller families and thus deepen the fertility decline.

3. Demographic Determinants of Poverty and Inequality

In this section, we shift to a micro-economic focus and assess the impact of household size on poverty and inequality dynamics. In particular, we want to investigate to what extent large household size generates a poverty trap, and to what extent changes in household size have contributed to changes in poverty and inequality in Mozambique in recent years. We will also do various simulations and decompositions to assess the potential impact of smaller household sizes on poverty and real incomes.

3.1 Data

The data used to assess the determinants of poverty and inequality are the Surveys of Household Consumption (*Inquerito aos Agregados Familiares Sobre Orçamento Familiar*, IAF) of the years 1996 and 2002. The IAF provides data on consumption on the household level as well as some demographic characteristics like age and sex, the size of the household, information on education obtained and the geographic location of the household. The survey of 1996 additionally carried sections on migration and fertility, but these have been discontinued in 2002. The samples used in this analysis contain data from 41503 individuals living in 7984 households in 1996 and 43157 individual observations collected in 8353 households in 2002. See Table 3.1 for more household characteristics.[4]

[4] The figures for dependency rates presented in Table 3.1 are means of household level dependency rates. The dependency rate values reported in Table 2.1 are computed as the ratio of the overall number of children aged 0-14 years and the elderly aged 65 or more years to the number of persons of working age (15-64 years). The difference in the values of the dependency ratio figures in Table 3.1 compared to the dependency rates presented in Table 2.1 indicates a large variation in household level dependency rates and thereby the household structure. The dependency ratio values computed by the UN Population Division as presented in Table 2.1 show a decreasing trend over time, while the mean dependency ratio in Table 3.1 increased from 1996 to 2002. A possible reason for this could be that working age individuals leave their rural households and migrate into urban areas and thereby reduce the proportion of working age members of the usually larger rural households. Another reason could be an increased mortality rate of the working age population due to HIV/AIDS.

TABLE 3.1: Descriptive Statistics of the Explanatory Variables on Household Level in 1996 and 2002

Variables	1996 Mean	1996 Standard Deviation	1996 Frequency in Sample	2002 Mean	2002 Standard Deviation	2002 Frequency in Sample
AE[a] Consumption	7446	10072.36	7984	15632.39	38449.54	8353
Spatially Adjusted AE Consumption	7718	8063.349	7984	15895.6	25491.9	8353
Spatially Adjusted AE Cons. in Prices of 2002[b]	12223	12770.38	7984			
Spatially Adjusted AE Log Consumption	8.6967	.6768	7984	9.376398	.6979231	8353
Spatially Adj. AE Log Cons. in Prices of 2002[b]	9.1565	.6768	7984			
Sex of Head Male D	.79	.4068782	6312	.77	.4238647	6392
Age of Head	41.5	13.92694	7984	41.6	14.34007	8353
Age of Head 15-24 D	.11	.310758	865	.09	.2871176	757
Age of Head 25-34 D	.26	.4380749	2067	.28	.4512206	2377
Age of Head 35-44 D	.23	.4214562	1844	.25	.4310182	2059
Age of Head 45-54 D	.20	.4002819	1600	.18	.3816778	1478
Age of Head 55 plus D	.20	.4011528	1609	.20	.4009984	1681
Household Size	4.85	2.50436	7984	4.89	2.566149	8353
Adjusted Household Size	4.63	2.350215	7984	4.7	2.412436	8353
Dependency Rate	1.04	.9359053	7984	1.11	.9697382	8353
No of Children in HH	2.24	1.800845	7984	2.29	1.812992	8353
HH Members aged 15-64	2.51	1.267518	7984	2.48	1.33914	8353
Elderly HH Members	0.10	.3203306	7984	1.11	.3579887	8353
Rural D	.82	.3834982	6554	.70	.4591439	5831
Rural * Household Size	3.87	2.834568	7984	3.31	3.006975	8353
No Education D	.40	.4900885	3200	.28	.4504356	2363
Some Primary Educ. D	.31	.4643859	2512	.44	.4964726	3679
First Primary concl. D	.19	.3884398	1478	.16	.3676056	1345
Second Primary concl. D	.07	.2560524	563	.06	.2450467	536
Some Second. Educ. D	.04	.1866609	289	.06	.2338181	485
Some Techn. Educ. D	.01	.0869401	61	.01	.0965253	79
Some Superior Educ. D	.002	.0498763	20	.004	.0625212	33
Niassa D	.05	.2174997	397	.05	.2157039	409
Cabo Delgado D	.10	.2974859	783	.1	.3062293	875
Nampula D	.21	.4090677	1696	.21	.4064191	1743
Zambezia D	.22	.4173382	1793	.20	.3990254	1660
Tete D	.07	.2572241	569	.08	.2709822	666
Manica D	.06	.2304427	449	.06	.2309454	472
Sofala D	.08	.265084	607	.07	.2604776	611
Inhambane D	.06	.2394762	488	.07	.2599639	609
Gaza D	.06	.2300475	448	.06	.2324894	479
Maputo D	.04	.2068016	357	.05	.2276679	458
Maputo Cidade D	.05	.2172096	396	.04	.2059803	371

Note: [a] AE: adult equivalent consumption. [b] Figures only available for 1996 consumption data. D: dummy variable, mean in %.
Source: Authors' computations from the 1996 and 2002 IAF Surveys.

