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PRO-POOR GROWTH IN MOZAMBIQUE:
AN EXPLORATION OF ITS INCOME AND NON-INCOME DIMENSIONS

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE
OF
MASTER OF ARTS
IN THE
ANDREW YOUNG SCHOOL OF POLICY STUDIES
OF
GEORGIA STATE UNIVERSITY

BY

JASON S. CALDER

GEORGIA STATE UNIVERSITY
DECEMBER 2005

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2005

ACCEPTANCE

This thesis was prepared under the direction of the candidate's Thesis Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Master of Arts in Economics in the Andrew Young School of Policy Studies of Georgia State University.

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ABSTRACT

PRO-POOR GROWTH IN MOZAMBIQUE:
AN EXPLORATION OF ITS INCOME AND NON-INCOME DIMENSIONS

By

JASON S. CALDER

DECEMBER 2005

Committee Chair: Dr. Sally Wallace

Major Department: Economics

The purpose of this study is to assess the incidence of economic growth and social attainment in Mozambique during the 1990s. There is a growing international debate about the impact of growth on poverty and inequality. International development goals endorsed by the United Nations, the World Bank, and governments from around the world emphasize achieving quantitative targets across various dimensions of welfare including, but not limited to, income. Therefore, efforts at evaluating growth must go beyond aggregates and focus on the experience of the poor during the growth process. The methodology used here is based on growth incidence curves first developed by Ravallion and Chen (2003, 267) for income growth rates and extended to social welfare (e.g., education level, vaccination rates) indicators by Klasen (2005). Growth incidence curves show the incidence of growth across the population distribution. They have the

benefit of describing how the gains from growth are distributed during the growth process. Using data from Mozambique's 1997 and 2003 household living conditions surveys, a growth incidence curve is calculated for Mozambique using consumption as a welfare metric. Data limitations do not allow non-income growth incidence curves to be calculated; however, an approach combining quantile distributions and kernel regressions using education data is taken in the spirit of the non-income growth incidence curve approach. Consumption growth in Mozambique is demonstrated to have been pro-poor by some definitions but not others. The general conclusion about the growth of educational attainment is that it has been pro-poor as well.

CHAPTER I
INTRODUCTION

The purpose of this study is to assess the incidence of economic growth and social attainment in Mozambique during the 1990s. Mozambique is a poor, highly-indebted country that launched economic reforms in the late 1980s to reverse a long period of economic stagnation and decline and enjoyed a subsequent period of high growth associated with economic recovery and poverty reduction. Among the questions this study seeks to assess are: Did growth reach the poor as much as the non-poor? Did economic inequality decline? How much poverty reduction was the result of economic growth as opposed to income redistribution? Did social indicators improve and how did this relate to those who were beneficiaries of growth?

The methodology to be used is based on growth incidence curves first developed by Ravallion and Chen (2003) for economic growth rates and subsequently applied for indicators or proxies of social welfare (e.g., education level, vaccination rates) by Klasen (2005). A growth incidence curve shows the incidence of growth across the population distribution. This has the benefit of describing how the gains from growth were distributed during the growth process. Growth incidence curves for social attainment can be constructed to show the pure incidence of the measure across quantiles of the population (unconditional incidence curves) or can be conditioned against the distribution of growth (conditional incidence curves). The latter demonstrates graphically whether or not social attainment tracked closely the incidence of income growth. The use of growth

incidence curves in these ways is increasingly important in the current debate of "pro-poor growth" within the international development community.

Growth incidence curves can be constructed on the basis of income (or consumption) data from national household surveys for two periods in time. For this study, the 1996/7 and 2002/3 nationwide household survey data sets for Mozambique known as the *Inquérito aos Agregados Familiares* (IAF) will be used.

The imperative of global poverty reduction is receiving increasing international attention. Of the over 5 billion people on earth in 2001, approximately 1.1 billion eked out a living on less than one dollar per day while a staggering 2.7 billion existed on less than two dollars a day (World Bank 2004). But these figures alone cannot do justice to the horror of poverty because poverty is much more than a lack of income. According to the poor themselves – 60,000 of them worldwide - surveyed for the 2000/2001 World Development Report on poverty (World Bank 2001, 15):

> "To be poor is to be hungry, to lack shelter and clothing, to be sick and not cared for, to be illiterate and not schooled. But for poor people, living in poverty is more than this. Poor people are particularly vulnerable to adverse events outside their control. They are often treated badly by the institutions of state and society and excluded from voice and power in those institutions."

Poverty is clearly a multidimensional phenomenon, and the understanding of this reality has finally moved beyond the realm of rhetoric and theory and into the practice of governments and international organizations concerned with development.

That the international community is thinking differently about growth, poverty and development can be seen in the adoption by the United Nations General Assembly of the Millennium Development Goals (MDGs) and their current acceptance in the policy and evaluation practice of governments and international organizations worldwide.

The MDGs, most for 2015, do not commit the nations of the world to achieving growth targets. They are concerned instead with the results of growth and the distribution of opportunities, namely: halving absolute poverty and the number that suffer from hunger; achieving universal primary education, ensuring equal access to education by girls and boys; reducing child mortality by two-thirds; reducing maternal mortality by three-quarters; halting and beginning to reverse the spread of HIV/AIDS, malaria, and other major diseases; halving the number of people without sustainable access to safe drinking water and sanitation, and so on. Such a more holistic and results-focused approach to development requires new ways of assessing economic growth and its impact on poverty reduction and opportunity distribution.

Following this introduction, Chapter II provides a review of the literature on growth, poverty and inequality and its recent extension into the idea of pro-poor growth. This is followed by a review of recent economic developments in Mozambique as well as trends in inequality and poverty there. Chapter III covers data and methodology starting with a summary of the Mozambican household surveys, the methodology behind the calculations of various types of growth incidence curves, as well as a description of the various welfare variables selected for analysis. Chapter IV presents and discusses the results of the growth incidence analysis and Chapter V concludes.

CHAPTER II
LITERATURE REVIEW

Growth, Poverty and Inequality

There is a rich literature on the nexus of growth, poverty, and inequality. This review will not delve into the literature on economic growth per se, but will instead focus on the interrelationship among the three phenomena in theory and practice. This section is broken down into (a) a discussion of the concepts of inequality and poverty, (b) the closely related issue of their measurement, and (c) the theoretical relationships between growth, inequality, and poverty and how empirical evidence from the literature bears them out. This review will lead into the subsequent topic of "pro-poor growth" which recently has emerged in policy circles and the academic literature uniting these issues.

Concepts of Poverty and Inequality

Poverty is of both intrinsic and instrumental significance in the study and pursuit of development. In many respects, the systemic elimination of the multiplicity of deprivations inherent in poverty – ill health, illiteracy, exposure, insecurity, shame, fear, pain, hopelessness – is the very objective of the development process. On the other hand poverty is the biggest barrier to its own eradication and thus is of instrumental, or functional, significance. As axiomatic as that sounds, those who live on the margins of survival lack the very means – from income, to skills, to physical energy, to social support – to overcome their plight. It is thus important to examine various concepts of poverty in the literature in order to appreciate the strengths and weaknesses of various attempts at measurement and evaluation.

Amartya Sen won the Nobel Prize in economics for his contributions to welfare analysis and the measurement and assessment of poverty and inequality. His approach reunited political and ethical philosophy with the study of economic development in the tradition of earlier economists like Adam Smith. Sen's capabilities, or freedoms, approach is a significant departure from the income based measures that are standard in the economics literature and they motivate this study's goal of moving beyond income-based assessment.

Sen notes that inequality (and one can include by extension poverty) is ultimately the result of social arrangements and the latter is critical to the ultimate evaluation and assessment of the former(Sen 1992, ix). To examine poverty solely through an economic lens, such as the absence of sufficient income levels or even in terms of material deprivations that manifest in biological form such as malnutrition or hunger, is to be distracted from the larger sociological and political institutions that have produced, tolerated, and sustained that situation. However, a framework for assessing well-being cannot simply focus on social institutions as this would deny individual agency and choice its rightful place in the realization of development outcomes. The approach must recognize both the diversity of individuals and the many ways in which they themselves might judge their well-being.

It is ultimately the "capability to achieve functionings that he or she has reason to value" that should drive our assessment (Sen 1992, 4-5). "Functionings" are outcomes in the sense either of states of being or accomplishments. They can vary from being nourished, avoiding premature death, being a valued member of a community, or having self respect. As is obvious from these examples, functionings are states of being and

doing that are of value to individuals. If the value judgment is ultimately left with the individual, then we must focus on what capabilities will enable them to achieve their desired beings and doings. The focus of the capabilities approach is on the freedom to achieve and not the achievement itself. Sen does grant that in assessing situations of extreme poverty, the analysis of a small set of basic functionings and their associated capabilities would take us a good measure of the distance to assessing well-being in that particular context (1992, 44-45). It is from this point of departure that it is useful to consider some of the standard approaches in the economic literature.

Most concepts of poverty in the economics literature start with some notion of a poverty line under which one is determined to be poor and above which non-poor. At a certain level, any such line is arbitrary. Few would argue that being just above or below a poverty line represents a significantly different standard of living, yet one would be labeled poor and the other not. However, poverty lines provide a transparent and practical benchmark for assessment. Poverty lines are calculated on the basis of data drawn from household surveys. These lines have various expressions, as measures of income, consumption, nutrition, or even caloric intake as in the case of some Indian poverty lines. At a more fundamental level, they represent a view of the "minimum level of 'acceptable' economic participation in a given society at a given point in time" (Ray 1998). Poverty lines should be treated with some degree of caution with an understanding of the inherent choices made in selecting a particular poverty line for consideration. The following discussion draws from Ray.

First, most poverty lines measure the *capacity to consume* and *not consumption itself*. Just because individuals achieve certain levels of income or consumption levels

relative to a poverty line does not mean that they will necessarily consume a basket of goods that satisfies a normative minimum standard. Two individuals with the same income levels can choose to spend those resources on very different baskets of goods and services with very different nutritive, caloric, or welfare characteristics. One household head might choose to provide square meals for the entire family as opposed to the other who spends a large proportion of income on alcohol, tobacco and gambling and spends the tiny remaining fraction on the family's basic needs. Notwithstanding these limitations, income and consumption-based poverty lines are widely used because of the accessibility of the information needed to construct them and because they do roughly proxy for welfare.

