

WIFO

ÖSTERREICHISCHES INSTITUT
FÜR WIRTSCHAFTSFORSCHUNG

 **WORKING PAPERS**

**The Impact of Inequality
on Economic Growth**

Thomas Leoni, Wolfgang Pollan

211/2003

The Impact of Inequality on Economic Growth

Thomas Leoni, Wolfgang Pollan

WIFO Working Papers, No. 211
November 2003

WIFO Working Papers

The impact of inequality on economic growth

– A survey of the empirical and theoretical literature with a special focus on advanced economies –

1. Introduction:

The issue of inequality and of the distribution of wealth within society has been addressed by economists since the days of Adam Smith and Thomas Malthus¹. It is no coincidence that one of the first controversies sparked by the classical economists centred on the English Poor Laws of the early 19th century. The question about the desirable level of inequality encompasses moral and political aspects that can hardly be reduced to the economic dimension. From the standpoint of the economic profession, there is only one coherent way to approach this delicate issue: that is, to ask whether inequality leads to more overall efficiency in an economy, thus creating the conditions for redistribution and enhanced welfare for everybody. For most of the past century, the answer provided by Keynes to this question has represented the dominant view. According to the author of the *General Theory*:

“It was precisely the inequality of the distribution of wealth which made possible those vast accumulations of fixed wealth and of capital improvements which distinguished that age [the 19th century] from all others. The immense accumulations of fixed capital which, to the great benefit of mankind, were built up during the half century before the war, could never have come about in a society where wealth was divided equitably”².

In other words, it was argued that inequality is beneficial to economic development because the rich have a higher saving rate than the poor. Only the presence of a class of wealthy allows for the capital accumulation which is necessary to spur economic growth. This view,

¹ Adam Smith, for example, writes in the *The Wealth of Nations*: “No society can surely be flourishing and happy of which the far greater part of the members is poor and miserable.”

² Keynes (1920).

which has been stylized by Nicholas Kaldor (1956), fits especially the initial phases of a growth process, the period when a country overcomes its traditional economic structure and industrializes³. With respect to advanced economies, the “Kaldorian” view has been reinforced by the “big trade-off” argument described by Arthur Okun (1975) with reference to the United States. According to Okun there exists a trade-off between equity and efficiency, which confronts policy makers with an inevitable choice: either increase the size of the pie, or redistribute a smaller pie more equally. To sum up, throughout the 20th century there has been a strong inclination to think that equality is associated with economic costs, and that a certain degree of inequality is conducive to overall economic performance. Over the past decade however, this consensus has been challenged on several accounts, and a lively debate on the economic impact of inequality has developed.

Arguably there are several elements which explain the resurgence of interest in the inequality topic. At a theoretical level, the development of “endogenous” growth theories has created the conditions for a re-assessment of the factors that influence economic growth. While the “neo-classical” models *à la* Solow relied heavily on exogenous determinants of growth, like technology, the insights of Paul Romer, Robert Lucas and others have opened the field for a more thorough analysis of the macro-economic conditions that affect growth dynamics. In this light, income and wealth distribution were readily recognized as significant variables. At the same time, empirical observations made in the late 1980s called for new explanations for growth differentials across countries. Here the sharp contrast in performance between the Latin American countries and the so-called East-Asian dragons is the best known case in point. Finally, developments in advanced economies might also be adduced to explain the new-found interest in the inequality issue. The stylized fact known as the “Kuznets-curve”⁴,

³ Here we can think of what Walt W. Rostow has called the “take-off” stage of economic growth, when a high saving rate and rapid capital accumulation are crucial for the attainment of a sustained growth path.

⁴ Kuznets (1955).

according to which inequality follows an inverse-U shaped pattern along the development path of a country's economy, seems not to hold any more. Kuznet's theory implies that after an increase in inequality, economic growth brings about greater equality. However, after decades of steady decrease, income inequality has been on the rise in many OECD countries since the 1980s⁵. This empirical incongruence has led economists to focus once more their attention on the distribution of wealth and income within society.

In the early 1990s, papers by Perotti (1992, 1993), Persson and Tabellini (1994), Alesina and Rodrik (1991, 1994), and Galor and Zeira (1993) have re-opened the debate about the effects of inequality on the economy. Following these seminal contributions, a rich literature on the topic has ensued, and new studies are being published up to date. The aim of this paper is to provide a survey of these studies, and to look at theoretical explanations and empirical findings that provide insights into the economic consequences of inequality. Particular attention will be devoted to arguments and findings that apply to highly industrialized democracies. The paper will be structured in the following way: section 2 will provide an overview of empirical research, looking at evidence for the effects of inequality on economic performance. The focus of this section will be on the broad question of whether inequality impacts aggregate output negatively. The third section, divided in four sub-sections, will analyse the theories that have tried to explain in detail the relationship between inequality and growth; where appropriate, theory-specific empirical evidence will also be reviewed. At a methodological level, the distribution of both income and wealth within society will be taken into account. Some theoretical approaches focus on one rather than the other of these forms of inequality, but given the link between income and wealth, the two variables are clearly connected, and used as proxies for each other in empirical studies.

⁵ According to a recent OECD study: „During the most recent period (mid-1980s to mid-1990s), income inequality has increased in at least half the [OECD] countries, while none of the remaining countries recorded an unambiguous decrease in inequality“, Förster and Pearson (2002), p. 35.

2. General empirical findings:

In the early 1990s scholars have made use of improved cross-country data sets to evaluate the significance of inequality on growth performance in cross-section regressions. The first studies of this type were made by Perotti (1992) and Alesina and Rodrik (1991, 1994). These papers focused on long-term growth, and regressed average growth rates on a measure of inequality for the beginning of the observed period. Alesina and Rodrik, for example, take the average GNP growth rate from 1960 to 1985 and regress it, among others, on an income distribution variable for the beginning of this period. In order to gather a high number of observations, the authors have to rely on income distribution variables that refer to years between 1948 and 1972, rather than exactly 1960. The results confirm their theoretical expectation that income inequality at the beginning of the observed period was significantly negatively correlated with economic growth. This general inverse relationship proves to be stronger and more significant for the sub-set of democratic countries, which are also those for which better data on income distribution are available. Thus the authors conclude that democracies with a more unequal distribution of capital ownership grow less rapidly than more egalitarian democracies: “Income inequality reduces growth in democratic countries, while this effect disappears or it is weaker in dictatorships. In particular, it would appear that redistributing income from the very rich to the middle class improves the growth performance of the economy”⁶.

