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INEQUALITY AND GROWTH: an overview of the theory

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INEQUALITY AND GROWTH: An Overview of the Theory

Marcos Mendes[1]

ABSTRACT

The relationship between inequality and growth is not a settled issue in economic theory. Some theories propose that growth affects inequality, while others argue that inequality shapes growth. There are theories in which the two variables are positively correlated, while in others this correlation is negative. This paper presents and compares some of these theories. The focus is on the effect of inequality on long-term growth in low and middle-income countries.

Conventional wisdom considers that increases in inequality are correlated to higher growth, due to savings effect (the rich save more than the poor) and incentives effect (in the absence of redistributive policies, talented people can collect the fruits of their effort).

However, there are many channels through which inequality may harm growth. In the political economy literature there are two main lines of reasoning: one which says that inequality may induce the political system to adopt redistributive policies and by doing so discourage investment; and another stating that rich people are able to bias property rights and laws in their favor.

The literature on development economics emphasizes that inequality may lead to credit constraints which may result in poverty traps; and that consumer markets may not be large enough to make industrialization viable. The macroeconomic literature calls attention to the inability of unequal countries to allocate the costs of a macroeconomic adjustment program and to sustain growth for a time long enough to achieve high levels of income.

Applied econometric studies have been unable to show a clear pattern of the causal relationship between inequality and growth. Many problems impose limitations to those studies: reversal causality, measurement error, sample bias and non-linearity are some of these barriers. Advances in theory and evidences in this field seem to be dependent on microdata and case studies.

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INEQUALITY AND GROWTH: AN OVERVIEW OF THE THEORY

1 INTRODUCTION

This essay presents an overview of the literature on the causal relationship between income (and wealth) inequality and economic growth. Does inequality affect growth? If yes, does it stimulate or block growth? What could be the economic mechanisms linking inequality to growth?

To be more exact, the focus is in the effect of inequality on long run growth in low and middle-income countries. Could Brazil, South Africa or Uganda have achieved higher levels of per capita income if they were less unequal? Can the concentration of wealth observed in Russia after the collapse of Communism affect the its long term growth perspectives? Is the recent intense income concentration and accelerated growth in China a signal that raising inequality stimulates growth? Did wealth redistribution play a relevant role in the growth miracle of South Korea and Taiwan?

Conventional wisdom points to a positive correlation between inequality and growth based on two lines of argument: savings and incentives. The argument related to savings originates from the idea that rich people save more than poor people. This leads to the conclusion that income concentration results in higher savings. Since higher savings may finance higher investments, income concentration is associated with higher growth. However, saving behaviour is complex and saving is not necessarily a linear function of income. Furthermore, there is no clear empirical evidence that income concentration increases savings.

The second line of argument is that the capitalist system tends to generate inequality: those who perform better have higher rewards. Incentives to get rich induce people to work hard and inequality is due to the different performances from individuals with varying abilities. Attempts to remedy inequality reduce those incentives. Societies that tax entrepreneurs and use the proceeds of this taxation to redistribute income to the poor discourage investment and effort which, as a consequence, stifles growth. In fact the history of the 20th century shows that communist countries, whose policies were focused on redistribution and on the repression of individual incentives, were unable to achieve high levels of per capita income.

However, developments in economic theory in the last twenty years have shown that this well-known trade off between efficiency and equity may not hold when one goes beyond a general concept of incentives and takes into consideration some important details and features of the "real world". For instance: inequality may create political instability and discourage investments or may undermine property rights. In these and in many other situations, inequality may be harmful to growth.

All these "real world" situations explored by the literature represent a departure from the traditional Solow growth model, which analyzes growth in a frictionless world. The Solow model describes a world of ideal conditions: property rights are fully protected, contracts are enforced, and law is equally valid to everybody. International trade and capital flows are free. There is no failure in the credit market or any other institutional problems (regulatory instability, volatility in tax policy, etc) that could reduce the expected value of investing in physical or human capital.

