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Understanding the Links between Inequalities and Poverty (LIP)

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Understanding the relationship between poverty, inequality and growth: a review of existing evidence

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About the research programme

CASE collaborated with the LSE's International Inequalities Institute to lead a three-year programme of research on the connections between inequality and poverty, *Improving the Evidence Base for Understanding the Links between Inequalities and Poverty*, funded by the Joseph Rowntree Foundation. The programme was designed to expand the evidence base on the links between inequality and poverty and to fill this knowledge gap through: Examining philosophical concerns for poverty and inequality and how they may overlap; Estimating the empirical relationship between income inequality and a variety of poverty measures; Reviewing the existing evidence base on potential mechanisms that may drive any relationship. In other work within the programme we investigate some of mechanisms identified in the evidence review to develop a policy toolkit.

Editorial note

Abigail McKnight is Associate Professorial Research Fellow and Associate Director of CASE.

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Any errors and ambiguities remain the author's responsibility.

An overview report, summarising the findings from the empirical analysis and the reviews of mechanisms can be downloaded from the CASE website [Understanding the relationship between poverty and inequality: overview report](#) (Hills et al., 2019).

Abstract

This paper reviews the theoretical literature and empirical evidence on the relationship between poverty, inequality and economic growth. It finds evidence that economic inequality is good for growth as well as new convincing evidence that inequality is bad for growth. Variation in data quality, methodologies, the range of countries included in different studies makes it difficult to compare the evidence. A recent hypothesis that the relationship between inequality and growth might be non-linear, with very low and very high levels of inequality being harmful to growth but a range in between where the relationship is not clearly defined might provide a means to unify some of the conflicting findings.

Key words: Poverty, inequality, growth

JEL codes: I32, D31, O47

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1. Introduction

This review is part of a programme of research exploring the relationship between economic inequality and poverty. The research in this programme includes empirical analysis estimating the statistical relationship within the UK over time and across European and OECD countries at various points in time. This research has identified a positive relationship between income inequality and poverty, using a variety of different inequality and poverty measures (Karagiannaki, 2017; Vizard and Yang, 2017). Empirical estimates show that higher income inequality is associated with higher rates of poverty and increases in income inequality are associated with increases in poverty. A series of literature reviews explore the evidence on how various mechanisms might drive the observed correlation between economic inequality and poverty. These include resource constraints, dynamic mechanisms and mechanisms associated with crime, the legal system and punitive sanctions. A number of other mechanisms such as geographic segregation, political economy, public opinion and shifts in social and cultural norms have been explored elsewhere (McKnight, Duque and Rucci, 2017).

This paper provides a review of existing evidence on the relationship between poverty, inequality and growth. It outlines the main theories that have been proposed and central questions that have been tested through empirical analysis. The causal mechanisms are potentially multi-directional, this is reflected in the range of hypotheses which have been empirically tested in the literature and shape the structure of this review. If inequality promotes economic growth that benefits the least well-off then growth may be a mechanism through which inequality could lead to lower poverty in the future. However, if inequality hampers growth or if it promotes a form of growth which is skewed in favour of the better-off then it could lead to an increase in relative poverty in the future.

2. Background

A key question explored in the early literature was whether growth would result in lower inequality as countries advanced through the stages of economic development. Kuznets illustrated this hypothesis through an inverse-U shaped curve and outlined a theory that inequality will first rise and then fall as economic growth increases and an economy becomes more developed (Kuznets, 1955). A stream of studies followed testing this hypothesis with some showing evidence for and some providing evidence against. More recently the focus of interest has shifted to estimating the reverse relationship, with research trying to establish whether inequality promotes economic growth or is harmful for growth. This is perhaps not surprising as in the last quarter of the 20th Century, economic inequality increased in many high income countries. If it is clearly established that economic inequality is harmful for economic growth then a much stronger case for reducing inequality can be made than if evidence suggests that inequality is beneficial for growth.

Trying to find a definitive answer to question of whether inequality is harmful or beneficial for economic growth is not straightforward. There are studies which estimate a positive relationship between economic inequality and economic growth and studies that estimate a negative relationship. Taken as a whole, the results are ambiguous, are sensitive to estimation techniques, data and time periods covered.

In terms of the causal mechanisms outlined in the theoretical literature and tested in empirical research, there are plausible mechanisms that can explain both positive and negative influences of inequality on growth. Recent developments have begun to explore if the relationship between inequality and growth is non-linear – with very low and very high levels of economic inequality being particularly harmful to growth but a wide band in the middle where the impact of inequality on growth is ambiguous, and where the rate of growth is more likely to be influenced by a range of other more influential factors.

The relationship between growth and poverty has been examined most extensively in the development literature. Typically this research explores the relationship between growth and levels of absolute rather than relative measures of income poverty.

A triangle has been used to describe the interrelationship between these three concepts: the poverty-growth-inequality triangle (Bourguignon, 2004) or the growth-inequality-poverty triangle (Dhrifi, 2015). Bourguignon (2004) shows that in the absence of distributional change, economic growth is necessary to reduce levels of absolute poverty. Where growth benefits everyone equally, this will lead to a reduction in

absolute poverty levels. However, where the rewards from economic growth are skewed in favour of the already well-off, economic growth does not lead to a reduction in levels of relative poverty. Therefore, the relationship between economic growth and relative income poverty is ambiguous.

We structure the research evidence around key theoretical hypotheses that have been developed and tested in the literature examining the relationship between economic inequality and economic growth:

- 1) Economic growth is good for economic inequality: growth leads to lower levels of inequality (Section 3);
- 2) Economic inequality is good for economic growth: inequality promotes growth (Section 4);
- 3) Economic inequality is bad for economic growth: inequality leads to lower levels of growth (Section 5);
- 4) The relationship between growth volatility and income inequality: higher volatility leads to higher inequality (Section 6);
- 5) Non-linear relationship between economic inequality and economic growth: the relationship varies at different levels of inequality (Section 7);
- 6) The relationship between poverty, inequality and growth: a three-way relationship exists between poverty, inequality and growth (Section 8).

In each section we first examine the theory and then review the empirical evidence.

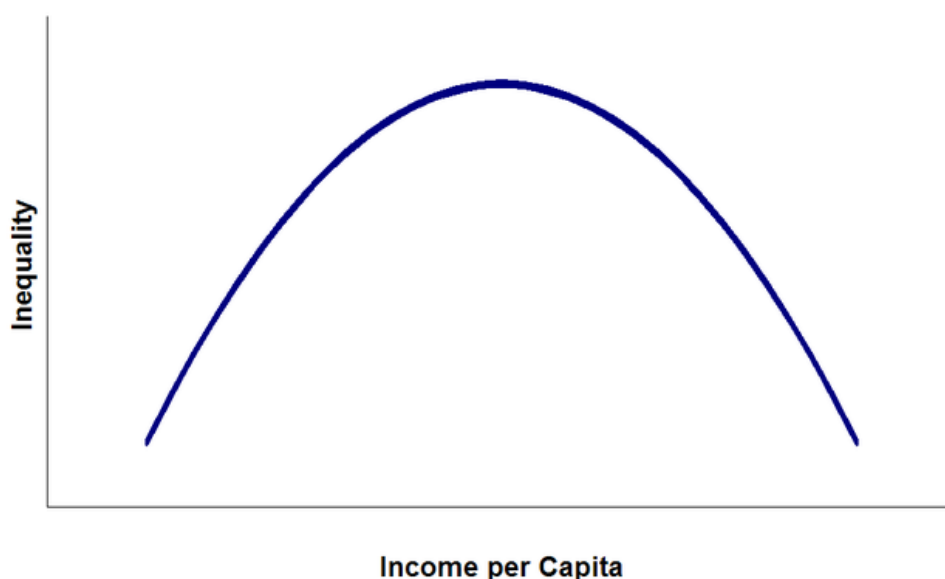
3. Economic growth is good for economic inequality: growth leads to lower levels of inequality

The early literature exploring the relationship between economic inequality and economic growth focused on the stages of economic development. In this section we examine the theory proposed for how inequality will evolve as economies grow and review the empirical evidence from testing these theories.