Another inherent consideration is whether to treat poverty as an *absolute* or *relative* concept. At a basic level, where deprivation meets biological imperatives, poverty is undeniably absolute. There are basic levels of caloric and nutritive intake that are necessary for human survival. One could easily extend this from food to non-food dimensions such as food and shelter without much argument. However, at a certain point overall socioeconomic standards and norms of what constitutes minimum acceptable well-being in a given society take on greater significance in judgments about poverty. These needs differ from country to country across rich and poor societies. This approach has led some countries to construct relative poverty lines that are based on a fraction of mean national income or consumption.

Poverty has a temporal dimension and thus can vary from being a *temporary* phenomenon to a *chronic* state, the latter spanning generations of a family in some instances. In many developing countries with widespread poverty (however measured)

people are clustered close to poverty lines and exist above or below it at any given time. External shocks (e.g., weather, economic, etc.) can temporarily plunge individuals or households into the sample of the poor at a particular point in time. Others may represent a long line of chronically poor.

Chronic poverty is defined by its extended duration which is intuitively related to the idea of living in poverty for the majority of one's life or to passing on poverty from one generation to the next (i.e. intergenerational poverty). Hulme and Shepherd propose a working definition of chronic poverty as occurring "when an individual experiences significant capability deprivations for a period of five years or more" (Hulme and Shepherd 2003, 405). The authors admit that the selection of this duration is rather arbitrary, but the underlying idea is that it captures a significant portion of an individual's life and reflects empirical evidence (albeit limited) that people who are poor for this long have a higher probability of remaining poor for their entire lives (Corcoran, M. 1995 in Hulme and Shepherd 2003). Green and Hulme (2005) cite the following updated definition from the Chronic Poverty Research Centre (2004): "…people who remain poor for much of their life course, who may 'pass on' their poverty to their children, and who may die of easily preventable deaths because of the poverty they experience."

While in all likelihood chronic poverty is positively related to the severity of poverty and to the existence of deprivations across multiple dimensions of well-being, empirical research still endeavors to establish a clearer understanding of the relationships. Hulme and Shepherd propose a five-tier system to categorize poverty in its temporal dimensions, consisting of the "always poor," "usually poor," "churning poor," 'occasionally poor," and "never poor" with those in the first two categories considered

chronic poor, the second two categories *transient poor*, while the final category through the wealthy are the *non-poor*. The "always poor" are those whose poverty measure is below the threshold in every period while the "usually poor" find their mean poverty score below the poverty line but are not poor in every period. This approach to chronic poverty still utilizes expenditure/income/nutrition levels as the basis for defining poverty although is flexible to accommodate other factors.

Finally, the question of the level at which poverty analysis takes place is of practical importance to most applied policy analysis. While we are ultimately concerned about the poverty of *individuals*, for numerous reasons the *household* has been the traditional unit of data collection and analysis. Information on a poverty measure is collected at the household level and then divided by the number of household members. This approach encounters three problems. First is that this method obviously glosses over what happens with intra-household distribution of resources which could be, and often is, discriminatory with respect certain members (e.g. women, the elderly, etc.). Second, poorer households often have a greater number of members generally, and children specifically, than more wealthy households. Simple division of total household income or consumption across household size can give a misleading per capita picture as the children or the elderly have different needs than working age adults. There obviously are ways of getting around this problem using adult equivalence scales (Ray 1998). A final consideration is that a household has certain fixed costs regardless of size. Smaller households that cannot spread these costs over more members are at a disadvantage.

With this coverage of poverty, we now turn briefly to the concept of inequality. Poverty concerns levels of welfare while inequality concerns its distribution. Borrowing

again from Ray (1998), inequality, like poverty, has both intrinsic and instrumental qualities. There are philosophical arguments in favor of equality, at least in terms of prospects and opportunities, if not outcomes. If inequality impacts growth – or any other issue of significance – either one way or another, then inequality has functional significance and therefore is worthy of examination.

Like poverty, income or wealth inequality can be looked at along the dimensions of absolute and relative as well as temporary and permanent. The issue of relative inequality will be picked up in the section concerning measurement, so we will briefly focus on other conceptual foundations of inequality. The first is the idea of mobility. A snapshot of inequality at a given point in time says very little without additional information. For one thing, it could either represent a temporary phenomenon which may not motivate significant concern or a deeply entrenched problem of major social significance. This leads to another set of considerations: What is the functional or personal distribution of inequality? These interrelated issues concern the return to factors of production (wages, profits, rents) and how those factors are owned by individuals or households. Understanding this space in a given society will say a lot about why inequality exists and how it accumulates and is transmitted. Ray notes that while approaches to the measurement of inequality do not capture these concerns, they are still important to bear in mind when doing empirical analysis of inequality (Ray 1998, 173).

Measurement

This section will cover standard quantitative measures of poverty and inequality as a point of departure to their interpretation in later sections in the case of Mozambique and to set a backdrop for the introduction to newer approaches that are used later as well.

Foster, Greer, and Thorbecke (1984), building on Sen (1976), developed a set of three decomposable poverty measures that have together become the workhorses of applied poverty analysis. Conceptually, they measure the incidence of poverty, the depth of poverty, and the severity of poverty and are known, respectively, as the headcount ratio, the poverty gap ratio, and the squared poverty gap ratio. They take the following basic functional form:

$$P_\alpha = \frac{1}{n}\sum_{y \le z}\left(1 - \frac{y}{z}\right)^\alpha \quad , \quad \alpha \ge 0$$

where *n* is the population, *y* is the average income of the household, and *z* is the poverty line. The values of 0, 1, and 2 are used for the parameter α to reflect increasing sensitivity to inequality among the poor.

With the value of α=0, P reduces simply to the headcount ratio. The headcount ratio measures the percentage of the population whose income or consumption falls below the established poverty line, which represents a minimum threshold that society believes is adequate.

While widely used, the headcount ratio fails two axioms of a good poverty measure according to Sen (1976). The first is the monotonicity axiom which states that, all else equal, a reduction of income below the poverty line must increase the poverty measure. This does not hold with the headcount ratio because it is not at all sensitive to the depth or extent of poverty, simply the number above or below the line. The second axiom which the headcount fails is the transfer axiom, which states that all else equal any transfer from a person below the poverty line to anyone who is richer must increase the

poverty measure. In this case, such regressive transfers either leave the headcount the same or, perversely, improve it if the transfer moves the recipient from below to above the poverty line. Notwithstanding these inadequacies, the headcount ratio provides a brute aggregate measure of poverty and is widely utilized.

The poverty gap index, represented by $\alpha=1$, is the average distance that measured income or consumption falls below the poverty line, expressed as a proportion of the line. The poverty gap index is normalized across the entire population with the non-poor treated as having no poverty gap. A poverty gap of 40% means that the average consumption (income) of the poor is 60% of the poverty line. The poverty gap satisfies the monotonicity axiom because if the income shortfall increases, everything else equal, the poverty gap measure will worsen. However, it does not satisfy the transfer axiom because it is insensitive to income changes among the poor. A transfer from the poorest person to the next poorest person would not change the poverty gap measure.

The squared poverty gap index, which is represented when $\alpha=2$, satisfies both the monotonicity and transfer axioms because it takes account of the distribution of income among the poor. As its name implies, it squares each poverty gap thus increasing the sensitivity of the measure to large shortfalls from the poverty line. If a transfer is made from someone just below the poverty line to another far below the line, the squared poverty gap index would decrease reflecting lower inequality among the poor. In this situation, the headcount index would not change and nor would the poverty gap since the overall average shortfall of the poor remains the same but is distributed differently.

As noted, the preceding poverty measures are limited by the fact that they are tied to measures of income in relation to a poverty line. They do not address any of the other

dimensions of well-being that may be important, particularly from a capabilities perspective such as health, education, or access to clean water and safe shelter, etc. There have been other attempts to move beyond these and other standard measures of well-being such as GDP per capita. The most notable of these is the United Nations Development Program's Human Development Index (HDI) and its related family of indices, including the Human Poverty Index (HPI) (UNDP 1997).

The HDI is a composite measure consisting of average achievement *of a country* in three basic dimensions of human development (longevity, knowledge, and standard of living). The HDI contains three variables: life expectancy, educational attainment (adult literacy and combined primary and secondary school enrollment) and real GDP per capita (in PPP$). While the HDI measures attainment, the HPI measures *deprivation* along the same dimensions that make up the HDI. While debate is engaged over the selection of variables that make up the HDI, their relative weighting within the index, and the theoretical underpinnings of the HDI family, the Human Development Index is a widely recognized and made a notable contribution to moving beyond income in aggregate measures of welfare and poverty.