In such an ideal world, people can internalize the returns of their investment, and there is no friction that prevents one from investing once he has decided to do so. Physical capital and people go to countries where expected returns are higher. There is a tendency for every country to converge to the same level of per capita income. Differences in the steady-state of per capita income of each country would reflect differences in preferences concerning intertemporal distribution of consumption (savings rate) and/or different choices in time allocation between labour and leisure.

However, in the real world we observe large disparities in per capita income among different countries. Some countries achieve higher levels of productivity, invest more in physical and human capital, grow faster and achieve higher levels of per capita income.

What are the exogenous causes of these different outcomes? Why are some countries able to accumulate physical and human capital faster than others? Why does productivity differ among countries? These are fundamental questions that still remain unanswered by growth theorists. As put by Easterly (2001, p. 1): "*many explanations of the cross-country differences in economic growth and development only lead to further questions. If differences in saving rates explain cross-country income differences, then why do some societies save more than others? If national policies explain much of the difference in growth rates across countries, then why do some nations have worse government policies than others?*"

Many different theories are being proposed to explain such disparities. The natural way is to relax "perfect world" hypotheses used in the Solow model. This essay explores one branch of this literature: the one that analyzes the impact of wealth and income inequality on the development path of nations.

Developing countries are those whose features are more distant from the ideal conditions of the Solow model: underdeveloped credit markets, fragile property rights, unstable politics and so on. Therefore, theoretical propositions that explore this kind of failure fit better in the understanding of development issues of poor and middle-income countries than with the developed nations' context.

In the specific case of inequality, there is a growing literature focused on developed countries[2], stimulated by a marginal increase in inequality in the recent years, and by the interaction of inequality and the global economic crisis started in 2008. However, this essay does not focus on issues that are specific to developed economies, and concentrates attention on developing countries and, as stressed above, on the relationship between inequality and long term economic performance.

It is worth noting that for a long time economists have explored a causal relation in the opposite direction: growth determining the level of inequality. Kuznets (1955) proposed that inequality tends to increase in the beginning of the development process and to fall when a country achieves a high level of per capita income. Recent econometric evidence does not support this possibility[3]. This essay does not cover theories that propose a causal relationship from growth to inequality, instead it concentrates on a causal relationship that goes from inequality to growth.

Some models described in this essay are in the branch of endogenous growth models. In these models there is some kind of non-decreasing returns in the production function and, as a consequence, permanent changes in policies may affect growth permanently. Other models are in the traditional set of decreasing returns, where governmental policies affect growth during a transitional path, while the economy moves from one steady state to another.

When describing the models I will not be thorough in distinguishing between temporary and permanent changes in growth rates. Firstly, because this is a descriptive

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2 Marrero and Rodríguez (2010), Kumhof and Ranciere (2010), Rajan (2010).

3 See Deininger and Squire (1996).

essay and there is no room for a precise investigation into how long the effect of a policy may last. As proposed by Jones (2002, p 184-5): *"if the government were to provide an additional subsidy to research or investment, growth rates would rise for a while (…). However, for how long would growth rates remain high? The answer could be 5 or 10 years, 50 or 100 years, or an infinite amount of time. (…) the distinction between whether policy has permanent or transitory effects on growth is somewhat misleading*".

Secondly, because "governmental policy" is not a clearly defined expression: it may represent a marginal change in some parameters (a tax increase, a subsidy, etc.) that may affect growth temporarily or for a long time; but it may also be a fundamental institutional reform (improvement in property rights, credit market reform, etc.) with a permanent impact on growth. Depending on the theory under analysis, the use of the term "growth" may refer to growth during the transitional path to a new steady state or to growth in the steady state.

It is important to remark that the main target of this essay is to serve as a theoretical background to a specific study of the effects of inequality on the development of the Brazilian economy. Therefore, this literature review will focus on those points that I consider more important in the study of the Brazilian case. For instance, I will not pay attention to questions such as ethnic fragmentation or gender inequality, which do not seem to be relevant to the Brazilian case.

