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Inequality – Worldwide Trends and Current Debates

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Abstract

Income inequality has been rising in many developing countries since the 1980s. At the same time, global income inequality has been roughly stable (or even falling slightly) and there is great heterogeneity in within-country inequality trends across countries and regions. Non-income inequality tends to have fallen, both within and between countries. There is no empirical evidence that rising inequality is an inevitable consequence of economic growth; similarly, the evidence of the impact of changes in inequality on growth is also inconclusive, although higher levels of inequality appear to be harmful for subsequent development. At the same time, reducing inequality is seen as important to promote greater fairness as well as to speed up poverty reduction. To study trends in inequality, we use a framework where income inequality is related to inequality in assets (land, labor, human capital, and physical capital), return to these assets, inequality in private transfers, and redistribution by the state. Trends in inequality are tied to these different drivers which differ greatly by country and over time. This framework also generates opportunities for policy intervention to tackle inequality. This will, however, depend greatly on the country. As a result, it is useful to start a policy framework with an inequality diagnostics to identify the most important drivers of levels and changes in inequality in a particular country; this is also an activity where bilateral development partners can play an important supporting role. When it comes to particular policy issues, some of the issues that have been discussed for a long time remain highly relevant, including land reform (where land is still an important asset), pro-poor educational policies, rural infrastructure, and a focus on improving agricultural productivity of poor farmers. At the same time, increasing the redistributive role of the state through a higher tax take (to be achieved via broadening the tax base, increasing tax compliance, increase resource taxes), and increasing pro-poor social transfers. On the international dimension, there is now a greater emphasis on assisting developing countries with fighting tax evasion and tax avoidance of firms and individuals. As a single bilateral donor, it is not easy to have a significant impact on inequality and an explicit aid program on inequality reduction might also be politically contentious. In principle, the potential is there for significantly affecting inequality via technical cooperation assisting states (and potentially non-state actors) in implementing an inequality-reducing agenda. Budget support and other systemic approaches can of course also support an overall agenda of reducing inequality, as can investment projects if they focus on the policy-areas for inequality reduction outlined here.

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Milestone 1: Definition, Measurement, and Trends in Inequality

Stephan Klasen, Rahul Lahoti, Nathalie Scholl, and Sebastian Vollmer

Question 1.1: Defining Inequality: What do we mean by inequality, and why does it matter?

(a) (In)equality of what?

The term inequality refers to the uneven distribution of some resource, that is, people having different amounts of something. But what is that "something" we generally refer to? What do we mean when we talk about inequality? The answer to this question is not straightforward, and there are distinct philosophical ideas behind the answers given by different groups of scholars. This does not only refer to the obvious choice of a *dimension*, that is, inequality in incomes or wages versus inequality in health, education, or any other component of human life one has reason to value. The less obvious question is: "Equality of *what*?", as put by Amartya Sen (1992). That is, in which *aspect* of a particular dimension does one want to achieve equality? Probably the most important distinction is between equality in opportunities and equality in outcomes. Sen argues that these aspects are not only conceptually distinguishable, but demanding equality in one aspect will inevitably imply inequality in another. The impossibility to achieve equality in all aspects arises from the simple but non-trivial fact that "people are different", and this diversity is at the origin of every debate on inequality and social justice. Nevertheless, the relationship between inequality of opportunity and inequality in outcomes is a close one, and inequality of outcomes is likely to be a result of inequality of opportunities in many instances. For example, if a talented person does not have the financial means to get an adequate education (inequality of opportunities), this will very likely translate into her having lower earnings later on, thereby causing inequality in outcomes as well. But at the same time, if two people have the same opportunities, their heterogeneity in preferences, values, efforts, and pure chance will ensure that their outcomes will not be identical.

Another, though less disputed, aspect of (in)equality is that of rights. Today, hardly anyone would question that every citizen should be equal in the eyes of the law. However, the mere existence of a law or right ("negative" interpretation of the law) does not guarantee that the mandate of the law is *actually* being fulfilled ("positive" interpretation of the law). The positive interpretation involves an entitlement to the fulfillment of a right. For example, the universal right to schooling does by no means imply that every child goes to school – a physically handicapped child might not be able to go to school because she is unable physically to reach the classroom, and a child from a poor family might not be able to go to school because his family is reliant on his labor income. Again this illustrates that ensuring mere equality of rights, will not ensure equality of real opportunities. A positive interpretation of this type of rights clearly requires an interventionist authority guaranteeing the disadvantaged the opportunity to actually make use of their rights.

A prominent proponent of the libertarian view of justice, Robert Nozick (1974) argues that the only morally legitimate equality the state can provide is that of (negative) rights, or liberties, merely guaranteeing the freedom of interference from others. All voluntary transfers between members of a society leading to inequality are, in this view, considered unproblematic – however unequal the outcome may be –, and interfering with the freedom of the individual to make such transfers is inefficient and would reduce everyone's welfare. Whether a distribution of goods is considered just or not depends solely on whether it came about in a "just" way, that is, on a voluntary basis, respecting the rights of all parties involved. The weakness of this view is that for any individual, the individual distribution of resources will often not have come about in a "just" way. Moreover, much of the individual distribution is a result of inheriting opportunities and resources from one's parents. Even if they acquired these resources in a just way, it may be considered unjustified that their children should have a better starting point in life than others.

In the same vein, one way to think about social justice and equality is to imagine a "lottery of birth". A person's place of birth and their family's wealth as well as their gender and ethnicity are still among the single most determinants of how well they will fare in the lives in terms of health, education, and material affluence. This is obviously an undesirable situation for ethical reasons, but also because it involves a tremendous waste of talent and potential for the common benefit. The inherent assumption is that where, under which circumstances, and into which environment a person is born into is entirely random in the sense that the person who is born has no influence and has done nothing to (not) deserve their outcome in the lottery of birth. However, in choosing a desirable concept of equality, most people would agree that holding someone responsible for the choices they have made should be respected. The central task is then to remedy the disadvantages of those born into less fortunate circumstances.

Approaches focusing on outcomes are mostly blind to the processes which have led to the outcome under consideration. A person may have a low wage because she is being exploited or discriminated against, or she may have a low wage because she chooses to put less effort into her work and is less productive. Simply equalizing outcomes would not only be ignorant to the underlying problem of discrimination or exploitation, but would also be unfair towards those whose wages are higher because they work more, or better. The latter point is known as the "incentive problem" and is being brought up reliably by economists in any discussion on redistribution.

Despite the fact that the concept of equality of opportunity has received a great deal of attention in the theoretical literature on inequality ever since John Rawls' (1971) theory of justice (for a literature overview, see e.g. Roemer and Trannoy 2013), most of the commonly known measures and statistics are actually based on outcomes. The above-mentioned example illustrates the main difficulties with operationalizing equality of opportunity: (1) how should one measure opportunities, that is, the set of choices available to a person, and (2) how can one differentiate personal choices from external, "unjust" circumstances? Related to the second point is the rather philosophical question of what should be regarded as a choice in the first place. In our example, while the worker earning the lower wage might "rightfully" earn less because she is less productive, this may be due to the fact that she is physically less

strong, or has been born with a lower intelligence level than her co-worker who earns more. Even if this is not the case, she might have been raised in such a way that never taught her to exercise a lot of effort and she will never be able to fully remedy the repercussions of her education. Or, maybe she was just with a lower work ethic. It is hard to decide in any of these scenarios whether being less productive or even exerting less effort is really her fault, or is even a choice she can deliberately make. A related debate is about whether people can be held responsible for their preferences (e.g. Dworkin, 1981), and whether attempts should be made to remedy inborn characteristics such as IQ (e.g. Jensen,1969; Herrnstein, 1971).

The abstractness of the existing literature on the topic may also have contributed to the lack of empirical work on equality of opportunity, as pointed out by Roemer (2002). Probably the most influential contribution related to the concept of opportunities has been Amartya Sen's capability approach, which has led to the creation of the Human Development Index (HDI), which however also only focuses on outcomes. In Sen's terminology, outcomes correspond to what he calls "functionings", and the set of functionings a person is able to achieve is called a person's capabilities – a concept which is obviously closely related to the idea of equal opportunity. Although Sen's ideas are commonly associated more with measuring poverty than inequality, the two concepts are closely related. The main difference is that poverty measurement is only interested in outcomes below a certain poverty line, whereas inequality measurement is concerned with the entire distribution of outcomes. The relationship between poverty and inequality measurement will be analyzed in more detail in Question 3 on multidimensional approaches to inequality measurement, as this section will lend extensively from the poverty measurement literature, which is far more progressed in this regard.

When thinking about inequality, a last point worth noting relates to the question of absolute versus relative inequality. Absolute inequality considers the range, or absolute distance, between outcomes, whereas relative inequality is concerned only with how two outcomes fare in relative terms. This distinction becomes relevant when one compares changes of a distribution over time. A numerical example helps demonstrate the difference between the two concepts: Consider two individuals, A an B. They have an hourly wage of 1 Euro and 10 Euros, respectively. When their wages rise to 2 Euros and 20 Euros, the relative distance between the two has not changed, but the absolute distance has increased from 9 to 18. Studies on subjective perceptions of inequality have found repeatedly that a non-negligible fraction of respondents regards the second scenario as more unequal than the first one (for a review, see Amiel (1999).

Many economists believe that absolute changes should not influence the judgment of inequality. This view becomes more apparent if one thinks of for example inflation, which increases all incomes by the same proportion but has no effect on people's real position or wealth. This is nothing else than the property of scale invariance, one of the five axioms of inequality measures (see below). At the same time, there is experimental evidence showing that absolute distance matters in the perception of people, and this has important implications for our interpretation of inequality. As will be shown below, relative inequality among world citizens has been declining in the past two decades. But even as the relative distance has

shrunk, the absolute distance between the rich world and most developing countries continues to increase.

(b) Why do we care about inequality?

Besides clarifying what is meant by (in)equality, one should also motivate why thinking about inequality is important in the first place. From an ethical perspective, most people would agree that some version of equality of opportunity is intrinsically desirable for reasons of justice and fairness. The justification for the desirability of equality of outcomes is less straightforward.

Probably the most influential contemporary contribution to the literature on inequality, John Rawls' (1971) "Theory of Justice" argues that there is an intrinsic preference for equality of outcomes in a society. Behind the "veil of ignorance", a hypothetical situation in which no member of society knows about their status, situation, and personal circumstances such as wealth, health, relative position, or even preferences, everyone would supposedly prefer an outcome wherein the situation of the least-off person is as good as possible (known as the maximin principle). Supposedly, because no one knows what their self-interest would be, decisions behind the veil of ignorance are instead based on moral considerations. While the concept is intuitively appealing, mathematical modeling of such scenarios shows that contrary to Rawls' assumption, they do not necessarily lead to an equal distribution of resources. Very specific assumptions, most notably extreme risk aversion, have to be made in order to arrive at an outcome, which really favors the most vulnerable (see Roemer & Trannoy 2013).

In economics there are both micro- and macroeconomic arguments in favor of outcome equality. The microeconomic argument is rather clear: inequality is inefficient. It leads to resources being wasted because someone who has very little would benefit more from an additional unit of the unequally distributed resource than someone who already has a lot of it. This reasoning hinges on two assumptions: (1) that individual benefit, or welfare, is the relevant criterion and (2) that there are decreasing returns in consumption of the resource under consideration. The second assumption is relatively straightforward and undisputed: Someone who has never visited a doctor would benefit more from a check-up than someone who goes regularly. A person who earns 50 Euros per hour will benefit less from a one-Euro rise than a person who earns 10 Euros per hour. An additional year of education is more beneficial to someone who has only had one year of education than to someone who has already had 10 years of schooling.

A challenge to the welfarist approach is that the rate at which people can transform consumption of a certain good (which can also be health services or education) does not only depend on the level which has already been consumed of the same good, but also on the person itself. This refers back to the initial statement that "people are different". Not only do people differ in their preferences over consumption goods, but their personal circumstances such as the environment they live in, their health status, etc. also determine how they can transform this consumption into welfare. An extreme example frequently brought up by Sen is that of a physically handicapped person, who would require far more income to achieve the

same standard of living than a healthy person. If one distributes resources solely on the basis of where they generate the highest welfare gains, such a person would be left behind. It is worth mentioning at this point that, as pointed out by Harsyani (1975), Rawls' maximin principle would always lead to the exact opposite result, which is not necessarily preferable when it comes to the distribution of "surplus" resources after all basic need have been fulfilled.[1]

Apart from inequality of outcomes, this point also has implications for other approaches to justifying equality. All attempts of establishing equality by 'leveling the playing field' are obviously not able to satisfactorily deal with such concerns. Even if one provides people with the exact same initial wealth and opportunities, because people are heterogeneous in how they can transform these resources into outcomes, there will nevertheless be a large degree of inequality in outcomes. As Sen (1992) points out, even John Rawls's allocation of primary goods (including "rights, liberties and opportunities, income and wealth, and the social bases of self-respect"[2]), which does explicitly allow for starting inequality in primary goods if it favors the least well-off, does not sufficiently address this heterogeneity in transforming these goods to reach their desired outcomes.

From a macroeconomic perspective, inequality –the distribution of a certain amount of goods – can affect the size of the amount itself. Inequality affects economic growth, and thereby the amount of many relevant private and public goods to be distributed. There are numerous arguments as to why inequality should (positively or negatively) affect economic growth and development, and an even larger number of empirical findings pertaining to the inequality-growth nexus. The inequality-growth debate will be reviewed in detail in the second chapter of this report.

Question 1.2: Which indices and indicators exist for measuring inequality within and between countries, and what are their strengths and weaknesses?

For now, the focus shall be on the more widely used outcome-based measures of (in)equality, although the concepts presented here can usually also be applied to inequalities of opportunities or inequality of capabilities. Commonly used inequality *indices* are the Gini, the Theil, and the Atkinson index, all of which compress information about the whole distribution of outcomes into a single index number. Other indicators like what share of overall income is owned by e.g. the wealthiest 5% of the population only highlight certain parts of the distribution. In dimensions other than income where it is sometimes difficult to measure outcomes on a cardinal scale, pairwise comparisons between subgroups (most commonly

[1] Another challenge to the welfarist assumption relates to the way such welfare judgments are empirically made by people. A challenge comes from happiness research, which has consistently found that people adjust to circumstances and judge their own standing by comparing themselves to their peers. A poor person living in a country where almost everyone (or at least his peers) are poor can be just as happy (or unhappy) as a rich person living among other rich people. Redistribution may therefore increase overall welfare only in the short-run, until happiness levels adjust to the new circumstances. This would call for an objective, external standard of judging well-being, reflecting people's opportunities rather than how they have fared within their own particular circumstances. Again, Amartya Sen's capability approach is one way of approaching this idea to an objective measure of human well-being.

[2] Rawls 1971: 60-65.

between the least and the most well-off in the same or another dimension) are a more convenient way to convey a first impression of the degree of inequality. The first limiting factor which restricts the set of available inequality measures is hence the structure of the underlying data.

Data issues

The first concern related to the nature of the available data is that of the measurement scale. Most monetary variables are measured continuously, and all available inequality measures can be applied to such data. However, for data, which cannot be ordered along a cardinal scale (that is, the distance between the different categories has a consistent meaning throughout the distribution), most of the traditionally used inequality measures do not yield a meaningful result. Consider education, for example. One way to measure educational achievements is to use years of schooling, which is measured on a cardinal scale: one implicitly assumes that one more year of education has the same effect between the first and the second year as between the tenth and the eleventh year. However, if one wishes to consider educational degrees earned, those cannot be interpreted cardinally: although having a Bachelor's degree is clearly superior to obtaining a university entrance certificate, this distance is not necessarily the same as that between earning a Bachelor's and a Master's degree. This also implies that it is impossible to calculate a mean for such data, which means most of the commonly used inequality indicators disqualify. Although indicators suitable for ordinal and categorical data have been developed (see e.g. Cowell and Flachaire 2012, or Madden 2008), they are rarely used in the economics literature, which may also owe to the fact that there is very little methodological discussion about multidimensional aspects of inequality. Comparisons between population subgroups are one easy way to convey an impression about the degree of inequality in an ordinal or categorical variable. For example, one might be interested in the share of university graduates among the lowest and the highest income decile. Obviously, there is a large degree of codetermination in these two variables given that income is to a large degree influenced by a person's education qualification – an aspect which will be considered in more detail in Question 3 on multidimensional inequality measurement. Such statements can of course also be made for other dimensions which suitable for the construction of more sophisticated inequality measures. These indicative measures have the advantage of making an immediate impact because they are easy to grasp and assess. However, despite or because their intuitive appeal, they are only able to make partial statements about selected parts of the distribution. They therefore miss out on other, potentially important details and can easily be used to manipulate perceptions of inequality by deliberately highlighting certain parts of the distribution while omitting others. They also do not fulfil all the relevant axioms of inequality measures which define desirable properties of inequality measures.

The second relevant aspect of the data structure is the unit of analysis. The conceptually most desirable level for computing inequality statistics is the individual. For a lot of variables, such as wages, years of education, or health indicators, this is also the most convenient way to measure the data, so individual-level data is often directly available.

Basing income inequality measurement on individual incomes leads, however, to a range of problems. One problem associated with individual-level income data is that of very high incomes. High-income earners often refuse to report their incomes, and because at very high values, anonymity of a respondent can no longer be guaranteed, incomes at the top end are often cut off at a threshold value. This practice of "top coding" sets all incomes above a certain threshold equal to the threshold value. Data can also be modified in some other way, e.g. sample attrition at the top end can be dealt with through imputation. For other measures such as consumption or expenditures, it is very complicated and sometimes impossible (for example in measuring the material well-being of children) to disentangle individual- from household-level measurement. A lot of goods are being consumed together by the household and consumer durables in particular exhibit large economies of scale. Thus it is impossible to attribute household incomes or consumption to individual members. As a result, all income inequality measurement usually measures incomes at the level of households and (implicitly) assumes that incomes are equally distributed among its members which is clearly a problematic (but unavoidable) assumption. This makes it virtually impossible to study intra-household income inequality by gender or age (despite claims to the contrary, see Klasen, 2007 for a discussion).

By measuring incomes at the household level, one needs to adjust income inequality measures to be able to compare households of different size and composition. Children consume less of certain goods than adults (in particular, their food intake is lower). This is not per se a problem, since different weighting schemes are readily available for economies of scale as well as adult equivalents to account for age structure of households. If the interest of the researcher lies at the bottom of the distribution, the choice of an appropriate scale becomes more relevant – however, as long as the chosen scale is consistently applied in different income distributions one wishes to compare, this is only a minor issue. In many cases, data is only available at much more aggregated levels such as firms, industries, regions, or even countries. Depending on the question of interest, the researcher then can decide to weigh the units by their population or to treat them as if they were of the same size, which can be desirable for example when comparing countries' income levels (for a discussion of the latter point, see Milanovic 2005).

Inequality Axioms

Inequality indices are mathematical formulas with particular mathematical properties which determine how the indices behave when a given distribution of income changes, e.g. over time. As a research or policy maker, one would like the index to behave in such a way that corresponds to one's ideas about how the occurring changes in the distribution should affect inequality. The specification of a set of axioms helps in the choice of an index which fulfils a number of basic properties which most people have reason to consider necessary for comparing inequality between two (or more) different states, like over time or between countries.

All of the three indices presented below fulfill the four essential properties of inequality measures: Symmetry, Replication Invariance, Scale Invariance, and the Transfer Principle.

The fifth inequality axiom of subgroup decomposability is not a necessary requirement and is fulfilled by the Theil and the Atkinson indices, but not the Gini index. Simpler indicators of inequality such as the range, variance, or quantile comparisons do not fulfill the four essential axioms and are therefore not recommendable to be used as more than a very crude proxy. What the axioms mean and why they are necessary is explained separately for each axiom in the following.

Symmetry

The property of symmetry, also referred to as anonymity, requires that no other characteristic of an individual (such as race, social status, or whether the individual has been rich or poor at an earlier point in time) other than his position in the distribution of the dimension of interest influences the inequality measure. For example, if the rich and the poor swap places, this must not influence the measured extent of inequality. This example demonstrates how, while inequality may be perceived as less of the problem in the presence of mobility between time, the two concepts are distinct. According to the axiom, the following two income distributions must yield exactly the same inequality statistic:

	Distribution I			**Distribution II**		
	Household A	**Household B**	**Household C**	**Household A**	**Household B**	**Household B**
Population	1	2	3	3	1	2
Income	1	5	9	9	1	5

Replication Invariance

This axiom is necessary in order to be able to meaningfully compare inequality statistics between populations of different size. If every individual in a population existed twice, the axiom states that the resulting measure of inequality remains the same. According to the axiom, the following two income distributions must yield exactly the same inequality statistic:

	Distribution I			**Distribution II**		
	Household A	**Household B**	**Household C**	**Household A**	**Household B**	**Household C**
Population	5	10	15	1	2	3
Income	1	5	9	1	5	9

Scale Invariance

Also referred to as mean independence, this axiom requires the inequality measure to be independent of the unit of measurement. Proportional changes of all incomes must not change inequality. In practical terms, this property is important when comparisons of inequality are made over time, even if they are in the same currency unit because inflation may increase all

nominal units without any change in people's real incomes. Similarly, if inequality is measured in different countries using different currencies, the inequality statistics can be compared directly without any prior currency conversion. According to the axiom, the following two income distributions must yield exactly the same inequality statistic:

	Distribution I			**Distribution II**		
	Household A	**Household B**	**Household C**	**Household A**	**Household B**	**Household C**
Population	1	2	3	1	2	3
Income	1	5	9	2	10	18

Note that measures of absolute inequality will violate this property and thus create some problems of interpretation (the absolute distance between rich and poor is larger in distribution 2 than in distribution 1). At the same time, one will need to recognize that measures of absolute inequality do have some resonance in people's perceptions, particularly when comparing trends in inequality.

Transfer (Pigou-Dalton principle)

The transfer principle requires that progressive transfers from richer to poorer individuals do not increase inequality, and vice versa for regressive transfers. According to the axiom, the inequality statistic for the second of the following two income distributions must not show a higher degree of inequality than the first one because redistribution has been taking place from the richest to the poorest individual:

	Distribution I			**Distribution II**		
	Individual A	**Individual B**	**Individual C**	**Individual A**	**Individual B**	**Individual C**
Population	1	1	1	1	1	1
Income	1	5	9	2	5	8

A potentially desirable, yet not commonly established, extension of this axiom is *"transfer sensitivity"*. It requires that an inequality measure should be more responsive to equally sized transfers in the lower- than in the upper end of the distribution. Shorrocks and Foster (1987: 485) provide a compelling example of why the transfer axiom alone is an incomplete requirement for an inequality measure to behave in a desirable manner: "[…] consider a situation in which a millionaire makes a small (regressive) transfer to a slightly more affluent millionaire and a simultaneous large (progressive) transfer to the poorest person in society. […] no constraint is placed on the relative magnitudes of these two effects. It is therefore possible for a Pigou-Dalton index to attach greater importance to the small transfer between millionaires and thereby conclude that the combined transfer leads to a rise in inequality." It

should be noted at this point that of the measures, which we will discuss, only the Atkinson index with a value of $\varepsilon>0$ fulfills this property.

Subgroup Decomposability:

The axiom requires that overall inequality must correspond to a (weighted) sum of inequality among subgroups. Such subgroups can not only be federal units or geographical units, but also, income dimension such as income from capital or wages, or populations subgroups such as workers in different sectors, or different age groups.

Further considerations for choosing an inequality measure

Besides the data structure and the adherence to the inequality axioms, two further factors can be relevant for the choice of a particular inequality measure: communicability and robustness.

Communicability is important when it comes to conveying the meaning of a specific numeric value of an inequality measure, which is especially relevant in the context of policy making.

Robustness refers to the susceptibility of a measure to extreme values. Because of the skewness of the income distribution and the fact that the bottom end is bounded by zero, this is more of a problem of the top end of the distribution. Cowell and Flachaire (2002) provide a systematic review of existing measures with respect to their sensitivity to extreme values. They find that of the commonly used inequality measures, the Gini index is the most robust to "data contamination", or outliers. The Theil index, as well as other measures belonging to the Generalized Entropy Class, is very sensitive to extremely high values. The Atkinson index on the other hand, due to its explicit focus on the bottom end of the distribution, is the only measure which is also sensitive to low incomes, in particular for values of $\varepsilon>1$. Low incomes are sensitive to assumptions about economies of scale in households. Because large households are typically at the bottom end of the income distribution, the higher the assumed economics of scale, the less poor these households appear. Robustness considerations are relevant for example if one uses a Theil index to compare inequality between two distributions, of which one has been "top censored" and the other has not. Inequality would then appear much lower in the top censored distribution because those incomes to which the measure is most responsive have been set to a lower threshold value.

"Simple" indicators of inequality

Among the most frequently used elementary measures are dispersion ratios, the range (or the interquartile range as a variant thereof), and the variance (or its derivatives, the standard deviation and coefficient of variations).

Dispersion ratios are defined as the ratio of the income of the richest quantile over that of the poorest quantile. The most frequently used quantiles are deciles (dividing the income of the richest ten percent, or the 90th decile, by that of the poorest ten percent, the 10th decile) or quintiles, but in principle, any quantile can be used. A version of the decile dispersion ratio using the ratio of the 10th over the 40th decile which has recently become popular is the so-

called *Palma Ratio*, proposed by Palma (2011). It has been developed to mitigate the shortcoming of the Gini index of being proportionally oversensitive to changes in the middle of the distribution. The 10/40 percentile ratio has been chosen based on the empirical observation that the middle class accounts for around half of incomes, with the rest being held by the top 10 and the bottom 40%. While the decile dispersion measures do fulfill the properties of scale invariance, replication invariance, and symmetry, they are not sensitive to transfers which happen in the middle of the distribution and do not affect the richest or poorest quantile. They generally ignore all information about the middle of the distribution and are also not able to capture inequality within the top and bottom quantiles. Dispersion ratios can furthermore be very sensitive to large outliers; but conversely, if chosen well (e.g. incomes at the 90th percentile divided by incomes at the 10% percentile, as done by inequality data made available for example by the Luxembourg Income Study, one of the world's largest set of inequality data), these measures are very robust to outliers that lie below the 10% and above the 90th percentile, which can be a distinct advantage.

The *range* is simply the difference between the largest and the smallest value within a distribution. The measure is clearly highly sensitive to outliers and top coding, and does not fulfill scale invariance or replication invariance. It is also subject to all weaknesses pertaining to dispersion ratios. The *interquartile range* is a slightly more robust version of the range, as it only gives the difference between the values of the 25th and 75th percentile, i.e. the middle 50% of the distribution.

The *variance* and its square root, the *standard deviation*, measure the degree of dispersion of the data from the mean. While the variance and the standard deviation are not mean-independent and therefore do not fulfill scale invariance, the coefficient of variation, which normalizes the standard deviation by dividing it by the distribution mean, does have this property. It also fulfills the other four essential axioms of inequality. However, it is a more appropriate measure for symmetrical distributions, whereas income distributions are typically skewed to the right. Because of this, the coefficient of variation becomes more sensitive to the upper end of the income distribution, even if the log-normal of the underlying distribution is used. Other disadvantages are that the measure is not decomposable and has no upper bound, so a single number can theoretically take any value between zero and infinity without there being any universal benchmark against which to evaluate a particular number.

Inequality indices

i.) The Gini index

Probably the best known and most common inequality measure is the Gini index, or Gini coefficient. As previously mentioned, the Gini is a summary statistic which breaks the entire distribution down to a single (index) number. The Gini index has several advantages, but also disadvantages vis-à-vis other inequality indices. Probably its most important characteristic is that because it is normalized between zero and one, it has a simple interpretation and is comparable between different societies and populations. It is also relatively easy to conceptually understand and convey, and with the Lorenz curve, it has a direct graphical

representation. Its main shortcoming is that it is (in its simple form) not perfectly decomposable, meaning that the (weighted) sum of inequalities of subgroups do not add up to the same number as if one directly measured inequality of all individuals. This property will become relevant when one wants to consider for example both within- and between-country inequality.

Construction of the Gini index

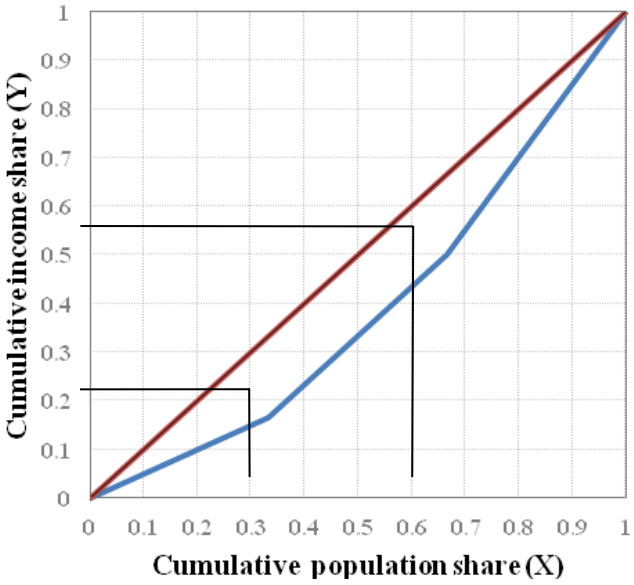
The Gini index is based on the concept of shares. In a perfectly equal society, a person's population share is equal to their income share, or, in other words, everyone earns exactly average income. In the small numerical example below of a society consisting of three people, each person represents one third of the society. Notably, whenever one considers inequality between individuals, every individual has the same weight or population share, which is 1/N with N being the total number of individuals or size of the society. If every person in the example also owned 1/3 of the income, the income share would be equal to the population share and income would be perfectly equally distributed in this society. In our example, this is not the case and there is a mismatch between income- and population shares. Note, again, that whenever one person's income share differs from her population share, this implies that the income share of at least one other person must be different from his population share as well. Person B below earns the exact income equal to her population share and does not contribute to inequality. Because Person A earns less than 1/3 of total income and Person B earns exactly 1/3, Person C must by definition earn more than 1/3 of total income.