In the following years a number of similar studies confirmed the existence of a significant negative impact of income and/or wealth inequality on economic growth. Benabou (1996) has provided a survey of their findings: out of thirteen reviewed studies, ten evidenced a

⁶ Alesina and Rodrik (1991), p. 28.

consistent and significant negative sign of the coefficient of inequality with respect to economic growth. Two studies established a consistent but not significant sign of the coefficient, while in one case a non-consistent but also insignificant sign emerged from the regression. Because of the scarcity of measures of inequality, these studies have relied on various variables as proxies, and have looked at various time periods and various sets of countries. However, a clear empirical regularity emerges from the survey, leading to the conclusion that “these regressions, run over a variety of data sets and periods with many different measures of income distribution, deliver a consistent message: initial inequality is detrimental to long-run growth. The magnitude of this effect is consistent across most studies: a one standard deviation decrease in inequality raises the annual growth rate of GDP per capita by .5 to .8 percentage points.”⁷

The consensus that emerged from this first wave of studies has been challenged in more recent years, largely as result of the introduction of a new data set developed by Deininger and Squire (1996). These panel data improved earlier data sets in terms of quality and quantity, providing information on income distribution for 108 countries and allowing for time-series analysis. However, as the authors themselves admit, intrinsic problems with the measurement of inequality make international comparisons still difficult. On the basis of the restricted, “high-quality” sample of their data, Deininger and Squire (1998) confirm the presence of a significant and negative relationship between initial inequality (income and land) and subsequent growth, but find the effect of income inequality to be less robust than expected. In fact, in cross-sectional regressions that cover the years 1960-92, the inclusion of regional dummy variables generates insignificant coefficients of income inequality. On the other hand, the authors find a very strong negative relationship between unequal land

⁷ Benabou (1996), p. 13.

distribution and growth⁸. Barro (2000) finds that the inclusion of a fertility variable significantly alters the outcome of regressions of growth on inequality. He builds his analysis on an expanded version of the Deininger and Squire data set, and argues that the overall effects of inequality on growth and investment are weak, with a difference between rich and poor countries. According to his panel regressions, inequality retards growth in poor countries but has positive effects in countries with a high per capita GDP.⁹

Kristin Forbes goes even further, and finds that overall inequality actually improves economic performance across all analysed countries. In Forbes (2000) she uses Deininger and Squire's income inequality data in fixed effects and related panel data regressions with time dummy variables evaluating 5- and 10-year sub-periods with correspondingly long lags between growth and income inequality for 1965-95. The author overturns previous findings, and claims that in fact there is a statistically significant positive relationship between within-country changes in income inequality and growth. This represents a return to the "traditional" view that short and medium run increases in income inequality positively affect growth. Li and Zou (1998) had found a similar result. These results, which contrast markedly with those of other studies, highlight the methodological difficulties in dealing with the issue of inequality. Banerjee and Duflo (2000) argue that the findings of Forbes and Li and Zou are "not warranted" and result from not adequately accounting for the non-linearity between changes in income inequality and growth. Rehme (2002) provides us with additional reasons to be sceptical of the findings of Forbes and others. The problem lies in the creation of large data samples that mix together different measures of inequality, viz. net and gross income Gini coefficients, for either individual or household income recipients. The fact that Deininger and Squire (1998), Forbes (2000) and Barro (2000) have constructed average Gini values on

⁸ This fact has been confirmed by other studies, e.g. Galor, Moav and Vollrath (2003). Since the impact of land distribution is not of particular relevance for developed countries, it will not be further analysed here.

⁹ „Growth tends to fall with greater inequality when per capita GDP is below or around \$2000 (1985 U.S. dollars) and to rise with inequality when per capita GDP is above \$2000“, Barro (2000).

the basis of these heterogeneous indicators makes it likely that the coefficients on inequality found in their studies are biased upwards. Rehme on the contrary adheres strictly to the “income and recipient concept”, which looks at gross income per household. Measures of gross income inequality have to be preferred over those of net income, because they do not embody the outcome of redistributive policies that might be themselves influenced by the level of inequality¹⁰. Rehme runs his regressions on a sample of 22 relatively rich countries, and he concludes that, when controlling for various factors including fertility, “more gross income inequality is *negatively* correlated with long-run growth in *all* regressions, that is, the point estimates measuring the association between income inequality and growth are negative, although usually only weakly so”¹¹.

This statement does certainly not represent the final word on the question of the impact of inequality on growth. As Deininger and Squire have pointed out, there is a “gap between the far-reaching implications of theoretical literature on inequality, and the much more limited empirical evidence available to actually support and test such theories”¹². As we have seen, this gap results from the intrinsic problems in measuring inequality and in making large cross-country comparisons. Nevertheless, the *status quo* of research points to an at least ambiguous impact of inequality on aggregate output. Table 1 provides a synthetic overview of the empirical studies that have looked at the direct link between inequality and growth. As can be seen, the majority indicates a clear negative relationship, thus reversing the consensus of the ‘classical’ view on inequality. Moreover, several studies have highlighted that inequality seems to be particularly detrimental to the growth performance of advanced economies¹³. The fact that these links are not unambiguous, and that their statistical significance varies

¹⁰ In this respect, see Milanovic (2000) who finds a strong empirical relationship between inequality and redistribution. This paper will be dealt with in section 3.2.

¹¹ Rehme (2002), p. 22.

¹² Deininger and Squire (1996).

¹³ See Alesina and Rodrik (1991), Knell (1999), Rehme (2002). Barro (2000) however has found the opposite to be true.

according to the inclusion of control variables, indicates that a more theoretical framework is needed.

3. Theoretical explanations:

We can distinguish mainly between three sets of explanations that have been suggested to account for the economic impact of income inequality. Each of these theoretical approaches focuses on a different channel through which inequality interacts with other crucial macro-economic variables. In the following three sub-sections we will look at each of them in turn, leaving the fourth sub-section for a brief exposition of explanations that do not fall within the three main strands. All three main theoretical approaches – none of them mutually exclusive - have been developed at the beginning of the 1990s. In the following years their empirical support has been tested, and variations and amendments to their underpinnings have been proposed. We will start by looking at the “institutionalist” (“political instability”) argument, which is particularly suggestive if applied to developing, non-democratic countries. Next we will turn to the “median voter” hypothesis, which is tailored to democratic regimes, but has failed to deliver on the empirical side. The “human capital” view will be described in section 3.3, while the last sub-section will outline other possible explanations for the link between inequality and growth.

3.1 The “Institutionalist” view:

Alesina and Perotti (1996) provided the first thorough analysis of the link between income inequality, political instability, and economic growth¹⁴. They developed their argument within the framework of neo-classical growth theory. Investment is seen as the crucial variable for economic growth, and income inequality as a variable that influences the investment rate by

¹⁴ Barro (1991) and Alesina, Ozler, Roubini and Swagler (1992) had already looked at a possible inverse relationship between political instability and growth.

affecting the political environment. Accordingly, the authors ask two questions: first, does income inequality increase political instability; and, second, does political instability reduce investment. Their answer to both questions is affirmative, and it is supported by empirical findings based on the growth performance of a sample of 70 countries for the years 1960-85. Alesina and Perotti try to broaden the scope of analysis, and to establish a link between inequality and political instability through the investment rate. The backbone of their theoretical argument is the following:

“Income inequality increases social discontent and fuels social unrest; the latter, by increasing the probability of coups, revolutions, mass violence or, more generally, by increasing policy uncertainty and threatening property rights, has a negative effect on investment, and, as a consequence, reduces growth”¹⁵.