Theory

Economic growth may be regarded as good for economic inequality in the long run if economic development leads to a more equal distribution of income through altering the distribution of resources and labour in an economy. This mechanism is at the core of the Kuznets's hypothesis, which predicts that inequality first rises and then falls as economic growth increases and an economy becomes more developed (Kuznets, 1955). This relationship is often illustrated using an inverse-U shape curve where inequality is plotted against income per capita: this has become known as 'Kuznets curve' (Figure 1). According to this hypothesis, a shift of labour and resources from agriculture to manufacturing during the early stages of economic development, creates inequalities between the urban manufacturing and rural farming sectors. After this initial increase in inequality, it is hypothesised that inequality will fall as the economy progresses along the development path; with "trickle-down development" argued to reduce inequality through workers earning higher average wages, democratisation, and the establishment of a welfare state.

Figure 1: The Kuznets inverse-U relationship between inequality and economic growth



Empirical evidence

Although Kuznets did publish some empirical evidence he lamented at the time about the lack of good quality data available to test his hypothesis. Since Kuznets (1955) publication data quality has improved and a large volume of empirical evidence has been published which tests the underlying hypothesis. On the one hand, some studies (Ahluwalia, 1976; Papanek and Kyn, 1986; Barro, 1999) do find empirical evidence for an inverted U-shaped curve between economic performance and inequality, but fail to explain variations in inequality between countries or over time. On the other hand, some empirical studies find no clear evidence of the existence of a Kuznets curve (Ravalion, 1995; Deininger and Squire, 1997, 1998; Bruno et al., 1998).

Recent research has challenged Kuznets' use of cross-sectional, cross-country data to illustrate the path of economic development. This includes criticism of the hypothesis on the grounds that the relationship estimated in this way reflects historical differences in inequality between countries, rather than the development of individual countries over time. Some researchers have sought to control for these historical differences. Deininger and Squire (1997), for example, control for historical differences in inequality in their analysis and find no empirical evidence for the Kuznets curve. Taken as a whole, the results are inconclusive and this brings into question whether there really is a natural tendency for inequality to fall as nations become wealthier.

4. Economic inequality is good for economic growth: inequality promotes growth

As noted in the introduction, research on the relationship between economic inequality and economic growth has largely shifted to addressing the opposite question: whether economic inequality is good or bad for economic growth. In this section we examine the theory and evidence which assesses whether economic inequality exerts a positive effect on growth.

Theory

Much of the theory suggesting a positive relationship between economic inequality and economic growth is based on the assumption that inequality leads to greater effort and innovation which in turn generates higher levels of economic growth. According to these theories, wage inequality creates incentives for individuals to gain higher levels of education and skills, to achieve higher wages and to work harder to maximise their income from work. Inequality can increase the incentive for workers to move to higher paying technologically advanced sectors of the economy, generate more innovation, entrepreneurial activity and enterprising behaviour (Lazear and Rosen, 1981; Galor and Tsiddon 1997a, 1997b).

Another hypothesised mechanism which links higher inequality to higher economic growth is through savings and investments. Kaldor (1957) explains how income inequality can generate higher savings which have a positive impact on growth through growth-inducing investment. The assumption is that individuals on a higher income have a greater propensity to save as a result of having income in excess of consumption needs. This in turn leads to higher levels of growth-inducing investment. Inequality may also be good for economic growth if investments require setup costs. Increasing returns to investment may only prevail over some range – for example, formal education may only enhance growth beyond primary schooling (Barro, 1997). Equally, a business may be productive only above some threshold size. In the presence of credit-market imperfections, so called, setup costs mean that concentration of assets can favour growth.

Not only is economic inequality seen to be good for economic growth but according to this theory, tackling inequality can be harmful for growth. This can be seen as evidence that inequality is good for growth *or* that inequality is bad for growth. If redistribution is found to be harmful for growth then this can be used as direct evidence that inequality is good for growth. On the other hand, if inequality above a certain level is so disliked by people that they demand redistribution and this redistribution

reduces growth then this can be seen as evidence that inequality is indirectly bad for growth. Okun (1975) suggests that pursuing equality can reduce efficiency as well as reducing incentives to work and invest and some see this as a trade-off between equality and efficiency. The efforts to redistribute – for example, through progressive taxation, cash transfers and minimum wages - can themselves be costly. This may be the result of administrative costs and disincentives to work for both those who pay taxes and those who receive transfers.

Empirical evidence

Partridge (1997, 2005) finds that overall income inequality in the US and the middle-class share of income are positively related to long-run growth. However, he finds that in the short-run the relationship is less clear. This is consistent with his hypothesis that a vibrant middle-class is crucial for shaping policies which promote inclusive growth, such as investment in education and redistribution through the tax system, but in the short-run may negatively affect growth. Forbes (2000) analysing panel data for 45 countries over the period 1966-1995, finds evidence that in the short term and medium term, an increase in the level of income inequality (Gini coefficient) within countries is estimated to have a positive relationship with economic growth.

Li and Zou (1998) use panel data from 46 countries for the years 1947–1994 and find that income inequality (Gini coefficient) is positively, and most of the time significantly, associated with economic growth. Although they do warn against reading the relationship between inequality and growth as a causal relationship.

Frank (2009a) using a 1945-2004 panel of US state-level data on income inequality measures, examines the relationship between income inequality (in particular the concentration of income at the top of the income distribution) and economic growth. He shows that the share of income held by the top decile group experienced a prolonged period of stability after World War II, but this was followed by a substantial increase in inequality during the 1980s and 1990s. His estimates suggest that the long-run relationship between inequality and growth is positive and he concludes that it is driven largely by the concentration of income in the upper end of the income distribution.

5. Economic inequality is bad for economic growth: inequality leads to lower levels of growth

In this section we review the literature that supports the notion that economic inequality can harm economic growth. There are a number of mechanisms that have been explored in the literature, including socio-political instability, imperfect financial markets or fiscal redistribution and distortions.

Theory

A number of theories have been suggested for how economic inequality can directly or indirectly have a negative impact on economic growth.

In contrast to Kaldor's positive view of savings and investment behaviour of the rich leading to economic growth (see above), more recent arguments, notably expressed since the 2007/08 financial crisis, have highlighted the tendency of the rich to invest their savings in non-productive assets and commodities such as housing, luxury goods and collectible items (Stiglitz, 2016). Growth in these commodity markets has relatively limited potential to impact positively on the wider economy, since much of any growth in non-productive assets manifests as increases in prices and can simply lead to property or asset bubbles, rather than stimulating greater employment or productivity.

There is a number of theories that highlight the role imperfect capital markets play in linking higher economic inequality with lower economic growth. Imperfections in capital markets are often seen to reflect asymmetric information and limitations of legal institutions (see, for example, Loury, 1981; Galor and Zeira, 1993; and Piketty, 1997). Galor and Zeira (1993) outline a model which describes how unequal access to education due to economic inequality and imperfect capital markets, results in sub-optimal investments in education (human capital) and therefore a negative effect on growth.

Alesina and Rodrik (1994) suggest that it is not the direct effect of inequality that is harmful for growth but the fact that greater inequality (for example, in income, education or land ownership) leads to greater demand for redistribution, which is assumed to be harmful for growth. In their political-economy model of economic growth they assume that there are differential preferences for redistribution related to heterogeneity in the ownership or endowment of capital and labour. Since tax on capital is assumed to have a negative impact on accumulation and growth, this difference also means that individuals differ in terms of their preferences over the ideal growth rate. An individual whose income derives entirely from capital prefers the tax rate that maximizes the economy's growth rate. However, anyone else would prefer a higher tax, with a

correspondingly lower growth rate. The lower an individual's share of capital income (relative to their labour income), the higher is their ideal tax, and the lower their ideal growth rate. A more equitable distribution is assumed to mean that the median voter is better endowed with capital, as the median voter influences government policy on taxation, the consequence is a lower equilibrium level of capital taxation and higher economic growth.