Example 1	**Person A**	**Person B**	**Person C**	**Total**
Population	1	1	1	3
Income (=per capita income)	5	10	15	30
Population share (X)	1/3=0.33	1/3=0.33	1/3=0.33	1
Income share (Y)	5/30=1/6=0.167	10/30=1/3=0.33	15/30=1/2=0.5	1
Cumulative population share (X)	0.33	0.67	1	1
Cumulative income share (Y)	0.167	0.5	1	1

The most approachable way to introduce the Gini index is using the graphical representation with Lorenz curves. The Lorenz curve is a plot of the cumulative population share (on the X axis) against the cumulative income share (on the Y axis) in a unit square. Cumulative shares are obtained by first ordering the data by income in ascending order, starting with the poorest individual. Both the income- and the population shares are then added up consecutively, as shown in the bottom rows of the example table. The first number just gives the income- and population share of the poorest individual, the second number shows what share of the total income the two poorest individuals earn together, and so on. The resulting numbers are graphed accordingly in the unit square to obtain the Lorenz curve. The obtained curve can be compared to the 45 degree line of perfect equality, which is the hypothetical line obtained if

all income shares were equal to the population shares. The further away the actual line is from the line of perfect equality, the higher is inequality in the society under consideration. At the other extreme, the highest imaginable degree of inequality would persist if one person earned all the income, and everyone else had nothing. In this case, the Lorenz curve would cover the entire triangle under the line of perfect equality. The Gini coefficient provides an exact numerical measure of the deviation of observed inequality from perfect inequality by computing the ratio of the area between the Lorenz curve and the 45 degree line to the entire area below the 45 degree line. Our example would yield a Gini coefficient of 0.22, which, given that the index ranges from 0 (no inequality) to 1 (perfect inequality with one person having all of the income), is not very high. The graph below shows the corresponding Lorenz curve.

Figure 1: Lorenz curve



The picture changes when one considers groups of different size instead of individuals. In practice, it is very often the case that one does not have data on incomes at the individual level, but rather at the household level, or for larger units such as cities, municipalities, or countries. Because it is ultimately the individual which is the center of interest, one usually wants to take these size differences into account. As discussed above, the implicit assumption is (*because* data on individual incomes is not available, or, in the case of households, often cannot be disentangled) that all people within a unit earn the same per capita income. In other words, the within-unit distribution is ignored. In our example, if we replace the individuals by households of different size, the data could look as follows:

Example 2.1	Household C	Household B	Household A	Total
Population	9	5	1	15
Income	15	10	5	30
Per capita income	1.667	2	5	2
Population share (X)	9/15=3/5=0.6	5/15=1/3=0.33	1/15=0.067	1
Income share (Y)	15/30=1/2=0.5	10/30=1/3=0.33	5/30=1/6=0.167	1
Cumulative population share (X)	0.6	0.933	1	1
Cumulative income share (Y)	0.5	0.833	1	1

Now if we want consider that the units we observe are households of different size rather than individuals, unit A, which previously appeared as the poorest unit is now the richest, and vice versa for unit C. B still earns exactly mean per capita income and still does not contribute to inequality. As a result, the ordering of the data changes accordingly. The corresponding Lorenz curve does not longer have an equidistant scale on the X-axis because group sizes now differ. To better illustrate the difference between individual-level and grouped data, the following table displays the data structure of the income data underlying the calculation of the Gini:

Individual data (3 individuals)	5	10					15								
Grouped data (15 individuals)	5	2	2	2	2	2	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67

It is possible to get two differently shaped Lorenz curves yielding the exact same Gini coefficient as illustrated by small modifications to the previous example:

Example 2.2	Household C	Household B	Household A	Total
Population	5	10	15	30
Income	1	5	9	15
Per capita income	1/5=0.2	5/10=0.5	9/15=0.6	0.5
Population share (X)	5/30=1/6=0.167	10/30=1/3=0.33	15/30=1/2=0.5	1
Income share (Y)	1/15=0.067	5/15=1/3=0.33	9/15=3/5=0.65	1
Cumulative population share (X)	0.167	0.4	1	1
Cumulative income share (Y)	0.067	0.35	1	1

Note that the same result would have been obtained if Household C had only one member, Household B two and Household A three members. This is because only the *relative* group size matters for the calculation of the Gini, which is of course true for incomes as well. Hence, if all household sizes, or all incomes, or both, were multiplied by a constant factor, this would not affect the value of the Gini coefficient.

Bottom and Top Inequality

As one can see in examples 2.1 and 2.2, the inequality arises in different parts of the distribution. Distribution 2.1 is more unequal at the top of the distribution, meaning that incomes are relatively more evenly distributed among those in the lower half relative to those in the upper half. Distribution 2.2 is more unequal at the bottom, with a few poor earning very little and a large fraction of the society earning more, but relatively similar incomes. Another extreme example would be if in one case, 50% of the population had no income and the remaining 50% had equal incomes (inequality at the bottom), and in the other case, one person had 50% of the income and the remaining 50% of the income was equally distributed among the rest of the population (inequality at the top). In both cases, the Gini coefficient would be 0.5. The Gini assigns the same value to the two distributions because the inequality arises (symmetrically) in different parts of the distribution, and the Gini coefficient is by construction neutral to whether this inequality occurs in the top- or the bottom part of the distribution. Other measures such as the Theil index or the Atkinson index are more sensitive to particular parts of the distribution. Whether this is a desirable property or not depends on what the question of interest, but it is important to be aware of these differences between the available inequality measures.

An alternative to the Gini coefficient is the class of so-called Generalized Entropy Measures, comprising both the Theil- and the Atkinson index. The term entropy comes from information theory and is a measure of the information content of a signal. Intuitively, the more unlikely an event is, the more valuable is the information derived from its occurrence. Such events should therefore have a higher weight in a measure of information content. A completely predictable event has no information value. Bridging the gap to inequality measurement, in a perfectly equal distribution of incomes, income for any randomly chosen individual is entirely predictable, and without any further knowledge about a population, the best guess for the income of an individual would be simply the mean. Deviations from this expected value therefore contain information about the distribution. Henri Theil (1967: 125-126) once interpreted his index as "the expected information content of the indirect message which transforms the population shares as prior probabilities into the income shares as posterior probabilities." The prior probability for the income of any random individual is the same as its population share, which, as previously discussed, is equivalent to stating that everyone earns the same (mean) income. In other words, the prior probability is that there is perfect equality, and the deviations from this expectation, reflected by a mismatch of income- from population shares, are the actual income shares, or posterior probabilities. One advantage the Generalized Entropy Measures have in common is that they are perfectly decomposable into a between and a within-component, which is very useful (see below).

ii.) The Theil index

Like the Gini index, the Theil index is based on the comparison of income- and population shares. It comes in two (mathematically equivalent) representations: one in shares, and one in means. Because the shares-based representation is more useful when it comes to the decomposition into within- and between group inequality, this representation shall be used in the following. In its simple form for individual level data, the Theil index has the following mathematical representation:

$$T = \sum_{i=1}^{N} \frac{y_i}{Y} \ln \left[\frac{\left(\frac{y_i}{Y} \right)}{\left(\frac{1}{N} \right)} \right]$$

Notation: y=income, n=individuals

Capital letters indicate total numbers.

It is a summation over all observation units i (in this case, individuals) of each individual's contribution to the index. These contributions consist of two parts. The first is the individual's income share, which can be interpreted as the weight with which each individual contribution enters the measure. The second part is the expression within the logarithmic bracket, which is simply the ratio of the income- over the population share. In the case of individuals as the unit of observation, this is just 1/N. In the case of perfect equality, the income share is equal to the population share (which is equivalent to stating that every individual earns mean income), and the ratio of the shares is equal to one. Taking the logarithm then yields a value of zero, and the respective observation does not contribute to the value of the index. Consequently, if all income shares and population shares are equal, the Theil takes its lower bound value of zero, indicating a perfectly equal distribution of income. If the income share of an individual is higher than its population share, the expression in the bracket takes a value higher than one. Taking the logarithm then yields a positive value, and vice versa if the income share is smaller than the population share. Although the contribution to the measure will be negative whenever the income share is larger than the population share, weighting the logged value with the income share ensures that positive values have a larger weight in the final measure. This is because for every unit that has a smaller income- than population share, there must be at least one for which the opposite is true. Because positive values by construction result from income shares *larger* than population shares, the positive values will automatically be multiplied with a larger number than the negative ones. T can therefore never be negative and has a lower bound of zero for perfect equality.

The index has the property of being decomposable into self-similar fractals, each of which represents the within-component of a higher level of aggregation. An example would be world income inequality, which can be decomposed into between-continent inequality as the highest level of aggregation and within-continent inequality. Within-continent inequality can again be decomposed into between- and within-country inequality, which can be decomposed into within- and between federal state inequality, and so on, for any desirable number of

subdivisions. The final unit is the individual, and summing up all the between- and within-components with their respective weights gives the exact same value as if the formula above had been applied to individuals only. The only requirement for such decompositions is that all groups must be *mutually exclusive*, meaning that no individual can be part of more than one group, and groups must be *exhaustive*, meaning that all individuals covered by the decomposition must be part of a group. The more general formula for grouped data on which the decomposition is based looks as follows:

$$T' = \sum_{g=1}^{G} \frac{y_g}{Y} \ln\left[\frac{\left(\frac{y_g}{Y}\right)}{\left(\frac{n_g}{N}\right)}\right]$$

Notation: y=income, g=groups

Capital letters indicate total numbers.

The decomposition into a within- and a between component, exemplified here by decomposing world income inequality T_{world} into between-country inequality T'_{world} and within country inequality $T_{countries}$ looks as follows:

$$T_{world} = \sum_{c=1}^{C} \frac{y_i}{Y_{world}} \ln\left[\frac{\left(\frac{y_i}{Y_{world}}\right)}{\left(\frac{1}{N_{world}}\right)}\right] = \qquad T'_{world} = \sum_{c=1}^{C} \frac{y_c}{Y_{world}} \ln\left[\frac{\left(\frac{y_c}{Y_{world}}\right)}{\left(\frac{n_c}{N_{world}}\right)}\right] +$$

World income inequality based on individuals = between-country inequality +

$$\sum_{c=1}^{C} \frac{y_c}{Y_{world}} T_{countries}$$, whereby $$T_{countries} = \sum_{i=1}^{N} \frac{y_i}{Y_{country}} \ln\left[\frac{\left(\frac{y_i}{Y_{country}}\right)}{\left(\frac{1}{N_{country}}\right)}\right]$$

weighted within-country inequality, with the weights being simply the income shares of the individual countries in world income

the within-country component, computed with the basic formula for individual-level data

Instead of directly measuring individual-level data within countries, one could further decompose within-country inequality into e.g. between-and within-state inequality. Then the individual-level formula for $T_{countries}$ would be replaced by its group-based equivalent (representing then between-state inequality) and one would add within-state individual-level inequality to it, which would then be weighted by each state's share in the country's overall income.

The main disadvantage of the Theil index is that unlike the Gini coefficient, it is not immediately interpretable since it is not normalized between fixed bounds. However, the measure has a lower bound of zero and an upper bound of ln(N), which is the number obtained if one unit had all income. Because N differs across populations, numbers of T cannot be compared between these populations, either. However, the index can be normalized by dividing by ln(N) to make numbers comparable and interpretable.

The Theil index has the property of being more sensitive to the upper end of the distribution. This becomes evident if one recalls the way the individual contributions are weighted before they are summarized to the final statistic. Because the weights are the income shares, and richer individuals therefore by definition enter the measure with a higher weight, it is more responsive to changes in this part of the distribution.

iii.) The Atkinson index

The intuition of the Atkinson index is very different from that of the previously discussed measures, although it can be transformed to a Generalized Entropy representation based on shares. In its Generalized Entropy transformed version, the Atkinson Index is also part of the class of perfectly decomposable inequality measure, although it is hardly ever used for this purpose since decomposition with e.g. the Theil index is more straightforward.

The Atkinson index is close to the microeconomic view on inequality introduced before, according to which inequality leads to resources being wasted because someone who has very little would benefit more from an additional unit of the unequally distributed resource than someone who already has a lot of it. Atkinson's index measures this welfare loss due to inequality by calculating the actual amount of income which is wasted due to inequality. It does so by comparing the actual income level at the given distribution of incomes to a hypothetical one which would be obtained if all incomes were distributed equally and which would yield the same level of welfare. This is called the equally distributed equivalent income Y_{EDE}. Assuming that there is some degree of inequality aversion (which is the point of the entire exercise), the Y_{EDE} will always be lower than the actual income level Y if there is inequality in the data under consideration. This also means that there is potential in the society under consideration to achieve a higher level of welfare with the same level of income through redistribution (welfare gains holding income constant). However, what the index measures is the inverse concept, that is, the income which could be saved if one redistributed the current income equally, without any loss in welfare (income "gains" holding welfare constant).

$$A_\varepsilon = 1 - \frac{Y_{EDE}}{\mu} = 1 - \frac{\mu_\varepsilon}{\mu}$$

A value of A=0.3, for example, would mean that 30% of the current income is "wasted" in terms of the generation of welfare due to inequality. The number would also allow us to say that if incomes were equally distributed, then we would need only 70 percent of the present national income to achieve the same level of social welfare.

Of course, this number is highly sensitive to the specific assumptions of the underlying welfare functions, in particular to the degree of concavity – that is, how high is the rate at which the returns to income decrease. This sensitivity is explicitly introduced in the index by means of an "inequality aversion parameter", ε. The higher the ε, the more inequality-adverse the preferences of a society and the higher the concavity of the underlying individual welfare functions. In order to retrieve an actual value for Y_{EDE}, the welfare functions have to be explicitly specified. Atkinson proposed an additively separable social welfare function, of the form

$$W = \frac{1}{N}\sum_{i=1}^{n} U(y_i)$$

which is simply a sum of the individual welfare functions, specified as

$$U(y_i) = \frac{1}{1-\varepsilon} y_i^{1-\varepsilon} \qquad \text{for } \varepsilon \neq 1$$

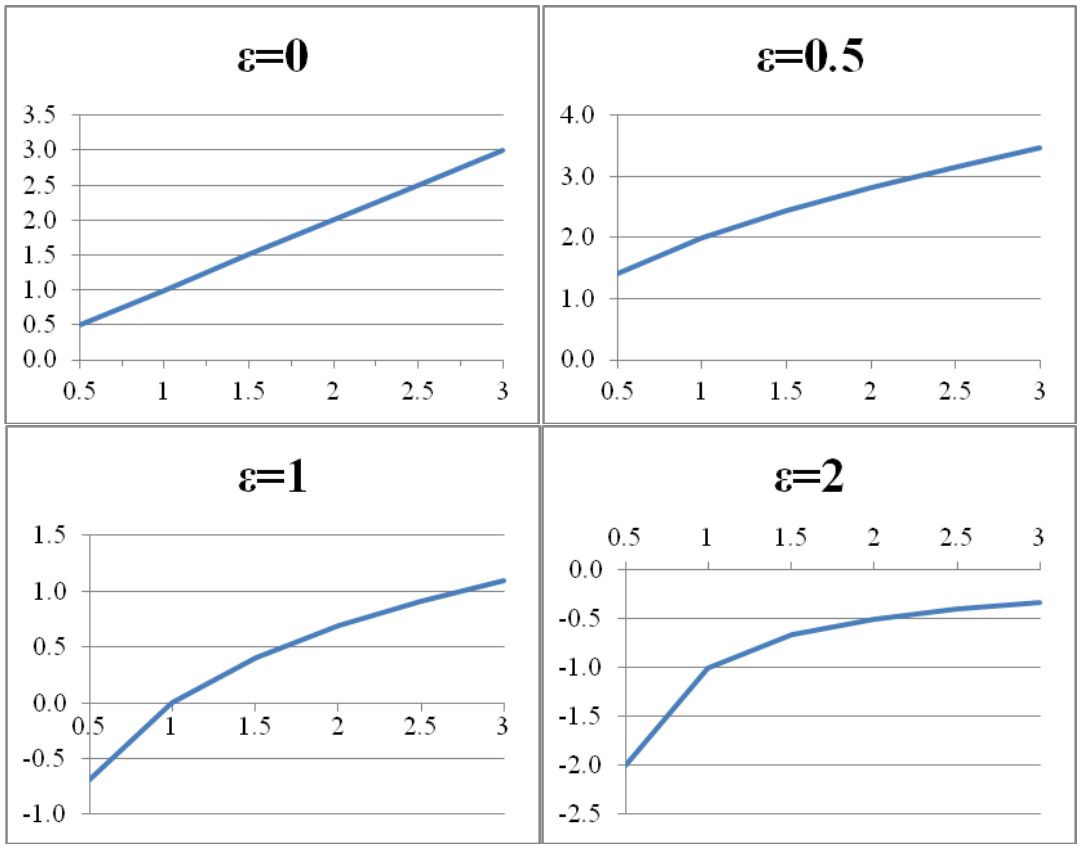
$$U(y_i) = \log y_i \qquad \text{for } \varepsilon = 1$$

The following numerical example illustrates the welfare functions for the most commonly used values of ε.[3]

Y	ε=0	ε=0.5	ε=1	ε=2
0,5	0,5	1,414	-0,693	-2,000
1	1,0	2,000	0,000	-1,000
1,5	1,5	2,449	0,405	-0,667
2	2,0	2,828	0,693	-0,500
2,5	2,5	3,162	0,916	-0,400
3	3,0	3,464	1,099	-0,333

[3] The negative values in the example are not a reason for concern. In his original representation, Atkinson introduced a shift parameter into the individual welfare functions, preventing the occurrence of negative values: $U(y_i) = A + B(\frac{1}{1-\varepsilon} y_i^{1-\varepsilon})$

Figure 2: Welfare functions for different values of epsilon



Adding up the individual welfare functions as per the formula for the social welfare function yields a social welfare function which, by definition, must yield the same level of social welfare as the welfare stemming from Y_{EDE}. Equating the two income levels and solving for Y_{EDE} gives and expression which can be plugged into the initial formula for A_ε. The resulting explicit formula for the Atkinson index is

$$A_\varepsilon = \begin{cases} 1-\frac{1}{\mu}\left(\frac{1}{N}\sum_{i=1}^{N} y_i^{1-\varepsilon}\right)^{1/(1-\varepsilon)} \; for \varepsilon \in [0,1) \cup (1,+\infty) \\ 1-\frac{1}{\mu}\left(\prod_{i=1}^{N} y_i\right)^{1/N} \; for \varepsilon = 1 \end{cases}$$

The Atkinson index has the nice property that the choice of the sensitivity of the measure to different parts of the distribution can be made explicit. The higher the value of the inequality aversion parameter ε, the more sensitive is the index to the bottom of the distribution. For $\varepsilon \to \infty$, the index effectively follows Rawls' maximin principle and is only concerned with the

least well-off individual in the distribution. The other extreme, if ε=0, the social welfare function corresponds to a utilitarian welfare function without any degree of inequality aversion, and hence welfare is always directly proportional to the income level, regardless of its distribution.

The Atkinson index has several desirable properties. In particular that it assigns a monetary value to the income wasted due to inequality makes it a rather impactful tool, for example for influencing policy decisions. But, the choice of an inequality aversion parameter reflecting a society's preferences of how much inequality is acceptable is somewhat arbitrary. On the other hand, there is by now, a substantial literature from experimental and behavioral economics that has provided estimates of inequality aversion (see, e.g., Klasen, 2008a). Another way of addressing this criticism is simply to report the Atkinson index for different values of ε.

Inconsistencies in inequality rankings

It is worth noting that even for measures fulfilling all of the inequality axioms, the ranking of different income distributions can differ. The example used above to show that the Gini index can have the same value for two different Lorenz curves can also be used to illustrate how rankings can differ between measures.

	Distribution I			**Distribution II**		
	Household A	**Household B**	**Household C**	**Household A**	**Household B**	**Household C**
Population	9	5	1	5	10	15
Income	15	10	5	1	5	9
Income per capita	1.667	2	5	1/5=0.2	5/10=0.5	9/15=0.6

As established before, the Gini assigns an equal ranking of 1.33 to both distributions. According to the Theil index, distribution I is more unequal with a value of T=0.06 than distribution II with T=0.48. The Atkinson index on the other hand is 0.047 (0.741) for distribution II and 0.097 (0.143) for distribution II for values of ε=1 (2). This indicates that more income is wasted in distribution II, namely 9.7 (14.3) percent of income, versus 4.7 (7.41) percent in distribution I. The example also nicely illustrates how the Atkinson index is more sensitive to the bottom of the distribution as it assigns a higher value to distribution II, which is more unequal at the bottom. Moreover, this difference grows as the inequality aversion parameter rises and the measure becomes more sensitive to bottom inequality. The Theil index on the other hand, being more sensitive to the top of the distribution, assigns a higher value to distribution I. In such a case, it is up to the observer to decide what type of inequality he is more concerned about. Another example of different inequality measuring yielding different rank orderings of inequality for real country-level data can be found in Atkinson (1970). The following table provides an overview over the strengths and shortcomings of the different measures and their appropriateness in different contexts.

Generally, when one is interested in the relative ranking of countries (or other units), it is advisable to compute different indices and see if the ranking is consistent across measures. Changes in rankings are then also illustrative of inequality in different parts of the distribution in the different units.

Table 1: Overview of inequality measures

Measure	Properties	When to apply	Caveats
Gini coefficient	Advantage: Intuitive, easy to interpret, most commoly used measure, graphically representable	When interested in single inequality statistics of one population at one point in time	Not distribution neutral: more sensitive to the middle of the distribution. Not decomposable.
Theil index	Advantage: Decomposable Disadvantage: Single values are not readily interpretable: More appropriate for comparisons, e.g. changes over time.	When interested in top inequality, e.g. Piketty debate. When the contribution of different population subgroups is of interest.	Subgroups must be mutually exclusive and exhaustive.
Atkinson index	Advantage: Intuitive, easy to interpret, powerful policy tool: gives a monetary value to the cost of inequality. Disadvantage: Specific assumptions are made about the social welfare function; values are dependent on the inequality aversion parameter, the choice of which is more or less arbitrary.	When interested in bottom inequality, e.g. for poverty alleviation targeting.	Advisable to consider different versions of the index. Most commonly used values for the inequality aversion parameter are 0.5, 1, and 2.
Decile dispersion ratios	Advantage: Intuitive, easy to interpret. Disavantage: Does not fulfill the full set of inequality axioms; only considers a small part of the distribution.	To get a first glimpse of the data. When one is interested only in certain parts of the distribution (e.g. the top 10%). The Palma Ratio can be reported in addition to the Gini index if one is not particularly concerned with the middle class.	Not responsive to any changes in the middle of the distribution/ changes between the chosen deciles.

Question 1.3: Which approaches exist for a multidimensional measurement of inequality and what is their relationship to multidimensional poverty measurement?

The justification for focusing on multiple dimensions of inequality is similar to that of multidimensional poverty measurement and depends on what one is ultimately interested in capturing. The writings of Amartya Sen (e.g. 1997) have been particularly influential in this domain. Sen argues that if what one is ultimately interested in is human well-being, income is just one of several means of achieving this end. Rather than measuring the means, one should then directly focus on the ends. However, as already pointed out earlier in Question 1, the measurement of opportunities is very difficult, and measuring negative (de jure) rights is insufficient. A second-best approach is therefore to measure the most important means besides income to achieve well-being. In establishing what these are, one should first answer the question of why income is an incomplete indicator of well-being. The main limitation of income is that it can only buy what the market provides. A large number of goods are, however, subject to market failures and have to be subsidized, regulated, or directly provided by the state. Among these are important components of human life such as education and health services, public infrastructure, safety, and so on. Whenever the state does not provide these goods and services, private income will be a poor indicator of well-being in these dimensions. In addition, many countries provide basic education-, health-, and infrastructure services for free, or at subsidized rates. While this implies that most people will in fact achieve a basic level of well-being in those dimensions, it also means that monetary well-being is increasingly decoupled from overall well-being. Sen (1997) provides several examples of how health and education indicators can diverge from income indicators in both directions. In addition to the public goods argument, the aforementioned interpersonal heterogeneity of transforming income into well-being, as well as the physical (such as nature, climate, pollution) and social environment influence the extent to which money can be converted to well-being.

Compared to the literature on monetary inequality, multidimensional approaches to inequality measurement have hardly been explored in the literature. Although there is a conceptual literature on the topic, virtually no attempts exist to develop a numerical measure of multidimensional inequality. The literature on multidimensional poverty measurement on the other hand is far more advanced in this regard and has led to the development of the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI), both of which have been put into practice and are now widely used in the analysis of poverty. Both measures contain the three dimensions health, education, and income/standard of living. Besides the method of aggregation, the main difference between the two measures lies in their data sources. The MPI relies entirely on household surveys and can therefore identify where a households is located in each of the three dimensions, whereas the HDI assembles data from different sources and can therefore not account for overlapping dimensions. The HDI provides and inequality-adjusted version of the index (IHDI), which penalizes each dimension by how unequal the distribution is within the dimension; here it uses the Atkinson's concept of equally distributed equivalent achievement discussed above to make the adjustment. However, this is very different from a multidimensional approach to measuring inequality, as

each dimension is effectively treated as separate. The MPI is more promising in this regard, as it directly allows the tracking of different dimensions for the same individuals.

Like inequality measures, poverty measures are subject to a number of axioms which are in fact very close to those of inequality measures. In particular, the transfer axiom requires poverty measures to be sensitive to progressive and regressive transfers. Poverty measures fulfilling the transfer axiom are equivalent to a one-sided inequality measure only interested in the bottom end of the distribution, which is cut off at the poverty line. One of the major flaws of the MPI is that it does not fulfill the transfer axiom. That is, the measure is not taking the depth of poverty (in the traditional sense of the concept), or inequality among the poor into account.

The way the MPI is constructed is that it considers three main dimensions health, education, and standard of living with a weight of 1/3 each. Within these main dimensions, there are two subcategories each for the health and the education component, and six subcategories for the standard of living. The final weight of the subcomponents in the measure are therefore lower than 1/3, namely 1/6 for the health and education components and 1/18 for the standard of living components. For each subcategory, a specific cut-off, or in the case of categorical data, a definition of which categories are considered poor has to be defined. Each household then receives a score of 1 if it is considered poor, or 0 if it is considered non-poor, in each dimension. The dimension scores are then added up with their respective weights to arrive at a final score. If that score is above 1/3, a household is considered (multidimensionally) poor. In this multidimensional framework, the score of 1/3 is hence equivalent to the poverty line. This poverty line of 1/3 and the dimension weights are determined completely arbitrarily, which is the cause for some criticism of the MPI. The intensity of poverty is also calculated in the MPI, but it is merely the average deprivation score resulting from the weighted summation of all the indicators, and does not say anything about how deprived a household is *within* each indicator. For example, the health indicator "nutrition" considers a household as deprived "if any adult or child in the family is malnourished". It records neither the degree of malnourishment, nor how many household members are malnourished.

Another important criticism of the MPI is that it despite the fact that this is feasible with the underlying household data, the index does not take into account that different dimensions are interconnected. For example, if a household does not have access to clean drinking water, this would very likely lead to health problems as well. The same holds for the abovementioned link between education and income – all other things equal, a more educated individual will earn a higher income on the labor market. Both indicators therefore measure at least partly the same thing. Clearly, this is a point one wants to take into account in the measurement of multidimensional inequality as well.

There have been a few attempts to address these deficiencies, which can be taken as starting points for multidimensional measures of inequality. The first approach that shall be highlighted is the "correlation-sensitive poverty index" (CSPI) developed by Nicole Rippin (2010, 2012). Her approach aims at capturing the overlaps between the different dimensions and has the additional advantage of, unlike virtually all other approaches of poverty

measurement, not excluding households above the poverty line from the analysis. Instead, she considers all households which are deprived in any of the dimensions as poor, and just assigns a correspondingly lower final poverty value to the households which are deprived in fewer dimensions. Her index takes inequality across dimensions into account by adding (in a multiplicative form) a version of the Generalized Entropy class of inequality indices to the intensity (or "breadth") of poverty as calculated by the original MPI method. The disadvantage of this approach is that the measure is not as easily decomposable, which can be a major drawback if the goal of a poverty analysis is to find specific population subgroups for targeting of policy measures.

Seth and Alkire (2014) therefore propose a different, subgroup decomposable extension of the MPI taking inequality among the poor into account. However, their measure also only considers the "breadth" of poverty, that is, how many dimensions a person is deprived in, and not the "depth" of poverty within a dimension itself.

In sum, there is currently no multidimensional measure directly suitable for inequality analysis, where "depth" aspect is of interest and the "breadth" aspect is not defined since there is no cut-off at any sort of poverty line. Even for poverty measurement, these types of measures are still rather new, with a literature that is just developing and subject to a lot of discussion. It is consequently also of very low practical relevance at the moment, although an application of these concepts would certainly be of interest, especially since the axiomatic foundations for deriving the equivalents to the one-dimensional poverty axioms for a multidimensional context have already been laid out (e.g. Chakravarty, Deutsch, and Silber 2008, Tsui 1999).

Question 1.4: How does the measurement of inequality differ from the World Bank concept of "shared prosperity"?

The World Bank recently adopted a twin goal strategy that should guide its work. On the one hand, the World Bank keeps the goal to reduce extreme poverty measured by the $ a day indicator (the new poverty line and associated poverty rates are currently being revised to reflect the new 2011 purchasing power parity exchange rates). It wants to contribute to the 'elimination' of absolute poverty by 2030 which it considers as reached if the poverty rate falls below 3% using that indicator. The second goal is the 'shared prosperity' goal which is to particularly consider the growth rate of the mean income of the poorest 40% of the population. The growth rate should be higher than that of mean incomes.

Both goals consider inequality to some, but limited, extent. The absolute extreme poverty goal reflects trends and levels of inequality insofar as poverty reduction is faster in countries if growth is accompanied by declining inequality or growth takes place in a country with lower initial inequality (Bourguignon, 2003; Klasen and Misselhorn, 2008). The second goal also considers inequality in the sense that it compares growth of the poorest 40% with growth in mean incomes. But it does so in a rather special, and not really intuitive, way, as the illustrative calculations below indicate.