The most problematic part of this approach lies in establishing a clear link between inequality and variables that capture instability. The authors employ an aggregated index of socio-political instability, which contains values for social unrest and violence, such as mass violence, violent and illegal forms of political expression, legal and illegal transfers of power. They run cross-sectional regressions to identify the impact of inequality on these factors, and of these factors on the investment rate. With respect to the income distribution, they use income data grouped by quintiles, and construct an indicator for the size of the middle class, that corresponds to the third and fourth quintiles of the population. A larger middle class is equivalent to a more equal income distribution, and in fact the authors find that an increase in the share of the middle class by one standard deviation decreases the index of political instability by one fourth of its standard deviation, and this in turn increases the share of investment on GDP by one percent. The causal chain proposed by Alesina and Perotti seems

¹⁵ Alesina and Perotti (1996), p. 1204.

very appropriate for the socio-political conditions in many Latin American and African countries, but it does not seem to fit developed democracies of the OECD type:

“A large group of impoverished citizens, facing a small and very rich group of well-off individuals is likely to become dissatisfied with the existing socio-economic status quo and demand radical changes, so that mass violence and illegal seizure of power are more likely than when income distribution is more equitable”¹⁶.

Given a situation of potential socio-political upheaval it is not difficult to establish a causal link between instability and investment: uncertainty derives from the likelihood of the government being overthrown, productive activities might be directly disrupted by social unrest, and attempts to seize power might lead to the abandonment of the rule of law and property rights. However, it is unclear whether more nuanced differences in income, such as those that can be observed across the European and North American continent, can have similarly significant impacts on investment. In this sense, it is doubtful whether the “political instability” analysis developed by Alesina and Perotti can provide us with insights into the economic consequences of income inequality for advanced economies. However, this does not mean that political instability has to be dismissed altogether as an explanatory channel for the impact of inequality. Other studies have tried to capture political instability by looking at the “propensity to change government”, or by using data on property and violent crimes as a proxy. So, e.g., one line of research has come up with empirical support for the political-institutional view on income inequality in the United States. Rodriguez (2000) uses a two-step causal model, using data at the interstate level to highlight the differences in economic performance within the United States. She finds a strong relationship between income inequality and the amount of property and violent crimes, and a strong relationship between this proxy for instability and economic growth.

¹⁶ Alesina and Perotti (1996), p. 1214.

Moreover, as Alesina and Perotti wrote, “social and political instability are variables that are hard to define and measure in a way which can be used for econometric work”¹⁷. In other words, an analysis of the implications of social and political instability, caused among other things by inequality, may well lie beyond the realm of pure economic inquiry. Political and sociological categories may be necessary in order to assess how the increase in inequality observed in many OECD countries has affected their economies. In this sense, distributional issues could be linked to the emergence of new socio-political cleavages, which in turn have determined novel forms of political protest in many advanced democracies over the past decade. The rise of radical political movements across Europe, with the success of populist/right wing parties in Italy, France, Belgium, the Netherlands, Denmark and Austria in recent years, could be seen as a case in point. It remains to be seen whether these developments, which certainly represent new phenomena, have actually increased political instability and led to economic costs through heightened uncertainty. Clearly, these remarks are very cursory, as this topic goes beyond the scope of the present paper. Nevertheless, studies in the field of political science have pointed to conflicts between losers and winners of recent economic developments, with changes in the income distribution as major explanatory variable.¹⁸ To sum up, the “political instability” view covers a wide field of inquiry, and further research on this topic might be necessary to grasp the subtle political and institutional effects of inequality on aggregate output¹⁹.

¹⁷ Alesina and Perotti (1996), p. 1205.

¹⁸ E.g. Kriesi (1999), p. 422: „More generally, we should not overlook the root cause of the movements of the radical right, which is related to the fact that the present transformation of Western societies creates a significant number of losers who are faced with ever stiffer competition from immigrants and, for that matter, from the economies of the Third World countries“.

¹⁹ So, for example, an interesting strand of analysis has been taken up by Woo (2003). He has investigated the hypothesis that income inequality might interact with political and institutional settings so as to increase the likelihood of fiscal deficits. Woo’s basic insight is that social polarization, as captured by income inequality, is linked to the fiscal policy-making process. His model is based on a two-sector economy, where more unequal initial income distribution leads to a more pronounced sectoral income gap during industrialization. This in turn leads to more polarized preferences for different types of government spending, with greater incentives for policy-makers to insist on higher spending for their preferred sectors, leading to larger deficits.

3.2 The median voter theorem:

There is a well-developed body of research that has analysed the impact of inequality on growth through the channel of the democratic voting mechanism. This approach is particularly interesting because it refers to democratic institutions and majority voting, and is therefore applicable to OECD type economies. A broad framework to tackle this issue has been provided by Persson and Tabellini (1994), where inequality, measured as the distance between the mean and the average income²⁰, results in strong distributional choices at the political level, with detrimental effects on the economy. High pre-tax income inequality leads people to vote for more redistributive policies. These policies result in a very progressive tax system, and, according to Persson and Tabellini, in distortions in production and investment. This causal chain is based on the proposition that redistribution prevents individuals from reaping the fruits of their economic efforts, and therefore sends the wrong incentives for accumulation and entrepreneurial activity.

Alesina and Rodrik (1991, 1994) have developed an argument that runs parallel to that by Persson and Tabellini²¹. However, they focus with much more detail on the behaviour of the median voter. Alesina and Rodrik's approach combines insights from endogenous growth theory with the effects of majority voting on tax rates, and claims that the more unequal is the distribution of resources in society, the lower is the rate of economic growth. The explanation for this lies in the voting behaviour: because the median voter has a relatively small endowment of capital when wealth is unequally distributed, he favours high taxes on capital. High capital taxes, in turn, constrain the capacity of the economy to invest and innovate, and

²⁰ The characterization of income distribution as more equal, the higher the median income is relative to the mean, goes back to seminal papers in the politico-economic literature. E.g., Meltzer and Richard (1981).

²¹ One methodological difference of this study consists in the fact that Alesina and Rodrik's model builds on wealth rather than income distribution. At the same time however, for the empirical part of their research the authors have to revert to measures of income inequality as proxy for wealth distribution.

thus reduce economic growth. As we have seen in section 2, Alesina and Rodrik provide empirical support for their view, leading to the conclusion that democracies with uneven distribution of wealth are expected to show slower growth rates than those with a more equal distribution. Similar conclusions were drawn by Persson and Tabellini (1994), who had analyzed a small sample of countries in long-term historical perspective, as well as a larger sample over the post-war period.

However, these empirical findings have not been confirmed by later studies. Zweimüller (2000) surveys the empirical literature on the median voter theorem, and casts serious doubts on this approach. On the one hand, he concludes that, despite compelling theoretical arguments, there is little evidence to confirm that inequality in democratic regimes results invariably in high redistribution rates. Moreover, it remains to be seen whether an intense redistributive activity necessarily results in distortions and disincentives that impede economic growth. “First, in a cross-section of countries, there is no statistically significant impact of inequality on taxes and transfers. Secondly, there is very little evidence that redistribution has a detrimental impact on investment and growth”²². According to Zweimüller, whether or not higher taxes have an impact on growth and investment depends on how the tax revenues are spent.