Persson and Tabellini (1994) develop a similar argument that inequality is indirectly harmful to growth because inequality leads to tax and regulatory policies that they see as harmful for growth. In their model, economic growth is assumed to be largely determined by the accumulation of capital, human capital, and knowledge usable in production.

“The incentives for such productive accumulation hinge on the ability of individuals to appropriate privately the fruits of their efforts, which in turn crucially hinges on what tax policies and regulatory policies are adopted. In a society where distributional conflict is more important, political decisions are likely to result in policies that allow less private appropriation and therefore less accumulation and less growth. But the growth rate also depends on political institutions, for it is through the political process that conflicting interests ultimately are aggregated into public-policy decisions.”

(Persson and Tabellini, 1994, p.600).

Another channel explored in the theoretical literature, through which inequality can be harmful for growth is social and political unrest. According to this theory, in an unequal society, the disadvantaged can be motivated to commit crime, riot and engage in other disruptive activities (Barro, 2000; Alesina and Perotti, 1996 and Benhabib and Rustichini, 1996). Theoretically, this can have a negative impact on economic growth due to the waste of resources (effort) diverted to non-productive disruptive activities and potential victims diverting resources in defensive effort. In addition, threats to property rights can lead to a reduction in investments, and social unrest can threaten the stability of political institutions.

Theory has also linked wealth inequality coupled with inefficient credit markets to reduced economic growth. Would-be entrepreneurs lacking their own capital or access to credit are unable to invest and consequently economic growth is lower (Blanchflower and Oswald, 1998). Access to credit may be hindered by imperfect information or rationing. Much of this literature assumes that would-be entrepreneurs' wealth is observable

but their ability is not, and many of the theoretical models developed in this literature assume that wealth (collateral) is used as a screening device by lenders (Coco, 2000; Besanko and Thakor, 1987). The consequence of this is that insufficient wealth holdings result in sub-optimal levels of investment among able entrepreneurs, particularly poorer entrepreneurs who are more dependent on credit (de Meza and Webb, 1999). Coco and Pignatoro (2010) outline an equilibrium where poor but able entrepreneurs may actually subsidise rich and incompetent entrepreneurs, or even be excluded altogether due to unobservable wealth differences and asymmetric information on heterogeneous effort preferences and choices. Their model is based on the assumption that wealth, or at least some wealth, is unobservable by the bank (credit market) and due to decreasing absolute risk aversion (higher levels of wealth are associated with a greater willingness to take on risk), wealthy individuals are more likely to become entrepreneurs irrespective of competence and the amount of effort they are prepared to put into their entrepreneurial activity. As a result, investment and growth are sub-optimal. Coco and Pignatoro's (2010) theoretical model findings suggest that a more efficient allocation of credit could be achieved by targeting lower wealth individuals.

Research has also looked at the impact of top-end inequality on growth. One effect of growth in the concentration of income at the top of the distribution may be to price out the less well-off from access to certain markets and investments. In the years leading up to the financial crisis, access to these markets for those who would otherwise be unable to afford it (based on current income and savings levels) was propped up by growth in consumer credit. One of the hypotheses for why people have become more willing to go into debt to attain standards of living beyond their current means, is that growing inequality has made the lifestyles of the rich ever more visible and noticeable in the mass media. This so-called "Hello magazine effect" has been attributed to making the consumption patterns of the rich more desirable (OECD, 2008), resulting in "trickle-down consumption" and changes in consumer preferences amplified throughout wider society as the less wealthy attempt to emulate the rich (Bertrand and Morse, 2013). As a result, rising inequality due to top-end led rather than inclusive growth may change social norms around what it means to be poor and accepted norms on reasons for accumulating financial debt and credit.

Both governments and the private financial sector have been criticised for enabling the credit growth that has perpetuated unsustainable and ultimately poverty-entrenching consumption patterns. It has been argued, for example, that the US government responded to inequality by easing the flow of credit to poorer households in a push for increased

home ownership among the poor (Raghuram, 2010). This easing meant that more households became indebted and this can have a negative impact on future consumption and growth.

Adair Turner, in his book *Between Debt and the Devil* (Turner, 2016), also argues that since the financial deregulation of the 1980s, financial innovations and “financial deepening” has allowed private banks ever more freedom to “create credit, money and purchasing power which did not previously exist.” (Turner, 2016, p.6). Furthermore, he points out that most of the lending in advanced economies has not supported new social or business investment “but instead funds either increased consumption or the purchase of already existing assets, in particular real estate and the urban land on which it sits” (Turner, 2016, p.6). Piketty (2014) concludes that through deregulation of controls over financial flows since the 1980s, both the government and the finance sector have played a key role in driving a shift in the share of national income towards capital and assets and away from labour. Considering that about half of the income of the top one percent constitutes non-labour income (Dabla-Norris et al., 2015) compared with a negligible amount for poor households, this shrinking wage share coupled with growth in top incomes means that even less of this growth benefits the poor further down the income distribution.

Empirical evidence

The theoretical negative relationship between economic inequality and economic growth is supported by cross-country evidence from a recent IMF study showing that an increase in the income share of the top income quintile group is followed by a decline in GDP growth over the medium term (Dabla-Norris et al., 2015). This research provides further evidence that growth is linked in particular to the income shares of the poor and the middle class, estimating that while a one percentage point increase in the income share of the top 20% will drag down GDP growth over the medium term, a rise in the income share of the bottom 20% actually boosts growth.

The evidence published in Dabla-Norris et al. (2015) suggests that higher income shares for households in the middle and lower decile groups are not only beneficial for the poor from a static perspective, but can enhance future growth which then results in further income growth for the poor and middle classes. The authors state that this is due to lower earners having a higher marginal propensity to consume rather than save, coupled with the high density of people at these lower income levels compared to the very rich. This means that the boost to aggregate demand is much greater than if income growth were concentrated among a small number of increasingly wealthy high earners. Conversely,

increasing inequality will depress aggregate demand and economic growth, unless the increased savings of the rich are offset by increased borrowing among middle or low income earners. In an increasingly unequal society, credit growth becomes necessary to maintain economic growth, but as the aftermath of the crisis highlights, this can be unsustainable and ultimately have detrimental effects on both growth and poverty. In the UK, aggregate household debt grew from 100% to almost 160% of total annual disposable income in the decade leading up to the crisis (Bunn and Rostom, 2015). The credit crunch reduced consumption in heavily indebted households and this is believed to have contributed to the length and depth of the economic recession (Bunn and Rostom, 2015).

Alesina and Rodrik (1994) test their theoretical model which links greater inequality with higher redistribution, which is hypothesised to be harmful to economic growth, using data for a number of countries between 1960 and 1985, and find that higher economic inequality in income and land ownership (which they use as a proxy for wealth) is correlated with lower subsequent economic growth. They conclude that this is supportive evidence for the theory that inequality in income and wealth leads to greater redistribution, and greater redistribution is harmful for growth. Persson and Tabellini (1994) also test the theory linking greater inequality with lower economic growth as a result of tax and regulatory policies. They use an historical panel of nine currently developed countries - the United States and eight European countries (1830-1985) - and a second larger postwar sample containing a broad cross-section of 56 countries, both developed and less developed (1960-1985). They too estimate a negative relationship between income inequality (top 20% share of personal income) and subsequent economic growth (at least in democracies). However, neither explicitly test if the negative relationship is due to redistribution or through some other mechanism and these findings could be used to support the theory that inequality is bad for growth, rather than indirectly via the impact of redistribution.

Frank (2009b) tests the direction of causality between inequality and growth, using the Granger causality test¹ and US annual state-level data over the period 1929–2000. He finds evidence that the income share of the top decile 'Granger-causes' lower income growth, but only weak evidence that income growth 'Granger-causes' the top decile income share. He concludes that his findings indicate that increases in the income share of the top decile negatively impact future income growth with income growth responding negatively to permanent changes in the

¹ The Granger causality test is used to test the direction of causality in terms of the ability to forecast future values of a time series using prior values of another time series (Granger, 1969).

income share of the top decile. This contradicts Frank's earlier study (2009a) which, using a different (inferior) methodology, found that inequality at the top of the income distribution has a positive impact on long-run growth (see above).