In Table 2, we report the average incomes of the poorest 4 deciles separately (and assume they are equal within each decile) as well as the income of the richest 60% (also assumed to be equal, see row 100 which reports their incomes). Then the table shows three growth scenarios and calculates a few summary measures. The first one is the shared prosperity measure, i.e. growth in the mean incomes of the poorest 40%. The second one is the growth in overall mean incomes. Shared prosperity takes place if the growth of the mean income of the poorest 40% exceeds that of mean incomes. The third statistic is the average of growth rates of the poorest 40% which is closely related to the concept of the growth incidence curve (Ravallion and Chen, 2003), which plots these growth rates by percentiles of the income distribution. And the last one is the average of growth rates of all 100 percentiles of the income distribution. The three growth scenarios illustrate the strengths and weaknesses of the shared prosperity indicator.

In scenario 1, one sees its strength as considering changes in inequality in its assessment. The shared prosperity measure (mean incomes of the poorest 40%) grows by 10%, while mean incomes grow by 18.9%. This shows that this growth does not fulfill the shared prosperity goal, as the poorest 40% grow at lower rates than the rest; as a result, inequality rises and the shared prosperity measure reflects this well.

Consider now scenario 2. Now the poorest decile experiences high growth (by 60%), the second and third decile grow by 10% as before, the fourth decile grows by 2.5%, and the richest 60% grow by 10% as before. In terms of inequality, this is arguably better as the poorest decile has experienced the highest growth, much higher than all other groups, while the second and third deciles grow as before. But the shared prosperity indicator now indicates that this growth was not one consistent with shared prosperity as the growth of mean income of the poorest 40% is smaller than growth of mean incomes. How can that be? Since the fourth decile has so much more income than the first decile, it has a much larger impact on the growth of mean incomes of the bottom 40% while the growth rate of the poorest decile hardly matters. Thus even though this measure tries to give more weight to the poorest 40%, among the poorest 40% it gives the highest weight to the richest (i.e. the fourth decile), which is hardly a desirably feature. The mean growth rate of the poorest 40% does not suffer from this short-coming. It shows that the mean growth rate of the poorest 40% was much larger than mean income growth. The reason is that it gives the same weight to the growth rates of all. This has been called the population-weighted growth rate and it has the desirable feature everyone the same (and it is also linked to an important poverty measure, the Watts index, see Klasen, 1994 and Ravallion and Chen, 2003). Also, the mean growth rate of all percentiles treats the change in fortunes of all the same and thus reflects that the poorest had this massive improvement (see Klasen, 1994 for a discussion).

Lastly, the third scenario shows the reverse effect. Now the poorest decile is losing money (by 40%), while the fourth quintile experiences 30% growth (and the second and third one experience no growth). Now this looks again like shared prosperity as the growth of mean incomes of the poorest 40% exceeds that of overall mean income growth. Again the fortunes of the poorest are virtually ignored and the shared prosperity measure focuses on the fortunes of the 4th decile, hardly a desirably feature of this measure. Again the mean growth rate of the

poorest 40% does not suffer from this problem and rightly reflects that the fortunes of the poorest have deteriorated.

Thus the shared prosperity measure as proposed by the World Bank considers changes in inequality only to a very limited extent. As shown in the scenarios, it can well be the case that most of the poor suffered losses but the shared prosperity measure still shows good results, as long as the fourth decile is thriving. There is an easy way to fix the problem, as the simulations below show. If the shared prosperity measure was taking the mean of the growth rates of the poorest 40 percentiles (instead of the growth of income of the poorest 40%), the link between shared prosperity and inequality reduction would be clear and direct.

Table 2: Shared Prosperity: Some scenarios

Percentile	Incomes	Scenario 1	Scenario 2	Scenario 3
10	10	11	16	6
20	20	22	22	20
30	40	44	44	40
40	80	88	82	104
100	200	240	220	220
Total Income	13500	16050	14840	14900
Mean	135	160.5	148.4	149
Growth of Mean of 40%		10.0%	9.3%	13.3%
Growth in Mean		18.9%	9.9%	10.4%
Mean Growth Rate 40%		10.0%	20.6%	-2.5%
Mean Growth Rate all		16.0%	14.3%	5.0%

Questions 1.5 and 1.6: What are the key trends in global inequality and in the Global Economic Partners of the BMZ?

Milanovic (2006) defines three concepts of global inequality, differentiated by population unit and income concept to which they refer. In Concept 1, countries are the population unit and mean national income per capita is the income concept. In this all countries have equal weights without taking population of the country into account. Using this approach, the level of global inequality is very high and trends in inequality point to rising inequality as there are relatively small countries that are very poor and have not grown much (the likes of Somalia, Zimbabwe, Burundi, Liberia, Niger) and there are a number of very small countries that are very rich and have gotten a lot richer in recent decades (e.g. Liechtenstein, Kuwait, Brunei, etc.). We report on figures for this type of inequality below but note that for many assessments of global inequality, treating countries of vastly different sizes the same is quite

problematic. In Concept 2, the population unit is the individual and the income concept is again mean national income per capita. In this case a country with larger population like India or China will have a bigger weight than less populous countries like the Bahamas. In Concept 3, the population unit is the individual and the income concept is the per capita income of the household to which the individual belongs. This is analogous to within-country inequality for the world as whole. Concept 3 is equal to concept 2 inequality plus the weighted average of inequality within countries (Anand and Segal, 2014). This is the income concept we largely use in the analysis below.

There exist quite a few studies that attempt to estimate global income or consumption inequality based on this Concept 3. In Table 3 we summarize all global income or consumption inequality estimates that we are aware of (this is basically an updated version of Anand and Segal, 2008). While using the same inequality concept, these studies nevertheless differ widely in their methodology and data sources. Some use National Accounts others use household surveys, some use income others use consumption, some use aggregate statistics others use micro data. What can we learn about global inequality from such different studies? Is there any consensus about the levels and trends of global inequality?

Global inequality is consistently estimated between 0.65 and 0.75. Trends are somewhat less clear. In some studies global inequality increases, in others it decreases, however, the changes are rather small and estimates tend to be quite stable over time. There seems to be agreement that global inequality is high and that changes over time, if any, tend to be rather small. There is less agreement about the direction of the trend. While the data below suggests that inequality changed little until about the 2000, most studies points to small decline in global inequality after 2000. However, as shown in Table 3, the magnitude of the decline differs between studies and greatly depends on methods, including the adjustments made for under-reporting of the super-rich, as well as the use of survey means versus national accounts.

A particular problem of all these studies is that they have to combine data sets from different countries, make allowances for inequality levels and trends in countries where no data is available, and are unable to provide statistically valid confidence intervals of the estimates of global inequality . It is thus not possible to identify beyond doubt whether a change in the estimate is really due to a change in global inequality or simply due to statistical variation.

That being said, we now investigate national and global inequality using data from the Global Consumption and Income Project (GCIP) to be able to use one consistent data source that will be used for global inequality as well as regional and national inequality.

The GCIP considers global inequality in the sense of inequality between people, not between countries (so China has a large impact on global inequality while Equatorial Guinea has a small one), this also using Concept 3. In the construction of the database deciles of national income distributions are weighted by population size and then inequality measures are calculated based on that.[4] The analysis is entirely based on household surveys. There is a

[4] The actual method used is actually slightly more complicated as it actually estimates continues Lorenz curves from the information provided from the surveys (on mean and distribution) and then includes that in the

discrepancy between mean incomes or consumption in household surveys and per capita incomes and consumption in national accounts, which would affect levels and trends of global inequality (and inequality within countries).

We present estimates based on inequality in income and inequality in consumption. The latter tends to be smaller as the poor consume all of their income (and sometimes more) while the rich only consume a share of their income. Consumption inequality is also smaller due to better measurement of consumption at the bottom of the income distribution. All estimates that we present below should be treated with the same caution that we mentioned above. Note also that our assessment of the income share of the top 10% is likely to be a serious underestimate as surveys do not capture the incomes of the top income earners of the country well; as shown in Table 3, various ways to adjust for top incomes indeed generate higher levels of inequality (and a smaller decline since 2000). Unfortunately, we only have alternative data on top incomes for a small share of countries (and will incorporate them in future versions of the analysis). As discussed above, we cannot provide confidence intervals or any of the estimates for global inequality and therefore cannot say if increases or decreases of global or even national inequality are statistically significant or not.[5]

Key results

1) Global inequality, as measured by the various measures, has experienced a decline over the years. The global income Gini peaked in 1970 at 0.73 and has declined to 0.65 in 2010. The 1990's decade saw an increase in income inequality and the decade of 2000 saw a substantial decline. See Figure 3 below. (Please note that the absolute gap between the rich and poor countries has nevertheless continued to increase; see discussion above on absolute versus relative views of inequality).

2) The decline is largely driven by sharp decline in between country inequality. The between country Mean logs deviation GE(0), an inequality measure that can be decomposed into a between-country and a within-country component, has declined from 1.02 in 1970 to 0.53 in 2010. See Figure 4 below. Essentially, the fall in between-country inequality is heavily affected by the rapid income growth of China since the 1980s and, to a lesser extent, rapid economic growth in countries including India, Vietnam, and Indonesia, particularly in the 2000s. In contrast, growth of developed countries was much slower, contributing also to the decline in global inequality. This decline in global inequality is also consistent with finding that the relative (and, even more so, the absolute) gap between the poorest and richest has continued to increase. As some of the very poorest countries in the world (e.g. Somalia, Afghanistan, Eritrea, Niger) have not grown much in recent decades while the richest countries (e.g. Kuwait, Liechtenstein, Norway) have, the income ratio (and, even more so, the absolute distance) between the richest and the poorest countries has

assessment of global inequality. But this (quantitatively) very similar to simply using income shares by decile in each country, weight them by population of each decile in each country, and then put them all together to create a global income distribution.

[5] For national inequality trends, GCIP also does not provide confidence intervals although the results are consistent with individual country studies that we discuss below and that are based on consistent and statistically valid assessment methods.

continued to rise. See also Figure 5 below. But fortunately, these very poor and very rich countries contain only a very small share of the global population so that they only have a small impact on the evolution of the (population-weighted) global inequality.

3) In contrast, the within component has seen an increase from 0.24 to 0.40 in the same period (see Figure 4). This means that high and rising within-country inequality is playing an increasingly important role in contributing to total global inequality. The share of between component of total MLD has declined from 81% in 1970 to 57% in 2010. This is to say, the (rising) difference in income between a poor and rich person in China and Germany now plays a much larger role in affecting global inequality than the difference between the average Chinese income earner and the average German income earner.

4) Contributing to this greater importance of within-country inequality is that the weighted average of the within-country Gini across all the countries of the world increased substantially in the 1980s and 1990s. Sharply rising inequality in China, India, Latin America, and many OECD countries has played an important role in this regard.

5) The weighted within-country Gini across all the countries of the world has declined slightly from its peak in 2000 from .47 to .46 in 2010. It is highest in sub-Saharan Africa followed by EAP in 2010. It has declined substantially in Latin America (.54 to .49). This has been related to high growth that increased wages and employment, as well as pro-poor labor market and social policies (see Cornia, 2014). The weighted average Gini is highest among the upper middle income countries. See Figure 7.

6) We assess trends in regional income inequality using World Bank's regional categorization. See Figure 6. East Asia and Pacific has been one of the highest inequality regions in the world throughout the period. This is because it contains populations at very different levels of development, from very poor Chinese or Indonesians for example, to Japanese (and more recently Koreans or Singaporeans) who enjoy levels of income of rich countries. However, even within this disparate group, China's rapid income growth has meant that inequality has fallen since 1990 because of the impact of that income-growth on inter-country differences within the region. Meanwhile, at the other end of the spectrum, North America is much more homogenous as a region and overall inequality is correspondingly lower. However, rising inequality within the US in particular has meant that inequality has risen sharply since 1990. South Asia and Europe and Central Asia, are not as homogenous in incomes as North America, but are decidedly more homogenous than East Asia and the Pacific, Sub-Saharan Africa and Latin America. In South Asia and in Europe and Central Asia, the experience of the last 20 years has been one of increasing inequality within the regions. On the other hand, in the initially high inequality regions of Latin America and in Sub-Saharan Africa, inequality has fallen or remained constant. In Latin America, inequality rose between 1990 and 2000 before falling subsequently. A similar same pattern of regional inequality can be observed when we look at other measures of relative inequality such as the mean log deviation (GE(0)), the Theil index (GE(1)), the mean-to-median ratio or the Palma ratio (Table 4). Between 1990 and 2010, Latin America and the Caribbean, East Asia and Pacific, and Sub-Saharan Africa

experienced sharp declines in all these measures, while South Asia and North America saw increases in these measures.

7) This pattern of change in regional inequality is different if we look at the changes in within country inequality in the regions (Table 5). East Asian countries, on average, have experienced a sharp increase in within country inequality, while Latin American and Carribean countries have witnessed a fall in within-country inequality. Sub-Saharan African countries have the highest average within-country inequality levels and it has not changed significantly over the years. Classifying countries by income levels shows that high income countries tend to have lowest average within country inequality and upper middle income countries have the highest levels. (Table 6).

8) Figure 6 presents the trend in the three global inequality concepts. Concept 2 inequality has declined sharply since 2000 and this has also led to a decline in Concept 3 inequality, even though inequality within countries on average has increased during this period. Concept 1 inequality (treating countries as the unit of analysis) has increased steadily between 1960 and 2005. After 2005, it has also declined slightly, due to higher growth rates in developing countries (including Sub-Saharan Africa) as compared to the developed countries.

9) Among the six Global Economic Partner Countries income inequality (as measured by Gini) is highest in South Africa. See Figure 8 and Table 7. Only Brazil has experienced substantial decline in inequality from 2000 to 2010 (.59 to .51). China and India experienced substantial increases in the 1980s and 1990s as the better-off parts of the populations benefited more from rapid economic growth there. Mexico, China and India has experienced some decline in inequality since 2000. One should note, however, that there is some uncertainty about data quality and comparability, particularly in the case of India and China, so that one should treat the relatively small decline with some caution. We will now discuss the individual country situations below.

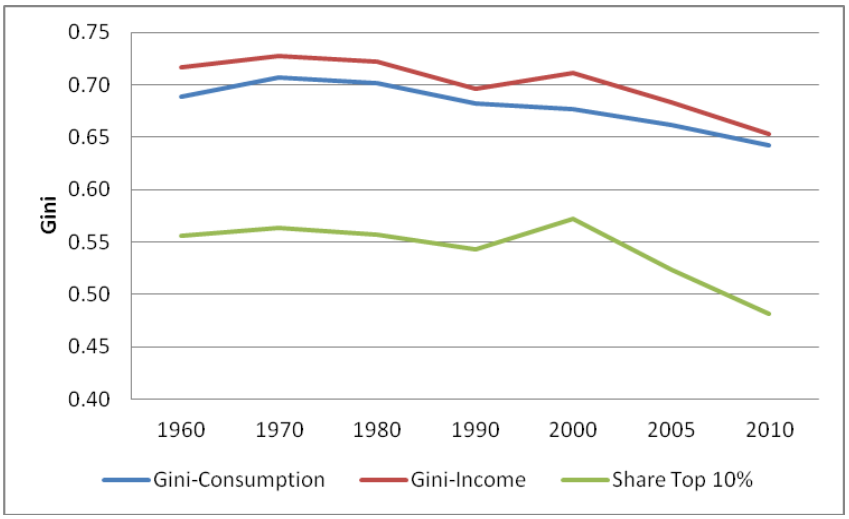
Table 3: Comparison of Global Inequality Estimates from Various Studies

	1988	1993	1998	2003	2005	2008
Global Consumption and Income Database (Income)	69.6	69.6	69.2	70.6	68.4	66.6
Anand and Segal (2014) (with top incomes)	72.6	72.7	72.2	73.5	72.7	
Anand and Segal (2014) (without top incomes, survey means)	70.5	70.7	69.8	71.1	70.1	
Anand and Segal (2014) (without top incomes, Household Consumption from National Account)	73.9	72.1	71.1	70.6	69.8	
Lakner and Milanovic (2013) (National Account Means + top heavy Pareto imputation)	76.3	76.1	77.2	78.1		75.9
Lakner and Milanovic (2013) (National Account Means)	71.5	70.5	70.6	70.7		67.6
Lakner and Milanovic (2013) (only survey means)	72.2	71.9	71.5	71.9		70.5
Milanovic (2012)	67.8	69.3	68.8	70.1		
Milanovic (2005)	61.9	65.2	64.2			
Milanovic (2002)	62.5	65.9				
Bhalla (2002) (Income)	67		65			
Bhalla (2002) (Consumption)	66		63			
Bourguignon & Morrisson (2002)		66				
Chotikapanich et. Al (1997)	65					
Dikhanov & Ward (2002)	69		68			
Dowrick & Akmal (2005) (GK)		64				
Dowrick & Akmal (2005) (Afriat)		71				
Sala-i-Martín (2006)	65	64	64			
Bourguignon (2012)	71		69			66

Notes: Milanovic (2012): Table 4, p. 14: Gini from row 5 (2005 PPP, sep. rural-urban prices for China, India & Indonesia); Theil from row 3 (2005 PPP, sep. rural-urban prices for China only); 2002 figures for 2003 benchmark. Milanovic (2002): Table 16, p. 72: Using full sample; Table 19, p. 78 (decomposition): Only for common sample. Milanovic (2005): Table 9.4, p. 108: Using full sample; Table 9.5, p. 112 (decomposition): Only for common sample. Bourguignon (2012): Figure 1, only approximate, because read-off from figure; 1988 refers to 1989, 1998 refers to 1997, 2008 refers to 2006. Otherwise: Anand and Segal (2008), Table 1: Survey estimates allocated to benchmark according to rules with micro data: 1988: Bhalla (2002), CVR (1997), and DW (2002) all refer to 1990; 1993: BM (2002) refer to 1992; 1998: Bhalla (2002) refers to 2000, and DW (2002) refers to 1999. GCIP's 1988 estimate refers to 1990.

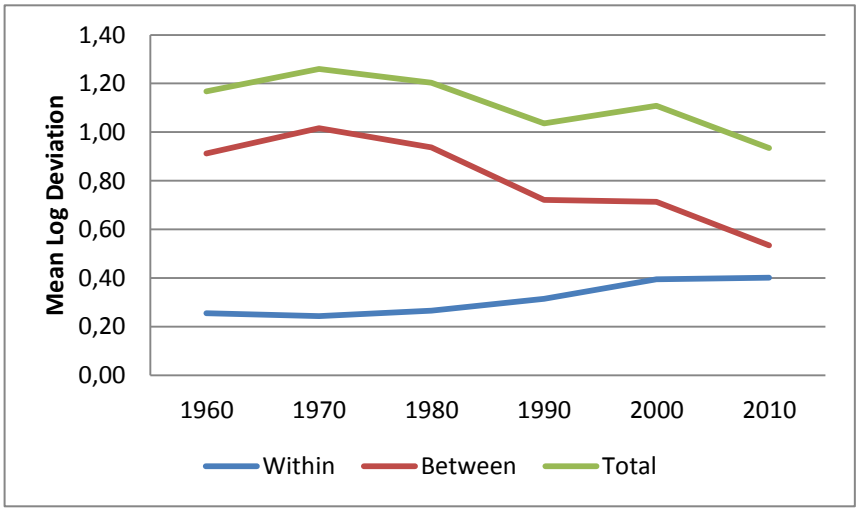
Source: Lakner and Milanovic (2013) and additions by authors

Figure 3: Global Relative Inequality Measures



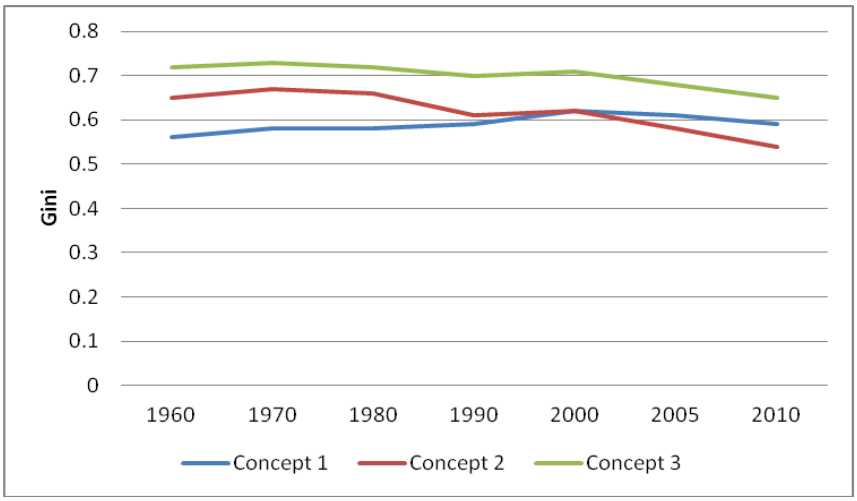
Source: Global Income and Consumption Database.

Figure 4: Within and Between Country Inequality Components of Global Inequality



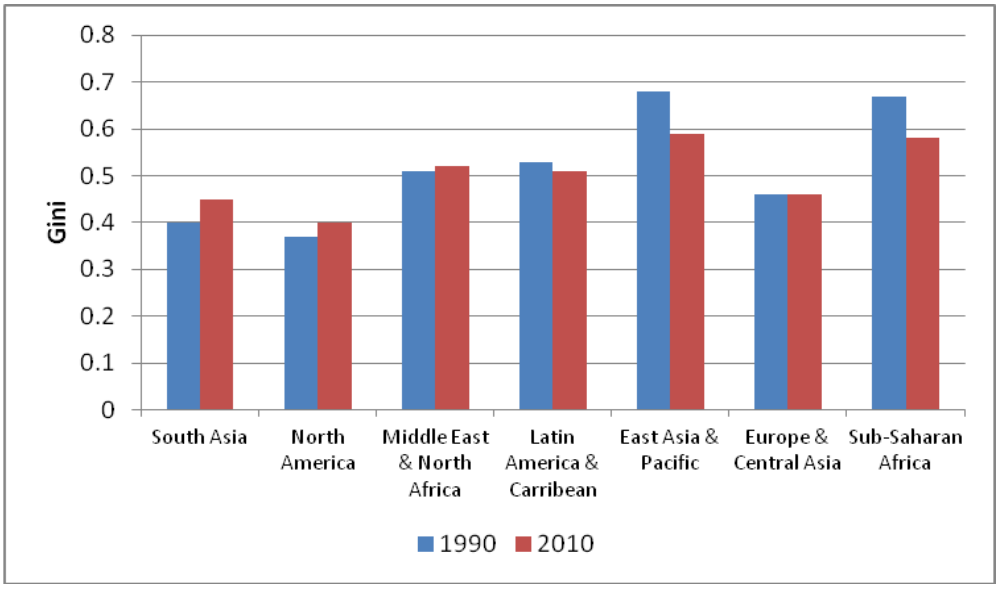
Source: Global Income and Consumption Database.

Figure 5: Global Inequality (various concepts)



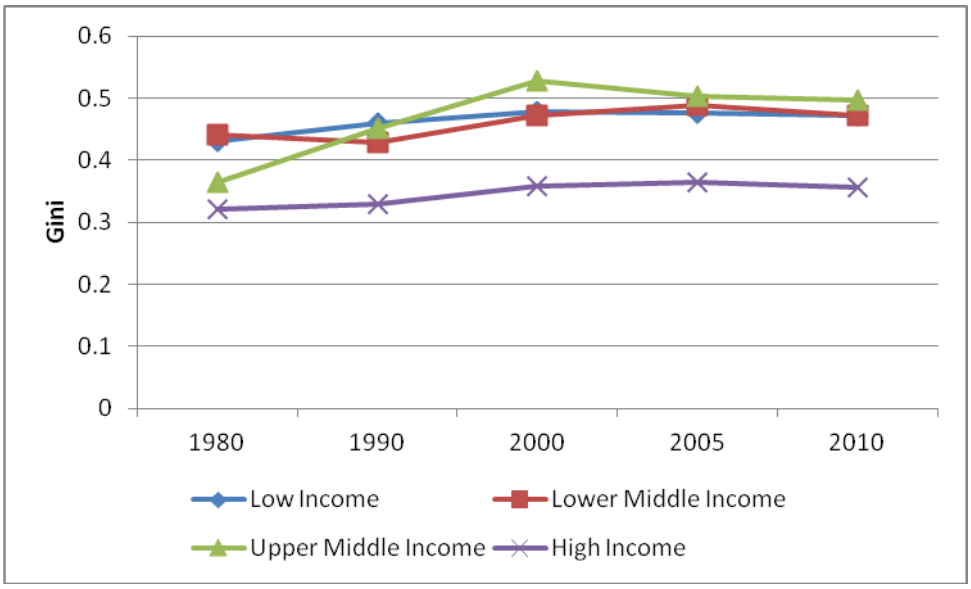
Source: Global Income and Consumption Database.

Figure 6: Regional Inequality



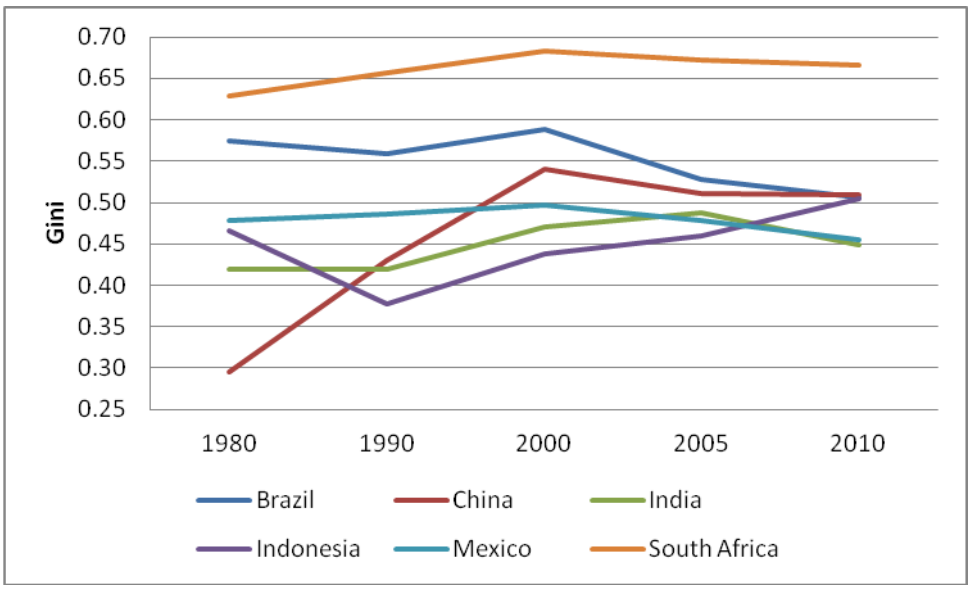
Source: Global Income and Consumption Database.

Figure 7: Average (population-weighted) within-country inequality by income groupings



Source: Global Income and Consumption Database.

Figure 8: Inequality for the Global Economic Partners



Source: Global Income and Consumption Database.