A more recent survey by Kucera (2002) arrived at similar conclusions, finding that – especially for the median voter theorem - empirical support is wanting: “It turns out that there is a fair amount of empirical evidence against the median voter theorem hypothesis of the inequality-growth relationship. One implication of the median voter theorem is that it ought to apply more strongly to democracies than non-democracies. Indeed, [several studies] find the opposite result, with the negative relationship holding more strongly for non-democracies

²² Zweimüller (2000), p. 11.

than democracies”²³. In addition, Kucera confirms that the negative relationship between redistribution and growth is far from ascertained. In fact, studies on this relationship generally find that countries with higher redistributive taxes (measured by tax rates and transfer payments) tend to grow more rapidly²⁴. Lastly, most studies on the relationship between inequality and redistributive taxes do not find that such taxes tend to be higher in countries with greater inequality²⁵.

An interesting explanation of why inequality does not unequivocally lead to a redistribution that favours the median voter has been provided by Grossman (2003). The author has examined the relationship between income inequality and the public consumption share in both a static and a dynamic median voter model, where redistribution occurs through the provision of public goods rather than transfers. In the static model, a tension between substitution effect and wealth effect with respect to the individual demand for public consumption leads to ambiguous results: “Although public expenditure plays a redistributive role in the model, higher income inequality may nevertheless imply a smaller size of the government in majority voting equilibrium”²⁶. This conclusion is confirmed by the general equilibrium model, where public consumption expenditure is financed by a synthetic²⁷ proportional income tax and labour supply is exogenous. According to this model, higher labour income taxation unambiguously reduces consumption levels of owners of labour, while higher capital income taxation has an ambiguous impact on the consumption levels of owners of capital. Hence, under a synthetic tax model, an increase in public consumption is more detrimental to capital-poor individuals than it is to capital-rich ones. “A capital-rich median voter unambiguously prefers a bigger government as provider of goods and services than a

²³ Kucera (2000), p. 8.

²⁴ See Benabou (1996); Aghion, Caroli and García-Peñalosa (1999).

²⁵ See Benabou (1996), p. 51; Tanninen (1999), p. 1114.

²⁶ Grossmann (2003), p. 271.

²⁷ With a synthetic income tax, every income type is considered taxable irrespective of its source.

capital-poor median voter”²⁸. According to Grossman, this theoretical finding reflects well the empirical fact that more equal economies do not seem to have smaller governments and thus do not seem to redistribute less towards the median voter.

Milanovic (2000) also argues that the empirical evidence for the median voter theorem is tenuous; he does however find a strong positive relationship between inequality and redistribution. In other words, Milanovic supports the view that more unequal societies tend to redistribute more, but he doubts that this fact can be explained through the median voter hypothesis. In his regression analysis, he defines the dependent and the independent variable as follows: “The dependent variable is the extent of redistribution— income share gain of the lower half of income distribution according to factor income (‘the poor’), or of the bottom quintile (‘the very poor’), or the middle class (fifth and sixth decile). The independent variable is the level of inequality of factor income or position of the middle class in factor income distribution”²⁹. Milanovic runs his test on a sample of 24 countries, and finds that higher inequality is correlated with more redistribution, but that this redistribution does not favour the median voter:

“We find strong support for the redistribution hypothesis. More unequal factor-income countries redistribute more toward the poor and very poor. [...] While the evidence supports the link between the extent of pro-poor redistribution, and factor income inequality, the evidence that redistribution takes place through the median voter channel is much weaker. [...] The median voter hypothesis fails once we focus on the truly redistributive transfers”³⁰.

While the strong formulation of the median voter theorem, as developed by Alesina and Rodrik (1991, 1994), does not seem to hold, there might be other economic effects caused by the interplay between inequality and voting preferences. Here we can mention a study that

²⁸ Grossmann (2003), p. 283.

²⁹ Milanovic (2000), p. 394.

³⁰ *Ibidem*, p. 395.

links inequality and the median voter theorem with environmental issues. Marsiliani and Rengström (2000) explore the ways in which income distribution within a country impacts political decisions with effects on the environment. They find a positive relationship between inequality, i.e. the distance between the mean and the average income, and pollution. In fact, they claim that a poor median voter, who has a low marginal rate of substitution between the environment and private, favours less rather than more pollution taxes. Moreover, a poor individual wishes to redistribute income, thereby distorting the production decisions and causing less production. If the environment is a normal good, this leads to a decrease in the marginal rate of substitution between environment and private consumption, and causes all individuals to prefer more private consumption in relation to the environment. As a consequence of these driving forces, a skewed income distribution has detrimental effects on the environmental standards of a country. The empirical evidence adduced to support this view is weak³¹. However the study gives us reasons to think that the connection between inequality and redistribution, as mediated through a democratic voting system, might have far-reaching implications that are yet to be discovered.

3.3 The “Human capital” view:

The studies that will be presented in this sub-section refer, in one way or the other, to the role of human capital as a medium between inequality and economic growth. The theoretical framework for this approach has been provided by endogenous growth theory. The latter, pioneered by Paul Romer and Robert Lucas in the late 1980s³², has attributed a pivotal role to human capital in fostering economic growth. It has also devoted much attention to the macro-

³¹ The authors look at correlations between growth, inequality and pollution in two small sets of countries (7 and 10 countries respectively). They use data from the Luxembourg Income Study database to determine a variable that consists of the share of income distribution of the 90th percentile over the 50th percentile of population. These data however refer to household disposable incomes, including social transfers as well as income taxes and social security payments. This makes them unsuitable to test for the effects of the voting mechanism, and for the median voter theorem, which should apply to gross income distribution (share of factor income as in Milanovic).

³² See Romer (1986) and Lucas (1988).

economic factors that determine the level of human capital accumulation. The following studies have tried to show that inequality, in interaction with externalities, is one of these factors, and thus eventually important for aggregate output. Here human capital is broadly defined and comprises all “the attributes of a person that are productive in some economic context”³³. Accordingly, human capital refers not only to formal education, but more generally to investment that enhances knowledge, skills and productivity.

Galor and Zeira (1993) have put forward the first comprehensive analysis of this idea. The main assumptions of their model are the presence of credit markets’ imperfections and indivisibilities in investment in human capital. Through these factors income and wealth distribution affect economic performance both in the short and in the long run. In fact, capital markets’ imperfections result in borrowing constraints, i.e. in a gap between the borrowing rate and the lending rate of individuals. Individuals that have no inheritance and are not privileged by wealth distribution, find it difficult to invest in their education. As a consequence, human capital accumulation falls short of its potential, and output is affected in the short run. This first result implies that the initial distribution of wealth impacts the aggregate levels of human capital accumulation, skills and therefore output. The additional assumption of investment indivisibility in human capital, i.e. that there is non-convexity³⁴ at the individual level, leads to a long-term impact of inequality, and captures the role of income inequality. Without this assumption, the initial wealth distribution would affect only the short run, as in the long run all dynasties would end up investing the same amount in human capital. On the contrary, the indivisibility assumption implies that ‘poor’ dynasties, with no initial

³³ See *On-line glossary of research economics*, <http://econterms.com/>.