Moving to the issue of inequality, the standard approach to measuring the relative inequality of a distribution – be it income, wealth, assets, etc. – has been built around four basic ethical principles: the anonymity principle, the population principle, the relative income principle, and the Dalton principle. The anonymity principle states that the actual identity of individuals or households ranked in a distribution is immaterial to the inequality measure. In other words, it does not matter to an impartial measure of inequality if, all things being equal, you are ranked first and I am ranked last or the other

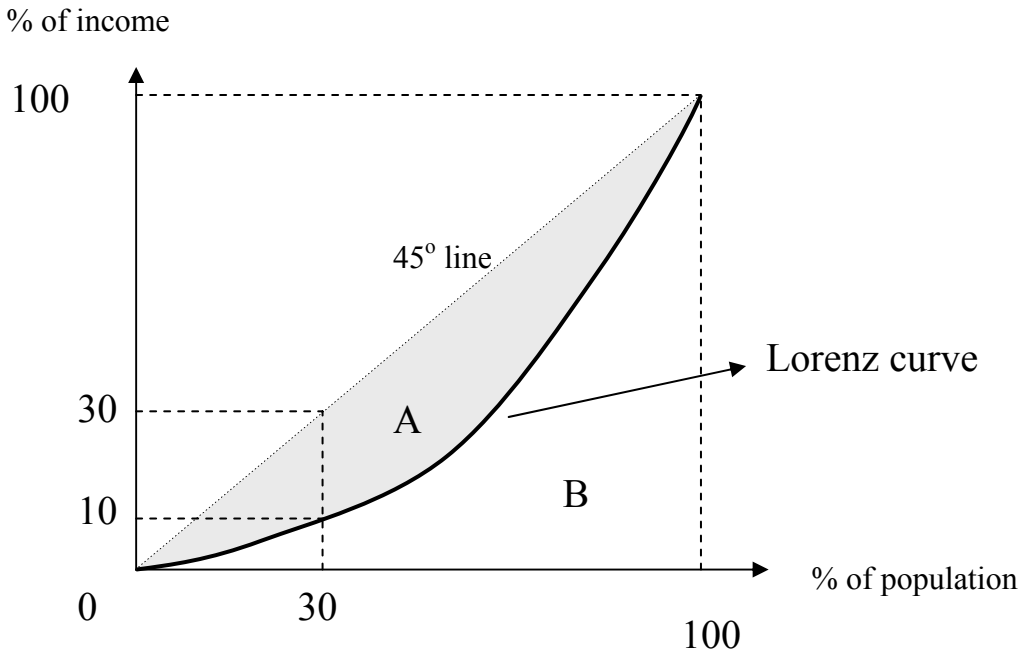
way around. The population principle allows two groups with the exact same relative distributions to be considered equivalent from an inequality perspective even if one contains twice as many people as the other. The relative income principle asserts that it is the relative shares of income that should matter to inequality measurement and not the absolute amounts.[1] Finally, the Dalton principle says that if one distribution can be created from another by a series of regressive transfers within the latter then the former distribution is the more unequal of the two starting distributions.

Thankfully, these principles deliver the more intuitively understandable concept of the Lorenz curve, which is one of the most popular ways of depicting inequality. The Lorenz curve plots cumulative shares of population on the x axis and cumulative shares of income on the y axis. A 45° line emanating from the origin depicts complete equality and thus any deviation from this is a bowed loop below and to the right of the line of equality. The further from the 45° line, the greater the inequality. Separate distributions can be calculated and depicted this way for comparison.

[1] While this is a widely accepted principle in the literature, its acceptance in popular discourse is contested. Ravallion (2003) notes how the global debate on whether inequality and poverty have increased or decreased over the last quarter of a century is driven by the value placed by some on absolute levels of inequality.

FIGURE 1

SAMPLE LORENZ CURVE



If one distribution is everywhere to the left of another – thus never crossing – then it can be said to be a more equal distribution. If Lorenz curves cross, the Dalton principle has been violated and it cannot be concluded whether one distribution is more or less equal than the other because to do so would require weighting of the value of certain transfers among the population in a subjective and therefore contestable manner.

The Lorenz curve leads to a popular quantitative measure of inequality: the Gini Coefficient. The Gini coefficient measures all pairwise combinations of income in a population. The coefficient falls between zero and one with zero representing total equality where the entire population has equal shares to complete inequality where one individual has all income. As shown on the Lorenz curve diagram above, the Gini measures the ratio of the shaded area between the curve and the equality line (A) to the total area under the equality line (A+B), a value of one.

Theory and Empirical Evidence

Growth and Inequality

Theories on the relationship between growth and inequality have a long history in the economics literature and can be fit broadly into two categories. One set focuses on the impact of economic growth on the distribution of income while the other sees the causal relationship running from the distribution of income to economic growth. This section will briefly summarize the state of the literature drawing on Lopez (2004).

Perhaps the most well-known theory of inequality and development is the Kuznets hypothesis. This was a broad development theory that grew out of the simple observation that income was more unequally distributed in poor countries than rich ones and that development appeared to be a process that was uneven, benefiting some and leaving others behind to catch up later. In this way, the evolution of inequality over time would appear as an "inverted U." As per capita income grew, the theory went, inequality would increase as those best positioned and endowed to take advantage of the growth process benefited (usually in the industrial or "modern" sectors of the economy) while the rest (usually in rural and agriculture sectors) were left behind. As the industrial sector expanded, resources in the economy would be reallocated and there would be migration out of the stagnating rural domain. Through this process the benefits of growth would permeate the economy and the incomes of those originally left behind would catch up and inequality would fall.

Lopez notes that more recent models argue that economic growth driven by technological progress may lead to higher productivity given its differential impact on the productivity of labor of different types. On the one hand, new technologies could drive

up the premium for skilled labor and thus increase inequality while on the other hand this could expand the pool of skilled labor leading to an overall ambiguous effect on inequality.

The existence of the "Inverted U" relationship is not borne out by most of the recent empirical studies (Anand and Kanbur 1993, ; Deininger and Squire 1998, ; Dollar and Kraay 2002, ; Ravallion and Chen 1997) although early studies claiming to establish the Kuznets hypothesis held early sway in the debate, notably Ahluwalia (1976).

Turning now to the inequality-to-growth relationship, theories can be divided into those which posit that inequality hinders growth and those which suggest the opposite. That inequality hinders growth is based on three arguments: political economy (Alesina and Rodrik 1994), sociopolitical instability (Alesina and Perotti 1996), and credit constraints.

The political economy argument rests on three pillars that when taken together would suggest that as inequality falls growth will increase. The first is that redistributive government policies are bad for growth because they negatively affect capital accumulation. The second is that an individual's preferred level of taxation and expenditure is inversely related to his income because the benefits of expenditure are equally distributed among individuals while taxes are proportional to income. Finally, government chooses a tax rate based on the median voter's preference meaning that in a more unequal society the tendency for redistribution will be stronger.

The sociopolitical instability theory is straightforward. Income inequality fuels social and political discontent. This is highly prejudicial for investment which requires stability and minimal future uncertainty. Since investment is critical to economic growth,

higher inequality transmits to lower growth through sociopolitical instability's depressing effect on investment and thereby hinder growth.

The third and final argument on inequality's hindrance of growth is based on the efficient functioning of credit markets. Galor and Zeira (1993) note that development requires complementarity between physical and human capital. Credit constraints exist which can prevent the poor from having the resources to invest in education. Thus inequality will suppress the level of human capital investment and thereby hinder growth.

Turning to the models that predict that inequality will enhance growth, there are three. One assumes that the marginal propensity of the rich to save is greater than that of the poor. If one accepts that higher saving stimulates investment which stimulates growth then higher inequality will be conducive of growth. Another proposition is advanced using the notion of investment indivisibilities. If large initial investments are required for growth-promoting capital projects then wealth concentration will be helpful in the face of credit constraints resulting from imperfect markets. A final prediction of inequality-enhanced growth comes from the idea that higher inequality provides a better incentive to work because wages are less compressed and thus reward merit as opposed to more equal situations where the opposite conditions prevail.

While the empirical literature on the growth-to-inequality relationship was unanimous, the same cannot be said for the inequality-to-growth theories. Both Alesina and Rodrik (1994) and Alesina and Perotti (1996) run cross-country regressions to test the political economy and sociopolitical instability models that predict a negative impact of inequality on growth. In both studies, their results confirm the model's prediction. However, Li and Zou (1998) build a model based on a more general framework in which

all government spending is not considered productive expenditure, as is implicit in Alesina and Rodrik. This approach yields results that find that income inequality is positively and often significantly related to economic growth. Forbes (2000) argues that a panel framework using fixed effects estimates is more appropriate than the cross-country models using OLS techniques of Alesina and Rodrik and Alesina and Perotti given that they will be biased by omitted country-specific effects. Her results, like Li and Zou, conclude that income inequality is positively associated with economic growth. Finally, Barro (2000) finds no relationship between inequality and growth using panel data and a three-stage least squares estimator that treats country specific effects as random errors.

Finally, Deininger and Squire's work (1998) looks at asset (land) inequality and growth for a different perspective. In comparison to initial income inequality that does not seem to have an impact on growth, initial inequality in the distribution of land is negatively associated with subsequent growth.

The following can be summarized from the foregoing review:

1. There is a degree of consensus that growth does not have a causal effect on income inequality, either positive or negative.
2. In the other direction, some studies conclude that inequality leads to faster growth while others that inequality slows growth.

The following section will bring poverty reduction into the growth and inequality equation.

Growth, Inequality, and Poverty Reduction

Dollar and Kraay (2002), in a cross-country empirical study of both developed and developing countries, find that average incomes (GDP per capita) of the poorest quintile rise or fall proportionately with average income, concluding that growth is good for the poor. Their findings are consistent across regions, income levels, and in periods of normalcy and crisis. They suggest their evidence does not support the idea that growth "trickles down" or that countries go through a Kuznets type transition from low to high to low inequality, but that the poor share contemporaneously in the growth process on average. They further point out that these results do not suggest that growth is all that is necessary for the poor or that distributional impacts should be ignored, they simply stress that the results suggest that growth on average benefits the poor as much as everyone else.

Using standard decomposition techniques, Kraay (2004) examines three sources of poverty reducing growth using panel data of a cross-section of countries. He concludes that roughly half of the variation in short-term changes in poverty can be explained by growth in average incomes. Between 66 and 90 percent of the variation in changes in poverty over the medium- to long-term can be explained by growth in average incomes. Virtually all of the remainder is due to changes in relative incomes. In contrast, cross-country differences in the sensitivity of poverty to growth in average incomes account for very little of the variation in changes in poverty. He also finds that the impact of growth on poverty reduction lessens as one moves from the headcount to the squared poverty gap index suggesting that as inequality among the poor increases the impact of growth diminishes.

Ravallion (2001) examines 120 "spells" of growth, mostly in the 1990s, based on the World Bank's dataset of household surveys for about 50 developing countries. Each spell is defined by the interval between two surveys. This data shows that on average, the poor benefit from aggregate growth and are hurt in aggregate contractions. Income inequality is not correlated with average household income growth per capita. However, the heterogeneity of experiences of the poor is masked by the averaging process across countries with very different levels of growth, poverty, and inequality. Thus, more micro-oriented studies are needed to get at the diversity of experiences below the averages and to say something useful for policymakers.