The variables on education all refer to the education of the household head. The second educational variable "some primary education" and the last three ones, "some secondary education", "some technical education", "and "some superior education", include all individuals having been enrolled in one of the classes in the respective courses irrespective if they dropped out or obtained a degree. Especially in the last three categories, the number of observations would otherwise have been very low for some of the subgroups. The category "some primary education" also comprises participants of alphabetization courses.

TABLE 3.2: Household Characteristics and Poverty Line in 1996 and 2002

	1996			2002		
	Rural (82 %)	Urban (18 %)	Total (100 %)	Rural (70 %)	Urban (30 %)	Total (100 %)
Household Size	4.71	5.50	4.85	4.74	5.22	4.89
Poor Households' Size[a)]	5.75	6.08	5.81	5.65	6.20	5.82
Non- Poor Households' Size [a)]	3.87	5.04	4.08	4.34	4.76	4.47
Age of Household Head	41.6	40.9	41.5	41.6	41.6	41.6
Proportion of Male Household Heads	0.79	0.79	0.79	0.77	0.75	0.77
Average Dependency Rate	1.04	1.08	1.05	1.16	1.00	1.11
Poverty Line Means	4753	7309	5272	6950	11643	8463

Note: [a)] based on adult equivalent consumption. All figures are on household level with the exception of the poverty line means. Poverty means are in Meticiais of the respective year.
Source: Authors' computations from the 1996 and 2002 IAF Surveys.

Examining trends and differentials in average household size (Table 3.2), several interesting findings emerge. First, the total household size and the size of poor households hardly changed from 1996 to 2002, while the size of non-poor households increased by 0.39 persons over the same period. Second, poor households in total are larger than non-poor households, but the difference has been decreasing from 1.73 persons in 1996 to 1.35 persons in 2002. This decrease is caused by the huge reduction of the difference of rural households' size from 1.88 persons (1996) to 1.31 persons (2002). In contrast, differences in household size between poor and non-poor households in urban areas have increased from 1.04 to 1.44 persons in the same period. Urban poor households have been larger by 0.33 persons than rural ones in 1996, this difference increased to 0.55 persons in 2002. In contrast, the rural-urban household size of non-poor households decreased from 1.17 persons in 1996 to 0.42 persons in 2002. But all these numbers have to be interpreted with caution as in the 1996 sample, 82 % of the households have been rural versus only 70 % in 2002 and this reduction in the proportion of rural households is mainly due to a change in the definition of "rural" (National Directory of Planning and Budget et al., 2004).

3.2 Determinants of Consumption

In order to assess the impact of household size on per capita incomes at the household level, Table 3.3 shows coefficient estimates obtained by regressing the log of per adult equivalent consumption on personal characteristics and educational and regional variables for both survey years 1996 and 2002. Values for the per adult equivalent consumption are spatially adjusted by price indices for the different regions to assure comparability. Consumption values for 1996 are expressed in 2002 spatially adjusted prices.

The coefficients for the demographic variables "household size" and "dependency rate" are both significant and negative for both years. When considering the household size variable alone, adding a person to a household reduces per adult equivalent consumption moderately by about 8%. While the coefficient for household size remained almost constant, the coefficient for the dependency rate doubled from 1996 to 2002, but still remains rather modest. As shown in Table 3.2, total means for both variables only slightly increased from 1996 to 2002. In 1996, being located in a rural area had a large and significant positive effect on consumption (about 21 %, which is somewhat surprising), but in 2002 the coefficient dropped to 1 % and lost its significance. Part of the change in magnitude may be due to a shift in the definition of "rural", a lot of the households classified as rural in 1996 switched to "urban" in 2002. Most probably, the concerned households did not represent the poorest ones in the remotest areas of Mozambique. The coefficient for the combination of "rural" and "household size" is negative and significant in 1996 but changes its sign, drops substantially in magnitude and equally turns insignificant in 2002. Thus there appears to have been an added penalty to large households in rural areas in 1996 which has entirely disappeared by 2002.

TABLE 3.3: Regression Coefficients for Spatially Adjusted Per Adult Equivalent Consumption