³⁴ „Non-convexity is explained by the incapacity of the *additivity* and *divisibility* hypotheses on production to hold. The additivity assumption says that if two production plans are technologically feasible, a new production plan consisting of the sum of these two will also be possible. Divisibility, on the other hand, states that if a production plan is feasible, then any production plan consisting of a reduction in scale will also be feasible. Failure of the *divisibility* assumption to hold is, it is argued, the main source of non-convexities in production“, *The Web Book of Regional Science – Glossary*, <http://www.rri.wvu.edu/WebBook/Schreiner/glossary.htm>.

wealth, are unable to accumulate the human capital which would allow them to gain skills, increase their income and therefore leave a large bequest to their children. Hence, aggregate output in the long run suffers from the fact that, due to high inequality, a chunk of the population, assumed to be identical in terms of potential skills and preferences to the rest, is trapped in a low-skill, low-income path. The conclusion that Galor and Zeira draw from this analysis is that „on the one hand, countries with greater income per capita have a more equal distribution of income and smaller wage differentials; on the other hand, countries with a more equal initial distribution of wealth grow more rapidly and have a higher income level in the long run“³⁵.

The study by Galor and Zeira has sparked a lively discussion in the economic literature³⁶. Foellmi and Zweimüller (2003) have reviewed this literature, and formulate the core of the human capital argument with respect to imperfect capital markets in the following way: “Education not only causes direct costs but is also a period without income. Individuals who lack the necessary funds and cannot raise these funds on the capital market have only limited access to the education system. Low-ability children of rich parents will get educated, whereas poor high-ability individuals will not, resulting in an inefficient allocation of talents”³⁷. This summarises what is behind most explanations that look at imperfect capital markets as a link between inequality and growth: heterogeneous returns to investment. Studies by Banerjee and Newman (1993), Aghion and Bolton (1997) and Piketty (1997), among others, have focused on this issue. From an empirical point of view, this approach is not easily tested. This is due to the lack of appropriate aggregate indicators of capital market

³⁵ Galor and Zeira (1993), p. 48.

³⁶ Some of these papers focus on aspects of the human capital view that are not very relevant for rich countries, and will therefore not be dealt with here. An example is de la Croix and Doepke (2001), where the authors provide a variation to the ‘human capital’ argument according to which income inequality results in different fertility choices, in the sense that low income and low human capital lead families to opt for more children and for less investment in education.

³⁷ Foellmi and Zweimüller (2003), p. 11.

imperfections, and the difficulties associated with measures of human capital accumulation that go beyond years of schooling.

Nevertheless, many studies show that there is a strong negative correlation between income inequality and the secondary school enrolment rates. Interestingly, this relationship has not been observed in developing countries only, but also in advanced economies³⁸. This indicates that there is a high research potential for more analysis of the causes and consequences of market constraints for the acquisition of human capital³⁹. With respect to developed countries, where capital markets can be assumed to be functioning better than in the developing world, additional social factors might play a crucial role in determining human capital accumulation. Foellmi and Zweimüller review studies⁴⁰ that look at “neighbourhood” effects, i.e. the fact that richer neighbourhoods might provide better schools. These effects may lead to a segregation of the population by income, and therefore reinforce the impact of inequality on the accumulation of human capital. This might be true of other social variables, like status concerns associated with education.⁴¹ “Put in other terms, social background and imperfect capital markets are complementary rather than competing explanations. Whatever the particular channel, income inequality is a primary determinant of educational choices”⁴².

A very interesting extension of the human capital argument has been provided by Fishman and Simhon (2001). In this study the authors find a link between inequality and human capital on the one hand, and division of labour and economic performance on the other. Their model represents a synthesis of elements that go back to classical economics, and more recent

³⁸ It can be mentioned, however, that there are specific problems that affect the accumulation of human capital in developing countries. Women face additional difficulties in accessing education in poor countries, and their income status is a major determinant of their educational possibilities. This issue has been recently addressed by the IMF, see Heller (2003).

³⁹ Zweimüller (2000), p. 12.

⁴⁰ E.g., Benabou (1996) and Durlauf (1996).

⁴¹ Here Foellmi and Zweimüller refer to Fershtman, Murphy and Weiss (1996).

⁴² Foellmi and Zweimüller (2003), p. 15.

theories about market failures and externalities. The division of labour, so they argue following in the footsteps of Adam Smith, is a crucial determinant of productivity and economic growth. At the same time, the degree of specialization achieved in an economy depends on the ability of individuals to pursue their education, exploit their skill potential, and enter entrepreneurial activity if they wish to do so. This ability is constrained if sectors of the population lack the resources which are necessary to achieve the preferred level of specialization. In other words, the division of labour that the market can achieve is directly related to the division of wealth within society. Fishman and Simhon rely on two presumptions: the first is that increased specialization requires the investment of real resources, the second that, because of capital market failures, the incentives of individuals to invest in specialization depend on their wealth. Individuals with low wealth endowment and with limited access to capital may be insufficiently motivated to invest in specialization. This distortion affects aggregate output negatively, and societies in which the distribution of wealth is too unequal may be unable to achieve the optimal division of labour. Hence, “a more egalitarian income distribution increases the long run division of labour and thereby, growth and development”⁴³.

Not unlike the model developed by Galor and Zeira (1993), the interaction between wealth distribution and division of labour described by Fishman and Simhon leads to either a virtuous, or a vicious cycle. If wealth is distributed very unequally, specialization is low, and accordingly productivity and wages of the poorer part of the population stay at a low level. This in turn determines high income inequality, reinforces wealth inequality and gives few chances to talented individuals to acquire the preferred level of specialization. The outcome of this extreme scenario is an equilibrium where inequality stays high, productivity and specialization stay low, and aggregate output suffers. Quite conversely, in a very equal

⁴³ Fishman and Simhon (2002).

society, more people have access to the capital that they need to invest in their skills. This leads to higher specialization and thus higher earnings, which in turn allow for even more specialization. In this case the whole economy is on a path of low inequality, high productivity and growth. This implies that the division of wealth not only affects the division of labour and productivity in the short run, but may also have long-run effects on development.

A corollary of the theory advanced by Fishman and Simhon regards the impact of inequality with respect to different stages of economic development. As we will see in more detail in the concluding section of this paper⁴⁴, inequality might have a different impact on different stages of economic development. In fact, it has been argued that over the long run there has been a shift from physical to human capital accumulation as engine for economic development⁴⁵. In this light, the role of inequality might vary according to whether physical or human capital is the driving force of growth. The theory advanced by Fishman and Simhon has interesting implications in this respect. Since specialization and the division of labour hinge on human capital formation, which in turn becomes increasingly important at advanced stages of development, also the negative impact of inequality can be assumed to be higher, the more developed an economy is.