This essay is divided into eleven sections; the first one being this introduction. Section 2 presents some stylized facts on inequality and growth that illustrate and support the theoretical exposition of the subsequent sections. Section 3 deals with theoretical propositions, that advocate a positive effect of inequality on growth: incentives and savings motives are analyzed. Sections 4 to 9 present theories in which there are many different channels through which inequality may harm growth. Section 4 presents the effects of redistributive (Robin Hood effect) policies. Section 5 describes how inequality may distort institutions in favour of the rich (King John effect). Section 6 shows how credit market imperfections may restrict the access of the poor to funds for financing their investment and how this may affect growth. Section 7 explores the possibility that inequality creates economic and political instability, which result in an inability of unequal countries to sustain growth for a period long enough to achieve high levels of per capita income. Section 8 shows how inequality weakens education and the

accumulation of human capital. Section 9 describes the hypothesis that unequal countries may have small consumer markets, which retard industrialization and growth. Section 10 summarizes econometric evaluation of the causal relationship between inequality and growth, and reaches the conclusion that there are insurmountable barriers to identify this relationship, such as non-linearity, data quality and availability, reverse causality, sample bias and inadequate definitions of variables representing inequality.

Due to these econometric restrictions, it seems that advances in the knowledge of the relationship between inequality and growth will depend on case studies and microdata. This approach may reduce the heterogeneity that exists in cross-country data and may permit a more detailed analysis; although at the cost of not allowing generalizations or external validity. Even though the different theories described in this essay cannot be unequivocally supported by econometric evidence, they offer a solid background for case studies. As stated above, I intend to use this theoretical structure to analyze the Brazilian case.

2 SOME STYLIZED FACTS ON INEQUALITY AND GROWTH

This section presents some cross-country data on inequality and growth that is helpful to establish some stylized facts and illustrate theoretical propositions that appear in the following sections.

The first point warranting attention is that inequality seems to be persistent throughout time. Graph 1-A plots the Gini index in "the past" versus the Gini index "in the present". This data comes from the World Inequality Database (WIID2C), which represents an update of the Denninger and Squire (1996) dataset. The Graph includes only those countries: (a) whose data quality is considered good (classified as quality level 1 or 2); (b) to which there is a distance of at least five years between the oldest and the newest information on inequality for each country[4].

The main message of Graph 1-A is that inequality in the past can predict inequality in the present reasonably well (R^2 coefficient of 0.5). Other important information contained in this Graph is that Latin-American and Caribbean countries (yellow dots) and African countries (red dots) present levels of income concentration

[4] The mean length of time between the first (past) and last observation (present) of the Gini index in the sample is 23 years. The median is 21 years. Standard deviation is 12,5.

much higher than the sample mean. Among the 20 more unequal countries in the sample, 16 of them are in those regions of the world.

Graph 1-A – Inequality in the past vs. Inequality in the present (Gini coefficient) – Complete sample

Source: World Inequality Database (WIID2C) – Available at http://www.wider.unu.edu/research/Database/en_GB/database/

Note: Includes countries: (1) whose data quality are ranked as level 1 or 2; (2) that have available data with a distance of at least five years from the oldest to the newest information.

Another interesting feature of this data, is that when communist or former-communist countries ("communists" from now on) are removed from the sample, the adjustment of the regression line improves a lot. As shown in Graph 1-B, the R^2 coefficient jumps from 0.5 (Graph 1-A) to 0.8. Inequality in the past is an even stronger predictor of inequality in the present for capitalist countries.

Graph 1-B – Inequality in the past vs. Inequality in the present (Gini coefficient) – Capitalist countries only

Source and note: see Table 1-A

This difference between communist and capitalist countries comes from the fact that between the initial moment (the past) and the final moment (the present) portrayed

in the Graphs, centrally planned economies went through economic reforms that liberalized them and seem to have caused an increase in inequality.