Many other studies also find a negative relationship between economic inequality and subsequent economic growth. For example, Assa (2012) builds on the model suggested by Alesina and Rodrik (1994) that higher inequality leads to greater demand for redistribution which has a negative impact on growth, and the idea by Ray (1998) that inequality negatively affects savings, work capacity, economic incentives, and access to and efficiency of credit and financial markets. He uses data for up to 141 countries for the period 1992-2005 and finds a strong negative effect of income inequality on future growth, with a stronger estimated effect for developing countries.

Castello-Climent (2010) finds a negative effect of inequality in income and human capital on economic growth in low and middle income countries. Sukiassyan (2007) finds a negative relationship between inequality and subsequent growth in Central and Eastern Europe and the Commonwealth of Independent States (1988-2002). In a recent review of cross-country evidence by economists at the IMF, Berg and Ostry (2011) conclude that lower inequality can help sustain growth and Ostry, Berg and Tsangarides (2014), using a large panel dataset for 173 countries over the period 1960-2010, find that a rise in inequality increases the risk of a growth spell ending.

Berg, Ostry, and Zettelmeyer (2012) and Berg and Ostry (2011), using large international datasets, find that when growth is looked at over the long term, the hypothesised trade-off between efficiency and equality may not exist. In fact, they find that equality appears to be an important ingredient in promoting and sustaining growth. Contrary to predictions from some of the earlier theoretical models, Berg, et al., (2018), using a large cross-country study, find that redistribution appears to be benign in terms of its impact on growth, except when it is extensive. They also find that lower inequality is correlated with faster and more durable growth. There are a variety of reasons why redistribution might in fact be beneficial for growth including the possibility that redistribution can reduce social unrest and political instability and thereby enhance economic growth (Barro, 1999).

6. Evidence on the relationship between growth volatility and income inequality: higher volatility leads to higher inequality

So far we have reviewed evidence on the relationship between inequality and growth levels. In this section we review evidence on the relationship between growth volatility and income inequality. This literature has tended to focus on a positive relationship. It might be the case that higher income inequality leads to great growth volatility but in our review of the literature we didn't find any research examining this relationship.

Theory

In the theoretical literature various mechanisms have been hypothesised as potential drivers behind a positive relationship between growth volatility and income inequality, whereby higher volatility in economic growth leads to higher income inequality. These include wage setting mechanisms (Caroli and García-Peñalosa, 2002) and human capital investment mechanisms (Checchi and García-Peñalosa, 2004; Galor and Zeira, 1993). In terms of the wage setting mechanism, random shocks affecting output in turn result in workers' marginal products and wages fluctuating over time. The consequence is that risk averse workers willingly accept lower average earnings in exchange for a constant wage offered by risk-neutral entrepreneurs. The lower constant wage may be accepted to avoid periods of unemployment or widely fluctuating hours of work and therefore earnings. In this case, greater volatility leads to an increase in the 'risk premium' workers are willing to forego and the larger the share of income seized by the entrepreneurs. In terms of the human capital investment mechanism, this works through the impact of inequality in wealth on human capital investment. Inherited wealth acts as an insurance mechanism where only individuals with sufficiently large inherited wealth will make risky human capital investments. In riskier economies (for example, where there is higher output volatility) investment in human capital requires larger amounts of inherited wealth. In this case, greater volatility leads to lower average human capital investment, which in turn results in greater educational inequalities and as a consequence higher income inequality.

Empirical evidence

A number of empirical studies have found evidence of a positive relationship between volatility in output or economic growth, and income inequality. Laursen and Mahajan (2005) use a panel of U.S. state-level data covering the period 1945 to 2004 to analyse large income swings, financial crises and terms of trade shocks, to assess the impact of output volatility on the income share of the bottom quintile (as a proxy for

poverty and inequality) and find evidence of a negative relationship. Meaning that higher growth volatility was associated with lower income share of individuals in the bottom quintile. Breen and García-Peñalosa (2005) examine the impact of macroeconomic volatility in output on the distribution of income. They estimate the relationship using cross-sectional data (1960-1990) for 80 developed and developing countries and find that greater output volatility is associated with higher income inequality, where inequality is measure using either the Gini coefficient or the income share of the top quintile.

Calderón and Levy-Yeyati (2009) examine the impact of cyclical output fluctuations and extreme output events (crises) on unemployment, poverty, and inequality using data from 75 countries over the period 1970-2005. They find evidence that output volatility is related to increases in income inequality (Gini coefficient) and poverty (poverty gap and poverty headcount) and the adverse effects are mitigated by initial income per capita as well as public expenditure and labour protection, highlighting the value of social safety nets in times of crisis.

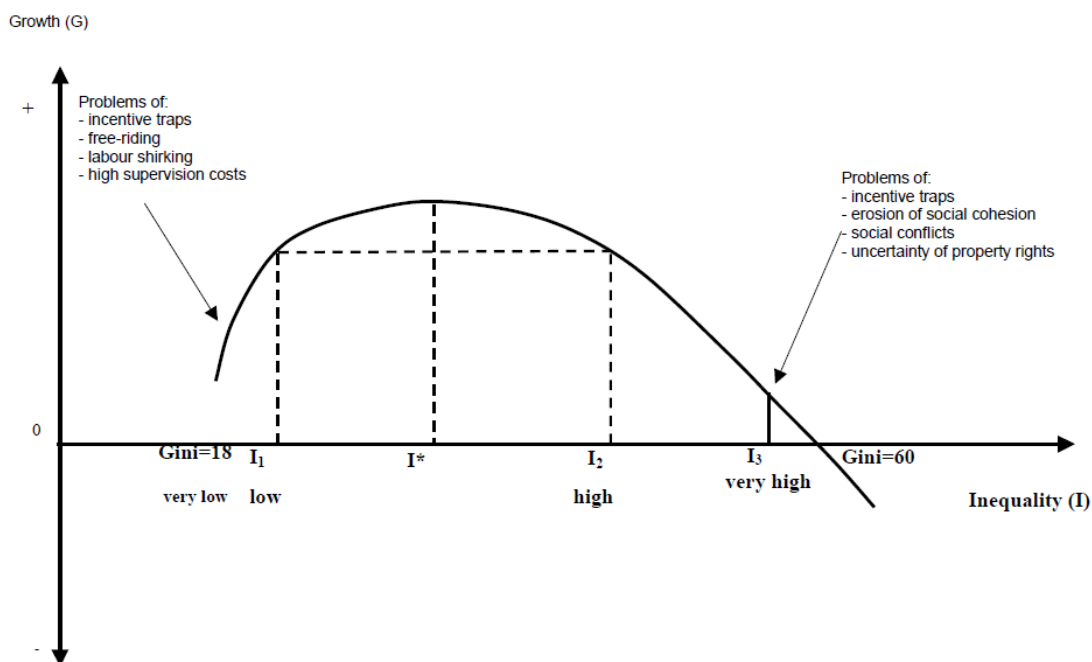
Huang et al (2015) use US state level data 1945-2004 to test the long-run effect of growth volatility on income inequality. They find that larger growth volatility is positively and significantly associated with higher income inequality. However, they found an asymmetry with larger growth volatility positively and significantly only associated with higher income inequality for positive economic growth but insignificant for negative economic growth.

7. Non-linear relationship between economic inequality and economic growth: the relationship varies at different levels of inequality

Although many of the theories and empirical estimates of the relationship between inequality and growth assumes that the relationship is linear, this assumption has been questioned by a number of researchers (for example, Benabou (1996), and Banerjee and Duflo (2003)), who suggest that at different levels of inequality the relationship with growth varies in a non-linear way.

Cornia, Addison and Kiitsi (2003, 2004) suggest that the relationship between economic growth and economic inequality is concave; inequality that is 'too low' or 'too high' can, *ceteris paribus*, be detrimental to growth, but between these two extremes exists a growth-maximizing range which varies across countries (Figure 2).