	1996 Adult Equivalents in Prices of 2002	2002 Adult Equivalents
Sex of Head Male	-.0009216	-.0282292
Age of Head 25-34	-.0897279**	-.0162614
Age of Head 35-44	-.088603**	-.0836948**
Age of Head 45-54	-.056093	-.0753155**
Age of Head 55 plus	-.10349**	-.0536632*
Household Size	-.0781794**	-.0790269**
Dependency Rate	-.0355584**	-.0701916**
Rural	.2057304**	.0116694
Rural * Household Size	-.0315637**	.0055998
Some Primary Education	.0869924**	.0610335**
First Primary Concluded	.2209376**	.1495496**
Second Primary Concluded	.3539031**	.4193354**
Some Secondary Education	.5942588**	.756889**
Some Technical Education	.4574766**	.7469379**
Some Superior Education.	.906331**	1.540826**
Cabo Delgado	.2267915**	-.2587478**
Nampula	-.0002043	-.2101917**
Zambezia	.0954081**	.0278582
Tete	-.1340923**	-.305351**
Manica	.3043506**	.0097602
Sofala	-.3706709**	.2499256**
Inhambane	-.1137833**	-.6701355**
Gaza	.2101984**	-.0901955*
Maputo	.1200144**	-.5166569**
Maputo Cidade	.3398384**	-.2040396**
constant	9.431989**	9.912357**
R^2	0.3001	0.2876

Note: Computations are at household level. Left out categories are "age of head 15-24 years", no education, and the province Niassa. ** significant at the 0.01-level; * significant at the 0.05-level. For full regression details see Tables B and C in the Appendix.
Source: Authors' computations from the 1996 and 2002 IAF surveys.

The coefficients for "sex of the head of household" show a negative sign but are not significant, neither in 1996 nor in 2002. This result is supported by findings for 1996 presented by the Ministry of Planning and Finance et al. (1998) in the first national assessment of household data. Unlike in many other African countries, female headed households in 1996 are not significantly poorer than male headed households on a national level. This holds also for female households in rural areas, but not for urban households, where 20.6 % of the urban poor are reported to live in female-headed households versus 17.0 % of the urban non-poor. One of the reasons given for these findings is that many households headed by females are in fact supported by remittances of the absent husband who migrated for a relatively better paid work.

The coefficients for age structure of the heads of household (compared to heads aged 15-24) are all negative for both years but show changing patterns of significance. Patterns may partly be due to war times where less human capital could be accumulated and many skills got lost during times of migration.

The education of the household heads is for all types of school and both years always positively and significantly correlated to the consumption levels. Even some primary education already has some benefit compared to no education, and these benefits rise more or less linearly with levels of education (but take a jump upwards for tertiary education). It is also noticeable that the returns to education have jumped upwards since 1996 and are now significantly larger, particularly for highly educated individuals. This should be seen in the context of low overall education levels. For 1996, the Ministry of Planning and Finance et al. (1998) reported in the first national assessment of household data that only 17.4 % of active adults have completed the first primary level. For 2002, we find a nationwide level of 16.1 % in our sample, and 27.7 % heads with completed first primary level.

These findings indicate some moderate negative impact of household size on adult equivalent incomes and otherwise confirm known findings about the impact of other socio-economic variables.

3.3 Poverty Rates

During the period from 1996 to 2002, poverty measured by headcount ratios has been declining rapidly. Table 3.4 shows poverty rates for both 1996 and 2002, based on consumption per adult equivalent.[5] Headcount ratios calculated on the base of *per capita* consumption are 69.6 % in 1996 and 54.2 % in 2002. Using adult equivalents, the poverty rate fell from 53.5 % in 1996 to 37 % in 2002. The large decline of poverty may be partly due to a change in the composition of the basic basket used to calculate the poverty lines. Table 3.4 also lists poverty headcounts for 2002 data calculated using the fixed bundle poverty lines on the basis of the 1996 consumption basket. Using this basket to calculate the headcount poverty ratio for 2002 results in a far more moderate decline of poverty (of only about 5 percentage points). This figure though should be interpreted with some care as not all prices for the goods contained in the 1996 basket could be obtained in 2002; see the detailed discussion of problems concerning the different basic basket assumptions in the IAF 2002 Assessment (National Directory of Planning and Budget et al., 2004).

[5] Note that there is no poverty line especially developed for the use of per adult equivalents.

TABLE 3.4: Poverty and Inequality at Individual Level[a)]

	1996	2002	2002 with 1996 Coefficients[b)]
Poverty			
Headcount Ratio Per Adult Equivalents (%)	53.47	36.99	
Headcount Ratio Per Capita (%)	69.60	54.20	
Headcount Ratio (%) Using the Adj. 1996 Basket and Per Adult Equivalents		48.30	
Probability to Be Poor [c)]	51.62	37.52	45.21
Headcount Ratio if No. of Children -10 % (%)d)	50.28	34.74	
Prob. to Be Poor with Adj. Household Size (%)e)	50.10	36.32	
Poverty Gap Ratio (%)	19.19	11.97	
Poverty Gap Ratio (%) Using 1996 Basket		16.84	
Inequality			
Gini Coefficient	0.5398	0.5817	

Note: [a)] all poverty rates are based on adult equivalent incomes with the exception of the second line where it is based on per capita incomes. [b)] In this simulation for consumption in 2002, the coefficients for "household size", "dependency rate" and "rural*household size" have been kept at the 1996 level. See Section 3.6 for more information. [c)] See Section 3.5 for more explanations on the calculation of the probability to be poor. d) Here we simply take actual household incomes and reduce the number of children by 10% and accordingly reduce the adult equivalents. e) Adj. household size: number of children reduced by 10 %. See section 3.6 for more information.
Source: Authors' computations from the 1996 and 2002 IAF Surveys.