Table 4: Regional Inequality (includes within and between inequality)

Region	South Asia		North America		Middle East & North Africa		Latin America & Carribean		East Asia & Pacific		Europe & Central Asia		Sub-Saharan Africa	
	1990	2010	1990	2010	1990	2010	1990	2010	1990	2010	1990	2010	1990	2010
Gini	0.40	0.45	0.37	0.40	0.51	0.52	0.53	0.51	0.68	0.59	0.46	0.46	0.67	0.58
MLD GE(0)	0.27	0.35	0.25	0.30	0.45	0.48	0.55	0.53	0.86	0.77	0.40	0.41	0.95	0.64
Theil GE(1)	0.31	0.33	0.23	0.28	0.50	0.53	0.48	0.45	0.95	0.63	0.36	0.35	0.90	0.65
Palma Ratio	1.88	2.26	1.56	1.89	3.35	3.68	4.00	3.61	8.83	6.30	2.67	2.60	10.47	5.19
Mean/ Median	1.46	1.60	1.21	1.27	1.87	1.86	1.78	1.65	3.07	2.09	1.47	1.41	2.79	1.99
Share of top 10%	32.4	30.3	26.4	29.2	40.4	41.3	36.2	34.8	59.6	40.4	32.4	31.5	54.8	45.6

Table 5: Average (population-weighted) of within country Gini by regions

	World	East Asia and Pacific	Europe and Central Asia	Latin America & Caribbean	Middle East & North Africa	North America	South Asia	Sub-Saharan Africa
1980	0.386	0.336	0.312	0.520	0.487	0.343	0.408	0.514
1990	0.418	0.418	0.317	0.512	0.472	0.367	0.413	0.538
2000	0.471	0.504	0.354	0.537	0.492	0.394	0.464	0.526
2005	0.469	0.488	0.367	0.509	0.480	0.401	0.478	0.525
2010	0.459	0.492	0.353	0.488	0.475	0.402	0.444	0.523

Table 6: Average (population-weighted) within country Gini by income groupings

	Low Income	Lower Middle Income	Upper Middle Income	High Income
1980	0.430	0.441	0.365	0.321
1990	0.460	0.429	0.452	0.329
2000	0.478	0.473	0.528	0.358
2005	0.476	0.489	0.503	0.365
2010	0.473	0.471	0.497	0.356

Table 7: Relative Inequality Measures for Selected Countries over time

	Gini	Palma Ratio	Mean/ Median	Share of top 10%	MLD	Theil	Atkinson
	Brazil						
1960	0.51	3.05	2.12	0.35	0.50	0.43	0.64
1970	0.53	4.79	2.09	0.47	0.50	0.55	0.60
1980	0.57	5.07	2.34	0.42	0.62	0.59	0.68
1990	0.56	4.88	2.44	0.36	0.65	0.51	0.74
2000	0.59	6.34	2.32	0.50	0.61	0.64	0.68
2005	0.53	3.89	2.07	0.34	0.56	0.46	0.69
2010	0.51	3.39	1.88	0.33	0.52	0.42	0.69
	Indonesia						
1970	0.41	1.76	1.63	0.29	0.27	0.27	0.39
1980	0.47	2.69	1.61	0.36	0.36	0.38	0.50
1990	0.38	1.78	1.46	0.32	0.22	0.25	0.33
2000	0.44	2.17	1.60	0.31	0.32	0.32	0.45
2005	0.46	2.47	1.74	0.30	0.39	0.34	0.54
2010	0.50	3.35	1.76	0.39	0.44	0.45	0.56
	South Africa						
1960	0.59	6.24	2.37	0.42	0.71	0.60	0.76
1970	0.60	6.66	2.50	0.44	0.72	0.64	0.75
1980	0.63	7.52	2.84	0.49	0.75	0.74	0.73
1990	0.66	8.41	3.27	0.54	0.80	0.86	0.72
2000	0.68	10.59	3.35	0.57	0.88	0.92	0.77
2005	0.67	12.87	5.16	0.45	1.06	0.77	0.86
	Mexico						
1960	0.50	3.29	1.91	0.39	0.43	0.45	0.53
1970	0.49	3.11	1.82	0.38	0.41	0.44	0.52
1980	0.48	2.88	1.71	0.37	0.39	0.41	0.51
1990	0.49	2.86	1.90	0.32	0.44	0.38	0.59
2000	0.50	3.13	1.92	0.32	0.48	0.40	0.63
2005	0.48	2.75	1.81	0.31	0.43	0.37	0.59
2010	0.45	2.42	1.63	0.29	0.42	0.34	0.63
	India						
1960	0.41	2.38	1.61	0.38	0.28	0.33	0.40
1970	0.40	1.72	1.58	0.28	0.27	0.26	0.40
1980	0.42	1.91	1.68	0.29	0.30	0.29	0.43
1990	0.42	2.26	1.59	0.37	0.26	0.32	0.37
2000	0.47	2.59	1.75	0.34	0.37	0.39	0.49
2005	0.49	2.91	1.90	0.32	0.45	0.39	0.60
2010	0.45	2.26	1.77	0.31	0.35	0.33	0.49
	China						
1980	0.29	1.01	1.20	0.21	0.15	0.14	0.26
1990	0.43	2.19	1.55	0.33	0.30	0.33	0.42
2000	0.54	4.23	1.89	0.41	0.53	0.52	0.66
2005	0.51	3.57	1.89	0.32	0.59	0.43	0.83
2010	0.51	3.61	1.85	0.32	0.60	0.42	0.84

Further discussion and analysis of inequality trends in Germany's Global Economic Partners

Brazil

Brazil has been one of the most unequal countries for a long time. High inequality in Brazil dates back to colonial times and remained very large in the 19th and 20th centuries. There was always a strong racial as well as a strong regional component to Brazilian inequality, with whites living in the South-East being substantially better off than Blacks loving in the North-East. Large inequality in access to land (including the role of slavery, abolished in Brazil in 1859) a very large role in explaining high inequality in the 19th, and up until the mid-20th century. In recent decades, differences in quantity and quality of education as well as differences in returns to education for difference race, gender, and regional groups, played an increasing role in accounting for Brazilian inequality. The redistributive role of the state was, until the 1990s, rather small. Since the mid-1990s, inequality has been falling substantially in Brazil. The literature suggests that the following four factors contributed to this falling inequality: a rising redistributive role of the state (including the large conditional cash transfer programs such as bolsa familia), a substantial rise in the minimum wage (which took place during favorable overall economic conditions), an equalization in the levels and returns to education, and reduced labor market inequality by race and gender groups.

Further Readings:

Ferreira, F., S. Firpo, and J. Messina (2012): A More Level Playing Field? IRIBA Working Paper No. 12.

Cornia, Giovanni Andrea (2014): Falling Inequality in Latin America: Policy Changes and Lessons. Oxford University Press.

China

During Mao's reign (1949-1976), inequality in China was very low, due to collectivized agriculture, the absence of private property of land and other means of production, state-provided welfare, and a highly compressed remuneration system where effort and productivity played little role in compensation. When Deng Xiaoping introduced the economic reforms in the late 1970s, they actually maintained low inequality in two ways: first, the economic reforms started in rural areas, allowing farmers to sell surplus production on markets (and keep the proceeds); since the poorest lived there, they were the prime beneficiaries of the reforms. Secondly, access to land (from previously collective farms) was granted to the rural population on an essentially equal basis, thus leading to a very low land inequality at the start of the reform process. During 1978-1985, rural growth was very high, driving by these agricultural reforms, leader to massive poverty reduction in China (and in fact, the fastest episode of poverty reduction ever recorded globally). Since the mid-.1980s, economic reforms shifted towards the creation of a vibrant and export-oriented manufacturing

sector (including private, but also state-owned industrial companies). While this policy has been instrumental in ensuring and maintain high economic growth rates, it led to substantially rising inequality. Part of this is related to the emergence of massive regional inequality, with coastal areas and urban areas more generally benefitting much more from the manufacturing-based export boom; migration restrictions exacerbate this problem. As a result, poverty reduction has also slowed. After this massive increase in inequality between the mid-1980s and the early 2000s, it appears to have reached a high plateau, also related to efforts of the government to spread the benefits of export-led growth further inland (through infrastructure investments and targeted industrial policy),and the emergence of a basic safety net.

Further Readings:

Chen, Shaohua, and Martin Ravallion (2007): China's Uneven Progress in Poverty Reduction. Journal of Development Economics. Vol. 82(1): pp. 1-42.

Wan, G. (2009): Globalization and Regional Inequality in China. Review of Income and Wealth. Vol. 53(1): pp. 35-59.

India

India reached independence with a medium level of inequality. Inequality in access to land was substantial and also inequality by social groups was (and is) large. At the same time, rural-urban gaps were not substantial and the moderate levels of growth in a heavily state-controlled economy that prevailed from the 1950 to the 1980s did not lead to rising inequality. Moreover, heavy investment in agriculture (including the so-called Green Revolution where high-yielding seed varieties were spread in India) ensured substantial rural growth and kept in equality in check. Domestic economic liberalization began in the 1980s and was followed by international liberalization (i.e. trade liberalization, freeing up of the exchange rate). This has contributed to substantially rising growth rates, but also to rising inequality. This is related to rising rural-urban inequality, rising earnings differentials by education, rising wealth inequality, and continued high levels of social inequality. But inequality remains moderate given the continued importance of the rural economy, continued substantial state control of the economy including state social policies.

Further Readings:

Datt, Gaurav and Martin Ravallion (2002): Is India's Growth leaving the poor behind? Journal of Economic Perspectives. Vol.16(3): pp. 89-108.

Weisskopf, Thomas. (2011): Why worry about Inequality in the booming Indian Economy? Economic and Political Weekly. Vol. 46(47): pp. 41-51.

Datt, Gaurav and Martin Ravallion (2009): Has India's Economic Growth Become More Pro-Poor in the Wake of Economic Reforms? World Bank Policy Research Working Paper 5103.

Indonesia

Indonesia also had medium levels of inequality since independence. Inequality was partly driven by the inequality between Java, the main island, and the generally poorer outer islands. The autocratic Suharto government (1965-1998) drew substantial support from rural areas and in turn invested heavily in rural infrastructure, agriculture, and health and education. Also, rice prices were controlled to ensure affordable food supplies to the poor in urban areas while providing enough incentives for rural producers. During this time period, inequality remained stable or even fell while the economy was growing rapidly. Since the large economic crisis of the late 1990s and associated economic and political liberalization, inequality has been rising, more or less continuously. Among the factors contributing to this rise has been a massive commodity boom favoring coal and palm oil producers, highly regressive and very high fuel subsidies, rising inequality in the returns to education, and poorly targeted transfer programs.

Further Readings:

Miranti, Riyana. et al. (2013): Trends in Poverty and Inequality in Decentralising Indonesia. OECD Social, Employment and Migration Working Papers No. 148. OECD Publishing.

Timmer, P. (2007). A historical perspective to pro-poor growth in Indonesia. In Grimm, M. and S. Klasen (eds.) Determinants of Pro-Poor Growth: Analytical Issues and Findings from Country Cases. London Palgrave.

World Bank (2014): Indonesian Economy Quarterly, July 2014.

Yusuf, Arief A., Sumner Andy and Irlan A. Rum (2015): Twenty Years of Expenditure Inequality in Indonesia, 1993-2013. Bulletin of Indonesian Economic Studies. Vol. 50(2): 243-254.

Mexico

Similar to Brazil, Mexico also has had historically high levels of inequality, dating back to the colonial era. Land inequality was very high, although less so than in Brazil after the land redistribution associated with the Mexican revolution of the early 1900s. In addition, inequality was associated with high poverty and discrimination of indigenous population groups that are concentrated in the Southern part of the country. Two important influences on Mexico's economy are the proximity to the United States which offers opportunities for drade integration as well as migration and remittances. The other is that Mexico has been a major oil producer since the 1970s which increased rents to the state and contributed to the very low tax/GDP ratio and associated low redistribution by the state. In the 1990s, inequality rose (slightly) and factors that contributed to this rise were rising regional inequality (with the Southern parts of the country falling behind) as well as rising returns for education. Since the 2000s, inequality has declined and this has been related to the increase in supply of educated people (and associated declining educational inequality) as well as a sizable and rising redistribution through targeted state transfers.

Further Readings:

Campos-Vazquez, R., G. Esquivel, and N. Lustig (2014): The Rise and Fall of Income Inequality in Mexiko. In: Cornia, Giovanni Andrea, ed. *Falling inequality in Latin America: policy changes and lessons*. Oxford University Press.

Cruces, G., C. Garcia Domench, and L. Gasparini. (2014): Inequality in Education: Evidence for Latin America. In Cornia, Giovanni Andrea, ed. *Falling inequality in Latin America: policy changes and lessons*. Oxford University Press.

Villalobos, Carlos, Stephan Klasen, and Sebastian Vollmer. (2015): The Distribution Dynamics of Human Development: Mexico 1990-2010. Review of Income and Wealth (forthcoming).

South Africa

South Africa has the highest income inequality among Germany's GEP. Inequality is strongly linked to the *apartheid* system which generated substantial between-race inequality through preferential policies for whites and discrimination of the dominant black African population group. This included inequality in access to education, health, and employment, residential segregation and differences in access to services. Since the end of apartheid in 1994 and the move to democratic rule, inequality has increased slightly, but the nature of inequality changed. While inequality between race groups fell, inequality within race groups has risen sharply, ensuring slightly rising overall inequality. These trends are related to improved opportunities for better educated previously disadvantaged groups, while high unemployment and low growth ensured that poorer black Africans did not benefit much from reduced racial discrimination. Inequality in educational opportunities (esp. concerning quality of education) continue to be large, and labor earnings inequality is accordingly very high and a major driver of high income inequality. Redistribution by the state helps reduce inequality, but the scale of redistribution (as a share of GDP) remains relatively small and the redistributive effect of state policies has somewhat fallen.

Further Readings:

Leibbrandt, Murray, Eva Wegner, and Arden Finn (2011): The Policies for Reducing Inequality and Poverty in South Africa. SALDRU Working Paper No. 64. Cape Town: SALDRU.

Finn, Arden and Murray Leibbrandt (2014): Mobility and Inequality in the first three Waves of NIDS. SALDRU Working Paper No. 120. Cape Town: SALDRU.

Leibbrandt, Murray, Ingrid Woolard, Arden Finn, and Jonathan Argent (2010): Trends in South African Income Distribution and Poverty since the Fall of Apartheid. OECD Social, Employment and Migration Working Paper No. 101. Paris: OECD.

Milestone 2: Structural Causes and Consequences of Inequality

Stephan Klasen, Nathalie Scholl, Sophie Ochmann, and Sebastian Vollmer

Question 2.1: What is the interplay between growth, inequality, and poverty reduction?

The interplay of economic growth, inequality and poverty reduction has been and still is a hotly debated topic in the development literature. There are two aspects to this question. One is to consider how inequality affects the impact economic growth has on poverty reduction. This is discussed in this section. The other is the empirical relationship between inequality and growth. In that context, one can consider two causal directions: The impact of economic growth on inequality, a topic commonly referred to as the Kuznets Hypothesis, which we will briefly discuss below. And the reverse causality concerns the impact of initial inequality on subsequent growth, which is taken up as an answer to question 3 below.

How inequality affects the relationship between growth and poverty

The concept of growth elasticity of poverty is important for determining the relationship among inequality, poverty and growth. By measuring small changes in growth rates and incomes of the poor, the elasticity answers the question "By what percent does the poverty headcount change when economic growth is increased by 1 percent (holding inequality constant)?" Determining this relationship is useful for policy-makers as it determines the extent to which the poor benefit from overall economic growth; there have been a number of studies that have examined empirically the magnitude of the growth elasticity of poverty (e.g. Adams, 2005; Bresson, 2009) and many reports by donors and international agencies regularly report on the growth elasticity on poverty (e.g. World Bank, 1999).

Using cross-country data, Dollar and Kraay (2002) in their famous and much criticized study give evidence that, on average, the poorest quintile's income rises equiproportionately with the mean income. They further show this finding to be robust even when incorporating policies believed to specifically benefit the poor (such as public spending on human development) in the econometric analysis, thus concluding that growth is good for the poor. While it is uncontroversial that, on average, growth is leading to absolute poverty reduction, the importance of growth versus inequality change is hotly debated (e.g. Bourguignon, 2003; Bresson, 2009).

An early contribution of this debate was by Ravallion (2001) who studies poverty reduction by disaggregating its determinants into changes in average household income and changes in inequality. Using a panel household data set of approximately 50 developing countries, his findings are summarized in the table below:

Table 8: Categorizing changes in poverty

Table 1. *Diverse impacts on poverty underlie the fact that changes in inequality are uncorrelated with economic growth*[a]

		What is happening to average household income between the surveys?	
		Falling	Rising
What is happening to inequality between the surveys?	Rising	16% *of spells* Poverty is rising at a median rate of 14.3% per year	30% *of spells* Poverty is falling at a median rate of 1.3% per year
	Falling	26% *of spells* Poverty is rising at a median rate of 1.7% per year	27% *of spells* Poverty is falling at a median rate of 9.6% per year

[a] Based on 117 spells between two household surveys covering 47 developing countries in the 1980s and 1990s. Poverty is measured by the % of the population living below $1/day at 1993 Purchasing Power Parity. Inequality is measured by the Gini index.

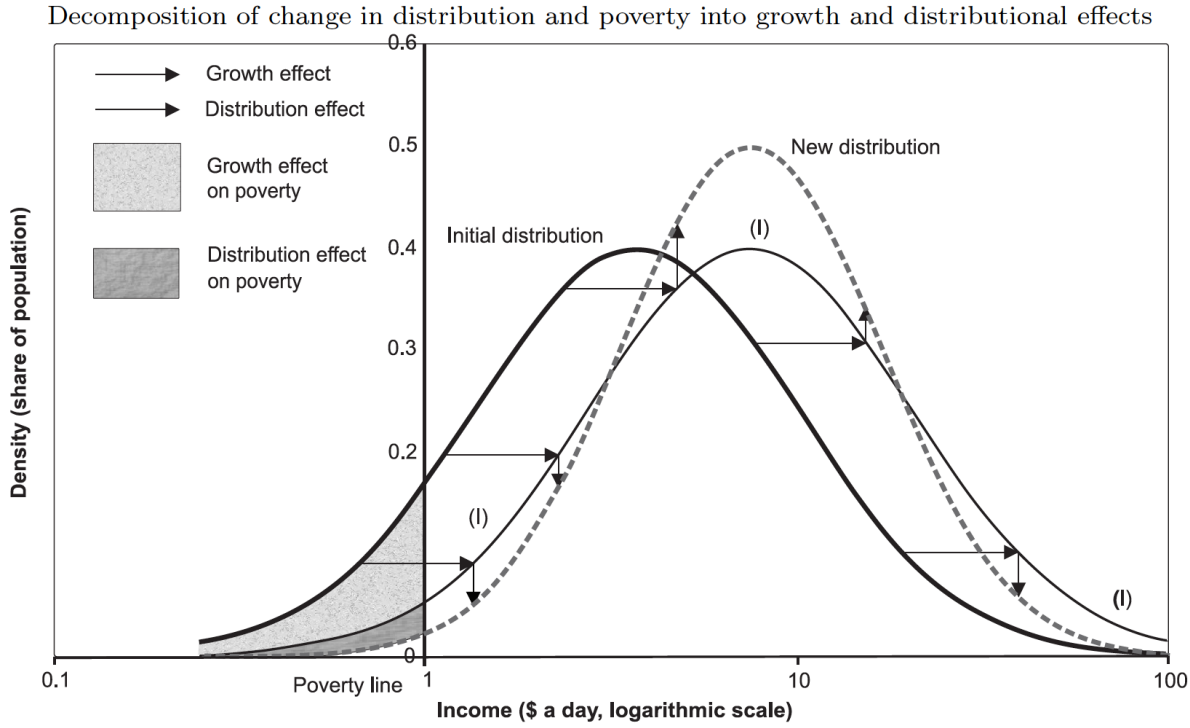
As can be seen, his empirical results are, on the one hand, in accord with Dollar and Kraay: A growing average household income has a positive correlation with poverty reduction and vice versa. The extent of this correlation however varies greatly, however, depending on whether inequality is decreasing (reducing the negative effect of a contracting average household income from a 14.3% (inequality rising) to a 1.7% poverty reduction (inequality falling)) or increasing (reducing the positive growth effect on poverty reduction from a 9.6% (inequality falling) to a 1.3% poverty decrease (inequality rising)).

Determining the relationships between inequality and growth as well as between growth and poverty reduction empirically brings about more statistical difficulties though. First, data availability remains limited (especially in low-income countries) due to the fact that inequality assessments require micro-level household data which are available in many low-income countries only at irregular intervals (and not available at all for some countries). Second, the heterogeneity in the measurement of indicators as well as individual country characteristics is the cause of diverging results in the literature. Solt (2009) discusses the limitations of the two mainly used datasets (Luxembourg Income Study (LIS) and Deininger and Squire 1996), for example the limited time frame (post 1993) and country selection (only 30 countries overall) of the former or the dissimilarity of measurement units across countries or even within countries over time of the latter.

Bourguignon (2003) argues that instead of studying the growth elasticity of poverty reduction empirically, it can be shown that there is a mathematical relationship linking growth, inequality levels and changes, and absolute poverty reduction. This relationship can be derived in a mathematically exact way under the assumption of a log-normal income distribution, which is a plausible approximation of the shape of income distributions across the world.[6] He develops a mathematical identity-relationship between inequality, economic growth and poverty reduction. He then differentiates between two effects that economic growth has on poverty: The *growth effect* changes all income proportionally with the distribution remaining unchanged (the horizontal shift to the right in the figure below) whereas the distributional effect is a change independent of mean income with some type of distribution occurring (change of shape from the grey curve to the dotted curve).

[6] Note that assuming a log-normal income distribution does not say anything about the extent of inequality. It just says that for each levels of inequality (measured by the Gini coefficient), there is a unique log-normal income distribution.

Figure 9: Poverty reduction decomposition



Source: Bourguignon (2003).

Bourguignon then can mathematically derive the growth elasticity of poverty reduction and he finds the following four key relationships: first, the higher economic growth, the larger absolute poverty reduction; second, if growth is accompanied by declining inequality, it will have a substantially larger impact on absolute poverty reduction (this can already be seen from the above figure. The new distribution has a higher mean income and lower inequality and both effects lower absolute poverty, shown in the shaded area on the right. Third, if growth effect on poverty (i.e. the growth elasticity of poverty reduction), is larger the lower is initial inequality. Thus initially more equal countries will reduce poverty faster with the same mean growth rate. Lastly, the growth elasticity of poverty reduction is larger the larger is mean income is in relation to the poverty line. Thus the growth elasticity will be larger in countries where mean incomes are far above the poverty line (i.e. in richer developing countries when the $1 a day poverty line is used). While these results are all derived mathematically using the log-normality assumption, Bourguignon also tests these results empirically and find that they fit the data very well. An important implication of his work is that one can essentially predict the impact growth will have on poverty depending on country characteristics. For example, the impact of growth on absolute poverty reduction will be smaller in many Sub-Saharan African countries as they have high initial levels of inequality and the ratio of mean income to the poverty line is low. So it is purely mathematics (rather than some kind of policy failure as often implied), when the low impact of growth on poverty reduction in Africa is lamented.

A weakness of the growth elasticity of poverty reduction is that it considers percentage changes, rather percentage point changes (e.g. a reduction of poverty from 50 to 40% is a 20%

reduction, but a 10 percentage point reduction). Policy-makers are generally interested in the percentage point reduction. Klasen and Misselhorn (2008) therefore extend Bourguignon's work by using *absolute* poverty measures, which is then called growth semi-elasticity of poverty reduction, i.e. "By how much percentage *points* does the poverty headcount change in response to a 1% increase in growth?" A further advantage of this method is that all data points can be used (when elasticities are calculated using "small" percentage changes, they lead to very large numbers, forcing Bourguignon to exclude countries where poverty rates are very small as well as countries with large changes in poverty). They find that again, higher growth, falling inequality, and lower initial inequality leads to higher percentage point poverty reduction; the impact of the relationship between mean incomes and the poverty line is, however, reversed now: Countries will have larger percentage point changes in the poverty line if the ratio of mean income to the poverty line is very low (i.e. very poor countries). This also illustrates another potential problem of the growth elasticity of poverty: it gives a possibly misleading impression of poverty reduction in poor countries: If, using the $1 a day line, Tanzania reduces its poverty from 50% to 40% as a result of 20% growth, this is 'only' a 20% reduction in poverty and a growth elasticity of 1 (but a 10 percentage point reduction, a semi-elasticity of 0.5); if Mexico reduces poverty from 5 to 2% as a result of 20% growth, this is a 60% reduction and a poverty elasticity of 3 (while the percentage point reduction is only 3 and the semi-elasticity only 0.15); using the growth elasticity gives the misleading impression that Mexico is 'better' at poverty reduction that Tanzania. In that sense, empirically estimating the growth elasticity of poverty has two problems: it is essentially estimating a mathematical identity that can be accurately predicted; and it is a misleading indicator to begin with. But apart from this, all studies confirm the empirical findings that growth, low initial inequality, and falling inequality all promote higher absolute poverty reduction.

The empirical impact of growth on inequality

While the above discussion focused on the impact of growth and inequality change on poverty reduction, an important empirical question is whether empirically growth is often associated with rising or falling inequality. This is question of the Kuznets Curve, the hypothesis proposed in 1955 by Simon Kuznets that, during the development process, inequality first increases and then falls. This is sometimes also called the inverse-U hypothesis. His empirical work was based on the experiences of the USA, the UK, and Germany. A number of mechanisms have been proposed for such a relationship. An important one is structural change. Poor countries are characterized by a large agricultural sector, a very small industrial sector, and a service sector focusing on low-productivity and often informal services. In the process of development, industrialization takes place which increases the size of the industrial sector with much higher productivity. This then leads to rising inequality (and a 'dualistic' structure of the economy) between the people in the very poor agricultural sector and the much richer workers in the industrial sector. As structural change proceeds, more people move to the industrial sector, productivity in agriculture and the service sector increases as well, so that the income differentials between the sectors fall again.

Other similar mechanisms for the inverse U hypothesis is initially high and then falling returns to capital, initially high and then falling returns to education, and demographic change

where initially only the rich reduce their family size, and later fertility reduction takes place throughout the income distribution.

Since the mid-1990s, when sufficient income distribution data became, there have been several studies that have examined whether such a relationship exists empirically. The answer has invariably been that no such relationship has been found in panel data that trace the development of inequality over the growth process (e.g. Deininger and Squire, 1998; Gruen and Klasen, 2003).[7] Also, no clear relationship has been found between structural change and the development of inequality. Thus is appears that one of the important mechanisms proposed by Kuznets does not seem to have a quantitatively sizable impact o n inequality.

More recent studies have tried to argue that the rising inequality in many fast-growing developing countries is related to the Kuznets curve (e.g. Besley and Cord, 2007), but these claims have not held up to closer scrutiny. It simply appears that there is no systematic relationship between economic growth and inequality: there are poor countries where economic growth is associated with falling as well as rising inequality, and there are richer countries where economic growth is associated with rising and falling inequality (e.g. Beegle et al., 2016). This is essentially good news, suggesting that there is scope for policy to influence whether growth is actually affecting inequality in one way or another. It also means that one can discuss issues of structural change and inequality development quite separately (Rodrik, MacMillan, and Verduzzo-Gallo, 2014). While it is clear that structural change is required for growth and development to take place and it worrying that structural change is proceeding very slowly in many low-income countries in Africa, such structural change need not increase inequality as feared by Kuznets, but can be managed in ways that ensures that inequality remains small. This issue is taken up below again.

Inequality in Non-Income Dimensions of Well-Being

Finally, the literature on non-income inequality has been growing recently as the multidimensionality of poverty has been recognized and researched more and more (also see the answer to Question 3 in the first milestone). Even though the income-poor are often education- or health-poor as well (for example), the correlation is by far not perfect and thus deserves mentioning. Grosse, Harttgen and Klasen (2008) develop the tool of non-income growth incidence curves (NIGIC) where they calculate the changes of non-income poverty (measures of education, health, nutrition and the composite welfare index) for (i) income-poor population quantiles (called "conditional NIGIC") and for (ii) non-income poor population quantiles (called "unconditional NIGIC"). This way, the effects of a changing (non-) income distribution can be analyzed. As the detail of household level data needed for this type of analysis is quite high, the authors so far could only present findings on a single country. Grimm et al. (2009), on the other hand, studied the human development index for each population quintile of income for a 32 countries data set.

[7] There have been studies that have shown that in a cross-sectional analysis (plotting income levels and inequality at a point in time), there appears to by an inverted U-Shape as posited by Kuznets. But this is not a test of the hypothesis which is about how inequality changes with growth in a country. For a discussion, see Deininger and Squire (1998), and Ray (1997).

Regarding the relationship between high mean achievements and inequality in human development, they found a significant negative correlation between having a high level of human development and a low inequality in human development. Partly this is related to the nature of these non-income achievements. Take education as an example: In a country where mean education levels are 4 years, there often tends to be a minority with very higher education (e.g. 12 years and above) and many with very poor education levels (e.g. less than 4 years), leading to high education al inequality. In a country where mean education levels are 12 years, inequality is likely to be much lower as those with the highest education will not have much more than 16 years of education and the majority of the population will have more than 8 years. The policy message is also clear then: Pushing up mean achievements in education and health is typically going to lower inequality in these human development indicators, as the best-off cannot improve much on their education and higher mean achievements can only be reached through improvements of the worse off. Of course, this still means that policy matters and can focus expansions of human development particularly on the worst off.

Question 2.2: What are the structural reasons for trends in inequality? Illustration using the country cases of Ethiopia, Honduras, Ghana, South Africa, and India

In this section we will focus exclusively on income inequality (although some arguments could also be extended to non-income inequality). To understand trends in inequality, it is useful to start a production function of household incomes, often also referred to as the primary (or market) income distribution. Household incomes are produced by using productive assets (land, labor, capital) that earn a return for being used for production.[8] For example, for an employee, the return of the labor asset is the wage; for a self-employed micro-entrepreneur, the return on the assets capital and labor are the sales of the produced goods (minus input costs). Thus critical for levels and trends in inequality is the amount of assets different groups of the population possess and the returns they get for these assets. If land, physical and human capital are very unequally distributed, household income will then also be unequally distributed. Such inequality can also be related to regional inequality in access to key assets (such as land or human capital). But also the returns on assets can differ between groups. If, for example, a household has poor access to infrastructure, the returns to even very productive land can be low if transport costs are high; this can be an important driver of regional inequality . Similarly, if households or individuals face discrimination in the labor or capital markets, the returns on their labor or capital may be lower than for non-discriminated groups. Also, structural change can affect inequality in returns. As a country industrializes the return to human capital in urban areas can increase a lot, while it may stay much lower in rural areas. Lastly, shocks can affect returns. Poor weather or low prices, or being victim of a crime can all lead to lower returns on one's productive assets.

While these factors largely determine the primary income distribution, the final income distribution can also be affected by the redistribution efforts of the state through taxes and transfers. In developed countries, the redistribution effort of the state is substantial, with

[8] See World Bank (1990, 1999) and Klasen (2004) for related discussions.

tax/GDP ratios often reaching 30% or more (e.g. Bourguignon, 2015). In developing countries, the redistribution effort is substantially more limited due to difficulties of levying and enforcing taxes, a large informal sector, the rural sector, etc. But still there is substantial scope for redistribution if expenditures are particularly pro-poor and the taxes that are levied are progressive (e.g. Cornia, 2013; Bourguignon, 2015).

Lastly, private transfers can and have played an increasing role in shaping the income distribution in developing countries. In particular, migrant remittances have grown dramatically as a source of income for many developing countries (UNDP, 2009). The impact on inequality will depend on which households are receiving a disproportionate amount of remittances. This will depend by country and is related to migrant costs, economic opportunities in home and receiving countries, and the like.

In sum, inequality change can come about as a result of the following factors:

- changes in the distribution of assets
- changes in the distribution of returns to assets
- changes in the redistribution by the state

This conceptual framework can also guide a policy framework to tackle inequality. Depending on the importance of these three structural causes of inequality, policy can either address the distribution of assets, chiefly through land reform policies (where land is still an important productive assets for a large share of the population), policies to promote education of the poor, and policies to increase access to capital for the poor. If returns to assets are the key drivers of inequality, policies to improve the functioning of markets for the poor (including infrastructure policies, improved access to inputs and technologies, credit policies, improved opportunities for migration, labor market policies) can play an important role. Lastly, policies can address the redistribution by the state through higher and broader taxation and pro-poor expenditure policies in health, education, and social protection.

We will now study changes in inequality in the different countries, also making reference to this conceptual framework.