Figure 2: Non-linear relation between inequality and growth



Source: Cornia, Addison and Kiitsi (2003), Figure 4, p.18 (reproduced).

The hypothesised non-linear relationship encompasses a number of the theories outlined earlier in this paper on why inequality might be either good or bad for growth. Where inequality is very low, over some range growth is first assumed to rise when inequality increases but then falls when inequality is very high. As Cornia, Addison and Kiitsi (2004, p.44-45) put it:

“Such a range varies across countries depending on structural factors such as asset distribution, the share of agriculture in total

output, natural resource endowment, the history of past policy decisions, and, thus, the accumulation and sectoral distribution of physical and human capital.

When the real income distribution is too compressed and only poorly reflects differences in talent, merit, and effort, growth may be inhibited by a weakening of individual work incentives, by attempts at labour shirking and free-riding, and by the search for a 'quiet working life'."

But, when inequality is 'too high':

"...growth turns sharply negative, as the observed distribution of income deviates markedly from the latent distribution of rewards based on talent, merit, and effort. This mainly happens because of the malfunctioning of labour, capital, and product markets, or because of unbalanced access to education, land, credit, and insurance or by sheer discrimination and segregation. This case is also characterized by an erosion of incentives which may lead to output contraction among the self-employed and to shirking and free-riding among dependent workers."

Cornia, Atkinson and Kiitsi (2003, 2004) also conduct an econometric test of a non-linear relationship between inequality and growth. They used data for 73 countries over the period 1980-1998. Comparing the results from using a linear function and a quadratic function they find that the quadratic function fits the data substantially better than the linear function and identifies a statistically significant concave relationship. Their estimates suggest that countries experiencing an increase in inequality are likely, on average, to experience a slowdown in growth.

Another form of non-linearity in the relationship between inequality and growth could be the variation estimated in a number of studies across low, middle and high income countries. Although it may not be strictly speaking due to a non-linear relationship between inequality and growth, a number of studies have found that any estimated relationship varies across countries.

Controls for initial level of income allows for the possibility of convergence, or for countries to be placed on a development path (defined in terms of income per capita) along which the relationship between inequality and growth can vary. As we saw in Section 3, Kuznets hypothesised that as income per capita increased, inequality would first rise and eventually fall. However, the results do not support this hypothesis. For example, Barro (2000) estimates that inequality has a negative impact on growth in low income countries, but a positive effect on growth in high income countries. Casetllo-Climent (2010) estimates a

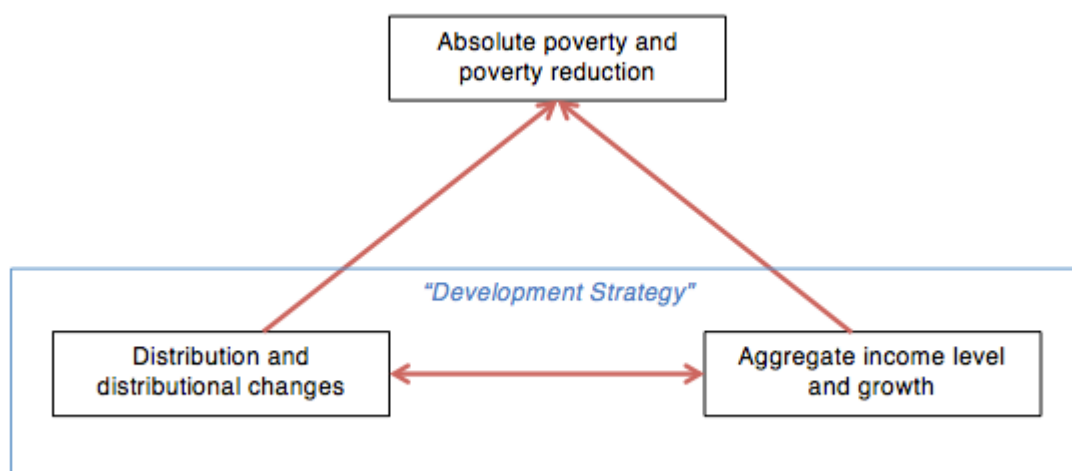
negative effect of inequality (income and human capital) on economic growth in low and middle income countries. Barro (2000) and Lin et al (2009) find what they describe as a 'non-linear inequality growth nexus' with inequality encouraging growth in high income economies but slowing growth in low income economies. In addition, Banerjee and Duflo (2003) and Assa (2012) estimate that the relationship is negative in developing countries.

8. The relationship between poverty, inequality and economic growth: a three-way relationship exists

Our interest lies not just in the relationship between inequality and growth but also how poverty fits into the macro-level picture. There is an extensive literature examining the relationship between poverty and economic growth within developing countries. These studies typically estimate this relationship using measures of absolute income poverty (mainly using minimum absolute income poverty thresholds, such as \$1/\$1.25/\$2.50 day). In low income countries, growth has been shown to be an important driver for absolute poverty reduction. Many studies test the relationship between poverty and growth through estimating the growth elasticity of poverty – how much a given rate of economic growth reduces poverty or how much poverty declines in percentage terms for a given percentage rise in economic growth – we do not provide an extensive review of this literature here as it is not the focus of this review. However, we are interested in the fact that some of this research has shown that inequality also plays an important role in determining the relationship between poverty and economic growth (for example, see Adams, 2004; Bourguignon, 2003, 2004; 2019; Epaulard, 2003; Fosu, 2008, 2009; Kalwij and Verschoor, 2007; Ravallion, 1997) and we review some of the findings from this literature.

A poverty-inequality-growth triangle (sometimes called the growth-inequality-poverty triangle (Dhrifi, 2015)) was first used by Bourguignon (2004) to describe the fact that a country's change in absolute poverty can be fully determined by its change in income growth and income inequality (Figure 3).

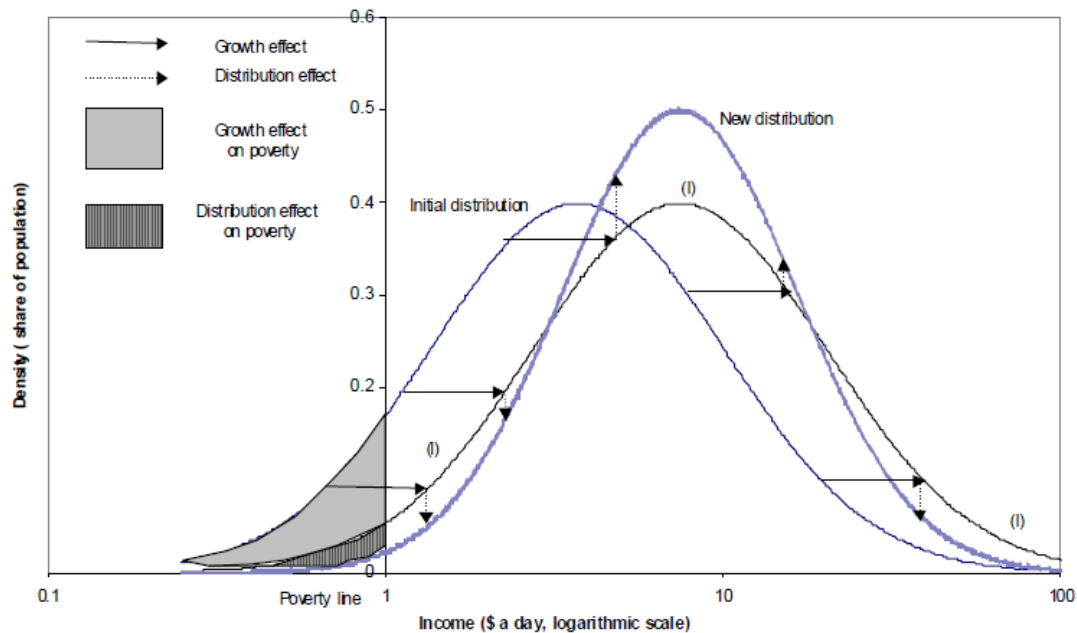
Figure 3: The poverty-inequality-growth triangle



Source: Bourguignon (2004), p.4. (reproduced).