An additional factor causing the huge decrease of poverty from 1996 to 2002 may lie in the design of data collection in 1996 where less attention has been paid to be representative in time and space. This is especially important for the collection of household consumption data as food prices tend to double or triple in pre-harvest periods and may have a significant impact on the poverty status of households. If for example a household uses savings or borrows money to buy the necessary quantity of food in high price season and is sampled in this period of the year, it may seem wealthier as it really is because of its high consumption expenditures. In the 2002-IAF, these effects have been taken into account by constructing representative population subgroups for each of the four survey periods and developing a temporal food price index (Ministry of Planning and Finance et al., 1998, National Directory of Planning and Budget et al., 2004).

3. 5 The Probability to Be Poor

In order to simulate the impact of changes in household size on poverty, we also calculate the probability to be poor for individuals entering the 1996 IAF survey and for those surveyed in 2002, following Ravallion and Wodon (1999). The welfare ratio, $logW_i$, obtained by dividing the household's nominal consumption rate by the spatially adjusted poverty lines computed for the specific year of the survey, 1996 or 2002, is assumed to be a linear function of a vector X_i of explanatory variables containing information about the age and sex of the household head, household size, dependency ratio, a combined variable rural*household size, and the province where the household is located:

$$\log W_i = \alpha_t + \beta_t' X_i + \varepsilon_{ti}, i \in t .$$

Assuming normally distributed error terms, the probability to be poor is then estimated conditional on the joint sample means, *X**, of both surveys 1996 and 2002:

$$\Pr[\log W_i < 0 \mid i \in 96, X_i = X^*] = \Phi[-(\alpha_{96} + \beta'_{96} X^*)/\sigma_{96}] \quad (3.x)$$
$$\Pr[\log W_i < 0 \mid i \in 02, X_i = X^*] = \Phi[-(\alpha_{02} + \beta'_{02} X^*)/\sigma_{02}] \quad (3.x)$$

with σ_{96} and σ_{02} denoting the respective root mean squared error and Φ being the cumulative density function of the standard normal distribution. Table 3.4 lists the probability to be poor for both survey years. Tables A and B in the Appendix show full regression results.

Using this method to asses the proportion of poor individuals yields a probability to be poor of 51.61 % for 1996 and of 37.52 % for 2002 (see Table 3.4). The first number is 1.5 percentage points below the headcount ratio for 1996, the probability to be poor for 2002 lies 0.5 percentage points above the headcount for 2002.

3.6 Simulation of Changes of Household Size

Additionally, we calculate the probability to be poor for several simulated scenarios to show possible effects of larger demographic changes. In a first scenario, we simply reduce the number of children in each household by 10%, then calculate new per adult equivalence rates and examine changes in the poverty rate. In a second scenario, we reduce the number of children in each household by 10 % to calculate headcount ratios and simulate the probability to be poor for lower household sizes than the actual ones. In a third scenario, we predict the probability to be poor in 2002 if the demographic coefficients for 1996 would have been valid in 2002, too. In a fourth scenario, we increase or reduce numbers of dependent and working age household members and assess the impact on per adult equivalent consumption based on the regression results shown above. Results for the first three scenarios are presented in Table 3.4, results for the third scenario can be found in Table 3.5 later in this section.

Turning to the first scenario, the number of children under 15 years of age is reduced by 10 %, and we recalculate per adult equivalent consumption levels based on the actually reported levels. By reducing the number of children by 10% (rather than an absolute number), we want to avoid that households with few children profit more by reducing the number of children by one than larger households. The results in Table 3.4 show that poverty would have falling to 50.3% in 1996 and 34.7% in 2002 as a result of these smaller household sizes.

In the second scenario, the number of children is reduced by 10% and the values for the dependency rate, adult equivalents and the combined variable "rural*household size" are altered accordingly as generate new predictions about the probability to be poor. Table 3.4 shows that the probability to be poor would be reduced by about 1.5 percentage points in both years.

If, in our third scenario, we would assume that the 1996 coefficients for the demographic variables "household size", "dependency rate" and "household size * rural" also were the valid prices for the 2002 explanatory variables the hypothetical probability to be poor in 2002 would have dropped by around 9 percentage points less from 1996, to only 45.21 % compared to the original headcount ratio of 36.99 % for 2002. This result is largely driven by the fact that rural households suffered a sizable additional penalty for household size in 1996 which has disappeared by 2002. Thus the burden of large household sizes has been considerably reduced, particularly in rural areas.

In our fourth scenario, we calculate the effects of changes in the number of dependent and working age household members for consumption in both years 1996 and 2002. Again, working age household members are those aged 15 - 64 years, as dependent are considered those aged 0 - 14 and 65 and older. First, we calculate the differences in the average of household sizes, household level dependency rates, and the combined variable "household size*rural" when adding or reducing household members of different dependency status. Multiplying the obtained differences in these variables by their respective coefficients taken from the Tables C and D in the Appendix, we obtain the effects for the changes in the household structure.