Table 1 shows that at the initial moment, communist countries were much more equal than capitalist ones. In the final moment they are still more equal. However, the distance between the two groups shrank. Differences among communist countries increased, as shown by the standard deviation statistics. On the other hand, capitalist countries do not show relevant changes in the mean level of inequality or in the dispersion of it among countries. It seems that communist economies converged to a capitalist pattern.

Table 1 – Inequality in the past vs. Inequality in the present (Gini coefficient) – Capitalist and communist countries

	Capitalist		Communist	
	Past	Present	Past	Present
Mean	41,9	40,8	26,9	35,9
Std. Deviation	10,0	9,9	5,3	8,5

Source and note: see Table 1-A

To summarise, communist countries seem to have been submitted to a structural change that resulted in higher inequality and higher heterogeneity among them. Capitalist countries, on the other hand, did not experience such structural break and exhibit a persistent pattern in their inequality statistics.

The liberalization in communist countries allowed faster economic growth. China is probably the most successful case of economic growth in the end of the 20th century and the beginning of the 21st century. Table 2 shows how inequality and per capita income evolved between 1988 and 2003 in this country. The Gini index almost doubled, reflecting an abrupt increase in inequality and at the same time, there was a boost in per capita income.

Table 2 – Inequality and per capita income in China (1988 and 2003)

	Gini index	Real per capita income(US$ - ppp)
1988	23,3	1.140
2003	44,9	3.589
% variation	93%	215%

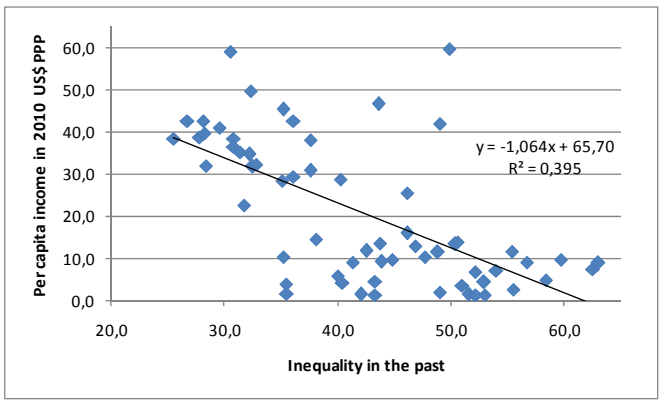
Sources: World Inequality Database (WIID2C) – Available at http://www.wider.unu.edu/research/Database/en_GB/database/ and Alan Heston,Robert Summers and Bettina Aten, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Nov 2012

These results point to a positive correlation between inequality and growth. More specifically, the channel that links inequality to growth in this case may be the reduction in the restrictions for free enterprise and in the redistributive intervention by the government. In a liberalized economy the proceeds of economic activity belong to those who invested in the production. The taxation of production and the redistribution to the whole population is much less pronounced.

Therefore, there is probably an incentive mechanism behind this positive relationship between inequality and growth. Section 3.1 of this essay describes theoretical aspects of this "incentive channel". Other possible mechanism is that income concentration produced higher aggregate savings, making more funds available to invest. This channel is analyzed in section 3.2.

However there should be other channels through which inequality and growth interact in a different way. In contrast with the Chinese pattern shown above, the cross-country data for capitalist economies shows that countries with high inequality in the past have a lower level of per capita income in the present (Graph 2).

Graph 2 – Inequality in the past and per capita income in the present – Capitalist countries only



Sources: see Table 2.

Although Graph 2 shows a simple correlation measure, a causal relationship may be behind this pattern. Inequality may create some distortions in the economy and block growth. Since inequality is persistent over time (see Graphs 1-A and 1-B), these distortions are not easily removed from the institutional and economic settings, and keep curbing growth for a long time. This essay examines the many ways through which this may happen (sections 4 to 9).