ETHIOPIA

Inequality levels in Ethiopia have been very low, both on a global scale and in comparison to other Sub-Sahara African countries (e.g. Beegle et al., 2016, see Figure 10). When Mengistu and the Derg overthrew the feudal system of Emperor Haile Selassie in 1974, he implemented a socialist-military dictatorship that involved nationalization of land and restriction of migration; it led to a relatively equal distribution of assets, including access to land; other assets, such as education and capital did not play an important role in this extremely poor country. When Meles Zenawi ended the socialist regime in 1991 and oriented Ethiopian policies around market mechanisms and democracy, inequality levels jumped up dramatically, largely linked to rising inequality in the returns to assets (esp. land and human capital) which

now earned much higher returns in the more market-based economy. Since then inequality slowly decreased again, also related to increasing attention by the state to raise incomes of the poorest through transfers and investment in agriculture (see Figure 10, Cornia 2015).

Nevertheless, land is still in the hand of the government and distributed among farmers in the form of leases. As 84% of the population still lives in rural areas (quite a unique phenomenon worldwide), this relatively land distribution brought about by the Derg and still largely operational today has played a crucial role in keeping inequality levels low. Poverty rates in urban and rural areas are also quite similar which is mainly due to the Agricultural Development-Led Industrialization Program (ADLI) that was initiated in 2005 together with the IMF and the World Bank. As increases in agricultural output had been mainly caused by increasing the amount of land cultivated, the program was implemented to increase the use of modern inputs and improve infrastructure linkages between sectors.

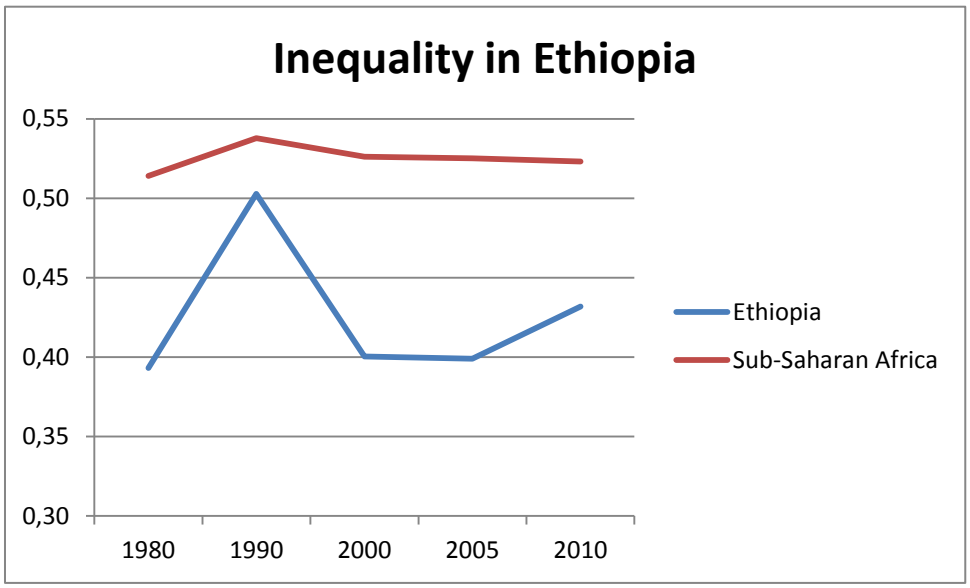
While this focus on agriculture has been one reason how the state has succeeded in keeping inequality levels relatively low, the state has also engaged in some forms of redistribution. Of particular note is Ethiopia's productive safety net program, a very large public works-based social protection program to ensure access to resources to the poorest and those hit by shocks.

High dependency ratios within households (many members being dependent on the income of the working members), female-headed households and household heads having little or no formal education are all predictors of low income in both urban and rural households. However, the variability of income is higher for rural households due to seasonal variations in environmental shocks and resulting risk-averse behavior. Since the splitting off of Eritrea in 1991/2, Ethiopia's landlocked status also contributes to relatively low levels of inequality (but also high levels of poverty) as the cost of exporting cash crops (e.g. coffee) has increased dramatically (Most exports are now shipped off via Djibouti's harbor), thereby hindering uneven income developments (Cash crop farmers would otherwise disproportionately benefit from agriculture in comparison to farmers growing crops for domestic use.). As a consequence, the majority of agricultural production solely serves Ethiopia's own national market and income from farming is still relatively independent from which crops are grown.

Nevertheless, inequality has been rising slowly over the past thirty years and is most likely to grow in the future. A decreasing contribution of agriculture to overall GDP and the rising importance of industry and especially services for overall GDP will lead to increasing urbanization and thus a rising rural-urban divide in income inequalities. Remittance levels are still negligibly small in Ethiopia (only 1.5% of GDP in 2008) but have been increasing dramatically since the turn of the century. As 40% of remittances are received by the top income quintile, these will also contribute to rising inequality levels in the near future.

To summarize: Ethiopia benefited from a relatively equal distribution of land, a key asset in this agrarian economy, and while the distribution of returns to assets have been rising and are likely to continue increasing also as structural change proceeds, a policy focus on promoting agriculture and also social safety net programs (including the large productive safety net program) have helped to check increases in inequality

Figure 10: Inequality Trends in Ethiopia



Source: Global Income and Consumption Database

HONDURAS

Honduras, a small Central American country, is notable not only for its relatively high level of inequality (also compared to the regional average in Latin America, see Figure 11), but also a further increase in inequality since the mid-1990s. Honduras is therefore an outlier in Latin America where inequality fell since the mid-1990s in most countries (Cornia et al. 2014).

Honduras is one of the poorest countries in Latin America. It is heavily dependent on its narrow base of exports (including primarily coffee and bananas) which is often grown on large plantations using landless laborers, and is highly vulnerable to natural disasters and shifts in commodity prices (World Bank 2006). As a result, Honduras is marked by a very high inequality in the distribution of assets, particularly land.

Among the shocks the economy is vulnerable to have been hurricane Mitch which devastated the country in 1998 and drastic swings in coffee prices over recent decades. Other factors that affect inequality in Honduras include: a rather poor education system with a relatively slow expansion of education in the past 20 years, particularly in rural areas which ensures that this key asset, human capital, also remains very unequally distributed (more so than in other Latin American countries); a rather strong segmentation of labor markets between a rural labor market that produces particularly cash crops for exports, and an urban non-tradable sector that includes a large service economy; relative small cash transfer programs that were instituted quite recently, and; an increasing role played by international remittances. Klasen et al. (2012, 2014) provide a detailed decomposition to understand the drivers of inequality. They first find that rising inequality has been primarily related to rising inequality in rural areas (see Figure

12 below). This higher inequality was linked to lower international prices for coffee and bananas that, combined with an overvalued exchange rate, led to much reduced export and thus labor earnings in the cash crop sector which affected particularly the poorest rural areas. Thus it was primarily shifts in the returns to assets in different sectors and regions that helps explain rising inequality there, with agriculture and rural areas more generally lagging behind and witnessing rising inequality. Capital inflows and remittances helped maintain this overvalued exchange rate which undermined the returns of poor workers in the rural sector. Low inter-sectoral mobility, also related to poor educational outcomes, exacerbated the plight of poor rural farmers and farmworkers. Between 2005 and 2007, inequality started to fall and poverty reduction increased, related to improving fortunes for the export sector (related to the international commodity boom), rising and more pro-poor remittances, and a substantial expansion of cash transfer programs. However, inequality remained stagnant after 2007 and poverty reduction , also linked to the ousting of the populist Zelaya government in 2009, which reversed some of the pro-poor policies.

Overall, the role of the state in affecting inequality has been very limited in Honduras. Education and health policies continue to generate very unequal outcomes, particularly between urban and rural areas, and the main form of redistribution has been the small cash transfer programs that were scaled up substantially under Zelaya and then reduced again subsequently.

To summarize, Honduras suffers from a high inequality in assets (esp. land, but also human capital), and highly unequal returns to these assets linked to poorly functioning markets, high variability due to weather shocks and commodity prices, and only small redistribution by the state.

Further Reading:

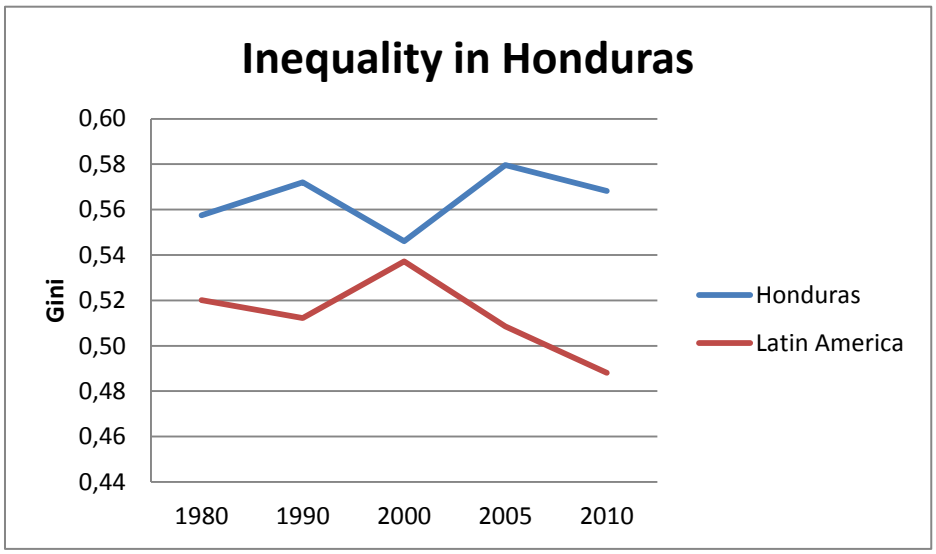
Cornia, G. A. (editor) 2014. Falling Inequality in Latin America. Oxford: Oxford University Press.

Klasen, S. T. Otter, and C. Villalobos. 2012. The dynamics of inequality change in a highly dualistic economy. UNU-WIDER Discussion Paper 2012/17.

Klasen, S. T. Otter, and C. Villalobos. 2014. The dynamics of inequality change in a highly dualistic economy. In Cornia, G. A. (editor) 2014. Falling Inequality in Latin America. Oxford: Oxford University Press

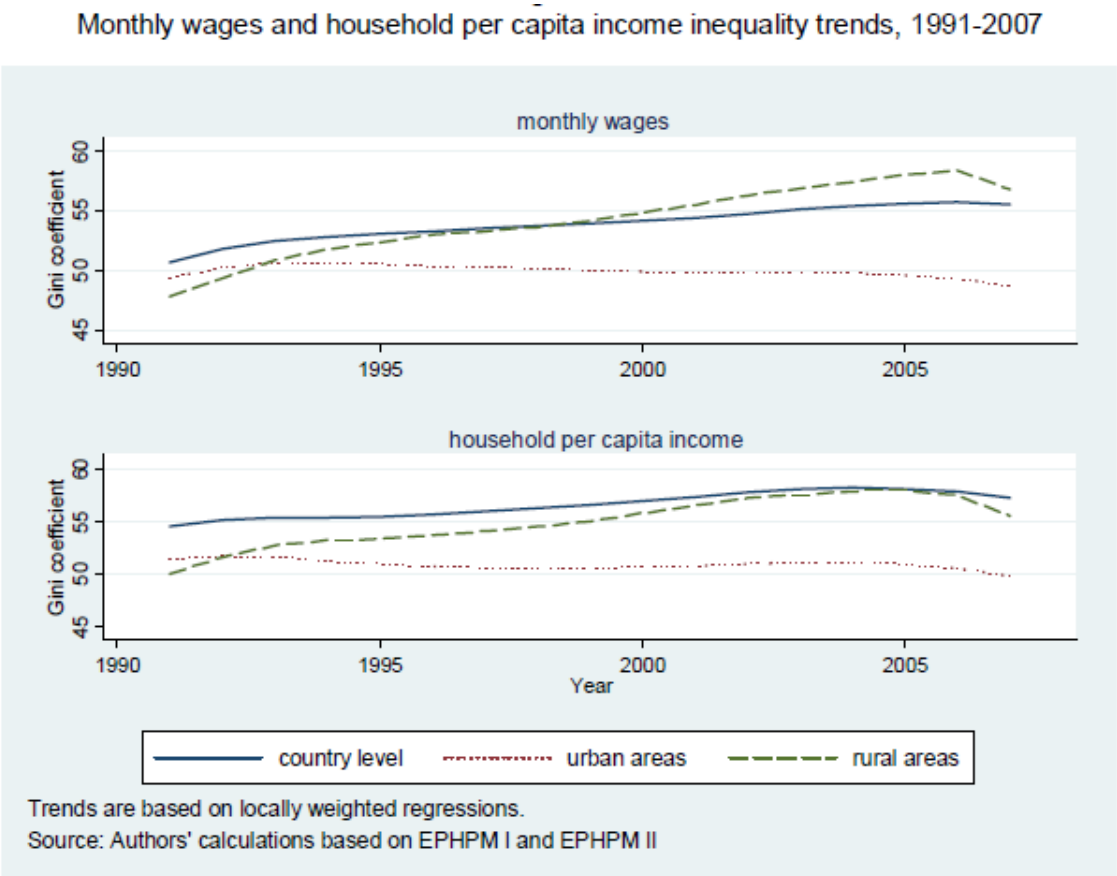
World Bank (2006). Honduras Poverty Assessment: Attaining Poverty Reduction. WB Report 35622-HN. Washington DC: The World Bank.

Figure 11: Inequality Trends in Honduras



Source: Global Income and Consumption Database

Figure 12: Trends in wage and per capita income inequality in Honduras, 1991-2007[9]



Source: Klasen, Otter and Villalobos (2012).

[9] Note that the databases for Figure 2 and 3 is slightly different so that the data are not fully comparable (but largely reflect similar trends). Figure 3 is based on a more detailed assessment of annual household surveys.

GHANA

Ghana's level of inequality is, in comparison to Ethiopia, quite high (Gini coefficient of 0,51 in 2010), similar to the Sub-Saharan average (see Figure 14) which can mostly be traced back to its geography as well as its colonial history. As is typical of many Western African countries, the differences in development levels of the Northern and Southern part of Ghana are quite pronounced (see Figure 13 below). While the Southern regions enjoy large physical resource endowments in the form of minerals, forests and a favorable climate as well as close proximity to the sea, the Northern regions are dominated by the Sahel with poorer land, less and erratic rainfalls while being far away from the sea; they thus earn much lower returns on their assets than households in the South. The British colonial policies exacerbated this "natural" inequality in resource endowment by focusing investments on infrastructure, cash crop production and mining in the South for exports. Simultaneously, the North of Ghana was gravely neglected not only for its unfavorable conditions for profitable economic activities but also for ensuring a cheap labor supply for the farms, mines and roads constructed in the country's South (Even today, Ghana has been characterized as a migrant economy with 35% of ethnic Northerners living in the South). Related to these policies, regional inequality in the distribution of human capital was another consequence.

After independence in 1957, the state pursued inward-looking, import-substitution policies which lead to a grave economic recession and concomitant political upheaval in the 1970s and early 1980s. Under pressure from, and with support of, the IMF and the World Bank, structural adjustment policies were implemented in the 1980s and 1990s which ended the economic crisis and set the country on a path of economic growth, fiscal discipline, macroeconomic stability and market reforms. Simultaneously, inequality in wage earnings increased dramatically, linked to freeing up of the economy where the most favored sectors and regions (cash crop agriculture, Southern region, educated workers) benefitted disproportionately (see also Figure 13). Thus again returns to assets became more unequal, this not only related to the geographic location but also due to human assets and type of economic activity.

The previously-described North-South differences are very comparable to the rural-urban divide in income. Ghana's South was industrializing and urbanizing around agglomerating port centers (the Greater Accra area contributes 20-30% to total GDP) while the country's North remained neglected. This is reflected in considerable differences in human development measures: In 2003, 70% of women from the North were uneducated, while it were only 10% in the South, men likewise obtained on average 1.7 years more education in the South. Furthermore, the under-5 mortality rate was 50% higher in the South.

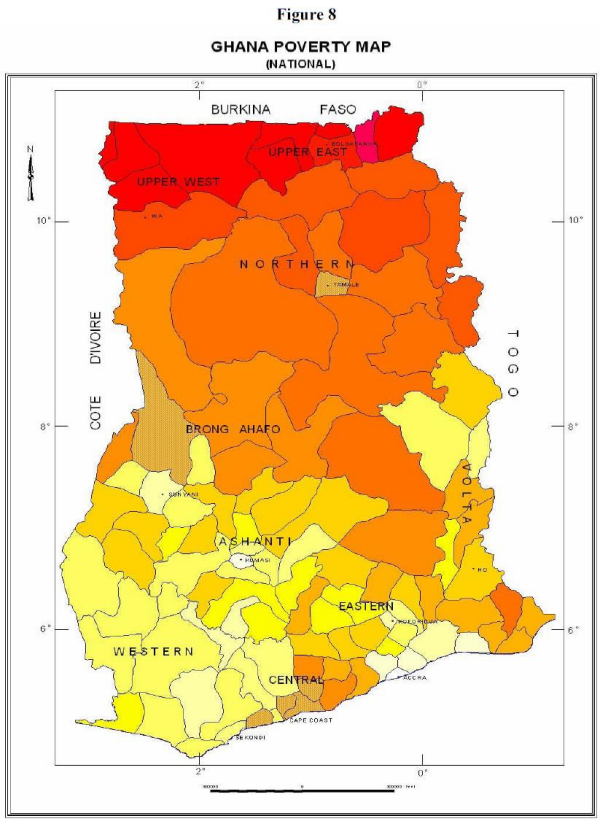
More inequality-enhancing developments have been non-farm earnings as well as remittances. While agricultural incomes are lower but more pro-poor (80% of total agricultural output is produced by smallholder subsistence farms in Ghana), non-farm earnings in rural areas have exacerbated inequality levels. Especially attractive for the wealthy and educated (the two entry barriers to earning non-farm income), wage employment has been on the rise in the last

decade. As these income sources are sensitive to location and distance to markets, once again the North-South divide is deepened.

Net remittances have likewise been an inequality-increasing source of income as it is mostly households at the top end of the income distribution receiving remittances. Especially internal remittances play an important role in deteriorating income equality (17.4% increase inequality as opposed to a 4% increase for international remittances). Until very recently, the state has played a negligible role in redistributing incomes but this role is slowly being enhanced in recent years, esp. due to greater state investment in health and education as well as the development of basic social protection policies. But overall, the redistributive role of the state is small, also circumscribed by a relatively low tax base.

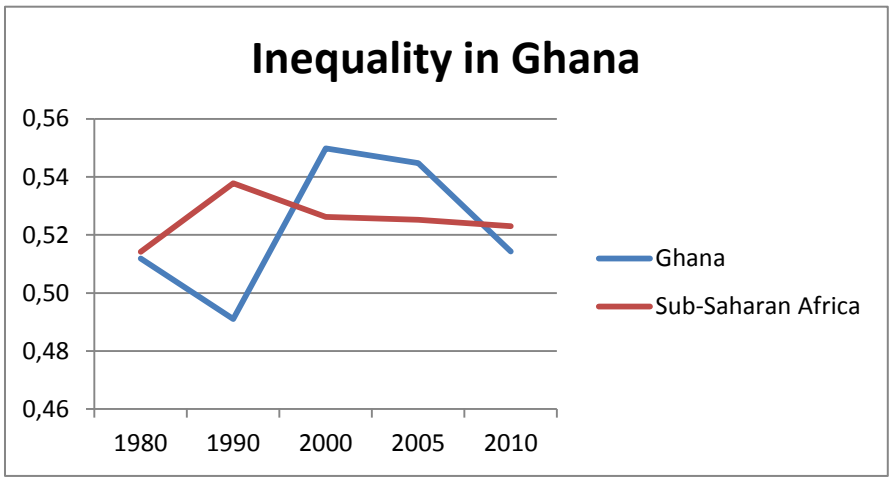
In summary, in Ghana inequality is to a substantial degree affected by large regional inequality in assets and returns to assets; market reforms have exacerbated these inequalities in returns and the state has, to date, only played a rather small role in reducing inequalities.

Figure 13: Spatial distribution of Poverty in Ghana



Source: Coulombe, Wodon 2007

Figure 14: Inequality trends in Ghana



Source: Global Consumption and Income Database

India

India reached, similar to other countries in South Asia, independence with a medium level of inequality. Inequality in access to land was substantial, with few larger famers and many farmers with very little land, and many landless laborers. Other assets (capital and human capital) were initially less relevant but have become more relevant recently. Some Indian states moved to lower land inequality through various land reform processes; most notable is the successful reduction in land inequality in West Bengal.

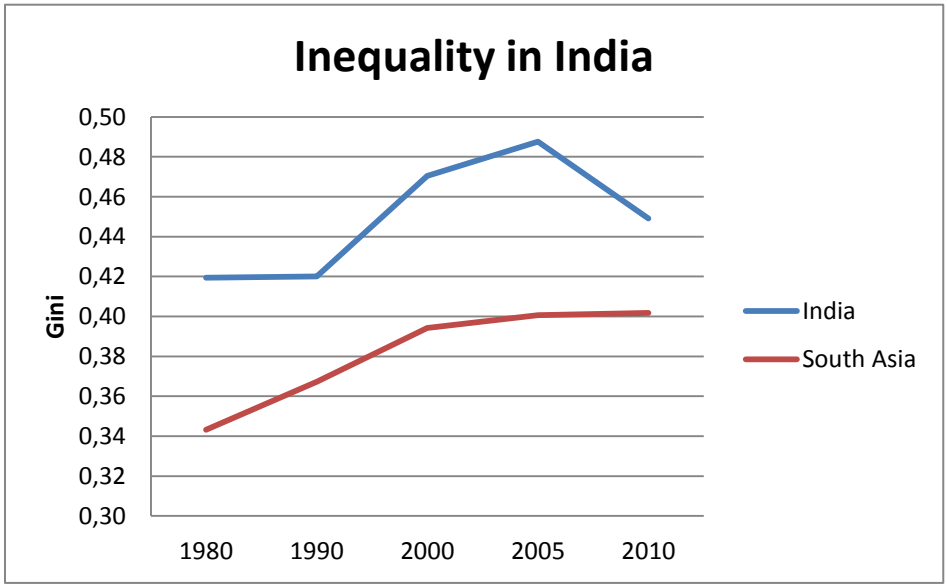
Moreover, inequality by social groups was (and is) large, leading to substantial differences in returns to assets by group; in particular members of so-called scheduled castes and scheduled tribes are typically much poorer and have less access to education and other services; long-standing quotas and affirmative action has only had a modest impact in addressing these deeply entrenched inequalities. India has performed extremely poorly in expanding access to human capital which has remained a very important source of asset inequality. There are also very large gender gaps in education which have been closing only very slowly, with the pace somewhat larger in the last 15 years.

At the same time, rural-urban gaps were not substantial and the moderate levels of growth in a heavily state-controlled economy that prevailed from the 1950 to the 1980s did not lead to rising inequality. Moreover, heavy investment in agriculture (including the so-called Green Revolution where high-yielding seed varieties were spread in India) as well as some land reforms (see above) ensured substantial rural growth, higher returns on assets there, and thus kept inequality in check. As a result, inequality in India in 1980 was still moderate, compared to other developing countries, but higher than the average in South Asia (see Figure 15).

Domestic economic liberalization began in the 1980s and was followed by international liberalization (i.e. trade liberalization, freeing up of the exchange rate) in the early 1990s (after a balance of payments crisis). This has contributed to substantially rising growth rates, but also to rising inequality. This is related to rising inequality in the returns to assets, most notably rising rural-urban inequality, rising earnings differentials by education. Asset inequality, in particular in wealth and human capital, as well as by social groups has remained substantial. But inequality remains moderate given the continued importance of the rural economy and pro-rural policies, continued substantial state control of the economy including state social policies that target poorer households, including an open-ended public works program (the National Rural Employment Guarantee Scheme) as well as health and nutrition programs. Lastly, educational inequality (certainly in terms of quantity of education) is finally falling, though differential in educational quality remain substantial with associated differential in returns.

In summary, inequality in assets are substantial in India (but still smaller than in some other developing regions) and have not become much more unequal. Returns to assets were not very unequal until market reforms in the 1980s and 1990s and have since become substantially more unequal. Considerable state involvement to promote agriculture and transfer resources to the poorest has somewhat moderated the rise in inequality in the last 20 years.

Figure 15: Inequality trends in India



Source: Global consumption and income database

Further Readings:

Datt, Gaurav and Martin Ravallion (2002): Is India's Growth leaving the poor behind? Journal of Economic Perspectives. Vol.16(3): pp. 89-108.

Weisskopf, Thomas. (2011): Why worry about Inequality in the booming Indian Economy? Economic and Political Weekly. Vol. 46(47): pp. 41-51.

Datt, Gaurav and Martin Ravallion (2009): Has India's Economic Growth Become More Pro-Poor in the Wake of Economic Reforms? World Bank Policy Research Working Paper 5103.

Dreze, J. and A. Sen. 2002. India: Development and Participation. Oxford: Oxford University Press.

South Africa

South Africa has among the highest income inequality among all developing countries, considerably higher also as the average in Sub-Saharan Africa (see Figure 16). Inequality is strongly linked to the *apartheid* system which generated substantial between-race inequality through preferential policies for whites and discrimination of the dominant black African population group. This included state-enforced inequality in access to education, health, and employment, strict residential segregation and associated differences in access to services. This led to huge racial disparity in assets and discriminatory labor and capital market policies as well as residential segregation also led to substantial racial differential in returns to assets. Lastly, the state did little to redistribute incomes between racial groups under apartheid.

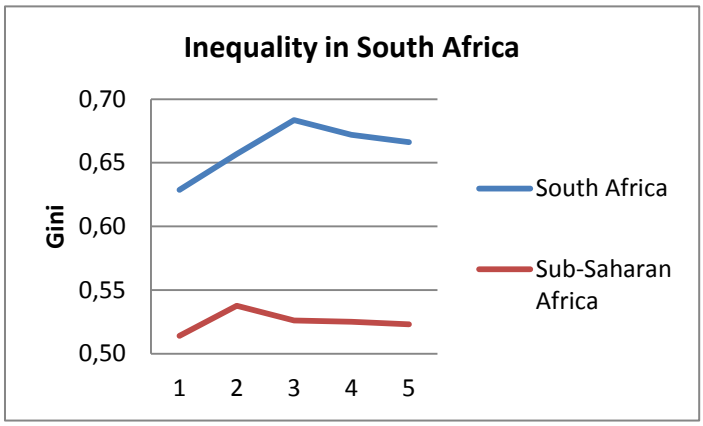
Since the end of apartheid in 1994 and the move to democratic rule, inequality has increased slightly, but the nature of inequality changed. While inequality between race groups fell, inequality within race groups has risen sharply, ensuring slightly rising overall inequality. Among the policies that lead to reduced between-race inequality have been efforts to reduce asset inequality through land reform and intensified investment in education of previously disadvantaged groups. Moreover, the lifting of apartheid era restrictions on labor markets and residential policies reduced the racial inequality in returns which were further affected by affirmative action policies.

While these policies reduced between-race inequality, they increased within-race inequality. In particular, they improved opportunities for better educated previously disadvantaged groups, while high unemployment and low growth ensured that poorer black Africans did not benefit much from reduced racial discrimination. Inequality in educational opportunities (esp. concerning quality of education) continue to be large (although smaller than before), and labor earnings inequality is accordingly very high and a major driver of high income inequality. Redistribution by the state helps reduce inequality, but the scale of redistribution

(as a share of GDP) remains relatively small and the redistributive effect of state policies has somewhat fallen over time.

In summary, while the previously massive inequality in assets between race groups has narrowed, rising within-race inequality has ensured that it remains very high. Similarly inequality in returns to assets within race groups has been rising, with better educated black Africans benefitting greatly from enhanced economic opportunities, and poorly educated rural Africans suffering from high unemployment, low earnings, poor market access, and poor quality education. Redistribution by the state has ameliorated this large inequality but not enough to reduce the very inequality of market incomes.

Figure 16: Inequality trends in South Africa



Source: Global consumption and income database

Further Readings:

Finn, Arden and Murray Leibbrandt (2014): Mobility and Inequality in the first three Waves of NIDS. SALDRU Working Paper No. 120. Cape Town: SALDRU.

Klasen, S. (1997). "Poverty, Inequality and Deprivation in South Africa: An Analysis of the 1993 SALDRU Survey," *Social Indicator Research* 41: 51-94.

Klasen S. (2002) "Social, Economic, and Environmental Limits for the Newly Enfranchised in South Africa?" *Economic Development and Cultural Change* 50:607-642 (2002).

Leibbrandt, Murray, Ingrid Woolard, Arden Finn, and Jonathan Argent (2010): Trends in South African Income Distribution and Poverty since the Fall of Apartheid. OECD Social, Employment and Migration Working Paper No. 101. Paris: OECD.

Leibbrandt, Murray, Eva Wegner, and Arden Finn (2011): The Policies for Reducing Inequality and Poverty in South Africa. SALDRU Working Paper No. 64. Cape Town: SALDRU.

Question 2.3: Which negative or positive effects result from inequality on social conflict, political stability, and economic incentives?

How does inequality influence economic growth? Theoretical channels

Does inequality only affect the welfare that a society can generate from a given amount of income or does the distribution of the income pie also have implications for the size of the pie itself? Following Voitchovsky (2009)[10], the theoretical channels of how inequality influences "the size of the pie", that is, income levels and their growth rates, can be broadly grouped into four types of arguments relating to different parts and aspects of the income distribution: (1) circumstances of the poor, (2) the overall distance between individuals, (3) wealth concentration, and (4) size and circumstances of the middle class. The arguments can also be grouped by topic, which is the second dimension along which we have structured the arguments. For several of the identified channels, strong institutions are important in shielding the economy from adverse effects of inequality, and inequality itself can play a role in weakening those institutions. That inequality and the quality of institutions are intimately related has been suggested by a number of studies, including those by Engerman and Sokoloff (2002), and Easterly (2007).