“When the capital stock is sufficiently large, greater equality increases investment in specialization and leads to a greater division of labour and higher growth. In our model, the Keynesian view that inequality is necessary for development is represented only at the early stages of development. Once the economy reaches a more mature stage, however, it is greater equality which leads to greater long run development”⁴⁶.

⁴⁴ See the discussion of Galor and Moav (1999), p. 26.

⁴⁵ In the words of Williamson (1991) “the mode of accumulation in the nineteenth century appears to have been much more heavily directed towards conventional capital formation, while the mode of accumulation in the twentieth century seems to have been much more heavily directed towards human capital accumulation”, p. 90.

⁴⁶ Fishman and Simhon (2002).

3.4 Other possible explanations:

This last sub-section provides a brief overview of theoretical explanations that are of relevance to advanced economies, but can not be subsumed under the three previous headings. The first of these approaches focuses on the long term effects that inequality has on productivity growth through its impact on market demand. Foellmi and Zweimüller (2003) start with the assumption that income distribution plays an important role in determining both *level* and *structure* of consumption⁴⁷. “Poor consumers will not only purchase (normal) goods in smaller quantity but will also purchase a different (smaller and lower quality) bundle of goods than the rich”⁴⁸. As a consequence, the demand for new and better products depends on the distribution of income, and the incentives for innovation are affected by inequality. The poorer strata of population can not afford to buy innovative goods. It can be argued that this is not a problem, because it is the class of wealthy, with a high willingness to pay, which generates the necessary demand for new products. However, Foellmi and Zweimüller question this view on the account that the incentives for firms to invest in innovation are determined by two different forces. There is a trade-off between prices, which are high when a class of rich people has a high willingness to pay for new products, and market size, which will be small when incomes are strongly concentrated among a few rich. Whether the price effect dominates the market size effect depends on the availability of substitutes for innovative goods. If there are close substitutes for the innovators’ products, innovators face high competition from those substitutes, and the market effect dominates the price effect. In such a situation inequality is detrimental to innovation incentives. The opposite is true if substitution possibilities are limited.

⁴⁷ This premise builds on the empirical regularity known as Engel’s law, according to which as income increases the proportion of money spent on food decreases.

⁴⁸ Foellmi and Zweimüller (2003), p. 17.

This mechanism is the most obvious by which income distribution can affect innovations, and indicates that high income inequality might be harmful for innovation, and ultimately for an economy's productivity and growth. But according to Foellmi and Zweimüller it is not the only one. Another aspect refers to the effects of income distribution on industrial R&D activities. With a skewed income distribution, innovators have incentives to target predominantly goods that are purchased by the rich. In such a situation, less R&D resources will be channelled into the improvement of mass production technologies. However, without substantial technological improvements in such mass consumption industries, that exploit economies of scale, productivity progress will be slow. Moreover, "with a more even distribution of incomes, demand will be distributed more evenly across industries. This makes it easier for new methods of production to penetrate *all* industries in the economy. As a result, the *dissemination* of knowledge may be easier when there is a sizeable middle class"⁴⁹.

Whereas Foellmi and Zweimüller have looked at innovation and productivity, Knell (1999) has linked inequality and aggregate output through consumption and savings. His analysis builds on the sociological notion of „relative standing” in terms of consumption. This notion refers to the consumption pattern of an individual with respect to a (chosen) reference group within society. It highlights the fact that consumption preferences are not driven by economic factors only, and that accordingly changes in the income distribution might generate distortions. In fact, individuals have a certain bundle of consumption goods which they regard as necessary in order to gain social approval and to participate fully in social life. As a consequence, a decline in a person's income that leaves her reference consumption bundle unchanged will induce this individual to use a larger fraction of her disposable income for expenditure on these goods, with less left for long-term and potentially growth-enhancing investment. This is particularly true if two conditions hold: first, that the individual has a

⁴⁹ Foellmi and Zweimüller (2003), pp. 18-19.

higher concern for her present than for her future relative standing; and second, that the individual has a tendency to find her reference group among people that are wealthier than she is herself. On the basis of the related literature, Knell shows that both assumptions are good proxies of human behaviour. In particular, they provide accurate descriptions of how people make their consumption choices in developed economies. Hence, the author comes to the conclusion that an increase in inequality can bring about a fall in the savings rate, and has therefore negative consequences on growth.⁵⁰

4. Conclusions:

The ‘classical’ view, which was based on the double tenet that inequality is conducive to economic development, and that the latter in turn brings about a reduction of inequality, has been questioned on both empirical and theoretical grounds over the past decade. The high number of studies that has been published is a clear indication that the debate on this issue is very much alive. Despite the efforts that have been made so far, the gap between the relevance of the inequality-growth topic (not least for its policy implications), and the scarcity of well-established facts in this context, remains wide. Although no conclusive evidence is available, strong empirical support exists for the view that inequality might have, at the very best, ambiguous effects on economic performance. In fact, it has been argued quite convincingly that the impact of inequality on aggregate output depends on political variables, such as the institutional setting, and economic conditions, such as the development of capital markets. In this respect, some regularities emerge with force from the research field. Thus, there seems to be a consensus that radical forms of inequality, such as great disparities in the distribution of land, and forms of inequality that can be linked to radical political phenomena,

⁵⁰ At the empirical level, Knell corroborates this conclusion with cross-section regressions based on the Deininger and Squire „high-quality“ data set, suggesting that the negative impact of inequality on growth is stronger in highly developed economies. However, the specifications of these regression resemble closely the models used by Alesina, Rodrik and other at the beginning of the 1990s, and do not test for the ‘social standing’ hypothesis.

such as social upheaval, are detrimental to the development of poor countries. At the same time, and with reference to a different category of countries, inequality seems to be particularly damaging to advanced economies with democratic regimes⁵¹.

At a theoretical level, three strands of thought have tried to provide explanations that fit these empirical findings. The argument that inequality is a factor that brings about political instability (the “institutionalist view”), and therefore hampers growth, seems particularly suitable to account for poor growth performances of developing countries which have experienced major socio-political upheaval. At the same time, a more detailed analysis might uncover the relationship between less pronounced forms of social polarization and the phenomena of political radicalism recently observed in advanced democracies. In this sense, the role of inequality for political and institutional determinants of economic performance remains relevant. The “median voter theorem”, on the other hand, has been weakened by the lack of empirical support. First, it is not clear whether high inequality leads to more redistribution because of the behaviour of the median voter. And second, the impact of redistribution on aggregate output seems to be ambiguous and to depend on other factors. The third set of explanations, here subsumed under the heading of “human capital view”, has not been fully investigated in empirical terms. Nevertheless, its focus on market imperfections, and crucial variables such as education, productivity, technology and specialization, makes it very suitable for an analysis of the situation in advanced economies.