Bourguignon (2004) also introduces a useful identity which expresses the change in absolute poverty as a function of: (a) the growth in mean income and (b) changes in the distribution of relative income (Change in Poverty \equiv F(growth, distribution, change in distribution)). He illustrated this identity using a diagram (Figure 4).

Figure 4: Decomposition of change in income distribution and poverty into growth and distributional effects



Source: Bourguignon (2004) Figure 1, p.7. (reproduced).

A large scale empirical study covering 138 countries over the period 2005–2010 (Khan et al., 2014), tested for empirical evidence of a poverty-growth-inequality triangle and found that:

- The impact of economic growth and income inequality on poverty reflects the fact that income inequality increases poverty while economic growth decreases poverty;
- The impact of inequality on increasing poverty is somewhat greater than the effect of growth in average income in reducing overall poverty in a sample countries;
- Poverty itself is also likely to be a barrier for poverty reduction [see more on this below];
- Inequality seems to predict lower future growth rates.

Kwasi (2010) shows that there are many countries where GDP or income growth may not translate to poverty reduction, with a number of countries registering only modest poverty reductions despite strong growth. Hull (2009) shows that growth in one sector of the economy will not automatically translate into poverty reduction as much depends on the profile of growth (in terms of employment or productivity intensity),

the sectors in which those in poverty are employed, and the extent of mobility across sectors.

Bhalla (2002) challenged previous use of changes in mean income (or consumption) to measure economic growth rather than changes in GDP per capita and shows that this led to underestimates of the relationship between growth and inequality. Another methodological consideration is whether initial levels of inequality should be controlled for. High initial levels of inequality have been found to limit the effectiveness of growth in reducing poverty (see, for example, Kwasi, 2010). Adams (2004) reviews a number of studies which provide estimates of the growth elasticity of poverty and concludes that earlier estimates appear to underestimate this relationship. He finds that the relationship between poverty and growth in low and middle income countries is sensitive to how growth is measured (income or GDP) but even with improved measures, estimates of the growth elasticity of poverty vary between countries and that the relationship greatly depends on initial levels of inequality.

Fosu (2009) also finds that initial inequality differences can lead to substantial cross-country disparities in the income-growth elasticity of poverty. He finds that initial inequality negatively affects the impact of GDP growth on poverty reduction for countries in Sub-Saharan Africa. Ravallion (1997) finds that if inequality is very high, countries that would have very good growth prospects at low levels of inequality may see very little growth and poverty reduction (or even a worsening in both).

However, there isn't a consensus on the role of inequality in mediating the relationship- between growth and poverty. Ravallion (2012) suggests that it is initial poverty rather than income inequality that affects economic growth. Ravallion questions why we do not find poverty convergence; countries starting with higher poverty rates do not see higher proportionate rates of poverty reduction. His research suggests that, at mean consumption, high initial poverty has an adverse effect on consumption growth and also makes growth less poverty-reducing. Thus, for many poor countries, the growth advantage of starting out with a low mean is lost due to a high incidence of poverty. In other evidence, Breunig and Majeed (2016) find that the negative impact of inequality on growth is concentrated in countries with high rates of poverty.

There is also research exploring why poverty can be harmful for growth. If individuals living in income poverty are more likely to suffer poor health and low productivity as a result (Perotti, 1996; Galor and Moav, 2004), then labour productivity and therefore economic growth could be lower than they would have been if poverty had been lower (Stiglitz, 2012). In addition there is evidence that child poverty is associated with a range of poorer adult outcomes related specifically to individuals' productive ability

– affecting education, health and employment. This disadvantage limits adults' productive contribution to growth and growth will be lower as a direct consequence. A systematic review of the literature on the effects of child poverty highlights how much of this is due to the fact that 'Money Matters' (Cooper and Stewart, 2013).

Another reason why poverty may hamper economic growth is explored by Bell et al. (2017) who examine the relationship between family background and innovation. They find that children of low-income parents are much less likely to become inventors than their higher-income background counterparts (as are minorities and women). Decompositions using education outcomes indicate that this income-innovation gap can largely be accounted for by differences in human capital acquisition during childhood. They also identify "innovation exposure effects" during childhood by showing that growing up in an area with a high innovation rate in a particular technology class is associated with a much higher probability of becoming an inventor specifically in that technology class.

Evidence that economic growth has not benefited disadvantaged groups or disproportionately benefited the already well-off has led to calls for, and a policy focus on, pro-poor or 'inclusive growth'. However, although it sounds counter-intuitive, it is possible to have pro-poor growth alongside rising inequality and increasing poverty rates due to re-ranking; those moving up the income distribution are simply replaced by new entrants (Chzhen, Toczydlowska and Handa, 2016; Van Kerm and Pi Alperin, 2015; Jenkins and Van Kerm (2006) contrast the USA with West Germany over the 1980s and 1990s).

City level evidence also shows that it is possible to have economic growth without poverty reduction (Lee et al., 2014; Lupton, 2016). This research shows that many of the most economically successful UK city economies have experienced stable or increasing poverty rates even during periods of economic growth. The researchers conclude that the reason for this is partly that growth in a relatively small number of high-value sectors can generate increasing economic output without having any substantial effect on increasing employment. In addition, the jobs that are generated do not necessarily provide a route out of poverty due to the problems of low pay, precarious work and lack of in-work progression.

9. Concluding remarks

In this paper we have reviewed evidence on the relationships between economic inequality, poverty and economic growth. In the early literature the focus was on examining the relationship between economic growth and economic inequality. Simon Kuznets' influential 1955 paper set out a hypothesis that as countries advance through the stages of development, inequality will first rise and then fall (the Kuznets curve). Kuznets provided some estimates of this relationship but lamented at the time the lack of good quality data. Later studies, with higher quality data, suggest that this relationship does not hold.

In more recent times, interest shifted to examining the opposite relationship: whether inequality is good or bad for growth. There is now an extensive literature covering the theoretical relationship and providing empirical evidence supporting both hypotheses. Results seem to hinge on data quality, differences in measures used, choice of control variables and statistical estimation techniques. Although it is possible to pick holes in some of these studies, one way in which the ambiguity in the results and the opposing positions can be aligned is through considering that the relationship between inequality and growth is non-linear.

Cornia, Addison and Kiiski (2003, 2004), outline a model where at lower levels of inequality, growth first rises as inequality increases, and at very high levels of inequality, growth falls with further increase in inequality. Between these two levels there exists a range where the relationship between inequality and growth is ambiguous.

Research has also examined the three way relationship between poverty, inequality and growth. Bourguignon (2004) shows that a country's change in absolute poverty can be fully determined by the change in income growth and income inequality. However, this identity does not hold for poverty measured in relative terms. While growth may be a key factor in reducing absolute poverty in low income countries, the idea held by some that inequality will promote growth and this growth will mean that the benefits from growth will 'trickle-down' and thus reduce poverty, is disproved in the literature. Evidence suggests that in many cases growth benefits the already well-off and that poverty, in fact, has a negative impact on the prospects of growth.