Using the same World Bank database, Adams (2004) uses an updated and refined set of 126 intervals for 60 developing countries to calculate the growth elasticity of poverty, which measures the percentage change in poverty given a corresponding percentage increase in economic growth. He finds that while economic growth does reduce poverty (based on the PPP$1/person/day measure), the degree depends on the measure of economic growth used. Controlling for changes in income inequality, the growth elasticity of headcount poverty is -2.79 when economic growth is measured by changes in survey mean income (consumption).[2] However, when growth is measured by changes in GDP per capita, the growth elasticity of poverty is much less than other recent studies suggest at a statistically insignificant -2.27. Growth elasticities using the poverty gap and squared poverty gap measures are even higher than those based on the headcount. Thus, growth even reduces the depth and intensity of poverty. According to

[2] The author performed his calculations with and without Eastern Europe and Central Asia (EE/CA) data to isolate the impact of the growth collapse resulting from the demise of the Soviet Union. Statistics presented here are for all countries in the sample excluding EE/CA.

the econometric analysis in this study, growth does not impact inequality, which changes very little over time (0.83 percent increase per year).

These findings are based on averages calculated across a diverse set of countries, which masks important variation between countries, so Adams divides the sample in two to test results according to initial inequality levels. The growth elasticity of headcount poverty (survey mean) for "low" inequality countries (Gini<.4) is -5.866 compared to -2.461 for "high" inequality countries (Gini>.4). The same calculations using GDP per capita were -2.282 and -1.2, respectively. In other words, initial inequality levels do matter for the poverty reducing impact of growth. Lopez (2004) cites Ravallion (2004) drawing a similar conclusion from his work with growth elasticities of poverty and concluding that "growth will be quite a blunt instrument against poverty unless that growth comes with falling inequality."

Lopez (2004) cites Lopez and Serven (2004) which looks at the share of variance in the changes in poverty due to growth as a function of different levels of inequality and development. From this approach, he concludes that in high-inequality countries a growth promotion strategy alone will have less impact on poverty reduction whereas in high-poverty countries, an emphasis on high growth is appropriate even if it means a slight deterioration in inequality. These observations will be relevant for the Mozambique case which we will examine later.

Pro-Poor Growth

A recent survey of the pro-poor growth literature (Lopez 2004) summarized alternative definitions of pro-poor growth and the following several points of consensus that have emerged from the literature on growth, inequality, poverty, and policy: (a)

growth is fundamental for poverty reduction, and in principle growth as such does not seem to affect inequality; (b) growth accompanied by progressive distributional change is better than growth alone; (c) high initial inequality is a brake on poverty reduction; (d) poverty itself is also likely to be a barrier for poverty reduction; (e) asset inequality seems to predict lower future growth rates; (f) education, infrastructure and macroeconomic stability seem to positively affect both growth and the distribution of income. There seems to be little agreement beyond this, in particular on the potential impact on growth of income inequality and redistribution and the potential impact of various policies (trade, financial sector liberalization, fiscal adjustment, among others) have on inequality in general.

Klasen (2005) provides the clearest summary of the various notions of pro-poor growth that have been offered in the literature (Kakwani and Pernia 2000, ; Ravallion and Chen 2003, ; White and Anderson 2000) by reducing them to three basic interpretations along two dimensions: absolute and relative. For those who subscribe to a relative concept of pro-poor growth, growth is "pro-poor" when it results in higher growth rates for the poor than the non-poor. In other words, growth must be biased toward the poor regardless of its impact on the reduction of poverty levels (as measured by a headcount index). While perhaps intuitively appealing, this definition is clearly problematic in some respects. Assume two countries with the same starting levels of poverty. Country A achieves average growth of 6%, with rates of 4% for the poor and 2% for the non poor while Country B achieves 10% average growth with 4% among the poor and 6% among the non-poor. The first would be judged "pro-poor" while the second would have done

more both to reduce poverty and increase growth for all, but would not be deemed "pro-poor" because incomes of the rich grew more than those of the poor.

The absolute pro-poor growth camp has two interpretations. The first is the idea of "strong" absolute pro-poor growth in which the absolute amount of the income gain of the poor exceeds that of the non-poor. White and Anderson (2000) show how difficult this is to achieve in practice. For this to happen the growth rate of the poor "would have to be larger by a factor calculated as the initial income ratio of the non-poor to the poor" (Klasen 2005). In the White and Anderson analysis of the growth episodes of 143 countries during intervals for which comparable national income surveys for two points in time are available, only 5 experience pro-poor growth by this definition when the poor are defined as the bottom 20% of the income distribution.

The second notion of absolute pro-poor growth is known as "weak" and is defined as the case when the growth rate in income among the poor is greater than zero. This is the standard used by Ravallion and Chen (2003). Like relative pro-poor growth, however, it is easy to imagine an example of a country with 1% growth for the poor and 10% growth for the non-poor, which would strictly fit this definition but wouldn't satisfy most notions of a progressive growth pattern.

Inherent in determining which of these definitions of pro-poor growth is the most appropriate requires consideration of the trade-offs between growth and distribution on poverty reduction. Unfortunately, as Klasen summarizes: "little is known about such trade-offs" (in the short or long-term, in different countries, associated with different policies) and this should be the focus of policy research. He goes on to suggest that for operational purposes there is no need to choose between the relative and weak absolute

definition, as they address two different and important questions. The first addresses whether there has been a bias in growth toward the poor while the latter focuses on how much income of the poor has grown, regardless of what happened to the non-poor, both of which are relevant questions for policymakers and the starting point for examination of deeper determinants of the change described.

Growth, Poverty and Inequality in Mozambique

Context and Recent Economic Developments

There are few countries which have experienced as tumultuous a recent history as Mozambique. In April 1974, a military coup in Lisbon brought to power a government ready to sue for peace with Mozambique's armed liberation movement, the Front for the Liberation of Mozambique (FRELIMO). Within months a deal was reached with FRELIMO and suddenly over four hundred and fifty years of Portuguese occupation and colonialism were over. Late to independence relative to the rest of the continent and with minimal human capital due to the exclusion and oppression Mozambique's native population suffered at the hands of the Portuguese settlers, few could have imagined that things could get more difficult. However, shortly after independence the country was plunged into a regional and civil conflict. Peace was not restored until 17 years later, but not after the war took the lives of a million people and destroyed much of the economic and social infrastructure.

Unlike many war to peace transitions in Africa, Mozambique's post-war recovery has been phenomenal. Mozambique achieved some of the highest growth rates on the continent, averaging 8.1% annually from 1993 to 2004 (AfDB/OECD 2004). This strong economic record was fueled by high levels of foreign aid, favorable weather, and the very

low base upon which recovery started following the war (Arndt, Jensen et al. 2000). Nominal per capita income increased from $139 in 1990 to and estimated $220 in 2001. Gross investment was 30% of GDP from 1995 to 2001, compared to the Sub-Saharan African average of 18% (UNECA 2003). Generous aid and debt relief helped the country to invest 63% of non-interest expenditures in the priority sectors of education, health, agriculture, infrastructure, good governance, and macroeconomic and financial management (Republic of Mozambique 2005, 103).

Despite this recent progress, over 50% of the population still lives in absolute poverty. Income and wealth inequalities remain pervasive and there are serious concerns over the sustainability of economic growth given severe human resource deficits and the growing impact of the HIV/AIDS epidemic (AfDB/OECD 2004). Much of the recent growth stems from a few large foreign ventures concentrated in the southern part of the country which have minimal spillover effects and have done little for job creation. Adult literacy was 44% in 2000, well below the Sub-Saharan African average of 61.5%, with severe disparities between male literacy (60%) and female literacy (28%). Life expectancy has fallen from 47.1 years in 1997 to 37.9 years in 2004 while the HIV/AIDS rate has increased rapidly (UNECA 2003). Mozambique faces an uphill battle to realize a second decade of post-war growth and translate that into meaningful human development gains.

Poverty and Inequality in Mozambique

Mozambique's National Institute of Statistics carried out nationally-representative surveys of household living conditions in 1996-97 and 2002-03 (known by their Portuguese acronym IAF). The surveys provide a comprehensive picture of absolute

poverty as well as detailed information on other dimensions of welfare. The IAFs use consistent methodologies for data collection, measuring household consumption of food (including own production) and non-food items, and constructing national poverty lines over the two periods.[3] The 2002-03 IAF constructed both flexible and fixed bundle poverty lines to account for substitution effects due to the changes in relative prices of commodities which took place over spatial and temporal domains.[4]

According to the IAF 1996-97, the national poverty headcount stood at 69.4 percent, meaning that consumption per capita of over two-thirds of the population was not enough to meet basic needs. Real mean per capita monthly consumption was 160,780 Meticals, which was equivalent to $170 annually at prevailing exchange rates at the time. Using just the food poverty line, 53.4 percent of the national population had inadequate per capita consumption. Poverty was higher in rural areas at 71.2 percent than in urban areas where the headcount was 62 percent. Regionally, poverty rates were higher in the central zone than in the north or south although when Maputo City is excluded from the south its poverty levels become comparable to the central zone (MPF/UEM/IFPRI 1998).