In this connection, it is worth concluding this survey with a paper by Galor and Moav (1999), which supports the “human capital view”, and may also help to reconcile some of the disparate empirical results. In this article, the authors advance a theory that differentiates between two effects of inequality on aggregate output: inequality is conducive to growth in

⁵¹ Besides the empirical studies mentioned in section 2, this conclusion has been reached at the theoretical level by Galor and Moav (1999), Knell (1999), Fishman and Simhon (2002).

early stages of development, and then harmful at later stages. This hypothesis, taken up also by Fishman and Simhon (2002)⁵², reconciles the classical view, according to which inequality is necessary to generate savings and investment, with the recent theories on market imperfections.

“The replacement of physical capital accumulation by human capital accumulation as a prime engine of economic growth has changed the qualitative impact of inequality on the process of development. In the early stages of the Industrial Revolution, when physical capital accumulation was the prime source of economic growth, inequality enhanced the process of development by channelling resources towards individuals whose marginal propensity to save is higher. In the later stages of the transition to modern growth, as human capital emerged as a prime engine of economic growth, equality alleviated the adverse effect of credit constraints on human capital accumulation and promoted the growth process.”⁵³

Hence, the impact of inequality on economic growth depends on the return of physical compared to that of human capital. As long as credit constraints play a role, a higher relative return to human capital implies a stronger negative impact of inequality. At mature stages of development, when credit constraints should disappear, the theory predicts inequality to become less and less significant. This approach - that has not been tested empirically – stresses the importance of further research on human capital formation and market imperfections. At the same time, this theory helps to differentiate empirical findings with respect to countries that are at different stages of economic development. Not unlike other scholars that have tackled this thorny issue, Galor and Moav indicate that the effects of inequality on growth might be heterogeneous, and that therefore we have to be wary of simplifications.

⁵² See section 3.3, p. 21.

⁵³ Galor and Moav (1999).

Bibliography

Philippe Aghion and Patrick Bolton (1997), *A Theory of Trickle-Down Growth and Development*, Review of Economic Studies, April 1997, 64(2), pp. 151-72.

Philippe Aghion, Eve Caroli and Cecilia García-Peñalosa (1999), *Inequality and Economic Growth: The Perspectives of the New Growth Theories*, Journal of Economic Literature, 37 (December 1999), pp. 1615-1660.

Alberto Alesina and Roberto Perotti (1996), *Income Distribution, Political Instability and Investment*, European Economic Review 40 (6), 1996, pp. 1203-1228.

Alberto Alesina and Dani Rodrik (1991), *Distributive Politics and Economic Growth*, NBER Working Paper 3668, March 1991.

Alberto Alesina and Dani Rodrik (1991), *Distributive Politics and Economic Growth*, Quarterly Journal of Economics, 109 (2), May 1994, pp. 465-490.

Abhijit Banerjee and Esther Duflo (2000), *Inequality And Growth: What Can The Data Say?*, MIT Dept. of Economics Working Paper 00-09, June 2000.

Abhijit Banerjee and Andrew Newman (1993), *Occupational Choice and the Process of Development*, Journal of Political Economy, 101, pp. 274-298.

Robert Barro (1991), *Economic growth in a cross-section of countries*, Quarterly Journal of Economics, 106, pp. 407-44.

Robert Barro (2000), *Inequality and Growth in a Panel of Countries*, Journal of Economic Growth, 5, 2000, pp. 5-32.

Roland Benabou (1996), *Inequality and Growth*, NBER Macroeconomics Annual, 11, pp. 11-74.

Jess Benhabib and Mark Spiegel (1994), *The Role of Human Capital in Economic Development. Evidence from Aggregate Cross-country Data*, *Journal of Monetary Economics*, 34, 1994, pp. 143-173.

Giuseppe Bertola (1993), *Factor Shares and Savings in Endogenous Growth*, *American Economic Review*, 83, 1993, pp. 1184–1198.

Klaus Deininger and Lyn Squire (1998), *New Ways of Looking at Old Issues*, *Journal of Development Economics*, 57, pp. 259-87.

Klaus Deininger and Lyn Squire (1996), *A New Data Set Measuring Income Inequality*, *World Bank Economic Review*, 10, pp. 565-591.

Chaim Fershtman, Kevin Murphy, Yoram Weiss (1996), *Social Status, Education, and Growth*, *Journal of Political Economy*, 104, pp. 108-132.

David de la Croix and Matthias Doepke (2001), *Inequality and growth, why differential fertility matters*, UCLA, Department of Economics Working paper 803, June 2001.

Arthur Fishman and Avi Simhon (2002), *The Division of Labor, Inequality and Growth*, *Journal of Economic Growth*, June 2002, 7 (2), pp. 117-36.

Reto Foellmi and Josef Zweimüller (2003), *Inequality and Economic Growth: European versus U.S. Experiences*, CESifo Working Paper 1007, August 2003.

Kristin Forbes (2000), *A Reassessment of the Relationship between Inequality and Growth*, *American Economic Review*, September 2000, 90 (4), pp. 869-87.

Michael Förster and Mark Pearson (2002), *Income Distribution and Poverty in the OECD Area: Trends and Driving Forces*, *OECD Economic Studies* 34, 2002/1, pp. 7-39.

Oded Galor and Omer Moav (1999), *From Physical to Human Capital Accumulation: Inequality and the Process of Development*, Brown University Working Paper No. 99-27.

Oded Galor, Omer Moav, and Dietrich Vollrath (2003), *Land Inequality and the Origin of Divergence and Overtaking in the Growth Process: Theory and Evidence*, CEPR Discussion Paper 3817, March 2003.

Oded Galor and Joseph Zeira (1993), *Income Distributions and Macroeconomics*, *Review of Economic Studies*, 60, pp. 35-52.

Cecilia García-Peñalosa (1995), *The Paradox of Education or the Good Side of Inequality*, *Oxford Economic Papers*, 47, 1995, pp. 265–285.

Volker Grossmann (2003), *Income Inequality, Voting over the Size of Public Consumption, and Growth*, *European Journal of Political Economy*, June 2003, 19(2), pp. 265-87.

Peter Heller (2003), *Can the IMF Contribute to the Promotion of the MDGs Relating to Gender Equality?*, speech held at the Meeting of High-Level Women in International Finance, Economics and Development, Dubai, September 2003, <http://www.imf.org/external/np/speeches/2003/092003a.htm>.

John Maynard Keynes, *The Economic Consequences of the Peace*, Macmillan, 1920.

Markus Knell (1999), *Social Comparisons, Inequality, and Growth*, *Journal of Institutional and Theoretical Economics*, December 1999, 155 (4), pp. 664-95.

Hanspeter Kriesi (1999), *Movements of the Left, Movements of the Right: Putting the Mobilization of the Two Next Types of Social Movements into Political Context*, in Kitschelt et al. (eds.), *Continuity and Change in Contemporary Capitalism*, Cambridge University Press, Cambridge.

David Kucera (2002), *The effects of wealth and gender Inequality on economic growth: A survey for research empirical studies*, International Institute for Labour Studies Geneva, Discussion Paper 136, 2002.