TABLE 3.5: Demographic Effects on the Spatially Adjusted Log Per Adult Equivalent Consumption

	Effect on AE Consumption in 1996 (%)	Effect on AE Consumption in 2002 (%)
Working Age HH-Members increased. by 1	- 0.09	- 0.05
Dependent HH-Members increased by 1	- 0.12	- 0.11
Working Age HH-Members reduced by 1	+ 0.08	+ 0.03
Dependent HH-Members reduced by 1	+ 0.12	+ 0.10

Note: Effects are computed by taking the differences in the variable averages of "household size", "dependency rate" and "household size * rural" when changing household member numbers and then multiplying these differences by the respective variables coefficients.
Source: Authors' computations from the 1996 and 2002 IAF surveys.

The results displayed in Table 3.5 show that an increase of one more working age household member reduces AE consumption by 9 % in 1996 and by only 5 % in 2002. This result is surprising in two ways. First, one might have expected that the addition of a working age member should increase per adult equivalent household incomes (as is does for example in South Africa, see Woolard and Klasen, 2004). This points to high unemployment and low productivity of many working age members. Secondly, it is interesting to note that this effect has declined in 2002 again confirming a falling burden of household size. Adding a dependent household member reduces AE consumption by more as expected (by 12 % in 1996 and by 11 % in 2002). Reducing household members yields very similar effects in absolute magnitude, but this time increasing AE consumption. The effects are generally smaller in 2002 compared to those in 1996, and effects of a change of the working age proportion of household members tend to show a stronger decrease in magnitude than those for changes in the number of dependent household members.

With the exception of the second scenario, the obtained results of the simulations yield quite similar results to the original headcount poverty ratios. This suggests that household size has not played a significant role in hampering poverty reduction in Mozambique. If anything, the falling penalties for household size have helped poverty reduction. This is considered in more detail below.

3.7 Consumption Decomposition

Apart from assessing poverty trends, one can also analyze to what extent changes in household size or the penalties associated with household size can explain changes in average per adult equivalent consumption between 1996 and 2002.

To do this, we use a Blinder decomposition (Blinder, 1973) to disentangle the effects of changes in the characteristics of households from effects of changes in the respective coefficients on spatially adjusted per adult equivalent consumption for the years 1996 and 2002, the 1996 consumption values adjusted to 2002 prices to assure comparability. For a linear regression, the standard Blinder decomposition can be written as follows:

$$\sum_i \log\left(C_i^{02}\right) - \sum_i \log\left(C_i^{96}\right) = \left[\beta_0^{02} - \beta_0^{96}\right] + \left[\sum_i \left(x_i^{02} - x_i^{96}\right)\beta_i^{02}\right] + \left[\sum_i \left(\beta_i^{02} - \beta_i^{96}\right)x_i^{96}\right] \qquad (3.1)$$

C^{96} and C^{02} are the per adult consumption equivalents in the year 1996 and 2002, respectively; x_i is a row vector of average values of household characteristics and β_i a vector of estimated coefficients for the respective year. The first term on the right hand of Equation (3.1) shows the shift coefficient resulting from the difference in regression constants. The second term is the endowment component, *E*, of the difference in the explanatory variables in the years 1996 and 2002 multiplied by the 1996 regression coefficients. This term turns positive when, on average, endowments increased from 1996 to 2002 (and when the respective coefficient is positive). The last term represents the coefficients' effect, *C*, the differences in consumption that are not explained by differences in the household characteristics but by a change in the "prices" these endowments are valued with. In the decomposition presented in Equation 3.1, consumption in the year 2002 is the reference consumption. The regression tables are presented in the Appendix (Tables C and D).

Tables 3.6 and 3.7 list the estimated decomposition results. The largest part of the difference in spatially adjusted per adult equivalent consumption in 1996 and 2002 is caused by the positive shift in the estimation constants (shift coefficient (U)). This shift in constants may be explained by the general economic upswing that started after the war ended and is still prevailing. Exogenous factors like peace, security, increasing trade and investments are influencing the per capita GDP growth rate positively across the board rather than affecting the effects of our independent variables.

TABLE 3.6: Summary of Decomposition Results (as %)

Total Difference {R} {E+C+U}	22.0
Shift coefficient (U)	43.8
Amount attributable	-26.0
- due to endowments (E)	-0.7
- due to coefficients (C)	-25.4
Adjusted differential (D) {C+U}	22.7
Endowments as % total (E/R)	-3.1
Discrimination as % total (D/R)	103.1

Note: U = difference between model constants; D = proportion due to discrimination (C+U). A + sign indicates advantage to 2002 group, a - sign indicates advantage to 1996 group

Both the endowment effect E and the coefficient effect C are negative suggesting that both factors on their own would have led to falling per capita incomes in 2002 were they not outweighed by the much larger positive shift coefficient. Of the two, the endowment effect E is very small with only -0.7. Having a closer look at the effects for particular variables (Table 3.7), it can be observed that both (E) and (C) for "household size" are negative and rather small. The negative endowment effect is due to a slight increase of the total household size from 1996 to 2002 multiplied by the negative household size coefficient for 2002 (see Table

3.1 for averages of the variables). The 2002 household size coefficient is slightly more negative than the one for 1996, yielding a small negative coefficient effect as well.