The 2002-03 IAF showed that absolute poverty at the national level declined significantly, by 15 percentage points, to 54.1 percent. The gap between the rural and urban poverty levels declined owing to strong recovery and growth in rural areas. The rural headcount was 55.3 per cent compared to 51.5 percent for urban areas. The central zone of the country, poorest in the 1996-97 IAF, experienced a stunning 28.3 percentage

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[3] Chapter III contains a full summary of the concepts, data and methodology behind the welfare calculations of the IAFs.
[4] See MPF/IFPRI/PU (2004) for a detailed explanation of the approach used to calculate the fixed and flexible food bundles that underpin the poverty lines in the 2002-03 IAF.

point drop in the head count rate while the south actually saw an increase of .7 percent and the north a drop of 11 percent (MPF/IFPRI/PU 2004).[5]

Measures of the depth of poverty such as the poverty gap index and the squared poverty gap index further bear out the positive trends. The poverty gap index reflects the intensity of poverty or, in other words, how poor the poor are. It measures the average gap between measured consumption levels and the poverty line for each poor person. The poverty gap index in 2003 was 20.5 percent, down 8.8 percentage points or 30 percent from the 1996-97 survey level. By comparison, the PPP$1/day poverty gap index for Africa as a whole in 2001 was 20 percent (Chen and Ravallion 2004). The squared poverty gap index is more sensitive to the severity of poverty among the poor. This measure decreased 5.3 percentage points at the national level between the two IAFs, or 34 percent. At the national level the severity of poverty decreased at a slightly higher rate than the depth of poverty which is consistent with lower inequality among the poor.

James, Arndt et al (forthcoming) conducted a comprehensive assessment of inequality in Mozambique based on the 2002-03 IAF. They examined both its level, according to the GINI coefficient and the General Entropy (GE) series of measures, and change over time since 1996-97. Overall inequality of consumption at the national level increased slightly between the two surveys from at GINI of .40 to .42. However, this difference was not statistically significant. These levels are relatively high, but are low

[5] MPF/IFPRI/PU (2004, 28-33) explain the significant decline in poverty rates in the central zone is due to the idiosyncratically low level of consumption measured in Sofala province in 1996-97. This is explained by the effect of recent floods at the time of the survey and the concentration of interviews during the "hungry season", and the fact that Sofala had sustained major damage during the war and it is possible that living standards were still depressed.

compared to many of Mozambique's neighbors.[6] Rural areas are more equal than urban areas, but the difference is less pronounced than in 1996 due to the faster decline in rural poverty over the period. Inequality is more pronounced in the southern region with a Gini of .42 compared to the center and the north, which have Ginis of .35 and .39, respectively. Inequality in Maputo was the highest of any region of the country at .52.

The GE measures can be calibrated to increased sensitivity to inequality among the poor (GE(1)) or inequality among the rich (GE(2)). Another advantage of the GI measures compared to the GINI is that they allow for the additive decomposition of the measure to within-group and between-group components of inequality (James, Arndt et al. forthcoming, 7). Using these measures, they note that the high GE(2) measure for Maputo City is driven by the small number of relatively very rich households in the sample. The GE(1) measure finds that only 5.4 percent of inequality is explained by differences in consumption between the provinces while the remainder is explained by within-province factors, demonstrating that inequality in the sample is not explained principally by differences in mean consumption between the provinces. Decomposing inequality based on household characteristics (rural/urban, sex of household head, literacy of household head, and whether or not agriculture is the household's principal employer) finds again that most inequality is explained by within-group factors (90 percent) rather than between these groups (10 percent). The exception is the case of households where agriculture is the principal employer, which the authors find

[6] GINI coefficients for other southern African countries are Malawi .503 (1997), Zambia .526 (1998), Zimbabwe .568 (1995), Swaziland .609 (1994), Madagascar .475 (2001), Namibia .707 (1993), Botswana .630 (1993), South Africa .593 (1995), and Tanzania .382 (1993) are from UNDP (United Nations Development Program). 2004. *Human development report 2004: Cultural liberty in today's diverse world*. New York: UNDP.

significant. It means there is more inequality between agriculture and non-agriculture households than between rural and urban (James, Arndt et al. forthcoming, 15).

The authors conclude that growth in Mozambique has been pro-poor as evidenced by (a) the significant drop in the poverty headcount nationally and in most regions, (b) growth in per capita consumption across all income groups, (c) a slight (and statistically insignificant) increase in inequality, and (d) the fact that, notably, inequality across regions and provinces has diminished contrary to many popular claims although high and growing inequality in Maputo City is cause for concern (James, Arndt et al. forthcoming, 16-17). James, Arndt et al also calculate a growth incidence curve for Mozambique and interpret growth as having been pro-poor using the Ravallion and Chen (2003) definition. The generation and interpretation of a growth incidence curve is one of the objectives of this study, so this will be examined in more detail in subsequent sections with reference to the interpretation given in James, Arndt et al.

Since we will later examine whether growth has been pro-poor in the social dimension, the study by Heltberg, Simler, et al (2001) provides some potentially interesting clues. They examined the incidence of public spending in Mozambique to determine whether it was progressive relative to the distribution of consumption. Using standard non-behavioral benefit incidence analysis, they found that the incidence of spending in basic health and education was fairly progressive in most areas. This was the case with lower primary education (EP1) and upper primary education (EP2). As one moved to basic post-primary (general and technical) the pattern became less equal. Upper secondary education was particularly unequally distributed. Health expenditures

on both hospitals and basic health facilities were found to be progressive (Heltberg, Simler et al. 2001, 19-21).

Their analysis did discern a degree of inequality in the distribution of public spending by region. A reasonably large proportion of rural communities in Mozambique received new social infrastructure investment (schools, health facilities, roads) since the end of the war, but the southern region of the country appeared to consistently get a larger share when compared to the central and northern regions. Similar patterns were evident in the distribution of recurrent spending on social services. Since this analysis was based on data from the 1996-97 household survey, we will revisit the extent to which the expected results of such patterns are borne out in the 2002-03 survey.

CHAPTER III
DATA AND METHODOLOGY

This research study will consist of analysis using quantitative methods to examine the incidence of consumption growth and social attainment in Mozambique between 1996/7 and 2002/3 in order to say more about the strong economic growth experienced during this period and whether it meets the standards of pro-poor definitions presented in the literature. The study will calculate a growth incidence curves for consumption based on the methodology of Ravallion and Chen (2003). While Klasen (2005) has adapted the growth incidence curve to the non-income dimensions of welfare, data limitations prevent us from calculating a series of non-income growth incidence curves for Mozambique based on this survey data. Therefore, this study will examine the incidence of social attainment between survey periods in a manner inspired by Klasen's approach. This research will seek to add to the understanding of what constitutes pro-poor growth according to definitions posed in the literature and contribute to the normative question of how pro-poor growth should be defined given the important weight being placed on this concept as a measure of progress in fighting global poverty.

Data[7]

This study utilizes household data gathered through Mozambique's national living conditions survey, known as the *Inquérito aos Agregados Familiares* (IAF), for 1996/7 and 2002/3. The two surveys were carried out by Mozambique's National Institute of Statistics and utilize the basic methodology for calculating consumption so that comparability of results over time is possible. Both survey samples are nationally representative, although drawn from different sampling frames,[8] and are representative across rural and urban zones and the country's ten provinces plus Maputo City.

The 1996/7 and 2002/3 IAFs contain detailed information on a random sample of 8,274 and 8,700 households, respectively. At the household level, two questionnaire instruments were used in the 1996/7 survey and three in the 2002/3 survey to collect household and personal information. Each household was interviewed at least three times over a seven day period. In addition, both IAFs included a community level questionnaire on available infrastructure in rural areas and of market prices for each urban block and rural locality for use in calculating consumption and poverty lines.

Among the household-level instruments, the *principal questionnaire* of both surveys covered demographic characteristics, health, education, and the employment status of individual household members. The 1996/7 questionnaire included a section on

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[7] This section draws from "Understanding Poverty and Well-Being in Mozambique: The First National Assessment (1996-97)" (1998) by the Ministry of Planning and Finance, Eduardo Mondlane University, and the International Food Policy Research Institute (IFPRI) and "Poverty and Well-Being in Mozambique: The Second National Assessment" (2004) by the National Directorate of Planning and Budget and the Economic Research Bureau of the Ministry of Planning and Budget, IFPRI, and Purdue University.

[8] The 2002/3 IAF sample is drawn from the 1997 national census, while the 1996/7 IAF sample is not. MPF/IFPRI/Purdue (2004) state that the census is a more reliable sampling frame than the non-census frame that was created and used for the 1996/7 IAF. Although this could pose issues of data comparability, and indeed there was a difference in *defined* rural population in 1996/7 of 80% compared to 70% in 2002/3 as a result, the authors ran their entire analysis using each survey's definition of rural and urban and got results that differed only slightly and were qualitatively similar (MPF/IFPRI/Purdue 2004, 2).

migration given the recent end of civil conflict only a few years earlier. The 2002/3 questionnaire included sections on poverty indicators and victimization that were not part of the 1996/7 questionnaire.

In terms of questions concerning the household as a whole, the 1996/7 questionnaire included questions on land, livestock and tree holdings; agricultural production (previous year); dwelling characteristics; basic services used; durable goods asset ownership; major nonfood expenditures (last three months), regular monthly nonfood expenditures, transfers into and out of the household, and sources of income for the household. The 2002/3 IAF was not as extensive in its collection of this information and was limited to dwelling characteristics, durable goods assets, monthly nonfood expenditures, transfers and income.

Finally, the *daily expenditures questionnaire* for households and individuals of both surveys collected information on food and nonfood expenditures consumed during the previous seven day period based on the respondent's recall.

The questionnaires collected data on consumption and other indicators in a manner that permitted comparison over the two periods. However, the 1996/7 IAF included a number of questions on well-being, particularly in the health and education modules, that were not included in the 2002/3 IAF. In addition, the question or response structure for certain topics differs between the two surveys. This limits this study from constructing non-income growth incidence curves in a number of potentially interesting areas such as nutrition and vaccination rates. More is said on this matter later in this section.

Growth Incidence Curves and Alternative Methods

The primary tool for analyzing pro-poor growth in this study is the Growth Incidence Curve (GIC) (Ravallion and Chen 2003). Klasen (2005) was the first to apply Ravallion and Chen's GIC methodology to social welfare indicators, which he called Non-Income Growth Incidence Curves (NIGICs). In general, these approaches permit the graphical depiction of the rate of growth of a chosen welfare indicator across the sample population arrayed from the poorest to richest percentile. The benefit of such a method for pro-poor growth analysis is clear. It facilitates looking beyond averages at what happened to the poor, the middle class, and the non-poor during the growth process. It is also a useful graphical indicator, which is intuitively appealing. Finally, it enables assessment of whether growth was pro-poor according to both the relative and absolute definitions discussed earlier.