(1) Circumstances of the poor

Credit constraints

One of the arguments most frequently brought forward for why inequality can be bad for growth is that of missed opportunities for those at the bottom end of the distribution. Credit market imperfections are the basis for a number of such arguments. The idea is that the poor are subject to credit constraints, which leads to foregone investment opportunities, and hence foregone economic growth (e.g. Birdsall 2006, Ghatak and Jiang 2002). That better financial systems lead to higher economic growth is well established (for a review of the relevant literature, see Levine 2004). Beck, Demirgüc-Kunt, and Levine (2004) find that financial development also leads to lower inequality and poverty alleviation. Credit constraints for the poor are particularly detrimental if they hinder investments in education, which may lead to long-term economic opportunities foregone, and to intergenerational poverty traps (e.g. Galor and Zeira 1993, Piketty 1997, Grossmann 2008). Perotti (1996) finds empirical evidence in favor of this claim, but suggests that other channels may be more important to explain the negative impact of inequality on growth. Taking the idea further, a related argument is that of effort. Because the poor need to take up credit for most types of investment and part of the rate of return of their investment goes to the lender, they exert lower effort when pursuing their entrepreneurial goals and hence also have a lower probability of success. This is in turn again exacerbating the credit constraints due to higher interest rates and credit rationing because lenders anticipate this type of behavior. (e.g. Aghion and Bolton 1997, Grüner 2003). However, there is very little empirical evidence on the effects of credit on effort, the only

[10] David Castells-Quintana and Vicente Royuela (2014) as well as Erhart (2009) provide alternatives of structuring the different transmission channels between inequality and growth proposed in the literature.

study explicitly looking at the effort-credit-link being Grüner (2001) with a focus on the upper part of the distribution in the US.

Fertility

Another channel pertaining to the circumstances of the poor is Gary Becker's (1960) famous economic theory of fertility. Similar to the property crime argument, if wages are low at the bottom end, opportunity costs of having children are low. In the absence of a functioning social security pension system, parents have to rely on their family and children to take care of them at old ages. Additionally, if the expected labor market earnings of the child are low as well, it becomes more important to have several children to make sure there are enough means later on to provide for the elderly. Parents face a "quality-quantity trade-off" between the number of children and the amount of resources spent on each child, which can be the quality and quantity of education, extracurricular activities such as music and sports lessons, health services, housing, and so on. This demographic transition, or fertility transition, has become an important concept in explaining economic growth and human development (e.g. Ahituv 2001). Its effect on growth is twofold: On the one hand, a decrease in population growth implies a higher per capita capital stock as well as per capita income. On the other hand, investment in children's education also increases the human capital stock, which is crucial for economic growth. Finally, like most arguments pertaining to the circumstances of the poor, there is a self-reinforcing mechanism of a large unskilled labor force squeezing wages at the low end of the distribution, which lowers opportunity costs of children for the unskilled even more (e.g. Kremer and Chen 2002). Empirical analyses by Perotti (1996), Barro (2000), and de la Croix and Doepke (2003) support the fertility channel of inequality on growth.

Social cohesion, political stability, and civil unrest

A number of arguments can be subsumed under transmission channels related to political stability, social cohesion and civil unrest. These relate to almost all aspects of the income distribution: the circumstances of the poor, the overall distance between individuals, and the concentration of wealth.

Generally, higher socio-economic polarization has been shown to lead to higher income and wealth inequality (Mogues and Carter 2005). Ferroni, Maeto, and Payne (2007) explore the links between trust, inequality, and social cohesion in Latin America and find that social cohesion is positively linked to economic growth and growth-enhancing institutions in general, and negatively associated with inequality and low social capital in the form of trust. Generally, all studies on the topic agree that social capital and trust, social cohesion, political polarization, and inequality are simultaneously determined and reinforcing one another, making it a challenging task to pin down causalities of these broad concepts going in only one direction. More palpable aspects of social cohesion and political stability such as crime, political polarization, and lobbying, are easier to empirically capture and analyze.

From an economics of crime perspective, higher inequality leads to more crime. In particular, it makes (property) crime more attractive: on the one hand, there is a lower opportunity cost attached to it because the lower the wages, the less there is to gain at the bottom end of the distribution, and, on the other hand, there are higher expected gains because there is more to steal from the top end of the distribution (e.g. Chiu and Madden 1998, Josten 2003). Besides the foregone production of those committing crimes, one can think of further unfavorable consequences such as spending on unproductive protection mechanisms from the rich, and lower incentives for the overall population to engage in legal (as opposed to illegal) activities due to the higher risk of being robbed of the returns. This would again lead to higher crime rates, leading to a vicious cycle of higher crime and lower growth. Although there some cross-sectional (e.g. Kelly 2000) and longitudinal (e.g. Doyle et al. 1999) studies suggest that there is no association between inequality and property crime, a meta-analysis of existing time-series analyses on the effects of inequality on crime (Rufrancos et al. 2013) concludes that rising inequality, in particular at the bottom end of the distribution, is robustly associated with increasing property crime, thereby lending support to this theoretical channel. According to the authors, the lack of findings in some studies can be attributed to missing control variables and flaws in the empirical specifications. That crime and social capital are interconnected has been widely recognized in the literature, and several authors have found that crime adversely affects social capital (e.g. Messner, Baumer, and Rosenfeld 1999, Liska and Warner 1991), with further implications on economic growth and development. The same can be said about the overall distance between individuals:

(2) Distance between individuals

How far individuals or groups in a society are from each other in economic terms can have important repercussions on growth via the formation of social capital and trust. A large recent literature (most prominently by nobel-prize winner Elinor Ostrom (1990)) has established that social capital and trust can help overcome prisoner's dilemma-type situations and thereby increase overall cooperation within a society, which can have positive impacts on a wide range of outcomes, ranging from business transactions and technology adoption to improved health and education.

If very large, the distance between individuals can also have explicit negative consequences for growth via social unrest and the social political polarization of society (see e.g. Keefer and Knack 2002, Easterly 2001). A very polarized political landscape can have adverse macroeconomic consequences such as political stalemate for important policy reforms, political budget cycles, and increased uncertainty leading to a less favorable investment climate. Empirical evidence by Loaysa, Rigolini, and Llorente (2012) furthermore suggests that a large middle class has positive impacts on growth via improved quality of governance regarding democratic participation and official corruption.

(3) Wealth concentration

An unequal distribution of income with high "top" inequality can be detrimental to growth by making it easier for the elite to capture institutions and extract the economy in their favor (see

e.g. Glaeser Scheinkman and Shleifer 2002). In this case, economic inequality translates into political inequality, which again reinforces economic inequality. Weak institutions exacerbate this process by facilitating rent-seeking behavior in the form of corruption and lobbying. This makes economic reforms unlikely which are in the interest of the broader public, but not necessarily the elite (see e.g. Falkinger and Grossmann 2005). An example can be the provision of exceptions for the very rich in contributing to public goods and services such as health care and education. It is also detrimental to the process of democratization, thereby perpetuating the weak instutions – inequality – low growth link. For example, Girma and Shortland (2007) find that financial development is hindered by a rich elite in order to prevent their competitors from accessing funds. It should be noted that in the presence of credit market imperfections leading to borrowing constraints for the poor, wealthy citizens are be in a better position to lobby for their interests if even in the context of strong institutions (e.g. Esteban and Ray 2006, 1999).

Trickle-down effects

One of the most frequently used arguments in favor of having a more unequal distribution of wealth is that the rich can provide the savings necessary for making large investments. This was long considered an accepted arguments and goes back to models by Keynes and Kaldor. As the poor are too poor to save, aggregate savings will depend on the savings of richer income groups. If income are redistributed to these richer income groups, savings will rise, and with it investment and steady-state incomes.

Version of these arguments have found their way into various forms of 'trickle-down' theories. In the US, the so-called “trickle-down” economic policy is based on this idea. Tax cuts, which disproportionally benefit top income earners and businesses, would ultimately benefit the broad population. According to this theory, larger investments of top income earners in businesses and equity markets will create more jobs for people at the lower end of the income distribution and stimulate growth. Trickle-down economics assumes that a larger share of income allocated to the top, relative to the rest of the income distribution, causes economic growth. Aghion and Bolton (1997) have developed a model of economic growth and inequality, which includes a trickle-down effect of capital accumulation in the presence of imperfect capital markets. Nevertheless, even in their theoretical model, redistribution brings greater equality of opportunity and accelerates the trickle-down process. The theory of Galor and Moav (2004) predicts that inequality stimulates economic growth in the early stages of development and slows economic growth in later stages of development. In early stages of development, physical capital accumulation is the primary source of growth, and inequality channels resources toward individuals with a higher propensity to save. In later stages of development, human capital is the main engine of economic growth, and equality alleviates human capital accumulation and thus stimulates the growth process. Accordingly, inequality should have a negative effect on economic growth in high-income countries.

Lastly, even if the trickle-down effect is true in the sense that higher inequality would promote growth of the entire society, this would then be compatible still with a *negative* long-term correlation between growth and inequality if growth does indeed benefit the entire

society and make it more equitable in the long run (i.e. high inequality promotes growth which, in the long-run, reduces inequality).

(4) Size & circumstances of the middle class

Domestic demand

Domestic demand is a crucial factor determining economic growth, and is typically associated with a strong middle class, implying a (relatively) equal income distribution with relatively few poor (who cover their basic needs and do not demand technologically sophisticated products) and relatively few rich (who primarily demand luxury goods) (e.g. Zweimüller 2000, Foellmi and Zweimüller 2006, Murphy, Sleifer and Vishny 1989). Note that in this context, redistribution from the rich to the poor would be growth-enhancing since it boosts demand. The inequality – domestic demand – economic growth relationship should be stronger in countries with low external trade since these countries are more dependent on domestic demand. For a more detailed survey of the demand-side type of arguments, see Erhart (2009). Only very few empirical analyses have investigated this cannel, providing mixed evidence, which additionally is limited in scope. Weinhold and Nair-Reichert (2008) find that a large middle class leads to more innovative activity in the US. Keefer and Knack (2002) investigate the role of domestic demand by exploiting the model prediction that the demand effect should be higher in countries with low external trade and find that there is only a very small, and insignificant, positive impact of domestic demand on growth. Falkinger and Zweimüller (1997) on the other hand find that inequality is positively related to product diversity, and negatively related to economic growth.

Political economy

Another well-know channel of how inequality and growth are linked is the median voter theorem, and related political economy arguments. It again postulates a negative relationship between inequality and growth. Basically, the higher the inequality in a society, the lower is the income of the median voter and the higher his preference for redistribution, thereby lowering growth (e.g. Bertola 1993, Alesina and Rodrik 1994, Perotti 1993). Underlying this logic is the notion that redistribution causes the well-established incentive problem of (income) taxation. Redistribution reduces incentives for well-off people (those who pay more than they receive) to generate additional income, thus causing economic growth to slow down. Naturally, this channel would only work in democracies, which is also one reason for distinguishing between democratic and non-democratic countries in empirical analyses. It should be noted that the median voter theorem has been challenged not only on empirical grounds (e.g., Perotti 1996, Milanovic 2000), but also theoretically. For example, Bénabou (2000, 2002) argues that if the rich have more political power than the poor, they may lobby against redistribution measures, even if these may be efficient. That the effect of redistribution on growth crucially hinges on the kind of taxation used for redistribution has been recognized by others as well. Proponents of the Scandinavian type welfare state argue that redistribution influences levels of social inclusion of the less privileged (for example, through education) and enables society as a whole to benefit from their talents. In particular, public investment in

health and education (Easterly 2007) and taxes on activities involving negative externalities (such as excessive risk-taking in financial markets) (Stiglitz 2012) can be considered growth-enhancing (IMF 2014). A good overview of earlier literature on inequality and public spending can be found in Osberg, Smeeding and Swabish (2004). Questioning the proposed inequality-redistribution-growth link more fundamentally, Saint-Paul and Verdier (1996) find that it is not necessarily true that more unequal societies redistribute more, and hence the observed negative correlation between inequality and growth is not because of redistribution. One of the few studies examining inequality, redistribution, and growth simultaneously, a recent report by the IMF (2014) challenges this proposition using newer data and finds that higher inequality is indeed associated with more redistribution, but concludes that redistribution nevertheless is not harmful for growth. Quite to the contrary, it leads to both higher growth and a longer duration of growth spells. Notwithstanding, one should keep in mind the peculiarities of the underlying data and the fact that the overall literature is far from conclusive about the overall effects of the inequality-redistribution channel on economic growth.

How does inequality influence economic growth? Empirical evidence from reduced-form estimations

The following overview of the empirical evidence on the effect of economic inequality on economic growth is largely based on Herzer and Vollmer (2012) and Herzer and Vollmer (2013). Another recent literature review is Neves and Silva (2014). The empirical literature on the relationship between inequality and growth is large, and there is no consensus on the question of whether inequality affects growth positively, negatively, or at all.

A pattern appears with regard to the data used for empirical analyses: While cross-sectional studies mostly find that inequality is growth-enhancing, with the emergence of newer panel data, this finding seems to shift in the opposite directions and more and more papers come to the conclusion that lower inequality is more conducive to growth. Panel studies which account for the fact that inequality is an endogeneous variable again come to the conclusion that inequality is harmful for growth.

Alesina and Rodrik (1994) argue that in societies in which large fractions of the population do not have access to the productive resources, there will be a large demand for redistribution. This redistributive conflict impedes economic growth. Empirically, they find that inequality in land and income ownership is negatively correlated with subsequent economic growth. Galor and Moav (2004) study the impact of inequality on the development process in the long run. In their model, inequality stimulates economic growth in the early stages of development, when physical capital accumulation is the primary source of growth, because it channels resources towards individuals with a higher propensity to save. In later stages of development, when human capital is the main engine of economic growth, this effect is reversed. Equality alleviates human capital accumulation and thus stimulates the growth process. Chambers and Krause (2010) empirically test this model and find that the data overall support the hypotheses of Galor and Moav.

Persson and Tabellini (1994) conclude that inequality is harmful for growth. In their model, political decisions produce economic policies that tax investment and growth-promoting activities in order to redistribute income. They confirm their theoretical predictions with historical panel data and postwar cross-sectional data, but they only find a negative correlation between inequality and growth in democracies. Clarke (1995) finds the same overall correlation, but in his paper it also holds for non-democracies. Deininger and Squire (1998) find a negative correlation between initial asset (land) inequality and long-run growth. Further, they find that inequality reduces income growth for the poor, but not for the wealthy.

Perotti (1996) also finds a negative association between inequality and growth. Although he finds some evidence that this association is stronger in democracies, he concludes that this finding is not very robust towards alternative specifications. Moreover, Perotti (1996) tries to shed some light into the specific channels through which inequality affects growth. He finds that more equal societies have lower fertility rates and higher rates of investment in education. More unequal societies tend to be politically and socially unstable.

Thus this confirms that cross-sectional studies generally find a negative effect of initial inequality n subsequent economic growth and development. Thus, for example, East Asian countries benefited greatly for their lower inequality in the 1960s, while Latin America was adversely affected by its high inequality then. These cross-sectional results can be viewed with caution for two reasons. First, they may present biased estimates in the sense that other unmeasured factors that are associated with both inequality and growth are wrongly attributed as an effect of inequality. For example, East Asia's experience might be related to some unmeasured cultural traits that caused both low inequality and high growth, but it was not the low inequality that caused the high growth. Second, from a policy perspective, it is more useful to learn what happens to growth if inequality changes in a country. For example, the South African policy-maker will want to know what happens to growth if South Africa lowers inequality; in that context, knowing that South Africa would have grown faster if it had has South Korea's inequality in the past is not very useful information. Panel data are able to address both of these problems. But they also suffer another short-coming. Many of the theoretical effects are likely to have an impact over long periods of time. Short-run panels that consider 5 or 10 year periods might be too short to pick up these effects.

Barro (2000) studies a panel of countries and finds little overall relationship between income inequality and growth. According to his paper, higher inequality tends to slow growth in poor countries and encourage it in rich countries. Forbes (2000) also studies a panel data set and finds that in the short and medium term, an increase in a country’s level of income inequality has a significant positive relationship to subsequent economic growth.

Banerjee and Duflo (2003) criticize Forbes (2000) and argue that the growth rate is an inverted U-shaped function of net changes in inequality. They further show how this non-linearity can explain the different findings in previous studies. However, their paper has little to say on the fundamental question of whether inequality is bad for growth. Knowles (2005) argues that most evidence on the growth and inequality relationship is derived from inequality data which are not fully comparable, and that a negative correlation between income

inequality and growth is not robust towards consistently measured income inequality. Voitchovsky (2005) points out that for the countries in the Luxembourg Income Study, inequality at the top end of the distribution is positively correlated with growth, while inequality at the bottom of the distribution is negatively correlated with subsequent growth.

Scholl, Klasen and Vollmer (2015) re-examine the data and approach of Forbes (2000) using an expanded and updated panel data set, including improved data on inequality. They find a small positive effect of inequality on growth which is, however, entirely due to a positive and non-robust effect of inequality on growth in transition countries in the 1990s and 2000s.

Herzer and Vollmer (2012) study the long-run relationship between inequality and growth in a panel of countries using panel cointegration techniques, which account for the fact that inequality is an endogenous variable. They conclude that inequality is harmful for growth and that the effect is quite sizeable.

In a recent empirical paper, Andrews, Jencks, & Leigh (2011) test the "trickle-down" hypothesis. They use unbalanced panel data for twelve developed countries and find that after 1960, a one-percentage-point rise in the top decile's income share is associated with a 0.12-point rise in GDP growth in the following year—a small effect. It would take 13 years for the growth effect to offset the bottom nine deciles' loss in their income share. Nevertheless, the result confirms the hypothesis that inequality in the form of larger shares for the top of the income distribution is good for growth.

Their fixed-effects specification however does not take into account that top income shares are plausibly both exogenous and endogenous to economic growth. Thus, their estimates are quite likely to be biased. Herzer and Vollmer (2013) employ heterogeneous panel cointegration techniques, which are robust to omitted variables, slope heterogeneity, and endogenous regressors, to examine the long-run effect of top income shares on income per capita and thus long-run growth. They find for a panel of nine high-income countries that the effect of an increase in top income shares on economic growth is negative, and, moreover, that causality indeed runs in both directions, not only from top income shares to growth, but also from growth to top income shares. Hence, not only is there no evidence for a trickle-down effect, but in fact, top inequality seems to slow down overall growth.

In short, the evidence on the empirical impact of inequality on growth is mixed and remains controversial. While cross-sectional and some panel studies suggest a negative effect, others find no or a slight positive effect. One way to interpret these findings is that societies would benefit from low levels of inequality, but that reducing inequality to low levels is not easy and will not generate growth benefits quickly. Another way to interpret these findings is that the ways inequality has changed in different countries over recent years cannot be easily compared and it may well be that some forms of inequality change are associated with lower growth while others are with higher growth. One policy message would then be that society should at least be concerned about preventing inequality from rising as this will harm growth and make it more difficult to reap the long-term benefits of lower inequality.

Question 2.4: What method and criteria can be used to assess the contribution of German aid on inequality?

The conceptual framework that was used in question 2 can be brought to bear on assessing the impact of German aid on income inequality in partner countries. There it was argued that inequality depends on level and trends in the inequality of assets, levels and trends in the inequality in returns on assets, the impact of the state redistribution system (taxes and transfers) and the impact of private transfers (mostly remittances). At the same time, aid policies can also affect non-income inequality, e.g. inequality in education, health, or access to services. Such a focus on reducing non-income dimensions of inequality has two benefits. One is that reducing these inequalities is intrinsically valuable and an end in itself. If health or education inequality is reduced, this can be a powerful way to have greater equality of opportunities. The other is that reducing inequality in education and health can also serve to lower income inequality as health and education are, as argued above, key human assets that affect the distribution of incomes.

One should note that changing inequality in a country does not depend on small marginal interventions, but requires substantial changes in the economic structure and the structure of assets and returns. As a result, the contribution of aid of one bilateral donor such as Germany on affecting the income distribution of a country is bound to be rather limited. This is particularly the case if the intervention is primarily a financial transfer or investment to affect assets, returns, or redistribution by the state. Realistically, the impact of such project or program spending by a single bilateral is likely to be very modest as it represents a small share of aggregate spending. Of course, technical assistance that helps change the overall policy environment of a government towards a more inequality-reducing direction can, in principle have larger effects though these will be very hard to demonstrate in practice.

Following from this discussion, the contribution of aid can nevertheless be assessed to what extent it directly targets these drives of income and non-income inequality. As argued, however, in Klasen (2004), it may also be the case that an aid project or program does not target disadvantaged groups directly, but they will benefit indirectly. This can happen if a program for example leads to higher tax revenues and this allows for adequate funding for pro-poor expenditures. Or if a program promotes labor-intensive manufacturing employment and poor rural people then migrate to those jobs.

As a result the following stepwise approach to considering the contribution of German development cooperation to inequality in a particular country is proposed:

a) Situation analysis: It is critical to first understand which are the substantial drivers of inequality. This can be very country-specific. For example, in some rural societies land inequality can be the key driver of inequality; in others it is human capital, in others it is discrimination of particular groups that leads to lower returns on their assets; it can also be poor infrastructure leading to low returns on assets for remote groups. Thus the situation analysis, which could be seen as similar to Rodrik's proposal for a 'growth diagnostics' (Hausman, Rodrik, and Velasco, 2005) and may be called an 'inequality diagnostics', which

tries to identify the key binding constraints to lowering inequality in income and non-income dimensions: with reference to the case studies discussed above, we illustrate this for one case: In the case of Honduras, land inequality is an important and as a consequence, support for a land reform that increases access to land for landless laborers could be one way to reduce inequality. Similarly, investments in the education of the poor would also help reduce asset inequality. But inequalities in returns to assets play an important role as well, particularly related to low inter-sectoral mobility and poor infrastructure. Investments in infrastructure in rural areas or training programs that promote employment opportunities for poor rural dwellers in cities might be ways to reduce the inequality in returns. Lastly, government redistribution is currently low and interventions might include an expansion (in size, coverage, and scope) of social protection programs (e.g. scaling-up conditional cash transfer programs). Of course ways to increase tax revenues and ensure high progressivity of the tax system (for example by improving tax administration, clamping down on capital flight, improving taxation of large companies) could be supportive for improved redistribution. This gives a menu of possible interventions that can then be considered more carefully.

b) Identifying the target of the intervention: As a next step, it would be critical to then clearly identify the aim of the particular project and program, using the framework discussed above. The following questions might be useful in this regard:

1) How is the program trying to address inequality: By improving the asset base of the poor? By improving the returns to assets of the poor? By strengthening the incomes of the middle classes (while ensuring that the poor at least do not lose out)? By redistributing from rich to poor and/or middle-income groups?
2) Is the project/program trying to improve the assets of the targeted group? Which assets are targeted? Are the groups targeted actually appropriately?
3) Is the project/program trying to improve the returns on assets of the targeted groups? What constraint to returns is being addressed (e.g. discrimination, access to technologies, infrastructure, mobility)? What is the proposed mechanism how the project/program will actually improve the returns on assets of the targeted group?
4) Is there an indirect mechanism how the targeted group can benefit through the intervention? Will it, for example, raise tax revenues and thus allow more pro-poor expenditures? Will it provide other indirect opportunities, such as opportunities for migration to new jobs? What is the mechanism for them to benefit and is there credible evidence for this mechanism to work, e.g. is it likely that the program will increase tax revenues and that pro-poor expenditures will increase as a result?
5) Is the project/program trying to improve the redistributive capacity of the state? If so, is it trying to improve the level and/or progressivity of revenues, e.g. by improving tax collection from the rich? Is it enhancing and improving the targeting of pro-poor expenditures? Is it ensuring that state benefits are redirected from the rich to the poor?
6) Is the program facilitating private transfers (esp. national and international remittances) to the targeted groups? How exactly is it achieving this?

Of course, one cannot look at the particular program and intervention in isolation of overall government policy, particularly since the individual intervention can only have a modest impact on inequality. Thus it will be important, starting already in the situation analysis, to examine the overall thrust of current government policies affecting redistribution. If a government is already dedicated to an agenda of trying to tackle inequalities, it may be easier to link into this agenda. If, however, the government is not pursuing such an objective, it might be better to focus first on a political and policy dialogue on the role of inequality and the ability of policy to affect, rather than focus on an isolated intervention that does not fit well into the government's overall policy framework and, as an isolated intervention may then not achieve very much.

Another way to examine this is to consider an individual aid project and examine how it can have an impact on inequality. We will consider two examples, an infrastructure project focusing on rural roads, as well as a technical assistance project focusing on decentralization. Following the framework discussed above, it is first important to assess whether the two projects are actually addressing a binding constraint affecting inequality. In the case of the rural roads projects the question to ask would be whether poor access to markets is an important driver of inequality as it lowers incomes of people in remote areas. In the case of the decentralization project, the question would be whether regional inequality is a major driver of overall inequality. The next step would then be to identify the target of the intervention and go through the questions discussed above. In the case of the rural roads projects, it would be important to ensure that the roads are being planned exactly in those areas where remoteness has been found to be a driver of low incomes and thus higher inequality. One would also have to examine what is the precise mechanism for the low returns to assets in those areas. Is it mainly high transport costs or large price gaps (e.g. a low ratio of farmgate prices to wholesale prices in the capital, and a high ratio of retail prices to wholesale prices in the capital)? Is there evidence for low competition on the input or output side? What is the estimated reduction in transport costs associated with the new road? Will the rural road affect inequality in other ways, e.g. by facilitation migration? In the case of the decentralisation project, it would also be critical to assess the main reasons for high regional inequality. Is it related to the lack of an adequate fiscal redistribution mechanism targeting poorer regions? Is it due to low local revenue-raising capacity? Is it due to capacity gaps in designing and implementing pro-poor policies in poorer regions? Is the project addressing the identified mechanism, i.e. addressing inter-governmental transfers and/or local capacity? What are other ways how this project can affect inequality, e.g. through elite capture of local authorities?

Of course, the precise questions to ask will depend on the intervention, but this is meant to provide an idea of how one can begin to examine the potential impact of an intervention on inequality.

Further Readings:

Hausman, R. D. Rodrik. and A. Velasco. 2005. *Growth Diagnostics*. Washington DC: Inter-American Development Bank.

Klasen, S. (2004) “In Search of the Holy Grail: How to Achieve Pro Poor Growth?” In: Tungodden, B., N. Stern, and I. Kolstad (Eds.*). Toward Pro Poor Policies-Aid, Institutions, and Globalization*. New York: Oxford University Press (2004), S. 63-94. Reprinted in Krakowski, M. (ed.) Attacking Poverty: What makes Growth Pro-Poor? HWWA Studies 75, Hamburg: Nomos (2004)

Milestone 3: Potential Starting Points for Development Cooperation; Short- and Medium-Term Policy Recommendations

Stephan Klasen

Question 3.1: What policy instruments exist for fighting within-country inequality?

The number of possible policy instruments to fight income inequality is, in principle, vast. At the same time, they depend in important ways on the stage of development a country is in as well as political economy issues. In keeping with the conceptual framework discussed in previous parts of this paper (see Milestone 2, question 2), it is important to discuss the potential to affect the asset distribution, returns on assets, as well as redistribution by the state. In addition, apart from considering the impact of policies that directly target inequality-reduction, one also has to consider policies in other areas (e.g. macroeconomic, trade, and sectoral policies) that might also have an important impact on inequality.

It is also important to distinguish between countries when discussing different policy options. In low income countries land is a critical productive asset, poor returns to assets a particular challenge for remote rural areas, and the potential for redistribution via progressive taxation is limited. In contrast, in middle-income countries, education and health are likely to be the key productive assets so that good access to education and health by the poor is going to be critical. Labor markets as well as opportunities for productive self-employment will have a large influence on returns to assets. Lastly, the opportunities for redistribution by the state through taxation and transfer programs are substantially larger.

Following this classification, Table 9 summarizes research findings as well as policy implications for particular policies to reduce inequality. While policies to address asset inequality, returns to assets, and the redistribution by the state are largely self-explanatory, it is important to point out that other policies can also have important distributional implications. In particular, macroeconomic policies can have sizable distributional implications. For example, there is a large literature that has demonstrated that high inflation is anti-poor, that large fiscal deficits eventually lead to anti-poor spending cuts, and that overvalued exchange rates mainly benefit rich consumers at the expense of poorer producers (esp. in agriculture, see Klasen, 2004). Thus it is important that the overall policy framework supports inequality reduction, not just the policies targeting inequality directly. Of course, this would also apply for aid programs in support of the overall policy framework.

There are also international dimensions to such a policy framework. Table 9 highlights a few of them. In particular, international agreements in the area of tax evasion of individuals and tax avoidance of multinational companies can significantly support an inequality-reduction agenda of developing countries who are struggling with capital flight and tax avoidance. Similarly, support for the management of capital flows as well as further measures to open up markets of rich countries to exports of agricultural goods and services produced from poorer segments of the population can help support an inequality-reduction agenda.

An important question that arises from the list of policies is whether one can devise a clear list of priority interventions. This is quite difficult to do in general and will depend very much on the country context. Thus a first step towards prioritizing policies is to do, as suggested already in Milestone 2 (question 4), a situation analysis of the key drivers of inequality in a particular country, using the conceptual framework proposed here, i.e. investigating the importance of different types of asset inequalities, inequalities in the returns to assets, and the differential redistribution by the state. If in a country, agriculture is still an important sector and land inequality is substantial, land reform policies as well as agricultural policies should receive high priority. In a more urban society where education is highly unequal, policies focusing on improving educational access and quality among the poor should be a priority.