Bibliography

- Adams, R. H. (2004). 'Economic growth, inequality and poverty: Estimating the growth elasticity of poverty', *World Development* 32(12), 1989-2014.
- Ahluwalia, M. S. (1976). 'Inequality, poverty and development', *Journal of Development Economics*, 3(4): 307-342.
- Alesina, A., and Rodrik, D. (1994). 'Distributive politics and economic growth', *Quarterly Journal of Economics*, 109(2), 465-490.
- Alesina, A., and Perotti, R. (1996). 'Income distribution, political instability, and investment', *European Economic Review* 40(6): 1203-1228
- Assa, J. (2012). 'Inequality and growth re-examined', *Technology and Investment*, 3(1): 1-6.
- Banerjee, A.V., and Duflo, E. (2003), 'Inequality and Growth: What Can the Data Say?' *Journal of Economic Growth*, 8(3): 267-99.
- Barro, R.J. (2000). 'Inequality and Growth in a Panel of Countries.' *Journal of Economic Growth*, 5(1): 5-32.
- Barro, R.J. (1999). 'Inequality, Growth, and Investment', NBER Working Papers 7038, National Bureau of Economic Research.
- Barro, R.J. (1997). *Determinants of Economic Growth: A Cross-Country Empirical Study*, Cambridge MA, MIT Press.
- Bell, A., Chetty, R., Jaravel, X., Petkova, N. and Van Reenen, J. (2017). 'Who Becomes an Inventor in America? The Importance of Exposure to Innovation', CEP Discussion Paper No 1519, Centre for Economic Performance, LSE, <http://cep.lse.ac.uk/pubs/download/dp1519.pdf>.
- Benabou, R. (1996), 'Inequality and growth', in: B. S. Bernanke and J. Rotemberg. *NBER Macroeconomics Annual 1996*. Cambridge, MA: MIT Press, 11-74.
- Benhabib, J., and Rustichini, A. (1996), 'Social conflict and growth', *Journal of Economic Growth*, 1, 125-142.
- Bertrand, M., and Morse, A., (2013). 'Trickle-Down Consumption' NBER Working Paper No. 18883. National Bureau of Economic Research.
- Berg, A., and Ostry, J.D. (2011). 'Inequality and Unsustainable Growth: Two Sides of the Same Coin?', IMF Staff Discussion Note 11/08 (Washington: International Monetary Fund).

- Berg, A., Ostry, J. D., Tsangarides, C. G., and Yakhshilikov, Y. (2018). 'Redistribution, inequality, and growth: new evidence', *Journal of Economic Growth*, 23(3): 259–305.
- Berg, A., Ostry, J.D., and Zettelmeyer, J. (2012). 'What Makes Growth Sustained?', *Journal of Development Economics*, 98, 2, 149–166.
- Besanko. D. and Thakor, A.V. (1987). 'Competitive equilibrium in the credit market under asymmetric information', *Journal of Economic Theory*, 42(1): 167-182.
- Bhalla, S. S. (2002). 'Imagine there's no country: Poverty, Inequality and Growth in the Era of Globalization', Washington DC: Institute of International Economics.
- Blanchflower, D. G., and Oswald, A. J. (1998). 'What Makes an Entrepreneur?', *Journal of Labor Economics*, 16(1): 26-60.
- Bourguignon, F. (2019). 'Poverty, inequality and growth', in Atkinson, A. B., *Measuring Poverty around the World*, Princeton University Press.
- Bourguignon, F. (2004). 'The Poverty-Growth-Inequality 'Triangle'' (Indian Council for Research on International Economic Relations, New Delhi Working Paper No. 125). Indian Council for Research on International Economic Relations, New Delhi, India.
- Bourguignon, F. (2003). 'The growth elasticity of poverty reduction: Explaining heterogeneity across countries and time periods', in Eicher, T. S. and S. J. Turnovsky (Eds.), *Inequality and Growth: Theory and Policy Implications* (pp.3-26). Cambridge, MA: MIT Press.
- Breen, R., and García-Peñalosa, C. (2005). 'Income Inequality and Macroeconomic Volatility: An Empirical Investigation', *Review of Development Economics*, 9: 380–398. doi:10.1111/j.1467-9361.2005.00283.x
- Breunig, R. V., and Majeed, O. (2016). 'Inequality or Poverty: Which is Bad for Growth?' CAMA Working Paper No. 43/2016.
- Bruno, M., Ravallion, M., and Squire, L. (1998). 'Equity and Growth in Developing Countries: Old and New Perspectives on the Policy Issues', in Tani, V. and Chu, K-Y, (editors), *Income Distribution and High Growth*, Cambridge, MA: MIT Press.
- Bunn, P., and Rostom, M. (2015). 'Household Debt and Spending in the United Kingdom', Bank of England Staff Working Paper No. 554.
- Calderón, C., and Levy-Yeyati, E. L. (2009). 'Zooming in: From Aggregate Volatility to Income Distribution', World Bank Policy Research Working Paper Series, No. 4895.

- Caroli, E., and García-Peñalosa, C. (2002). 'Risk Aversion and Rising Wage Inequality', *Economic Letters*, 77(1): 21-26.
- Castelló-Climent, A. (2010). 'Inequality and growth in advanced economies: an empirical investigation', *Journal of Economic Inequality*, 8(3): 293-321.
- Checchi, D. and García-Peñalosa, C. (2004). 'Risk and the distribution of human capital', *Economics Letters*, 82(1): 53-61.
- Chzhen, Y., Toczydlowska, E., and Handa, S. (2016). 'Child Poverty Dynamics and Income Mobility in Europe', Innocenti Working Paper No.2016-16, UNICEF Office of Research, Florence.
- Coco, G. (2000). 'On the Use of Collateral', *Journal of Economic Surveys*, 14: 191-214.
- Coco, G. and Pignataro, G. (2010). 'Inequality of opportunity in the credit market', No 2010/5, DEMQ Working Paper Series, University of Catania, Department of Economics and Quantitative Methods.
- Cooper, K., and Stewart, K. (2013). 'Does money affect children's outcomes? A systematic review', Joseph Rowntree Foundation Report, CASereport 80, <http://sticerd.lse.ac.uk/dps/case/cr/casereport80.pdf>
- Cornia, G. A., Addison, T. and Kiiski, S. (2004). 'Income distribution changes and their impact in the post Second World War period', in Cornia (ed) *Inequality, growth and poverty in an era of liberalization and globalization*, Oxford: Oxford University Press.
- Cornia, G. A., Addison, T. and Kiiski, S. (2003). 'Income Distribution Changes and their Impact in the Post-World War II Period', Discussion Paper No. 2003/28, UNU/WIDER.
- Dabla-Norris, E., Kochhar, K., Suphaphiphat, N., Ricka, F., and Tsounta, E. (2015). 'Causes and consequences of income inequality: A global perspective', IMF Staff Discussion Note, International Monetary Fund.
- Deininger, K.W., and Squire, L. D. (1998). 'New ways of looking at old issues: inequality and growth', *Journal of Development Economics*, 57, 259-287.
- Deininger, K., and Squire, L. (1997). 'Economic growth and income inequality: reexamining the links', *Finance and Development*, March, 38-41.
- De Meza, D. and Webb, D. (1999). 'Wealth, Enterprise and Credit Policy', *The Economic Journal*, 109(455): 153-63.

Dhrifi, A. (2015). 'Financial Development and the "Growth-Inequality-Poverty" Triangle', *Journal of the Knowledge Economy*, 6(4): 1163–1176.

Dollar, D., and Kraay, A. (2001). *Growth is good for the poor*. World Bank, Washington, DC.

Duque, M., and McKnight, A. (2019). 'Understanding the relationship between inequalities and poverty: a review of dynamic mechanisms', CASEpaper / LIP paper 7, London: Centre for Analysis of Social Exclusion, LSE.

Duque, M., and McKnight, A. (2019). 'Understanding the relationship between inequalities and poverty: mechanisms associated with crime, the legal system and punitive sanctions', CASEpaper 215 / LIP paper 6, London: Centre for Analysis of Social Exclusion, LSE.

Epaulard, A. (2003), 'Macroeconomic Performance and Poverty Reduction', IMF Working Paper No. 03/72, International Monetary Fund.

Forbes, K. (2000). 'A Reassessment of the Relationship between Inequality and Growth', *American Economic Review*, 90, 869-887.

Fosu, A.K. (2009). 'Inequality and the Impact of Growth on Poverty: Comparative Evidence for SubSaharan Africa', *Journal of Development Studies*, 45(5): 726-745.

Fosu, A.K. (2008). 'Inequality and the Growth-Poverty Nexus: Specification Empirics Using African Data', *Applied Economics Letters*, 15, pp. 563-566.

Frank, M. W. (2009a). 'Inequality and growth in the United States: Evidence from a new state-level panel of income inequality measures', *Economic Inquiry*, 47: 55–68.

Frank, M. W. (2009b). 'Income inequality, human capital, and income growth: Evidence from a State-Level VAR analysis', *Atlantic Economic Journal*, 37:173–185.