We examine the incidence of growth and/or advancement across two welfare indicators: consumption and education level. A GIC is created using comparable household consumption survey data taken from two points in time. The GIC for household consumption is calculated using a STATA command developed by Lokshin and Ravallion (2004) for this purpose. First, variables are created for nominal and real household consumption in 2002/3 and 1996/7. Specifically, in order to address comparability over time, nominal consumption as a percentage of the relevant poverty line is the measure used. The samples are then ordered by per capita consumption and grouped into percentiles. The growth in consumption is calculated at each percentile and then graphed with percentile as the x axis and the growth rate of per capita consumption as the y axis.

NIGICs are calculated using basically the same process, as described in Klasen (2005). However, for each social welfare indicator, an unconditional and conditional curve is created. An unconditional NIGIC orders percentiles from welfare poor (e.g., years of school) to welfare rich. This permits the examination of the incidence of growth of social attainment between periods for, say, those who began education poor. A conditional NIGIC combined the social indicator with income data in order to examine whether the distribution of progress in social development mirrors that for consumption growth. Unfortunately, while data limitations conspire against producing NIGICs from these data, this study will use other techniques based on kernel regression to depict the incidence of social attainment across consumption levels in the spirit of Klasen's approach. This approach is described in greater detail in the results section.

GICs and NIGICs can be interpreted according to the previous discussion of pro poor growth in its absolute (strong or weak) and relative dimensions. First if the curve is in general downward sloping then one can say that growth has been pro-poor in the relative sense. In other words, growth rates for the poor were greater than for the non-poor and thus inequality fell. Obviously, the shape of the GIC won't always be so easily interpretable and little may be decisively discerned by its shape. Second, if the curve is upward sloping, but everywhere positive (above zero), then growth can be said to have been pro-poor in the absolute (weak) sense. If one were to measure absolute gains (rather than growth rates) on the y axis, then one could calculate whether growth has been pro-poor in the absolute (strong) sense, i.e. total income going to the poor exceeded that for the rich.

Selected Welfare Indicators

Per Capita Consumption

The first objective is to construct a growth incidence curve for the chosen measure of income poverty. The primary objective of the IAF was to measure the welfare of the Mozambican population. Given the high levels of poverty and deprivation, considerable attention is given to the concept of absolute poverty, defined generally as "…a measure of the inability of a population to attain a minimum level of well-being" (MPF/UEM/IFPRI 1998). More specifically, the IAFs used per capita consumption (total household consumption divided by the number of household members) as the basic measure of individual welfare, which also will be the basis for the growth incidence curve.

As noted, the two IAFs use consistent approaches to creating a comprehensive measure of consumption, drawing from several modules of the IAF based on the cost of basic needs approach (Ravallion 1998). It measures "…the total value of consumption of food and nonfood items (including purchases, home-produced items, and gifts received), as well as imputed use values for owner-occupied housing and household durable goods" (MPF/IFPRI/PU 2004).

Using a consumption based measure of poverty raises several conceptual and practical issues. The first concerns the justification of using consumption over income as a welfare measure. Here the authors of the IAF assessments offer four principal reasons:

(1) welfare achievement is ultimately of interest and this is better approximated by consumption as opposed to income which is really welfare opportunity;

(2) consumption fluctuates less than income and thus is a more stable measure of welfare over time;

(3) some researchers believe survey respondents are more likely to reveal consumption behavior than income;

(4) it is particularly difficult to measure income for the labor force in developing countries given that so many are engaged in self employment.

The second issue concerns using the household as the unit of aggregation. Doing so masks issues surrounding the intra-household allocation of resources which should not be assumed to be equitable. In addition, comparing per capita consumption across households of different sizes does not allow for the impact of economies of scale that might exist.

The third set of issues relate to what is left out of the measure of consumption itself. The approach to calculating consumption draws on several modules of the survey. It calculates the value of food and nonfood items, including purchases, home-produced goods, and gifts received. Imputed use values for owner-occupied housing and household durable goods are also calculated and included in the consumption measure. The only major items omitted from the consumption calculation are the value of publicly-provided goods consumed by individuals or households (for example, the use of a public water tap, road infrastructure, or free health care services) and services provided within the household (e.g. child care, cooking, cleaning). While these omissions are not uncommon for household surveys of this type, it is worth explicitly noting that the IAF data do not permit their quantification as part of the measure of consumption.

Finally, when constructing a measure of consumption it is important to factor in the variability of prices for agriculture products over the course of the year since they make up a high percentage of household expenditure. These can range from simple during the post-harvest period to double or triple during the lean season up until the mid-year harvest. This is where the two surveys differed in methodology. The bulk of data collection for urban areas in the 1996/7 IAF took place during January to June period when commodity prices would be higher. As a result, food consumption aggregates had to be deflated using seasonal food price indices. The 2002/3 IAF survey employed a method of data collection to account for seasonal price variations. Data collection took place over the course of the entire year from July 2002 to June 2003. The year was divided into quarters with one quarter of the interviews of each representative population sub-group conducted each quarter. Organizing the data collection process this way was considered an improvement in methodology over the 1996/7 IAF (MPF/IFPRI/PU 2004). Nevertheless, a temporal food price index was developed for the survey period and used to adjust nominal values of food consumption. It was assumed that nonfood prices did not vary temporally.

As noted, the calculation of consumption consists of food and nonfood consumption. For food consumption, the household was asked about what food was acquired, through what means, at what cost, in what amount, and how long this was expected to last. This would then be normalized to reflect weekly average consumption before being divided by seven to get a daily amount. The estimates for food consumption for each item were then aggregated for the household.

Nonfood consumption consists of direct expenditures reported by respondents during the interview process as well as imputed use values for certain items. The IAF collected information on numerous consumable nonfood items ranging from clothing and footwear, cooking fuel, local transport, educational expenses, and domestic household items, among others. Information was collected on the quantity purchased of each item and its cost. Calculating the daily consumption value was done simply by dividing the number of days corresponding to the recall period. For durable goods such as radios and bicycles that are consumed over a longer period, use value was calculated taking into account the asset's replacement value, current condition, depreciation, and opportunity cost. The other important category of nonfood consumption consists of housing costs. Actual rent paid was used when the household rented its primary dwelling. In cases where the resident owned the dwelling, she was asked what she would pay to rent the house if she were to rent it out. Finally, for households where no such data was available, a hedonic rental model was estimated using dwelling characteristics and actual self-estimated rent drawn from the rest of the survey. The exact estimation methods for asset valuation and housing costs are described fully in MPF/UEM/IFPRI (1998).

Social Attainment: Level of Education

A goal of this study is to complement an assessment of consumption growth by analyzing changes in the distribution of social attainment during the growth period. Unfortunately, while the surveys were consistent in their treatment of consumption over the two surveys, there were a number of differences in the coverage of non-income topics, thus limiting our choice of possible social indicators. Furthermore, the plausible social indicators that remain are categorical, rather than continuous, variables rendering

the calculation of a "growth rate" between periods impossible. As a result, this study will examine the absolute changes in levels of achievement of the chosen variable over the period or the actual levels of achievement in each period, rather than a growth rate. Based on a comparison of question structure in the two surveys an indicator of the level of education attained is chosen.

It has been found in Mozambique that the education level of adults in the household, particularly adult females, is an important determinant for everything from the levels of household consumption to children's nutrition to children's enrollment in school (MPF/UEM/IFPRI 1998, 275-281). The highest level of school completed is selected as the basis for the main education indicators used, which will be examined at both the individual and household levels. Given that the impact of growth and progress of social attainment during the period between surveys is of interest, a focus on the 17-25 year old group in both periods will be taken as a reference for the analysis.

The indicators come from the education sections of the principal questionnaires. Survey respondents seven years and older were first asked whether they had ever attended school before. If they had, they were then asked: "What it the highest level of school that [NAME] concluded?" The answer choices were based on the levels of the Mozambican educational system and other schooling options provided by the state, as follows: (00) None, (01) Literacy Training, (02) EP1: Grammar school first level (up to grade 5), (03) EP2: Grammar school second level (grade 6 and 7), (04) ESG1: First cycle secondary school (grade 8 to 10), (05) ESG2: Second cycle secondary school (grade 11 and 12), (06) Technical School Elementary, (07) Technical School Basic, (08) Technical School Middle, (09) Teacher training, (10) Higher education, and (11) Other.

Some consolidation of the data was undertaken in the creation of variables. First, those that answered that they had never attended school showed up in the highest level completed data missing values. Since never having attended school is equivalent to never having completed a level, these responses were recoded accordingly in the 1997 and 2003 datasets.

MPF/UEM/IFPRI (1998) note that in light of Mozambique's tracked schooling system, the three levels of technical school are equivalent to EP2, ESG1, and ESG2, respectively. Therefore, for simplification purposes given that there are very few responses in these categories, the answers corresponding to elementary, basic, and mid-level technical school (06, 07, and 08) were folded into the answers for EP2, ESG1, and ESG2 (02, 03, and 04), respectively. Similarly, there are few answers for Literacy (01) and Teacher Training (09). These were folded into the None (00) and Higher Education (10) categories, respectively, although with less of an empirical basis than in the case of the technical school responses. Other (11) was simply dropped. On this basis, variables for the highest education level attained were created for all individuals and the 17-25 age group in both surveys.

For purposes of examining educational attainment conditioned on consumption in the sprit of a conditional NIGIC, a household level indicator was created. This was done for two reasons. First, not much is gained by examining individual consumption given that it is simply derived from total household consumption by dividing across the number of household members and thus ignoring the intra-household allocation issues. Second, Basu and Foster's (1998) insights on the importance of the education of the best educated household member in the face of educational spillovers provides an approach that skirts

the issue of intra-household allocation. Thus, the education variable is collapsed to the household level on the maximum level of education attained by any member and compared across the survey periods.