The dependency rate contributed to -4.1 of the 26 percentage point decline in the attributable change in consumption levels. The larger part of the attribution is lying in the coefficient component which turned more negative in 2002. The average household level dependency rate increased from 1.04 in 1996 to 1.11 in 2002. In 1996, the dependency rate coefficient is less than half of the household size coefficient while both coefficients almost amount to the same negative magnitude in 2002.

By far the largest contribution to the consumption differences stem from the variables "rural" and "rural*household size". Again, the largest part of the attribution is due to the coefficient component, with the endowment effect only being small. The number of rural households decreased from 82 % in 1996 to 70 % in 2002. The positive coefficient dropped from 21 % to 1 % and so yields negative coefficient and endowment components. The effect of rural interacted with household size is the largest change of interest here. Due to the disappearance of a negative coefficient effect for large households in rural areas, per adult equivalent consumption has increased by 14.4 percentage points. In contrast there is a minor negative (and somewhat counterintuitive) endowment effect which is related to the fact that the size of the interaction declined (due to the falling share of the rural population) which combined with the positive coefficient in 2002 ensures that this factor alone would have led to a minor reduction in per adult equivalent incomes.

TABLE 3.7: Decomposition Results for Variables

Variable	Attribution	Endowment Component	Coefficient Component
Sex of Head	-2.1	0.1	-2.2
Age of Head 25-34	1.9	-0.0	1.9
Age of Head 35-44	-0.0	-0.1	0.1
Age of Head 45-54	-0.2	0.2	-0.4
Age of Head 55 and more	1.0	0.0	1.0
Household Size	-0.7	-0.3	-0.4
Dependency Rate	-4.1	-0.5	-3.6
Rural	-16.1	-0.1	-15.9
Rural * Household Size	14.1	-0.3	14.4
Some Primary Education	-0.0	0.8	-0.8
First Primary Concluded	-1.7	-0.4	-1.3
Second Primary Concluded	0.2	-0.3	0.5
Some Secondary Education	2.2	1.7	0.6
Some Technical Education	0.4	0.1	0.2
Some Superior Education.	0.4	0.2	0.2
Cabo Delgado	-4.9	-0.2	-4.8
Nampula	-4.4	0.1	-4.5
Zambezia	-1.6	-0.1	-1.5
Tete	-1.5	-0.3	-1.2
Manica	-1.7	0.0	-1.7
Sofala	4.6	-0.1	4.7
Inhambane	-4.2	-0.8	-3.4
Gaza	-1.7	-0.0	-1.7
Maputo	-3.4	-0.5	-2.9
Maputo Cidade	-2.6	0.1	-2.7
Subtotal	-26.0	-0.7	-25.4

Note: All figures in %.

Summarizing the decomposition results, several findings are important. First, there appears to have been a general improvement in incomes that is captured by the shift coefficient and not attributable to the variables included in the regression. Secondly, household size and dependency rates are not major factors in explaining changes in adult equivalent incomes between 1996 and 2002. Third, the disappearance of the negative coefficient on household size in rural areas contributes significantly to rising per adult equivalent incomes between 1996 and 2002.

4. Conclusions

The findings of this note suggest that population dynamics do not appear to be a major driver of changes in growth, per capita incomes, poverty, or inequality trends. At the macro level this can be seen at the off-setting effects of population growth on the one hand and the potential to reap the benefits of a demographic gift and higher population density on the other. At the micro level, it is clear that household size has not changed drastically and the existing negative impact of household size appears to have fallen in recent years, particularly in rural areas. Thus demographic dynamics have helped support rising per capita incomes and falling poverty rather than hindering it.

It is important to point that these findings should not be seen as arguments for abandoning any efforts to improve reproductive health and family planning services in Mozambique. Access to quality reproductive health and family planning services is surely a vital ingredient for the continuing fertility decline in Mozambique. In addition, it is a critically necessary policy for reducing mortality rates of women and children, which is a major problem in itself with serious repercussions for growth and poverty reduction. And lastly, high quality reproductive health and family planning services allow women the reproductive choices to which they are entitled to.

Appendix

TABLE A: Regression of Spatially Adjusted Log Consumption in 1996 Normalized by Poverty Line