Table 9: Policies with direct and indirect impact on inequality

Policy Issue	**Research finding**	**Policy implication**
Tackling asset inequality		
Land Reform	Land inequality an important driver of asset inequality in many low-income and lower middle-income countries with large agricultural sectors. Insecure tenure can reduce investments of the poor	Land reform with redistribution component an important policy-lever. Tenure reform should focus on improving tenure security for current users.
Education and health policies	Pro-poor education and health policies can reduce inequality in human capital and promote economic growth; educational inequality important driver of overall inequality	Focus public health and education expenditures on basic education and health care, enable the poor to access higher education and health (though loans, and insurance schemes, respectively)
Credit policies	Lack of access to capital a significant constraint for the poor to invest; capital markets do not work for them and many microcredit schemes bypass the poorest and/or lead to high indebtedness;	Support microcredit institutions that reach the poorest and provide sustainable credit (usually with subsidy element)
Gender policy	Gender inequality exacerbates income inequality via educational inequalities, health inequalities, inequalities in access to financial services, etc. which in turn reduces growth and pro-poor growth.	Thus, promoting female education, employment and access to health care (also to constrain fertility) will decrease gender inequality and thus promote more equality in income.
Improving returns to asset for the poor		
Infrastructure	Rural infrastructure can improve the functioning of agricultural input and output markets	Promote the construction of rural roads and associated market infrastructure
Agricultural policies	Inequality heavily affected by low agricultural productivity of poor producers, related to low access and use of modern inputs and seeds,	Prioritize access to seeds and modern inputs for poor farmers through subsidy schemes, starter-packs, targeted extension services, etc.

	lack of infrastructure, extension services, etc.	
Labor market policy	Unequal distribution of employment and earnings key driver of inequality, particularly in middle-income countries; active labor market policies including minimum wages and training initiatives can reduce labor market inequality there	Invest in education and training of the poor; improve access to labor markets through dedicated services for them; provide incentives for formalization; consider minimum wages (in middle-income countries);
Increasing redistribution by the state		
Fiscal policy	Fiscal policies are especially important for (i) fighting inequality directly via a progressive tax regime as well as for (ii) financing social transfers and public expenditure benefiting the poor. Tax/GDP ratios generally low and increases have tended to help lower inequality, esp. in middle-income countries	Increasing the tax per GDP ratio through reducing exemptions, closing tax loopholes and tax evasion, and some increases in progressive taxation (e.g. luxury VAT, commodity taxation); re-orient public spending towards the poor by increasing access to government services, asking for co-payments among non-poor, and introducing new pro-poor programs
Social policy	Transfers to the poor (including conditional cash transfer programs and non-contributory social pensions and child grants) decrease poverty, lower inequality, can promote human capital investment, and risk-taking by the poor.	Promote social protection programs that are broad in coverage, easy to administer, and fiscally sustainable (costs less than 1-2%/GDP)
Improving public sector management	Poorly functioning public sector (government and state-owned enterprises) lowers ability to effect redistributive policies	Strengthen state capacity through improved financial management and public oversight; analyze distributional impact of public spending; harden budget constraints for state-owned enterprises.
Other policies with inequality implications		
Macroeconomic and monetary policy	Low inflation and competitive exchange rates are both important for macroeconomic stability and for fighting income inequality.	Set targets for low inflation, manage exchange rate and capital inflows, ensure low fiscal deficits;
Trade policy	Trade liberalization is important for macroeconomic stability, economic growth and diversification, but can be inequality-enhancing.	Removing export-bias and enhancing free trade (especially regional and South-South trade) is generally desirable. Temporary protection of infant industries and prevention of re-primarization (undermining industrialization by returning to a focus on agriculture and resource extraction for exports) is advisable for poor countries. Maintain competitive exchange rate
Structural	Since many of the poor still live in	Focus on improving agricultural productivity

policy	rural areas and thus depend on agriculture for income, regional and sectoral policies can benefit the fight against income inequality if focused on promoting productivity of land and labor. Regional inequalities moreover slow down economic growth and enhance inequality; industrial policy focused on urban areas can increase inequality in the short-term.	and earnings for poorest; promote labor-intensive industrialization; accommodate rural-urban migration; promote infrastructure and agriculture in backward regions.
Governance	Poor governance usually inequality-enhancing as the poor suffer particularly under corruption, poor state capacity and inadequate services.	Promote governance reforms that increase transparency, tackle corruption, and improve state capacity, particularly in the delivery of services.
International Trends and Policies that can Affect Within-Country Inequality		
Tax transparency and compliance	Capital flight and tax evasion by wealthy individuals, and tax avoidance by multinational companies reduces tax revenues and redistribution by the state;	OECD processes to reduce tax evasion by individuals and tax avoidance by multinational companies should ensure developing countries benefit fully from new rules and systems
Trade Policy	Further trade liberalization in rich countries in agriculture and services can promote pro-poor exports; trade facilitation can promote pro-poor exports	Complete Doha Development Round (or alternative processes) focusing on facilitating exports from poorer segments of developing countries, focusing on agriculture, services, and trade facilitation;
Capital flows	Capital flows can provide much-needed resources for pro-poor growth; but many capital flows, esp. short-term flows as well as most FDI will likely increase inequality; also, short-term capital inflows are destabilizing; remittances can help reduce inequality if migration of the poor is facilitated;	Regulation and management of short-term capital inflows important to prevent financial crises; transparent immigration policy can facilitate remittances and migration of poorer segments of population.

Source: Updated and adapted from Klasen (2004).

The feasibility of policy instruments differs greatly between different groups of developing countries. The income level of the country is less relevant than state capacity and governance. For example, a high-income country such as Equatorial Guinea with a poor state capacity and poor governance will be more constrained in implementing these policy instruments than much poorer Rwanda or Ethiopia where state capacity is generally much stronger.

In countries with poor state capacity, it will be particularly difficult to manage asset redistributions such as land reforms well. Similarly, the options to use the state for redistribution will be more severely circumscribed as the state revenue base tends to be low, and there are few instruments for progressive taxation. Lastly, active labor market policies will be a particular challenge. In these circumstances, it is important to focus on fewer policy instruments to still affect redistribution. For example, it may be preferable to rely more heavily on commodity taxes as well as a low but broad sales or value-added tax for fiscal revenues. Investments in assets should then focus primarily on ensuring that the poor have good access to primary education and health services. And agricultural policies should focus on improving rural infrastructure and providing access to modern inputs and seeds. Social protection policies might focus on public works programs and non-contributory social pensions as their main pillar. And other policy areas should particularly focus on maintaining macroeconomic stability and a stable, competitive exchange rate. While such a policy framework is much reduced, it could still have a sizable impact on addressing the most important forms of inequality.

Question 3.2: Which indicators are proposed for aid programs to assess progress in reducing inequality?

To measure progress of aid policies in reducing inequality, it is important to use indicators along the entire causal chain that generates inequality in a society. At the most aggregate level, it is of course important to monitor outcome indicators of income and non-income inequality. At the same time, it is also critical to monitor indicators that keep with the conceptual framework, i.e. considers asset inequality, returns to assets, as well as redistribution by the state. We will discuss these items in turn:

Outcome indicators

As discussed in earlier parts of this study, key outcome indicators are aggregate inequality measures in a country. They include the Gini coefficient, as well as cruder ratios that consider different parts of the income distribution such as the Palma ratio (the income share of the top 10% divided by the income share of the bottom 40%) or the 90/10 ratio (the incomes at the 90th percentile divided by the income at the 10th percentile). As discussed in question 2 and 3, there are different advantages and disadvantages of these measures, particularly regarding their ease of interpretation, data requirements, as well as the type of inequality they particularly emphasize. For example, the Gini coefficient is particularly sensitive to changes in the middle of the distribution (and can therefore particularly monitor the development of the 'middle class' in a country), the Palma and decile ratios are rather crude measures but have the advantage that they are less sensitive to measurement error in the tails of the distribution, and the Atkinson measure would particularly emphasize the plight of the poorest. As discussed in question 4, the shared prosperity indicator can also be useful although it has some weaknesses as was discussed there.

Similar outcome indicators can also be used for non-income inequality (as discussed in question 3), by including inequality considerations into a multidimensional poverty measure.

These are all static indicators of inequality in income and non-income dimensions. If one wants to monitor changes in inequality over time, income and non-income growth incidence curves may be particularly useful in tracking how economic growth is affecting different parts of the income and non-income distribution (Klasen, 2008b; Grosse et al, 2008). Income growth incidence curves track the income growth of centiles of the income distribution between two time periods. Non-income growth incidence curves (NIGICs) track the development of a non-income outcome (e.g. education) over time. There are two types of NIGICs, conditional and unconditional NIGICs. Conditional NIGICs track the development of the non-income indicator by percentile of the income distribution, investigating therefore whether the income-poor benefited more from improvements in, say, education, than the rich. The unconditional NIGIC measures the development of the income indicator by percentiles of the non-income distribution, investigating therefore whether the, say, education-poor benefited more from expansions in education than those with high education. Examples of such curves for Vietnam (2002-2012) are reproduced below and each provides a different, and complementary, perspective on changes in the distributional pattern of growth and improvements in non-income achievements (Klasen, 2008b; Grosse et al. 2008).

Figure 17: Growth incidence curve. Vietnam, Period: 2002 to 2012

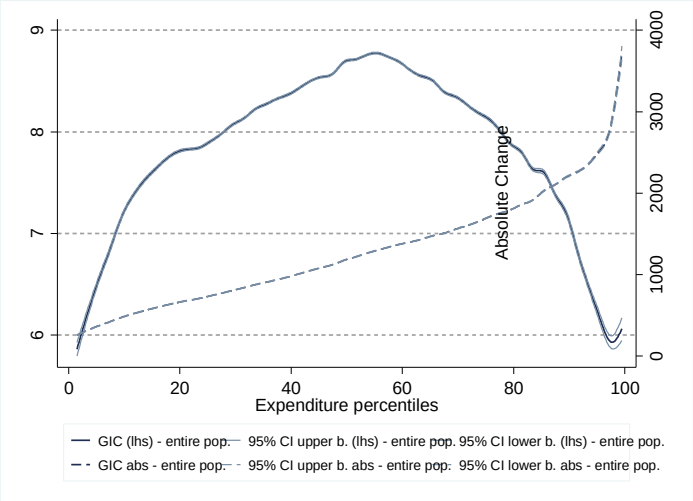


Figure 18: Conditional NIGIC for Years of Schooling. Vietnam, Period: 2002 to 2012

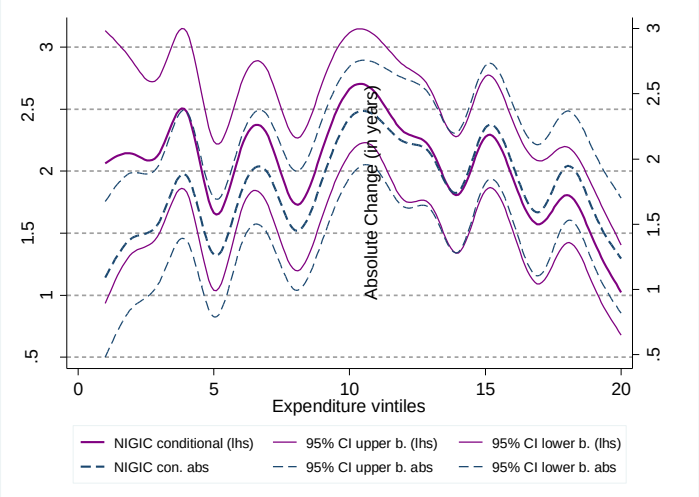
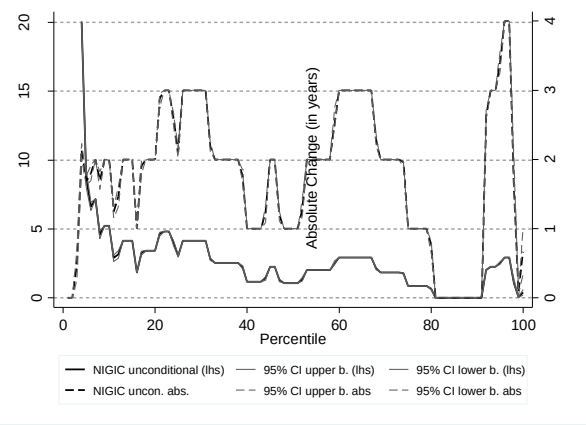


Figure 19: Unconditional NIGIC. Vietnam, Period: 2002 to 2012



Such outcome indicators can be particularly relevant for assessing the overall impact of aid programs (maybe also the joint effect of total aid from all sources). To the extent that aid comes in the form of budget or sector support, such outcome indicators can also be an important way to monitor the distributional impact of budget or sector support.

Intermediate Indicators

While the outcome indicators are clearly important and ultimately the most relevant targets of policy intervention, it is unrealistic to assume that individual aid programs (apart from large budget or sector support programs) will have a sizable impact on these measures. This is even more the case for an individual donor where the ability to affect the income and non-income distribution of the country is limited.

For those cases, intermediate indicators are likely to be more useful. These intermediate indicators could be immediately linked the conceptual framework we have been using in this study, focusing on the role of assets, their returns, and redistribution by the state.

To monitor changes in the asset distribution, useful indicators can be the percentage of poor households that owns land and/or has secure access to land if land inequality is the key constraint. If educational inequality is the key constraint, the NIGICs discussed above for the case of education can also be a useful intermediate indicator.

To monitor changes in returns to assets, it is useful to monitor agricultural productivity of poor households (compared to other agricultural households). As argued by Reimers and Klasen (2014), also here one can use growth incidence curves to study the development of agricultural land or labor productivity across the income distribution (conditional) or the non-income distribution (unconditional). Examples for Rwanda between 2000 and 2010 are reproduced below.

Figure 20: Land productivity and growth incidence curves

Figure 7: Monetary land productivity growth incidence curves: EICV1-EICV3

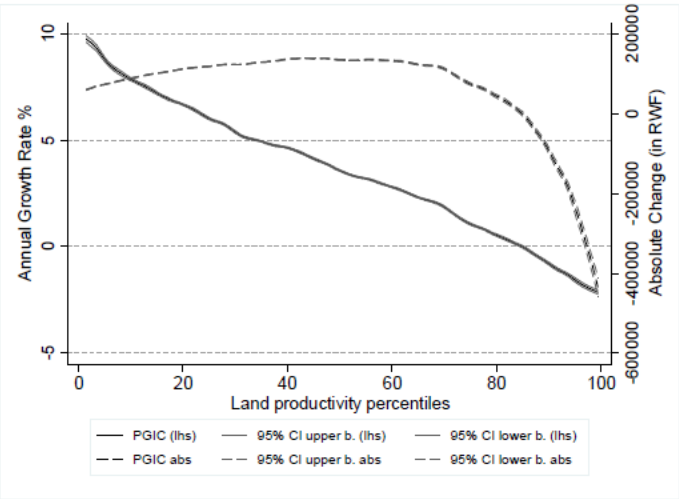
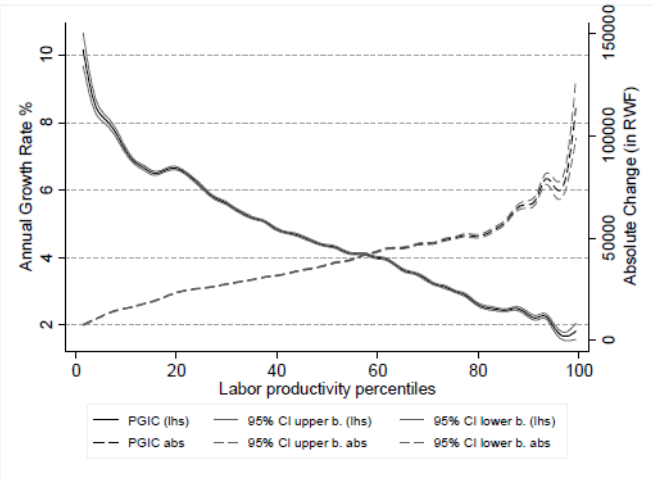


Figure 8: Monetary labor productivity growth incidence curves: EICV1-EICV3



Source: Reimers and Klasen (2014)

Other ways to assess changes in returns to assets is to examine returns to education and health for poor households. This can be done in the framework of earnings regressions where one studies whether, as a result of an intervention, the earnings for poor people for a given amount of education or health have improved.

Lastly, one should examine whether an intervention has affected the redistribution by the state. Important indicators here would be first, the overall revenue base of the state (tax/GDP ratio) and its change over time, as well as the incidence of taxation and public expenditure by income quintiles. The question to asked is to what extent the tax system is progressive and how this has changed over time. Here not only the de jure tax system is of relevance but it is important to study actually paid taxes by income groups given tax loopholes, capital flight, and tax evasion. Similarly, one needs to monitor whether key state expenditures (esp. in the fields of education, health, but also economic services) are pro-poor or not. This can be done

using the well-known methods of tax and expenditure incidence analysis as discussed, for example, in van de Walle and Nead (1995), and done recently by Lustig (2015) for a sample of countries. In such incidence analysis, it is analyzed which households along the income distribution pay the largest share of various taxes (relative to their incomes), and which households benefit the most from public expenditures. In the case of cash transfers, the incidence can be estimated quite easily. In the case of health and education spending, the incidence is estimated by comparing use of services of different income groups with spending on these services.

These intermediate indicators can also be of particular use to examine the impact of programs of budget and sector support as well as technical assistance programs that target directly policy-making.

Input Indicators

Of course, a particular project intervention can primarily target inputs to this conceptual framework and it is therefore useful to monitor the production of these inputs. For example, a project might improve the technical education of poor rural dwellers (thus improving the asset base of the poor) or finance the construction of rural roads (thereby aiming to improve the returns to assets of the rural poor). Then key input indicators would be to monitor whether the intervention is actually delivering these promised outputs. Note, however, that for a more comprehensive assessment of the impact of these interventions on inequality, it is insufficient to just monitor these input indicators as one cannot be sure that they indeed have an impact on inequality. At the least one should therefore combine the monitoring of these input indicators with an assessment at the intermediate level of whether the indeed the asset base of the poor has been improved, whether their returns have improved, and/or whether it has served to improve redistribution by the state.

Project-level indicators

A difficulty with the proposals made above is that many projects might be too small to be able to have a detectable impact on input, intermediate outcome measures since the projects often focus on one intervention and/or often have a regional focus where an intervention is unlikely to impact national-level data. While it is the case that outcome indicators are not suitable in this case, the intermediate and input indicators discussed above can still be generated at a project-level. They then of course should be focused on the area of intervention and the geographic region of the intervention. Here methods from impact evaluation are relevant. They would involve generating baseline data in the intervention area and a suitable control region, and follow-up data to assess then the impact of the project using various available impact assessment techniques (such as difference-in-difference, propensity score matching, regression discontinuity, and the like, see World Bank 2011).

The indicators proposed here not only differ in their position along the causal chain but also in their complexity. In Table 10 we sort the indicators by complexity, ranging from single

headline indicators to analytical tools that go beyond a single number, and their position in the causal chain as a way to summarize the discussion. These are examples and will depend on the nature of the intervention. When discussing intermediate, input, and project-level indicators, we have a project delivering input supplies to the poor to improve their agricultural productivity in mind.

Table 10: Different Types of Indicators to Monitor Inequality Effect of Aid Programs

Complexity	Outcome	Intermediate	Input	Project-level
Headline Indicator	Levels and changes in Gini coefficient	Levels and changes in agricultural productivity of the poor	Amount of seeds and fertilizer delivered per poor household;	Improvement of agricultural productivity of targeted households
Other indicators	Levels and changes in Palma Ratio, 90/10 ratio, Atkinson measure, shared prosperity	Levels and changes in land inequality, transport costs, price margins	spending on the program/project; unit costs of inputs delivered	Comparison of treatment and control area; cost per beneficiary; cost-effectiveness
Analytical Tools	Income and non-income growth incidence curves	Income and non-income growth incidence curves, tax and expenditure incidence	Incidence analysis (who benefited from these input deliveries)	Impact evaluation methods

Question 3.3: What implications does the development of inequality have for German development cooperation?

A concern for inequality in developing countries is not new. In the past, however, the concern was mainly about adverse distributional consequences of development in general, including aid programs. Inequality was treated more as an undesirable side-effect. In recent year, propelled by discussions on inequality of opportunity (e.g. World Bank, 2005), the impact of inequality on growth (see discussion above), the discussions on rising within-country inequality across the world (see works by Picketty and discussions above), tackling inequality is now seen as a critical goal of development itself. In particular, there are three substantive justifications for German development cooperation to be concerned about promoting reduced inequality in partner countries now.

The first relates to the recently concluded Sustainable Development Goals. In particular, SDG10 calls for reductions in inequality between and among countries. This goal conflates two issues: one is inequality between countries which can only be overcome if economic growth rates of poorer countries are larger than those of richer countries. Thus would thus translate into a call to promote economic growth in poorer countries (with particular emphasis on least developed countries). This part of the goal is not very new and an important

justification for development aid has always been to promote economic growth in poor countries. In that sense, this part of the goal does not require a fundamental reorientation of aid, including of German aid. Of course, it would still be important to monitor to what extent German aid is targeted on the poorest countries and it able to promote economic growth there. Interestingly, the indicators recently proposed to monitor SDG10 totally ignore this between-country aspect of inequality and do not propose a single indicator in this regard (UN, 2015)

The new element of SDG10 and its relation (most of the discussion) in this study is, however, related to the new emphasis on reducing country-level inequality which was not a previous goal in the MDGs. In particular, the first four targets are of relevance here (the other three are only loosely related to an inequality agenda). They call for higher growth of the bottom 40% than average growth (see discussion in Milestone 1 on that), the empowerment and inclusion of all groups in society, with particular emphasis on disadvantaged groups, the reduction of inequality of opportunities and of outcomes, and the adoption of policies to achieve greater equality. As Germany has explicitly supported the new SDG agenda it will need to position itself with respect to this goal and its associated targets. The current proposal for indicators for these targets (see UN, 2015) is the shared prosperity indicator (growth rate of the bottom 40%), a relative poverty measure (share of people living below 50% of median income), share of the population that has experienced discrimination, and the labor share of GDP (i.e. the share of national income going to labor as opposed to owners of capital). These are related indicators to the ones we discussed above and Germany will need to examine which indicators (of the ones proposed above or the ones included in the SDGs) it will use to monitor its commitment to this issue.

A second substantive justification for German Development Cooperation to be concerned about inequality is the impact inequality has on overall development. There is now much more clarity on the negative impact of inequality on development. As we have argued above, inequality reduces welfare, it slows down poverty, reduction, it promotes social and political instability and it appears to be associated with lower economic growth (at least in the longer-term). Thus high inequality reduces development and thus also reduces the effectiveness of German Development Cooperation in promoting economic development.

Lastly, rising inequality in many developing countries poses particular social and political challenges for development and thus also for development cooperation. This is particularly the case in some of the fast-growing Asian countries as well as many countries in Sub Saharan Africa, where rising inequality is tearing at the social fabric of societies and has serious social, economic, and political consequences. Given this situation, there is a particular urgency to address inequality issues in these countries.

Given this situation, there are essentially two approaches how German Development Cooperation can position itself vis-a-vis this topic. The first is to explicitly develop programs with the main direct aim to reduce inequality. As discussed above, such programs could support asset redistributions such as land reform, investment in education and health of the poor, programs to improve the returns of assets for the poor, or programs that increase the redistribution of the state. On the latter, there are would be several policy options that would

be consistent with an inequality-reducing agenda. One relates to improving the amount and the progressivity of taxes collected. This could either come through instituting new progressive taxes (e.g. in Latin America higher taxes on commodities has played that role, see Cornia et al. 2013) or through improved collection of existing taxes. The latter relates to the increasingly important agenda of tax evasion and capital flight by wealthy individuals as well as tax evasion by multinational companies. Here policies could link to current OECD initiatives and provide support to extend them to developing countries. On the expenditure side, expenditures could be shifted to programs that are more pro-poor. For example, non-contributory social pensions, conditional cash transfer programs tend to be much more pro-poor than public pensions which often benefit the formal sector employed.

The second approach would be to not to target inequality per se but to ensure that the entire portfolio of activities is at consistent with an agenda to reduce inequality. In such an approach, the substantive justification for intervention is not inequality reduction (e.g. improve human capital, improve state capacity, increase agricultural productivity). But the way these programs are then designed and implemented would have to demonstrate that they are consistent with a focus on reducing inequality. So, for example, a program to improve education should have a particular emphasis on improving education of poorer population groups and a program to improve state capacity should also include measures to improve redistribution by the state through tax and and/or expenditure reforms. In many cases such a link to inequality can be made quite easily.

In others, it is more difficult. For example, it is not ex ante clear whether a program to promote decentralization will serve to lower or increase inequality. Nor is it clear whether financing a power station or a major highway will lower or increase inequality. In these cases, it would be important to use the framework above to explicitly discuss whether and how such intervention can improve the distribution of assets, the return to assets, or the redistribution by the state. If these programs cannot demonstrate such a link, components could be added to ensure such a link. For example, in the case of decentralization, the program could include a component that includes fiscal redistribution to poorer local entities. Or in the case of the power station, a program to extend electricity access to unserved households could be added to the project. And in the case of a major highway one could develop this as a toll road but exempt transport means by the poor from the tolls (e.g. buses or minibus taxis).

Ultimately it is a political question whether one will pursue the first or the second approach to this question. In many countries, it might be politically difficult to negotiate aid programs with the governments that target inequality directly and explicitly. In those cases, the second approach might be more promising. But in practice, there are often programs that can be justified using an explicit equity focus or a focus on poverty and overall development. For example, it is possible to promote social protection programs with either as poverty or as equity programs. Or one can promote increases in the redistributive capacity of the state as an equity program or as a program to promote state capacity overall. So sometimes it is not necessary to choose between the two justifications for promoting an equity agenda.

Question 3.4: What recommendations can be derived from this study for the development of the portfolio of German Development Cooperation?

As argued above (question 3), it is important for German Development Cooperation to include inequality reduction as an important goal for German Development Cooperation. We also argued above (question 3), that German Development Cooperation should ensure that its activities either explicitly target inequality reduction or are designed in such a way that they are consistent with an inequality-reduction agenda. More specific recommendations would be the following:

- German Development Cooperation should undertake an analysis of its existing portfolio to study to what extent it is consistent with an inequality-reduction agenda. The conceptual framework developed here as well as the indicators procedure outlined in Milestone 2 (question 4) could form the basis of such an assessment;

- German Development Cooperation should include inequality reduction as a central goal of its strategy for the reasons outlined above (see Milestone3, question 3); it should require from implementing agencies that project proposals provide information how the proposed projects can serve to lower inequality in partner countries and what indicators will be used to monitor this impact;

- In its policy advisory work, German Development Cooperation should improve the ability of partner countries to assess levels, trends, and policy drivers of inequality; such inequality diagnostics can then provide an entry point for development cooperation to support programs that address inequality explicitly or are designed in such a way that they are inequality-reducing;

- As discussed above, an inequality-reducing agenda has to focus particularly on national policy-making such as tax and expenditure policies, national health and education policies, social protection policies, and the like as these are the critical policy-levers affecting inequality; as a result, an inequality-reducing agenda is likely to be more successful if it engages with national policy-making in these areas rather than focus on smaller projects that are likely to have only limited impacts on equity. For technical cooperation, this would imply engagement with policy processes in these areas at the national level. For financial cooperation, this would imply the development of programs that can affect national policy-making. Here budget support combined with policy engagement at the national level is likely to provide a much more powerful entry point for promoting an equity agenda than project work in individual sectors.

- In order to engage with partner countries on promoting such an equity agenda, it is also important to improve the analytical capacity of German Development Cooperation in this field; engagement with national policy-makers on equity issues requires that the German side is able to offer support in analyzing inequality trends and drivers and the impact of policy on inequality; this it is critical to build up analytical capacity to be able to engage with partner countries in this issue.

- There are also a number of international processes under way that link to inequality where German Development Cooperation could engage with. Two processes at the OECD (and partly at G-20) relate to measures to reduce tax evasion by wealthy individuals and multinational corporations. Both of these processes are relatively far advanced as far as policy measures in OECD countries are concerned. But of course this topic is just as relevant for developing countries who are losing valuable tax resources, particularly also from wealthy individuals, which harms the redistributive capacity of the state and directly promotes inequality. German Development Cooperation could offer to support these processes by assisting developing countries is engaging with these processes and implementing their proposed policy measures to reduce tax evasion by individuals and multinational corporations.

Question 3.5: Which topics are of particular relevance for German Development Cooperation to work on in the Medium Term

Inequality issues, maybe in contrast to some other issues in development cooperation that often proved to be short-term fads, are likely to be an important topic for partner countries and the international community for a long period of time. Inequality levels are high, often rising, and it is causing serious social and political frictions in countries affected by it. Consequently, it pays for German Development Cooperation to develop a medium-term strategy of engagement with these issues. Of course it is hard to predict with facets of the inequality agenda will play a particularly important role in future policy debates. At the same, we suggest that German Development Cooperation should work on the following issues, also for a medium-term agenda:

a) Inequality diagnostics and analytics

In order to be a relevant and useful partner in this policy area, German Development Cooperation must increase its analytical and advisory capacity in this field. This could include the development of inequality diagnostics tools, analytical approaches to simulate the impact of policies on inequality, and approaches the measure the impact of policies on inequality ex post. Such a work program could also support the gathering of data on incomes that are poorly captured in household surveys, particularly the incomes of the top 1%. Here the use of tax records and other administrative data will be important, also to devise policies to lower inequality and tax evasion.

b) Priority areas for intervention: redistributive capacity of the state and social protection programs

It is likely that a key area of concern will remain to strengthen the redistributive capacity of the state. This will be a challenging area of intervention in middle-income countries, but even more so in low-income countries and fragile states, where state capacity is particularly limited. This would be an important area for technical cooperation, but also financial cooperation can play a role in financing measures to improve state capacity (such as the build-up of tax authorities). Social protection programs are another area of intervention which is likely to remain of great importance for an inequality-reducing agenda. The Latin American

experience shows that they can contribute significantly to reducing inequality and the challenge will be to implement well-designed programs (at scale) in low-income countries, including again fragile states (see ERD, 2010). Moreover, social protection programs serve many agendas, apart from the focus on inequality, at the same time, including poverty reduction, risk-coping, and investments in human capital, so that they are likely to play an important role also in the medium term.

c) From projects to programs and sector and budget support

As argued here, an agenda tackling inequality will have to engage with national policy-making where the key policy levers for such an agenda are located. In the case of technical cooperation, this will involve advising national policy-makers in all policy areas with implications for inequality (see Milestone 3, question 1). In the case of financial cooperation, small-scale project-based aid is unlikely to have a significant impact on inequality. To engage with national policy-making, sector and budget support are likely to be much more appropriate tools as they enable also a policy dialogue on inequality that cannot be had with project-based aid.

d) Engagement with international processes

The international processes surrounding the reduction of tax evasion and capital flight by rich individuals as well as the reduction of tax evasion of multinational companies is going to be one of the most important international processes with inequality implications. These processes are currently most focused on OECD countries as well as G-20 countries. By engaging with these processes and contributing to extending them to poorer developing countries, German Development Cooperation could play a major constructive role in promoting this important international agenda.