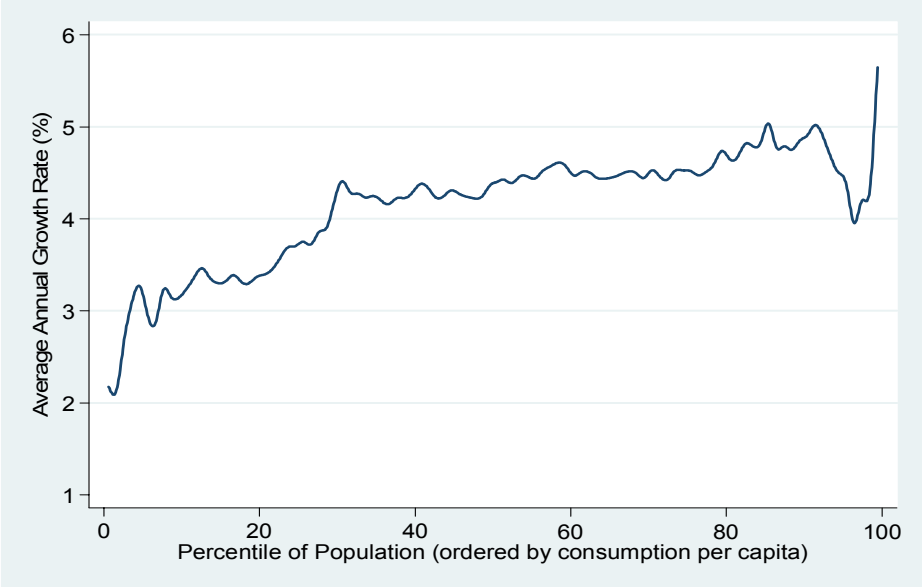
CHAPTER IV
PRESENTATION AND DISCUSSION OF RESULTS

Consumption

The growth incidence curve (GIC) calculated for Mozambique is shown in Figure 1. This depicts the average annual growth rate of consumption per capita between 1997 and 2003 across percentiles of the population ordered by consumption. The GIC shows that for every percentile of the population, growth in consumption has been positive. (Even the poorest households experienced 2 percent annual growth per capita.) Thus, growth in Mozambique was pro-poor according to the Ravallion and Chen (2003) definition of pro-poor growth or what Klasen (2005) refers to as "weak absolute" pro-poor growth. James, Arndt et al (forthcoming) draw the same conclusion about pro-poor growth in Mozambique based on the GIC.

FIGURE 1

GROWTH INCIDENCE CURVE FOR MOZAMBIQUE



However, growth in Mozambique would not have been pro-poor if one were to adopt the Kakwani and Pernia (2000) definition in which the growth rates for the poor must exceed those of the non-poor. Such pro-poor growth in the relative sense, as Klasen (2005) terms it, was not achieved as can be seen by the generally upward sloping trend of the GIC and the fact that overall national level GINI coefficient increased from .40 to .42 (although not statistically significant), according to James, Arndt et al (forthcoming). Redistribution did not happen, although it would be difficult to defend this interpretation of pro-poor growth given how broad and deep poverty was and still is in Mozambique. As noted by Lopez (2004), one can conclude that Mozambique fits the typology of a high-poverty country in which an emphasis on high growth has been appropriate even if it has meant a slight deterioration in inequality.

While Mozambique remains a high poverty country with 54% of the population still living below the poverty line, an emphasis on growth and poverty reduction without regard to growing inequality is not a sustainable strategy as the poverty elasticity of growth will decrease over time. In addition, as Birdsall (2004) cautions, the traditional focus on relative income inequality can often distract from growing absolute, or distance, inequality, which is often what fuels the perceptions of growing disparities. This is a point that Ravallion (2003) also cites as a major factor in the acrimonious global debate on inequality and poverty.

At this stage in Mozambique's development, the perspective provided here by the growth incidence curve, coupled with the decline in the various aggregate measures of the incidence, depth, and intensity of poverty cited earlier, is that growth in the income (consumption) dimension has indeed been pro-poor. The next section examines whether developments in the social space of education reinforce this conclusion.

Education

Mozambique's post-war economic progress has been matched by considerable progress in rebuilding social, and particularly educational, infrastructure. Intermediate indicators such as children in school, teachers employed, and grades completed all corroborate this trend.

According to the IAF data analyzed here, educational enrollment jumped considerably between surveys. The percent of the school age population (age 7 to 17) that had ever attended school increased from 61 to 80 percent at the national level and the proportion of this cohort that was attending school at the time of the survey also increased from 49 percent to 68 percent. Looking further at the enrollment data, the

increase of 19 percentage points in rural areas (44 to 63 percent) exceeded that of 12 points for urban areas (from 67 to 79 percent). Given that poverty is higher in rural areas, these data give us our first hint of a progressive pattern of social attainment during the growth process. However, while the rural-urban enrollment gap narrowed, it nevertheless remains large at 16 percentage points. School attendance for girls also increased significantly from 43 to 65 percent compared to 54 to 71 percent rise for boys, narrowing the gender gap in enrollment. The improvement in girls' enrollment was particularly pronounced in rural areas where it jumped from 37 to 58 percent, a 57 percent increase, between 1997 and 2003.

These results in enrollment are being translated into completed schooling overall, and specifically by the younger cohort. As shown in Table 1, at the national level 82 percent of individuals in 1997 had never completed the first level of primary school (EP1), equivalent to grades one through five. This figure had dropped modestly to 79.7 percent by 2003. A more meaningful picture of improved attainment can be seen by the percent of 17-25 year olds in both surveys that had never completed a level of schooling. This dropped by almost seven percentage points from 70.4 percent to 63.6. Whether measured for the population as a whole, or for the cohort that just completed its school years, the percent of individuals who had completed each level of schooling increased between 1997 and 2003. Educational attainment is a slow moving indicator, but this is demonstrable progress. While this is clearly progress in terms of social inclusion, Mozambique remains desperately poor in human capital terms and these data, it should be noted, do not give us any insight on the quality of education that is being attained.

TABLE 1

EDUCATIONAL ATTAINMENT IN MOZAMBIQUE (%)

LEVEL	***All Individuals***		***17-25 Year Olds***	
	1997	**2003**	**1997**	**2003**
None	82.03	79.69	70.45	63.61
EP1	11.88	12.42	18.31	20.08
EP2	4.49	5.27	8.33	11.91
ESG1	1.15	1.63	2.36	3.18
ESG2	0.39	0.88	0.54	1.17
HigherEd.	0.06	0.12	0.00	0.05

The objective of an unconditional non-income growth incidence curve in this situation would be to capture the rate of growth in educational attainment across quantiles of the population ordered from least- to most-educated. As noted earlier, the lumpiness of this data and the fact that educational level is categorical does not allow for the calculation of percentiles or growth rates. However, the unconditional incidence can be inferred from Table 1 with a little imagination. Consider instead the notion of quantiles of the population separated by the cutpoints associated with each level of education. Order the populations of 1997 and 2003 by educational levels from none to higher education. Rather than a curve, one would have a stepped function with the first level representing no schooling completed.[9] If growth in absolute educational attainment was pro-poor in the unconditional sense, the width of the first "level" associated with the percent of the population that had never completed a level would show a decline from 70.4 percent to 63.6 percent. The width associated with each subsequent level of education would show an increase reflecting the greater levels of attainment. As such, the unconditional incidence of educational attainment could be said to have been pro-poor in Mozambique between periods.

[9] Unfortunately, quantile plots in STATA cannot carry analytical weights and thus simply reflect the distribution of the sample data and not the population.

While the same data constraints (lumpiness, categorical social variable) inhibit the ability to construct a conditional non-income growth incidence curve, a kernel regression permits an approximation of one. First, note again that the motivation is to see how educational attainment relates to consumption growth across the distribution. Some of the pertinent questions we could consider with this information are: Did those who were relatively poor in consumption increase their human capital stock? Did they do so at a faster or slower rate than the non poor? As one advances up the income ladder, does educational attainment increase?

As discussed earlier, the level at which this analysis is conducted is the household. The educational variable is the highest level of education in the household. The consumption variable is real consumption as a percent of the poverty line (ppl) for each period. The first step in solving the problem of lumpiness was to redistribute the data so it was less skewed. The logarithm of the consumption variable was calculated so that it would follow a normal distribution. This allows educational attainment at lower levels of consumption, where much of the data is bunched, to be more easily ascertained. Data for both years is aligned at the poverty line (ppl=1), which is 0 on the x axis (ln(1)=0).

The next step was to do a kernel regression to smooth out the data and depict the essential relationship between the variables. This type of nonparametric regression does not assume a specific functional form to the relationship of the data (Deaton 1997). In other words, the data are allowed to shape the form of the functional relationship between the variables. Kernel estimation is based on calculating bands of local moving averages around values of x. Unfortunately, the kernel regression function in STATA also does