Galor, O., and Moav, O. (2004). 'From Physical to Human Capital Accumulation: Inequality and the Process of Development', *Review of Economic Studies*, 71, 1001–1026. doi:10.1111/0034-6527.00312.

Galor, O., and Tsiddon, D. (1997a). 'The Distribution of Human Capital and Economic Growth'. *Journal of Economic Growth*, 2, 93-124.

Galor, O., and Tsiddon, D. (1997b). 'Technological progress, mobility and economic growth', *American Economic Review*. 87(3): 363-382.

Galor, O., and Zeira, J. (1993). 'Income Distribution and Macroeconomics', *The Review of Economic Studies*, 60: 35–52.

- Granger, C. W. J. (1969). 'Investigating Causal Relations by Econometric Models and Cross-spectral Methods', *Econometrica*, 37(3): 424-438.
- Hills, J., McKnight, A., Bucelli, I., Karagiannaki, E., Vizard, P., and Yang, L., with Duque, D., and Rucci, M. (2019). *Understanding the Relationship between Poverty and Inequality: Overview Report*, CASE Report No. 119, LIP Paper 10, London School of Economics.
- Huang, H., Fang, W., Miller, S., and Yeh, C. (2015). 'The effect of growth volatility on income inequality', *Economic Modelling*, 45, issue C, 212-222.
- Hull, K. (2009). 'Understanding the relationship between economic growth, employment and poverty reduction', in *Promoting pro-poor growth: Employment*. OECD.
- Jenkins, S. P., and Van Kerm, P. (2006), 'Trends in income inequality, pro-poor income growth, and income mobility', *Oxford Economic Papers*, 58 (3): 531-548
- Kaldor, N. (1957). 'A Model of Economic Growth', *Economic Journal*, 67, 591-624.
- Kalwij, A. and A. Werschoor (2007), 'Not by Growth Alone: The Role of the Distribution of Income in Regional Diversity in Poverty Reduction', *European Economic Review*, 51, 805-829.
- Karagiannaki, E. (2017). 'The empirical relationship between poverty and inequality in rich and middle income countries', CASEpaper 206/ LIP paper 3, London: Centre for Analysis of Social Exclusion, LSE.
- Khan, M.A., Khan, M.Z., Zaman, K., Hassan, U., and Umar, S. (2014). 'Global estimates of growth-inequality-poverty (GIP) triangle: evidence from World Bank's classification countries', *Quality and Quantity*, 48: 2631. <https://doi.org/10.1007/s11135-013-9912-7>
- Kuznets, S. (1955). 'Economic Growth and Income Inequality', *American Economic Review*, 45 (1):1-28.
- Kwasi, A. (2010). 'Growth, inequality and poverty reduction in developing countries: recent global evidence', Background Paper for the Global Development Outlook 2010 *Shifting Wealth: Implications for Development*, OECD <http://www.oecd.org/dev/pgd/44773119.pdf>
- Laursen, T. and Mahajan, S. (2005). 'Volatility, Income Distribution, and Poverty', in Aizenman, J. and Pinto, B. (Eds.), *Managing Volatility and Crisis: A Practitioner's Guide*, New York: Cambridge University Press, 101-136.
- Lazear, E., and Rosen, S. (1981). 'Rank-order tournaments as optimum labor contracts', *Journal of Political Economy*, 89, 841-864.

- Lee, N., Sissons, P., Hughes, C., Green, A., Atfield, G., Adam, D. and Rodríguez-Pose, A. (2014). 'Cities, growth and poverty: A review of the evidence', Joseph Rowntree Foundation.
- Li, H., and Zou, H.-f. (1998). 'Income Inequality is not Harmful for Growth: Theory and Evidence', *Review of Development Economics*, 2: 318–334.
- Lin S.-C., Kim, D.-H., Huang, H.-C., and Yeh, C.-C. (2009). 'Nonlinearity between Inequality and Growth', *Studies in Nonlinear Dynamics and Econometrics*, 13(2): 1-20.
- Loury, G. (1981). 'Intergenerational Transfers and the Distribution of Earnings', *Econometrica*, 49, 843-867.
- Lupton, R. (2016). 'Inclusive growth for UK cities - New Manchester-based collaboration gets underway', *Inclusive Growth*.
- Lundberg, M., and Squire, L. (2003). 'The simultaneous evolution of growth and inequality', *Economic Journal*, 113: 326–344.
- McKnight, A., Duque, M., and Rucci, M. (2017). 'Double Trouble: A Review of the relationship between UK poverty and economic inequality', Oxfam GB <https://policy-practice.oxfam.org.uk/publications/double-trouble-a-review-of-the-relationship-between-uk-poverty-and-economic-ine-620373>
- OECD (2008). *Growing Unequal?* Organisation for Economic Co-operation and Development, Paris.
- Okun, A. (1975). *Equality and Efficiency: The Big Tradeoff*, Washington: Brookings Institution Press.
- Ostry, J.D., Berg, A. and Tsangarides, C.G. (2014). 'Redistribution, Inequality, and Growth', IMF Staff Discussion Note No. SDN/14/02, International Monetary Fund.
- Papanek, G., and O. Kyn. (1986). 'The Effect on Income Distribution of Development, the Growth Rate and Economic Strategy', *Journal of Development Economics*, 23(1): 55-65.
- Partridge, M.D. (2005). 'Does Income Distribution Affect U.S. State Economic Growth?' *Journal of Regional Science*, 45(2): 363-394.
- Partridge, M.D, (1997). 'Is Inequality Harmful for Growth? Comment.' *American Economic Review*, 87(5): 1019-1032.
- Perotti, R., (1996). 'Growth, income distribution, and democracy: What the data say', *Journal of Economic Growth*, 1, 149–187.
doi: 10.1007/BF00138861

- Persson, T. and Tabellini, G. (1994). 'Is Inequality Harmful for Growth?', *American Economic Review*, 84(3): 600-621.
- Piketty, T. (2014). *Capital in the Twenty-First Century*. Harvard University Press, Cambridge Massachusetts.
- Piketty, T. (1997). 'The Dynamics of the Wealth Distribution and the Interest Rate with Credit Rationing', *Review of Economic Studies*, 64(2): 173-189.
- Raghuram, R. (2010). *Fault lines: How hidden fractures still threaten the world economy*. Princeton University Press.
- Ravallion, M. (2012). 'Why Don't We See Poverty Convergence?', *American Economic Review*, 102(1): 504-23.
- Ravallion, M. (1997). 'Can High Inequality Developing Countries Escape Absolute Poverty?' *Economics Letters*, 56: 51-57.
- Ravallion, M. (1995). 'Growth and Poverty: Evidence for Developing Countries in the 1980s', *Economics Letters*, 48: 411-417.
- Scott, R., and Pressman, S. (2013). 'Household debt and income distribution', LIS Working Paper No. 589. Luxembourg Income Study.
- Stiglitz, J. (2016). 'Inequality and Economic Growth', in: Mazzucato, M., Jacobs, M. (Eds.), *Rethinking Capitalism*. Wiley-Blackwell, Hoboken, New Jersey.
- Stiglitz, J. E. (2012). *The Price of Inequality: How Today's Divided Society Endangers Our Future*, W. W. Norton & Company, New York.
- Sukiassyan, G. (2007). 'Inequality and growth: what does the transition economy data say', *Journal of Comparative Economics*, 35: 35-56.
- Turner, A. (2016). *Between debt and the devil*. Princeton University Press, Princeton.
- Van Kerm, P., and Pi Alperin, M. N. (2013). 'Inequality, growth and mobility: The intertemporal distribution of income in European countries 2003–2007', *Economic Modelling*, 35: 931–939.
- Yang, L. (2018). 'The relationship between poverty and inequality: Resource constraint mechanisms', LIPpaper 5/CASEpaper 211, London: Centre for Analysis of Social Exclusion, LSE.
- Yang, L. and Vizard, P. (2017). 'Multidimensional poverty and income inequality in the EU: An adjusted headcount approach', CASEpaper 207/ LIP paper 4, LIP programme, London: Centre for Analysis of Social Exclusion, LSE.