ln_relcpad	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Sex of Head Male	.0206271	.0080696	2.56	0.011	.0048105	.0364437
Age of Head 25-34	-.0965484	.0123681	-7.81	0.000	-.1207901	-.0723067
Age of Head 35-44	-.0925718	.0125119	-7.40	0.000	-.1170953	-.0680482
Age of Head 45-54	-.0759228	.0128008	-5.93	0.000	-.1010127	-.0508329
Age of Head 55 plus	-.1437998	.0130416	-11.03	0.000	-.1693616	-.1182381
Household Size	-.059643	.0020824	-28.64	0.000	-.0637246	-.0555614
Dependency Rate	-.0266673	.0031623	-8.43	0.000	-.0328655	-.020469
Rural	.1285892	.0176776	7.27	0.000	.0939407	.1632377
Rural * Household Size	-.0194034	.0023733	-8.18	0.000	-.0240551	-.0147517
Some Primary Education	.0896465	.0071354	12.56	0.000	.075661	.103632
First Primary Concluded	.2316358	.0084011	27.57	0.000	.2151695	.2481021
Second Primary Concluded	.3391553	.0119402	28.40	0.000	.3157522	.3625584
Some Secondary Education	.526391	.0147704	35.64	0.000	.4974408	.5553412
Some Technical Education	.4433624	.0312434	14.19	0.000	.3821247	.5046002
Some Superior Education.	.820089	.05889	13.93	0.000	.7046634	.9355146
Cabo Delgado	.1947379	.0163717	11.89	0.000	.162649	.2268268
Nampula	-.0209793	.0144439	-1.45	0.146	-.0492898	.0073311
Zambezia	.0464915	.014451	3.22	0.001	.0181673	.0748158
Tete	-.1843414	.0166434	-11.08	0.000	-.2169628	-.15172
Manica	.2568069	.0172623	14.88	0.000	.2229725	.2906414
Sofala	-.4271206	.0161485	-26.45	0.000	-.4587721	-.3954692
Inhambane	-.122194	.0168832	-7.24	0.000	-.1552854	-.0891026
Gaza	.2412197	.0173691	13.89	0.000	.2071759	.2752634
Maputo	.1368151	.0181716	7.53	0.000	.1011984	.1724318
Maputo Cidade	.2582021	.018732	13.78	0.000	.2214871	.2949172
constant	.2810457	.0234683	11.98	0.000	.2350473	.327044
R2	0.2578					

Note: Left out categories are 'age of head 15-24 years', "no education", and the province 'Niassa'.
Source: Authors' computations from the 1996 and 2002 IAF Surveys.

TABLE B: Regression of Spatially Adjusted Log Consumption in 2002 Normalized by Poverty Line

ln_relcpad	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Sex of Head Male	.016068	.0078936	2.04	0.042	.0005965	.0315396
Age of Head 25-34	-.0570667	.0131515	-4.34	0.000	-.0828438	-.0312896
Age of Head 35-44	-.1545439	.013271	-11.65	0.000	-.1805554	-.1285325
Age of Head 45-54	-.1420253	.0137433	-10.33	0.000	-.1689624	-.1150883
Age of Head 55 plus	-.1384832	.0138253	-10.02	0.000	-.1655811	-.1113854
Household Size	-.0516879	.0017584	-29.39	0.000	-.0551343	-.0482414
Dependency Rate	-.0666572	.0031865	-20.92	0.000	-.0729027	-.0604117
Rural	-.0448693	.0149018	-3.01	0.003	-.0740772	-.0156614
Rural * Household Size	.0122773	.0020637	5.95	0.000	.0082324	.0163223
Some Primary Education	.0389909	.0073723	5.29	0.000	.024541	.0534408
First Primary Concluded	.1005254	.0094511	10.64	0.000	.0820009	.1190498
Second Primary Concluded	.3456848	.0131933	26.20	0.000	.3198257	.3715439
Some Secondary Education	.6747168	.0126313	53.42	0.000	.6499593	.6994743
Some Technical Education	.6754387	.0269278	25.08	0.000	.6226597	.7282178
Some Superior Education.	1.13062	.0453091	24.95	0.000	1.041813	1.219427
Cabo Delgado	-.2578004	.0163548	-15.76	0.000	-.289856	-.2257447
Nampula	-.145123	.0146834	-9.88	0.000	-.1739027	-.1163432
Zambezia	.0393327	.0145681	2.70	0.007	.010779	.0678864
Tete	-.2911607	.0165756	-17.57	0.000	-.3236491	-.2586723
Manica	.0129991	.0171638	0.76	0.449	-.0206421	.0466404
Sofala	.2755126	.0164634	16.73	0.000	.243244	.3077811
Inhambane	-.6246801	.0168685	-37.03	0.000	-.6577427	-.5916175
Gaza	-.0326135	.0174927	-1.86	0.062	-.0668996	.0016725
Maputo	-.4772206	.0182135	-26.20	0.000	-.5129194	-.4415219
Maputo Cidade	-.2163518	.0190739	-11.34	0.000	-.253737	-.1789665
constant	.7189481	.0218085	32.97	0.000	.6762029	.7616932
R2	0.2474					

Note: Left out categories are 'age of head 15-24 years', "no education", and the province 'Niassa'.
Source: Authors' computations from the 1996 and 2002 IAF Surveys.