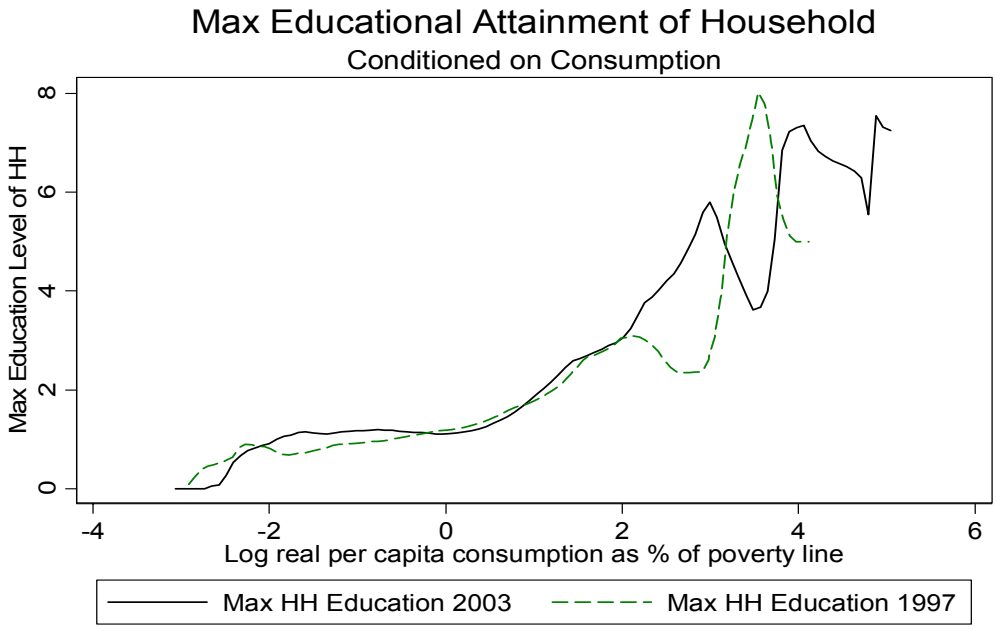
not allow for the use of sample weights and thus would give an inaccurate picture of the relationship between education and consumption in the population. A solution to this problem was to blow up the dataset to the level of the population (approximately 18 million in 2003) using sample weights and then run the regression. Unfortunately, RAM memory limitations did not permit running the regressions on the dataset expanded by the full population weights. Instead the population weight was divided by ten for the expansion so that the final "population" on which the regression was run was 1.8 million as opposed to 18 million.[10]

A growth incidence curve would calculate and plot the growth (in absolute or relative terms) in the social variable at each point along ordered population percentiles of consumption. Since categorical percentiles cannot be calculated, the approach used here does not calculate the growth between points of each year. It instead overlays the kernel regression lines for 1997 and 2003. The general slope of each line and their relationship to each other in terms of which dominates at each point on the x axis, the distance between them for a given level of consumption, and the rightward shift of the 2003 line are relevant for assessing the improvement in educational attainment by income levels over time. The following figure shows these results:

[10] Comparison of weighted and unweighted regressions, in the end, did not appear drastically different from one another.

FIGURE 2

KERNEL REGRESSION OF EDUCATION ON CONSUMPTION



It is important to note something about the distribution of households depicted in this figure. While the process of logging consumption helped clarify what is going on at the lower end of the distribution, it does so at the expense of a true rendering of the actual proportion of households along the x axis. The poverty line is depicted at 0 on the x axis, so recall that the headcount poverty rate in 1997 was 69 percent and in 2003 it is 54 percent. This provides an understanding of what proportion of the household distribution is to the left of 0 for each line. Thus, a weakness of this depiction is that more data points go into drawing the line between -1 and 1 (or -2 and 2) than go into drawing other parts of the line (the tails). (A way to compensate for this would be to use percentiles of consumption along the x axis, but this would lose information about consumption growth that is shown here.)

With the above caveats in mind, the first feature of this figure is that each line is generally upward sloping indicating that households with higher levels of consumption usually possess a member with a higher level of education. Second, if the 2003 line was everywhere above the 1997 line, it could be said that there has been growth in educational attainment across all consumption levels. However, the lines cross showing that there are sections of the consumption distribution where educational attainment declined. However, some of these areas are near x = +2 to +5 which is the end of the distribution in which we have less confidence. (A wider bandwidth on that portion of the distribution would probably result in better tracking of the lines.)

Starting with the poorest of the poor (x = -3 to -2), it appears that there has been a decline in educational attainment. Moving from x = -2 to the poverty line (where a majority of data points are clustered), the 2003 line for the most part dominates 1997 suggesting that there has been growth in educational attainment for this class of the poor. If this difference is indeed significant, it would suggest that education spending has had an impact on the poor and thus has been socially inclusive. However, the general flatness of the lines suggests that overall there is not a lot of human capital accumulation here as higher levels of education aren't leading to higher levels of income. Another interpretation of these data suggests a possible threshold effect of education at the completion of EP1, the first cycle of primary (y = 2).

In conclusion, from both the adapted unconditional and conditional analysis it can be concluded that growth in Mozambique has in all likelihood been pro-poor in this particular aspect of the non-income dimension. More people are entering the school system and completing a level in 2003 than in 1997 and completion rates are rising at

every level of education. In general, most households below the poverty line saw positive growth in their maximum education levels. However, the data would indicate that the poorest of households lost ground over the last six years and this would be an important issue for further study and remedy.

These overall patterns are consistent with what would have been expected given the findings of Heltberg, Simler et al (2001) referenced earlier in regard to the progressive pattern of government spending on EP1 and the large proportion of rural areas that received social infrastructure spending. Furthermore, that study also concluded that the pattern of public service spending would reduce inequality relative to the distribution of consumption.

CHAPTER V
CONCLUSION

This study sought to assess the degree to which economic growth in Mozambique has been pro-poor according to various definitions in the literature and in both income and non-income dimensions. The growth incidence curve of consumption shows that growth has indeed been pro-poor in the weak absolute sense. Average annual increases in household consumption per capita were above two percent for every percentile of the population. It is this steady and broad based growth that has contributed to the significant decline in headcount poverty from 69 to 54 percent between 1997 and 2003. Measures of the depth and intensity of poverty have also declined at the national level while inequality has increased slightly. While consumption growth in Mozambique has not been pro-poor by the relative definition, it is concluded consistent with the observations in the literature that this might not be an appropriate metric for a high poverty country like Mozambique. However, this study does caution against overlooking a growth pattern that increases inequality.

Growth in the non-income dimension of education has also been pro-poor, according to conclusions drawn from the methodology used here. As a result of the natural progression of post-war recovery and strong public interventions in rehabilitating and expanding the educational system, fewer Mozambicans of all ages in 2003 have never completed a level of schooling. This drop over the entire population is driven by

the age group of 17 to 25 year olds in 2003 that passed through the educational system during the period between surveys. In the spirit of the unconditional non-income growth incidence curves developed by Klasen (2005), the distribution of educational attainment by population quantiles was pro-poor. The relationship between consumption growth and maximum educational levels of households is also pro-poor. In general, most households below the poverty line saw positive growth in their maximum education levels. However, the data would indicate that the poorest of households lost ground over the last six years. Determining the nature and characteristics of these households and determining why they have not been reached by the education system should be a priority for the government.

Income and non-income growth incidence curves are important new tools that have become available for the measurement and assessment of pro-poor growth at a time when development practitioners and policy makers are keenly interested in measures of progress toward the Millennium Development Goals. While this study was able to produce a growth incidence curve, it encountered severe limitations in developing non-income growth incidence curves for important areas like health, education, and access to clean water due to the inconsistency of the IAF questionnaires between the two periods. Some questions on social indicators were dropped from the second survey or the answer structure was changed from a cardinal to an ordinal measure. Simple changes to future surveys that ensured consistency and greater use of cardinal measures would remedy this problem, providing government and researchers with the ability to calculate non-income growth incidence curves. For example, the more comprehensive 1996-97 IAF included data on vaccination coverage, years of schooling, and nutrition that yielded continuous

variables which were dropped or possibly moved to other government surveys. A useful exercise for the next IAF would be to revisit the 1996-97 IAF and examine which of these questions might be repeated in future IAFs in order to produce non-income growth incidence curves in areas of interest. This would also provide a longer period of time over which to assess the pro-poorness of growth, which is important in many non-income dimensions given that changes in social attainment (e.g., education levels) take time to accumulate.

Finally, this study did not seek to answer the question of what policy or other factors might have contributed to the pro-poorness of growth beyond reference to previous studies of the incidence of social expenditures. Exploration of the causes of pro-poor growth in Mozambique is another area of potential future research.

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CURRICULUM VITA

Jason Stewart Calder was born on January 8, 1969, in the east Texas oil town of Port Arthur to parents hailing from Eastport, Maine. From their roots Down East the family moved to the Far East where Mr. Calder spent most of his formative years. Eight years in the economically dynamic cities of Kobe, Japan and Taipei, Taiwan made their impression on Mr. Calder, who developed an early interest in foreign cultures and the challenges facing rapidly developing societies.

Mr. Calder returned to the United States to attend high school at Pinkerton Academy in Derry, New Hampshire and later the University of New Hampshire (UNH) in Durham. He pursued his interest in international affairs and development through a dual degree in International Relations and Business Administration and a double minor in Environmental Conservation and Spanish. He spent a semester at the Universidad de las Americas in Cholula, Mexico in the shadow of the world's largest pyramid and a symbol of the Spanish conquistadors' domination and destruction of the local indigenous culture.

Mr. Calder moved to Atlanta, Georgia in 1993 to join the Global Development Initiative of The Carter Center, headed by former president Jimmy Carter. The Global Development Initiative (GDI) was established to find new approaches to improve the coherence and effectiveness of international development assistance in the least developed countries, particularly newly-emerging democracies and conflict-affected societies. Mr. Calder developed long-term programs in Albania, Guyana, Mali and Mozambique helping these countries to formulate and implement their national development strategies. These wide-ranging efforts involving political leaders, government officials, civil society, the

private sector, and international donor actors opened Mr. Calder's eyes to the complex realities shaping the destinies of the poorest of the world and to the fact that globalization is an inherently disequalizing process. They also resulted in some of Mr. Calder's most fulfilling professional relationships and grounded his commitment to the challenges of deepening democracy and achieving sustainable development.

Mr. Calder also organized a series of high-level Development Cooperation Forums held during this time which brought together heads of state and representatives of GDI's partner countries with the likes of World Bank President James Wolfensohn, U.N. Secretary General Boutros Boutros Ghali, Nobel Laureate Joseph Stiglitz, United Nations Development Program Administrator Mark Malloch Brown, USAID Administrators Andrew Natsios and Brian Atwood, US Treasury Secretary Robert Rubin, and other development experts and senior officials from international financial institutions. The forums provided unique opportunities for all involved to cut through the lofty rhetoric and layers of bureaucracy and focus on the practical realities inhibiting international development cooperation in practice.

While working for The Carter Center, Mr. Calder completed his Master of Arts in Economics at the Andrew Young School of Policy Studies of Georgia State University. He is married to Kelly Elizabeth James, originally of Greensboro, North Carolina. They have one four-legged child, a Boxer named Gus.