Simon Kuznets (1955), *Economic Growth and Income Inequality*, *American Economic Review* 45, March 1955, pp. 1-28.

Hongyi Li and Heng-Fu Zou (1998), *Income Inequality is Not Harmful for Growth: Theory and Evidence*, in *Review of Development Economics*, Vol. 2, No. 3, pp. 318-334.

Robert Lucas (1988), *On the Mechanics of Economic Development*, *Journal of Monetary Economics* 22, 1988, pp. 3 - 42.

Laura Marsiliani and Thomas I. Rengström (2000), *Inequality, Environmental Protection and Growth*, *Fondazione Eni Enrico Mattei, Nota di Lavoro* 36, 2000.

Allan Meltzer and Scott Richard (1981), *A Rational Theory of the Size of Government*, *Journal of Political Economy*, 89, pp. 914-927.

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

Arthur Okun (1975), *Equality and Efficiency. The Big Trade-off*, The Brookings Institution, Washington DC, 1975.

Roberto Perotti (1992), *Fiscal Policy, Income Distribution, and Growth*, Columbia University Working Paper 636, November 1992.

Roberto Perotti (1993), *Political Equilibrium, Income Distribution, and Growth*, *Review of Economic Studies* 60, 1993, pp. 755-776.

Roberto Perotti (1994), *Income Distribution and Investment*, *European Economic Review*, 38, 1994, pp. 827-835.

Torsten Persson and Guido Tabellini (1994), *Is Inequality Harmful for Growth?*, *American Economic Review*, June 1994, 84 (3), pp. 600-621.

Thomas Piketty (1997), *The Dynamics of the Wealth Distribution and the Interest Rate with Credit Rationing*, *Review of Economic Studies*, April 1997; 64(2): 173-89.

Günther Rehme (2002), *Education, economic growth and personal income inequality across (rich) countries*, Luxembourg Income Study Working paper 300, April 2002.

Carolyn Rodriguez (2000), *An Empirical Test of the Institutional View on Income Inequality: Economic Growth within the United States*, American Journal of Economics and Sociology, Vol. 59 (2), April 2000, pp. 303-313.

Paul Romer (1986), *Increasing Returns and Long-run Growth*, Journal of Political Economy, 94, 1986, pp. 1002 - 1037.

Hannu Tanninen (1999), *Income Inequality, Government Expenditures and Growth*, in Applied Economics, Vol. 31, No. 9, pp. 1109-1117.

J.G. Williamson (1991), *Inequality, Poverty and History*, Oxford: Blackwell.

Jaejoon Woo (2003), *Economic, Political, and Institutional Determinants of Public Deficits*, Journal of Public Economics, 87(3-4), March 2003, pp. 387-426.

Josef Zweimüller (2000), *Inequality, Redistribution, and Economic Growth*, Institute for Empirical Research in Economics, University of Zurich, Working Paper No. 31, January 2000

Table 1

	Main findings with respect to the inequality-growth relation	Type of analysis and size of the sample	Findings with respect to advanced economies
Alesina and Rodrik (1991)	inequality in income and land distribution is negatively associated with growth	cross-sectional regressions (high quality sample of 46 mostly rich, and large sample of 70 countries), data set constructed by the authors using different sources	inequality is more detrimental to advanced democracies
Alesina and Perotti (1996)	inequality increases socio-political instability, which in turn harms investment	cross-sectional regressions (71 countries), same data as Perotti (1996)	
Banerjee and Duflo (2000)	changes in income distribution affect growth in the short run; no conclusive evidence on the relation between inequality and growth in the long run	random effect panel regressions using D/S high quality (45 countries) and Barro (50 countries) data sets	
Barro (2000)	negative relationship between income inequality and growth is not robust with respect to the inclusion of a fertility variable	random effect panel regressions based on expanded version of D/S high quality data set (146 observations)	there is a positive relationship between inequality and growth in rich countries

Benhabib-Spiegel (1996)	coefficient of inequality (size of the middle class) on growth is insignificant	cross-sectional regressions (40 countries) based on the Summers-Heston data set	
Deininger and Squire (1998)	statistically significant negative relationship between income inequality and growth is not robust with respect to the inclusion of regional dummies	cross-sectional regressions based on D/S high quality data	
Forbes (2000)	inequality has a positive impact on growth in the short and medium run	fixed effect panel regressions using the D/S high quality data (45 countries, 180 observations)	
Keefe-Knack (1995)	inequality affects growth negatively through its impact on property rights	cross-sectional regressions based on D/S high quality data (56 countries)	
Knell (1999)	a rise in inequality has a negative impact on growth	cross-sectional regressions using D/S high quality data and a data set by Barro (83 countries, divided in a low-income and a high-income sample)	the negative impact of inequality is higher in high-income countries
Li and Zou (1998)	income inequality is positively, and very often significantly, associated	fixed and random effects panel regressions based on D/S data set	

	with economic growth	(46 countries, 217 observations)	
Milanovic (2000)	income inequality increases redistributive policies; the median voter theorem does not hold	fixed effect panel regressions based on Luxembourg Income Study data (24 countries, 78 observations)	
Perotti (1994)	inequality has a negative impact on investment because of political instability and imperfect capital markets	cross-sectional regressions on data from Alesina and Perotti (1993, 1996)	
Perotti (1996)	inequality affects growth negatively through the 'political instability' and the 'human capital' channel; no support for the median voter theorem	cross-sectional regressions (67 countries), data on inequality (share of middle class) constructed by the author	
Persson and Tabellini (1994)	income inequality has a negative impact on growth (in democratic countries)	long-term (historical) panel regression (9 countries) and post-war cross-sectional regression (56 countries),	the negative correlation between inequality and growth is present only under democratic institutions
Rehme (2002)	inequality is negatively associated with growth in the long run	cross-sectional regressions using small samples based on D/S (21 countries) and Luxembourg Income Study (13 countries)	the results are based on samples of relatively rich countries

Tanninen (1999)	a decrease in income inequality increases the growth rate	cross-sectional regressions, D/S and Penn World Table data (52 countries)	
Venieris and Gupta (1986)	income distribution (the size of the middle class) affects aggregate savings, and therefore growth	cross-sectional regressions (49 countries)	

© 2003 Österreichisches Institut für Wirtschaftsforschung

Medieninhaber (Verleger), Hersteller: Österreichisches Institut für Wirtschaftsforschung • Wien 3, Arsenal, Objekt 20 • A-1103 Wien, Postfach 91 • Tel. (43 1) 798 26 01-0 • Fax (43 1) 798 93 86 • <http://www.wifo.ac.at/> • Verlags- und Herstellungsort: Wien

Die Working Papers geben nicht notwendigerweise die Meinung des WIFO wieder

Verkaufspreis: EUR 8,00 • Download kostenlos:

http://publikationen.wifo.ac.at/pls/wifosite/wifosite.wifo_search.get_abstract_type?p_language=1&pubid=24704