Bibliography

Ackah, C. (2011): Nonfarm employment and incomes in rural Ghana. *Journal of International Development,* Vol. 25(3), pp.325-339.

Adams, R., Cuecuecha, A., and Page, J. (2008): The Impact of Remittances on Poverty and Inequality in Ghana. World Bank Policy Research Working Paper 4732.

Aghion, P., and Bolton, P. (1997): A theory of trickle-down growth and development. *The Review of Economic Studies*, Vol. 64(2), pp.151-172.

Ahituv A. (2001): Be fruitful or multiply: On the interplay between fertility and economic development. *Journal of Population Economics*, Vol. 14(1), pp.51-71.

Alesina, A. and Rodrik, D. (1994): Distributive politics and economic growth. *Quarterly Journal of Economics*, Vol. 109(2), pp.465-490.

Alkire, S., and Santos, M. E. (2010): Acute Multidimensional Poverty: A New Index for Developing Countries. Oxford Poverty and Human Development Initiative (OPHI) Working Paper No. 38.

Amiel, Y. (1999): The Measurement of Income Inequality: The Subjective Approach. In: Silber, J. (ed.): Handbook of Income Inequality Measurement. Kluwer Academic Publishers, pp. 227–241.

Anand, S., and Segal, P. (2014): The Global Distribution of Income. Handbook of Income Distribution. Volume 2A. Ch. 11, pp. 937-979.

Anand, S., and Segal, P. (2008): What Do We Know about Global Income Inequality? *Journal of Economic Literature*, Vol. 46(1), pp.57-94.

Andrews, D., Jencks, C., and Leigh, A. (2011): Do rising top incomes lift all boats? *The B.E. Journal of Economic Analysis and Policy*, Vol. 11(1), Contributions Article 6.

Annim, S., Mariwah, S., and Sebu, J. (2012): Spatial inequality and household poverty in Ghana. *Economic Systems*, Vol. 36(4), pp.487-505.

Aryeetey, E., and Baah-Boateng, W. (2007): Growth, Investment and Employment in Ghana. Policy Integration Department ILO, Working Paper No. 80.

Aryeetey, E., Owusu, G., and Mensah, E. (2009): An Analysis of Poverty and Regional Inequalities in Ghana. GDN Working Paper Series No. 27, Global Development Network.

Asamoah, B., Agardh, A., and Östergren, P. (2013): Inequality in fertility rate and modern contraceptive use among Ghanaian women from 1988–2008. *International Journal for Equity in Health*, Vol. 12(1), p.37.

Asante, R., and Gyimah-Boadi, E. (2004): Ethnic structure, inequality and governance of the public sector in Ghana. United Nations Research Institute for Social Development.

Banerjee, A. V., and Duflo, E. (2003): Inequality and growth: what can the data Say? *Journal of Economic Growth*, Vol. 8(3), pp. 267-299.

Barro, R. J. (2000): Inequality and Growth in a Panel of Countries. *Journal of Economic Growth*, Vol. *5*(1), pp.5-32.

Basu, K. (2013): Shared Prosperity and the Mitigation of Poverty: In Practice and in Precept. World Bank Policy Research Working Paper No. 6700.

Beck, T., Demirgüc-Kunt, A., and Levine, R. (2004): Finance, Inequality, and Poverty: Cross-Country Evidence. NBER Working Paper 10979.

Becker, G. S. (1960): An economic analysis of fertility. Demographic and Economic Change in Developed Countries. Princeton University Press, pp.209-231.

Beegle, K., L. Christiaensen, A. Dabalen, I. Gaddis. (2016) *Poverty in a Rising Africa*. Washington DC: The World Bank.

Bellemare, M., Barrett, C., and Just, D. (2013): The Welfare impacts of Commodity Price Volatility: Evidence from Rural Ethiopian Households. *American Journal of Agricultural Economics*, Vol. 95(4), pp.877-899.

Bénabou, R. (2002): Tax and Education Policy in a Heterogeneous-Agent Economy: What Levels of Redistribution Maximize Growth and Efficiency?. *Econometrica*, Vol. *70*(2), pp.481-517.

Bénabou, R. (2000): Unequal Societies: Income Distribution and the Social Contract. *American Economic Review*, Vol. 90(1), pp.96-129.

Bertola, G. (1993): Factor Shares and Savings in Endogenous Growth. *American Economic Review*, Vol. 83(5), pp.1184-98.

Beyene, B. (2014): The Effects of International Remittances on Poverty and Inequality in Ethiopia. *The Journal of Development Studies*, Vol. 50(10), pp.1380-1396.

Bhalla, S. (2002): Imagine there's no country: Poverty, inequality, and growth in the era of globalization. Peterson Institute.

Bhasin, V., and Kobina Annim, S. (2005): Impact of elimination of taxes on poverty and income distribution in Ghana. Global Development Network.

Bigsten, A., and Shimeles, A. (2008): Poverty Transition and Persistence in Ethiopia: 1994–2004. *World Development*, Vol. 36(9), pp.1559-1584.

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

Birdsall, N. (2006). Rising inequality in the new global economy. *International Journal of Development Issues*, Vol. 5(1), pp.1-9.

Bourguignon, F. (2015). The Globalization of Inequality. Princeton: Princeton University Press.

Bourguignon, F. (2012): La mondialisation de l'inégalité. Seuil et La République des Idées.

Bourguignon, F. (2003): The growth elasticity of poverty reduction. In: Eicher, T., and Turnovsky, S. (eds.): Inequality and Growth, Ch. 1, MIT Press: Cambridge, pp.3-26.

Bourguignon, F., and Morrisson, C. (2002): Inequality Among World Citizens: 1820-1992. *American Economic Review*, Vol. 92(4), pp.727-744.

Bresson, F. (2009): On the estimation of growth and inequality elasticities of poverty with grouped data. *Review of Income and Wealth*, Vol. 55(2), pp.266-302.

Canagarajah, S., Mazumdar, D., and Ye, X. (1998): The structure and determinants of inequality and poverty reduction in Ghana, 1988-92. World Bank Policy Research Working Paper.

Canagarajah, S., Newman, C., and Bhattamishra, R. (2001): Non-farm income, gender, and inequality: evidence from rural Ghana and Uganda. *Food Policy*, Vol. 26(4), pp.405-420.

Caracciolo, F., and Santeramo, F. (2013): Price Trends and Income Inequalities: Will Sub-Saharan Africa Reduce the Gap?. *African Development Review*, Vol. 25(1), pp.42-54.

Castells Quintana, D., and Royuela Mora, V. (2014): Tracking positive and negative effects of inequality on long-run growth. IREA–Working Papers, 2014, IR14/001.

Chakravarty, S. R., Deutsch, J., and Silber, J. (2008): On the Watts Multidimensional Poverty Index and its Decomposition. *World Development*, Vol. 36(6), pp.1067–1077.

Chambers, D., and Krause, A. (2010): Is the relationship between inequality and growth affected by physical and human capital accumulation? *Journal of Economic Inequality*, Vol. 8(2), pp.153-172.

Chiu, W. H., and Madden, P. (1998): Burglary and income inequality. *Journal of Public Economics*, Vol. 69(1), pp. 123-141.

Chotikapanich, D., Valenzuela, R., and Prasada Rao, D. S. (1997): Global and Regional Inequality in the Distribution of Income: Estimation With Limited/Incomplete Data. *Empirical Economics*, Vol. 22(4), pp. 533–546.

Clarke, G. R. G. (1995): More evidence on income distribution and growth. *Journal of Development Economics*, Vol. 47(2), pp.403–427.

Cornia, G. A. (2014): Income inequality levels, trends and determinants in Sub-Saharan Africa: An Overview of the main changes. UNDP Project.

Cornia, G. A. (2014): Inequality trends and their determinants: Latin America over the period 1990-2010. In: G. Cornia, ed., Falling Inequality in Latin America - Policy changes and lessons, 1st ed. Oxford: Oxford University Press, pp.23-48.

Cornia, G. A. (2014): Falling Inequality in Latin America: Policy Changes and Lessons. Oxford University Press.

Cornia, G. A. (2013): The decline of inequality in Latin America. New York: Oxford University Press.

Coulombe, H., and Wodon, Q. (2007). Poverty, livelihoods, and access to basic services in Ghana. Ghana CEM: Meeting the challenge of accelerated and shared growth 2007.

Cowell, F., and Flachaire, E. (2014): Inequality with Ordinal Data. London School of Economics and Political Science (LSE) Discussion Paper No. DARP 16.

Cowell, F., and Flachaire, E. (2002): Sensitivity of inequality measures to extreme values. London School of Economics and Political Science (LSE) Discussion Paper No. DARP 60.

De La Croix, D., and Doepke, M. (2003): Inequality and growth: why differential fertility matters. *The American Economic Review*, Vol. 93(4), pp.1091-1113.

Deininger, K., and Squire, L. (1998): New ways of looking at old issues: inequality and growth. *Journal of development economics*, Vol. 57(2), pp.259-287.

Dendir, S. (2014): Children's cognitive ability, schooling and work: Evidence from Ethiopia. *International Journal of Educational Development*, Vol. 38, pp.22-36.

Dercon, S. (2006): Economic reform, growth and the poor: Evidence from rural Ethiopia. *Journal of Development Economics*, Vol. 81(1), pp.1-24.

Dercon, S. and Krishnan, P. (2000): Vulnerability, seasonality and poverty in Ethiopia. *Journal of Development Studies*, Vol. 36(6), pp.25-53.

Dercon, S. and Vargas Hill, R. (2009):Growth from Agriculture in Etiopia: Identifying Key Constraints. Department for International Development UK.

Dercon, S., Hoddinott, J. and Woldehanna, T. (2005): Shocks and Consumption in 15 Ethiopian Villages, 1999-2004. *Journal of African Economies*, Vol. 14(4), pp.559-585.

Devereux, S., Teshome, A. and Sabates-Wheeler, R. (2005): Too Much Inequality or Too Little? Inequality and Stagnation in Ethiopian Agriculture. *IDS Bulletin*, Vol. 36(2), pp.121-126.

Dikhanov, Y., and Ward, M. (2002): Evolution of the Global Distribution of Income 1970–99. 53rd Session of the International Statistical Institute, Seoul, Republic of Korea, pp 22-29.

Dollar, D. and Kraay, A. (2002): Growth is Good for the Poor. *Journal of Economic Growth*, Vol. 7, pp.195-225.

Dorosh, P. and Schmidt, E. (2010): The Rural-Urban Transformation in Ethiopia. Ethiopia Strategy Support Program 2, Discussion Paper 13.

Dowrick, S., and Akmal, M. (2005): Contradictory Trends in Global Income Inequality: A Tale of Two Biases. Review of Income and Wealth. Vol. 51(2): pp. 201-229.

Doyle, J. M., Ahmed, E., and Horn, R. N. (1999): The effects of labor markets and income inequality on crime: evidence from panel data. *Southern Economic Journal*, pp.717-738.

Easterly, W. (2007): Inequality does cause underdevelopment: Insights from a new instrument. *Journal of Development Economics*, Vol. 84(2), pp.755-776.

Easterly, W. (2001): The middle class consensus and economic development. *Journal of economic growth*, Vol. 6(4), pp.317-335.

Ehrhart, C. (2009): The effects of inequality on growth: a survey of the theoretical and empirical literature. *ECINEQ WP*, Vol. 107.

Engerman, S. L., and Sokoloff, K. L. (2002): Factor endowments, inequality, and paths of development among new world economics. National Bureau of Economic Research, No. w9259.

ERD (2010): Social protection for Inclusive Development. The 2010 European Report on Development.

Esteban, J., and Ray, D. (2006): Inequality, lobbying, and resource allocation. *The American Economic Review*, pp.257-279.

Esteban, J., and Ray, D. (1999): Conflict and distribution. *Journal of Economic Theory*, Vol. 87(2), pp.379-415.

Falkinger, J., and Grossmann, V. (2005): Institutions and development: The interaction between trade regime and political system. *Journal of Economic Growth*, Vol. 10(3), pp.231-272.

Falkinger, J., and Zweimüller, J. (1997): The impact of income inequality on product diversity and economic growth. *Metroeconomica*, Vol. 48(3), pp.211-237.

Ferroni, M., Mateo, M., and Payne, M. (2007): Development under conditions of inequality and distrust: Social cohesion in Latin America. IFPRI discussion paper, 777.

Foellmi, R., and Zweimüller, J. (2006): Income distribution and demand-induced innovations. *The Review of Economic Studies*, Vol. 73(4), pp.941-960.

Forbes, K. J. (2000): A Reassessment of the Relationship between Inequality and Growth. *American economic review*, pp.869-887.

Galor, O., and Moav, O. (2004): From physical to human capital accumulation: Inequality and the process of development. *The Review of Economic Studies*, Vol. 71(4), pp.1001-1026.

Galor, O., and Zeira, J. (1993): Income distribution and macroeconomics. *The review of economic studies*, Vol. 60(1), pp.35-52.

Gatiso, T. and Wossen, T. (2014): Forest dependence and income inequality in rural Ethiopia: evidence from Chilimo-Gaji community forest users. *International Journal of Sustainable Development & World Ecology*, pp.1-11.

Geda, A., Shimeles, A. and Weeks, J. (2009): Growth, poverty and inequality in Ethiopia: Which way for pro-poor growth?. *Journal of International Development*, Vol. 21(7), pp.947-970.

Ghatak, M., and Jiang, N. N. H. (2002): A simple model of inequality, occupational choice, and development. *Journal of development Economics*, Vol. 69(1), pp.205-226.

Gilligan, D., Hoddinott, J., and Taffesse, A. (2009): The Impact of Ethiopia's Productive Safety Net Programme and its Linkages. *Journal of Development Studies*, Vol. 45(10), pp.1684-1706.

Girma,S., and Shortland, A. (*2*007):The Political Economy of Financial Development, *Oxford Economic Papers*, Vol. 60*(*4), pp.567–96.

Glaeser, E., Scheinkman, J., and Shleifer, A. (2003): The injustice of inequality. *Journal of Monetary Economics*, Vol. 50(1), pp.199-222.

Grant, R. and Nijman, J. (2004): The re-scaling of uneven development in Ghana and India. *Tijdschrift voor Economische en Sociale Geografie*, Vol. 95(5), pp.467-481.

Grimm, M., Harttgen, K., Klasen, S., Misselhorn, M., Munzi, T. and Smeeding, T. (2009): Inequality in Human Development: An Empirical Assessment of 32 Countries. Soc Indic Res, Vol. 97(2), pp.191-211.

Grimm, M. and Klasen, S. (2007): Findings and Challenges in the Measurement and Analysis of Pro-Poor Growth. In: M. Grimm, S. Klasen and A. McKay, ed., Determinants of Pro-Poor Growth - Analytical Issues and Findings from Country Cases, 1st ed. Hampshire (UK): Palgrave Macmillan, pp.1-19.

Grosse, M., Harttgen K., and Klasen, S. (2008): Measuring Pro-Poor Growth using Non-Income Indicators. *World Development*, Vol. 36(6), pp.1021-1047

Grossmann, V. (2008): Risky human capital investment, income distribution, and macroeconomic dynamics. *Journal of Macroeconomics*, Vol. 30(1), pp.19-42.

Grüner, H. P. (2003): Redistribution as a selection device. *Journal of Economic Theory*, Vol. 108(2), pp.194-216.

Grüner, H. P. (2001)*:* Wealth distribution and interest rates: empirical evidence for the US. CEPR Discussion Paper 3106*. Review of Economic Studies*, Vol. 71, pp.1001–1026.

Harsanyi, John C. (1975): Can the Maximin Principle Serve as a Basis for Morality? A Critique of John Rawls's Theory Author. *The American Political Science Review*. Vol. 69(2), pp. 594–606.

Herzer, D., and Vollmer, S. (2013): Rising top incomes do not raise the tide. *Journal of Policy Modeling*, Vol. 35(4), pp.504-519.

Herzer, D., and Vollmer, S. (2012): Inequality and growth: evidence from panel cointegration. *The Journal of Economic Inequality*, *10*(4), pp.489-503.

Arjun, J., Lahoti, R., and Reddy, S. (2015): Who Got What, Then and Now? A fifty year overview from the Global Consumption and Income Project. Courant Research Centre "Poverty, Equity and Growth-Discussion Papers" No. 174.

Arjun, J., Lahoti, R., and Reddy, S. (2014): The Global Consumption and Income Project (GCIP): An Introduction and Preliminary Findings. Available at SSRN 2480636.

Josten, S. D. (2003): Inequality, crime and economic growth. A classical argument for distributional equality. International Tax and Public Finance, Vol. 10(4), pp.435-452.

Kacem, R. (2012): Monetary versus non-monetary pro-poor growth: Evidence from rural Ethiopia between 2004 and 2009. *Economics E-Journal,* Discussion Paper No. 2012-62.

Keefer, P., and Knack, S. (2002): Polarization, politics and property rights: Links between inequality and growth. Public choice, Vol. 111(1-2), pp.127-154.

Kelly, M. (2000): Inequality and crime. *Review of economics and Statistics*, Vol. 82(4), pp.530-539.

Kimhi, A. (2009): Entrepreneurship and income inequality in southern Ethiopia. *Small Business Economics journal*, Vol. 34(1), pp.81-91.

Klasen, S. (2008a): The efficiency of equity. Review of Political Economy, Vol. 20(2): pp. 257–74.

Klasen, S. (2008b): Economic Growth and Poverty Reduction. *World Development*, Vol. 36(3), pp.420-45

Klasen, S. (2007). Gender-related indicators of well-being. In McGillivray, M. (ed.) Human well-being: Concepts and measurement. London: Palgrave. pp. 167-192.

Klasen, S. (2004): In Search of the Holy Grail: How to Achieve Pro Poor Growth? In Tungodden, B., N. Stern, and I. Kolstad (Eds.*).* Toward Pro Poor Policies-Aid, Institutions, and Globalization. New York: Oxford University Press, pp. 63-94.

Klasen, S. (1994): Growth and Well-being: Introducing Distribution-Weighted Growth Rates to Reevaluate U.S. Post-war Economic Performance. Review of Income and Wealth. International Association for Research in Income and Wealth, Vol. 40(3), pp251–72

Klasen, S., and Misselhorn, M. (2008): Determinants of the Growth Semi-Elasticity of Poverty Reduction. Ibero America Institute for Economy. Research (IAI) Discussion Papers 176

Klasen, S., and Reimers, M. (2013): Looking at Pro-Poor Growth from an Agricultural Perspective 2013 Annual Meeting, August 4-6, 2013, Washington, D.C. 149745, Agricultural and Applied Economics Association.

Knowles, S. (2005). Inequality and economic growth: the empirical relationship reconsidered in the light of comparable data. *The Journal of Development Studies*, Vol. 41(1), pp.135-159.

Kremer, M., and Chen, D. L. (2002). Income distribution dynamics with endogenous fertility. *Journal of Economic growth*, Vol. 7(3), pp.227-258.

Lakner, C., and Milanovic, B. (2014): Global Income Distribution: From the fall of the Berlin Wall to the Great Recession. World Bank Policy Research Working Paper 6719.

Liska, A. E., and Warner, B. D. (1991). Functions of crime: A paradoxical process. *American Journal of Sociology*, pp.1441-1463.

Loayza, N., Rigolini, J., and Llorente, G. (2012). Do middle classes bring about institutional reforms? *Economics letters*, Vol. 116(3), pp.440-444.

Lustig, N. (2015). Inequality and fiscal redistribution in middle income countries: Brazil, Chile, Colombia, Indonesia, Mexico, Peru, and South Africa. CGD Working Paper No. 410.

MacMillan, M., Rodrik, D., and Verdizco-Gallo, I. (2014): Globalization, Structural Change, and Productivity Growth, with an Update on Africa. *World Development*, Vol. 63, pp.11-32.

Madden, D. (2010): Ordinal and Cardinal Measures of Health Inequality. Health Economics, Vol. 19(2): pp. 243–50.

Mancini, L. (2009): Comparative Trends in Ethno-Regional Inequalities in Ghana and Nigeria: Evidence from Demographic and Health Surveys. CRISE Working Paper No. 72.

Messner, S. F., Baumer, E. P., and Rosenfeld, R. (2004): Dimensions of social capital and rates of criminal homicide. *American Sociological Review*, Vol. 69(6), pp.882-903.

Milanovic, B. (2012): Global inequality recalculated and updated: the effect of new PPP estimates on global inequality and 2005 estimates. *The Journal of Economic Inequality*, Vol. 10(1): pp.1-18.

Milanovic, B. (2006): Global income inequality: What it is and why it matters. World Bank Policy Research Working Paper 3865.

Milanovic, B. (2005): Worlds Apart: Measuring International and Global Inequality. Princeton University Press.

Milanovic, B. (2002): True World Income Distribution, 1988 and 1993: First Calculation Based on Household Surveys Alone. *The Economic Journal*, Vol. 112(476): pp.51-92.

Milanovic, B. (2000): The median-voter hypothesis, income inequality, and income redistribution: an empirical test with the required data. *European Journal of Political Economy*, Vol. 16, pp.367–410.

Mogues, T., and Carter, M. R. (2005): Social capital and the reproduction of economic inequality in polarized societies. *The Journal of Economic Inequality*, Vol. 3(3), pp.193-219.

Molla, M., Mitiku, I., Worku, A. and Yamin, A. (2015): Impacts of maternal mortality on living children and families: A qualitative study from Butajira, Ethiopia. *Reproductive Health*, Vol. 12(1), pp.6.

Murphy, K. M., Shleifer, A., and Vishny, R. (1989): Income Distribution, Market Size, and Industrialization. *Quarterly Journal of Economics*, Vol. 104(3), pp. 537-564.

Neves, P. C., and Silva, S. M. T. (2014): Inequality and growth: Uncovering the main conclusions from the empirics. *Journal of Development Studies*, Vol. 50(1), pp.1-21.

Nicita, A., Olarreaga, M. and Porto, G. (2014): Pro-poor trade policy in Sub-Saharan Africa. *Journal of International Economics*, Vol. 92(2), pp.252-265.

Nozick, R. (1974): Anarchy, State, and Utopia. Basic Books: New York.

Obeng-Odoom, F. (2012): Neoliberalism and the Urban Economy in Ghana: Urban Employment, Inequality, and Poverty. *Growth and Change*, Vol. 43(1), pp.85-109.

Osberg, L., Smeeding, T. M., and Schwabish, J. (2004): Income distribution and public social expenditure: Theories, effects, and evidence. Social inequality, pp.821-859.

Ostrom, E. (1990): Governing the commons: the evolution of institutions for collective action. Cambridge University Press.

Palma, G. J. (2011): Homogeneous Middles vs. Heterogeneous Tails, and the End of the 'Inverted-U': the Share of the Rich is what it's all about. Cambridge Working Papers in Economics (CWPE) No. 1111.

Perotti, R. (1996): Growth, income distribution, and democracy: what the data say. *Journal of Economic growth*, Vol. 1(2), pp.149-187.

Perotti, R. (1993): Political equilibrium, income distribution, and growth. *The Review of Economic Studies*, Vol. 60(4), pp.755-776.

Persson, T., and Tabellini, G. (1994): Is inequality harmful for growth?. *American Economic Review*, Vol. 84, pp.600–621.

Piketty, T. (1997): The dynamics of the wealth distribution and the interest rate with credit rationing. *The Review of Economic Studies*, Vol. 64(2), pp.173-189.

Ramesh, R. and Abebe, A. (2014): Has Economic Growth Contributed to Human Development in Ethiopia?. *Journal of Asian and African Studies*.

Ravallion, M., and Chen, S. (2003): Measuring Pro-Poor Growth. *Economics Letters*, Vol. 78, pp. 93–99.

Ravallion, M. (2001): Growth, Inequality and Poverty: Looking Beyond Averages. *World Development*, Vol. 29(11), pp.1803-1815.

Ravallion, M. (1998): Does aggregation hide the harmful effects of inequality on growth?. *Economics Letters*, Vol. 61(1), pp.73-77.

Rawls, J. (1971): A theory of justice. Harvard University Press: Cambridge.

Rippin, N. (2012): Operationalising the Capability Approach: A German Correlation Sensitive Poverty Index. Göttingen Courant Research Centre "Poverty, Equity and Growth" Discussion Paper 132.

Rippin, N. (2010): Poverty severity in a multidimensional framework: the issue of inequality between dimensions. Göttingen Courant Research Centre "Poverty, Equity and Growth" Discussion Paper 47.

Roember, J. E., and Trannoy, A. (2015): Equality of opportunity. In: Atkinson, Anthony, and François Bourguignon (eds.): Handbook of Income Distribution. pp. 217–300.

Rosenfeld, R., Baumer, E. P., and Messner, S. F. (2001): Social capital and homicide. *Social Forces*, Vol. 80(1), pp.283-310.

Rufrancos H. G., Power M., Pickett, K. E., Wilkinson, R. (2013): Income Inequality and Crime: A Review and Explanation of the Time–series Evidence . Sociology and Crimonology No. 1, pp.103.

Sala-i-Martin, X. (2006): The World Distribution of Income: Falling Poverty and... Convergence, Period. The Quarterly Journal of Economics. Vol. 121(2): pp. 351-397.

Scholl, N., and Klasen, S. (2016): Re-estimating the Relationship between Inequality and Growth. Göttingen Courant Research Centre "Poverty, Equity and Growth" Discussion Paper 205.

Sen, A. (1997): From Income Inequality to Economic Inequality. *Southern Economic Journal*, Vol. 64(2): pp. 384–401.

Sen, A. (1992): Inequality reexamined. Harvard University Press: Cambridge.

Senadza, B. (2011): Does Non-farm Income Improve or Worsen Income Inequality? Evidence from Rural Ghana. *African Review of Economics and Finance*, Vol. 2(2).

Suman, S., and Alkire, S. (2014): Measuring and Decomposing Inequality among the Multidimensionally Poor Using Ordinal Data: A Counting Approach. Oxford Poverty and Human Development Initiative (OPHI) Working Paper No. 68.

Shorrocks, A. F. and Foster, J. (1987): Transfer Sensitive Inequality Measures. Review of Economic Studies. Vol. 54 (3): pp. 485–497.

Solt, F. (2009): Standardizing the World Income Inequality Database. *Social Science Quarterly*, Vol. 90(2), pp.231-242.

Stifel, D., and Woldehanna, T. (2014): Utility-consistent poverty in Ethiopia, 2000-2011: Welfare improvements in a changing economic landscape. WIDER Working Paper, No. 2014/125.

Stiglitz, J. (2012): The Price of Inequality: How Today's Divided Society Endangers Our Future. W. W. Norton & Company.

Taffesse, A., Dorosh, P. and Asrat, S. (2011): Crop Production in Ethiopia: Regional Patterns and Trends. Ethiopia Strategy Support Program 2, Working Paper 16.

Theil, H. (1967): Economics and Information Theory. North Holland: Amsterdam.

Thiede, B. (2014): Rainfall Shocks and Within-Community Wealth Inequality: Evidence from Rural Ethiopia. *World Development*, Vol. 64, pp.181-193.

Thorbecke, E. (2012): The Interrelationship Linking Growth, Inequality and Poverty in Sub-Saharan Africa. *Journal of African Economies*, Vol. 22(1), pp.15-48.

Tranvåg, E., Ali, M. and Norheim, O. (2013): Health inequalities in Ethiopia: modeling inequalities in length of life within and between population groups. *International Journal for Equity in Health*, Vol. 12(1), pp.52.

Tsikata, D. and Seini, W. (2004): Identities, inequalities and conflicts in Ghana. Center fr Research on Ineqaulitz, Human Security and Ethnicity, Working Paper 5.

Tsui, K. (1999): Multidimensional Inequality and Multidimensional Generalized Entropy Measures: An Axiomatic Derivation. *Social Choice and Welfare*, Vol. 16, pp.145–157.

UN (2015): Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators. New York: UN Economic and Social Council (E/CN.3/2016/2).

UNDP (2009): Human Development Report 2009: Overcoming Barriers: Human Mobility and Development. New York: UNDP.

Van de Poel, E., Reza Hosseinpoor, A., Jehu-Appiah, C., Vega, J., and Speybroeck, N. (2007): Malnutrition and the disproportional burden on the poor: the case of Ghana. *International Journal for Equity in Health*, Vol. 6(21).

Van de Walle, D., and Nead, K. (1995): Public Spending and the Poor: Theory and Evidence. World Bank Publications.

Voitchovsky, S. (2009): Inequality and economic growth. The Oxford Handbook of Economic Inequality, Oxford University Press, pp. 549–574.

Voitchovsky, S. (2005): Does the profile of income inequality matter for economic growth? *Journal of Economic Growth*, Vol. 10, pp.273–296.

Weinhold, D. and Nair-Reichert, U. (2008): Innovation, Inequality and Intellectual Property Rights. *World Development*, Vol. 37(5), pp.889–901.

World Bank (2011): Impact Evaluation in Practice. Washington DC: The World Bank.

World Bank (2005): World Development Report: Equity and Development.

Zweimüller, J. (2000): Schumpeterian Entrepreneurs Meet Engel's Law: The Impact of Inequality on Innovation-Driven Growth. *Journal of Economic Growth*, Vol. 5, pp.185-206.