TABLE C: Regression of Spatially Adjusted 1996 Log Per Adult Equivalent Consumption in prices of 2002

ln_cr_pae	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Sex of Head Male	-.0009216	.0172448	-0.05	0.957	-.034726	.0328828
Age of Head 25-34	-.0897279	.0235714	-3.81	0.000	-.1359341	-.0435217
Age of Head 35-44	-.088603	.0247594	-3.58	0.000	-.1371379	-.0400681
Age of Head 45-54	-.056093	.0253051	-2.22	0.027	-.1056976	-.0064884
Age of Head 55 plus	-.10349	.0255469	-4.05	0.000	-.1535685	-.0534114
Household Size	-.0781794	.0055771	-14.02	0.000	-.0891119	-.0672469
Dependency Rate	-.0355584	.0078705	-4.52	0.000	-.0509867	-.02013
Rural	.2057304	.0378465	5.44	0.000	.1315414	.2799195
Rural * Household Size	-.0315637	.0061952	-5.09	0.000	-.043708	-.0194194
Some Primary Education	.0869924	.0160523	5.42	0.000	.0555257	.1184592
First Primary Concluded	.2209376	.0195196	11.32	0.000	.1826741	.2592011
Second Primary Concluded	.3539031	.0278772	12.70	0.000	.2992565	.4085497
Some Secondary Education	.5942588	.0368617	16.12	0.000	.5220001	.6665175
Some Technical Education	.4574766	.0750319	6.10	0.000	.3103944	.6045588
Some Superior Education.	.906331	.1286343	7.05	0.000	.6541741	1.158488
Cabo Delgado	.2267915	.035254	6.43	0.000	.1576845	.2958986
Nampula	-.0002043	.0317072	-0.01	0.995	-.0623588	.0619502
Zambezia	.0954081	.0317209	3.01	0.003	.0332268	.1575894
Tete	-.1340923	.0371993	-3.60	0.000	-.2070127	-.061172
Manica	.3043506	.0391893	7.77	0.000	.2275293	.3811719
Sofala	-.3706709	.0368924	-10.05	0.000	-.4429896	-.2983523
Inhambane	-.1137833	.0386964	-2.94	0.003	-.1896384	-.0379281
Gaza	.2101984	.0396243	5.30	0.000	.1325244	.2878724
Maputo	.1200144	.0418848	2.87	0.004	.0379093	.2021195
Maputo Cidade	.3398384	.0440254	7.72	0.000	.253537	.4261398
constant	9.431989	.0488428	193.11	0.000	9.336244	9.527734
R2	0.3001					

Note: Left out categories are "age of head 15-24 years", "no education", and the province "Niassa".
Source: Authors' computations from the 1996 and 2002 IAF Surveys.

TABLE D: Regression of Spatially Adjusted 2002 Log Per Adult Equivalent Consumption

ln_cr_pae	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Sex of Head Male	-.0282292	.0168413	-1.68	0.094	-.0612423	.004784
Age of Head 25-34	-.0162614	.0249423	-0.65	0.514	-.0651546	.0326317
Age of Head 35-44	-.0836948	.025769	-3.25	0.001	-.1342085	-.0331812
Age of Head 45-54	-.0753155	.0272328	-2.77	0.006	-.1286986	-.0219325
Age of Head 55 plus	-.0536632	.026612	-2.02	0.044	-.1058293	-.001497
Household Size	-.0790269	.0045923	-17.21	0.000	-.088029	-.0700249
Dependency Rate	-.0701916	.0076526	-9.17	0.000	-.0851926	-.0551906
Rural	.0116694	.0314281	0.37	0.710	-.0499376	.0732763
Rural * Household Size	.0055998	.005451	1.03	0.304	-.0050856	.0162851
Some Primary Education	.0610335	.016162	3.78	0.000	.0293519	.0927152
First Primary Concluded	.1495496	.021638	6.91	0.000	.1071338	.1919654
Second Primary Concluded	.4193354	.0303401	13.82	0.000	.3598614	.4788095
Some Secondary Education	.756889	.0307943	24.58	0.000	.6965246	.8172534
Some Technical Education	.7469379	.068961	10.83	0.000	.6117572	.8821186
Some Superior Education.	1.540826	.1046391	14.73	0.000	1.335707	1.745945
Cabo Delgado	-.2587478	.0356109	-7.27	0.000	-.3285541	-.1889415
Nampula	-.2101917	.0329258	-6.38	0.000	-.2747344	-.145649
Zambezia	.0278582	.0328517	0.85	0.396	-.0365394	.0922557
Tete	-.305351	.0371059	-8.23	0.000	-.3780878	-.2326143
Manica	.0097602	.0400873	0.24	0.808	-.0688209	.0883412
Sofala	.2499256	.0380779	6.56	0.000	.1752835	.3245677
Inhambane	-.6701355	.0380452	-17.61	0.000	-.7447136	-.5955574
Gaza	-.0901955	.0404284	-2.23	0.026	-.1694451	-.0109459
Maputo	-.5166569	.0410966	-12.57	0.000	-.5972165	-.4360973
Maputo Cidade	-.2040396	.045337	-4.50	0.000	-.2929114	-.1151679
constant	9.912357	.0455565	217.58	0.000	9.823055	10.00166
R2	0.2876					

Note: Left out categories are "age of head 15-24 years", "no education", and the province "Niassa".
Source: Authors' computations from the 1996 and 2002 IAF Surveys.

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