3 INEQUALITY AS A STIMULUS TO GROWTH

There are two main channels through which inequality may stimulate growth: incentives and savings.

Incentives have a direct effect on growth: agents working in an environment where there are rewards for effort will work harder and generate a higher level of output. Once the system of rewards and punishment produce inequality, there will be a link between inequality and growth. However, if one introduces other restrictions in the model, such as imperfect credit markets or political economy constraints on policymaking, the interplay of these restrictions with incentives may result in a negative causal relationship between inequality and growth.

Higher saving rates determine higher levels of steady state income in the Solow model, or higher growth rates in endogenous growth models. The idea that inequality leads to higher savings has been taken as conventional wisdom. However, there are several theoretical arguments that support a positive, a negative or a neutral relationship between inequality and savings. Most recent econometric evidence shows that income inequality has no significant effect on savings, probably due to the compensatory effects of mechanisms pushing in different directions.

3.1 INCENTIVES

It is easy to see the trade-off between equality and economic growth in a simple moral hazard model.

Working hard implies a cost (mental or physical effort, the time spent in the work, etc.). A rational individual will make effort to achieve a target only if he receives compensation that is proportional to his efforts.

Assume that there is an employer (principal) and many employees (agents), and that the success of a project depends on the level of effort applied by those involved in it. The employer cannot observe the effort made by the employees, but can observe the final result of their work.

If the employer offers a fixed wage to everybody, irrespective of individual effort, nobody will have an incentive to work hard. On the other hand, if there is a variable higher payment for those who obtain good results and a reduction in payment for those who underperform, agents will be stimulated to do their best.

Therefore, productivity and the level of production will be higher when unequal rewards are paid. The aggregation of this argument for the whole economy, means that incentives may promote a higher level of income. There is an *"important role of income differences in providing incentives to invest in education and physical capital, to work, and to take risks"*[5]

If a government intervenes in the labour contract to impose limits in the reward/punishment scheme, to facilitate a reduction in inequality among the agents, the incentive scheme will no longer deliver the best level of production: in this case there is "*a fundamental trade-off between productive efficiency (and/or growth) and social justice, as redistribution would reduce differences in income and wealth, but would also diminish the incentives to accumulate wealth"* (Aghion et al, 1999, p. 11).

Governmental policies, such as taxation and regulation, are natural instruments for redistributing income and wealth. Used with a redistributive purpose they may harm growth. In the neoclassical growth model, taxing capital reduces the return to saving, inducing people to increase consumption and reduce savings, which reduces investment and growth. A similar role may be played by regulatory policies such as minimum wage policies, labour market regulations, food price regulations, trade and capital restrictions, patent legislation, etc. Similar to taxation, these policies affect the expected profits and may induce those who have capital to reduce investment and increase consumption. As stated by Persson and Tabellini (1994, p.600) :

> Economic growth is 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. (text not underlined in the original version)

A benevolent planner whose objective is to maximize growth will avoid redistributive policies. However, section 4 presents a situation in which political decision-making is not exogenously defined by a social planner, but results from democratic voting. In this case inequality may induce the choice of redistributive policies and, by doing so, harm growth.

In section 6.3 it will be shown that the trade-off between inequality and growth may not hold if there is a restriction in the possibility of punishment to agents that apply

[5] World Bank (2006, p. 3).

low effort (limited liability) and if there are imperfections in the credit market. In this case, inequality may (but not necessarily will) harm growth.

3.2 SAVINGS[6]

The idea that a concentration of income (and wealth) promotes savings increase is based on the assumption that rich people save more than poor people. Therefore, transferring income from the poor to the rich would result in higher aggregate savings. In fact, the real causal effect between inequality and savings are far from being clearly understood. There are several different theoretical propositions about it, arguing in favour of a positive, negative or neutral relationship between these two variables. This section summarizes the theoretical debate on this issue.

Keynesian growth models, such as Kaldor (1957), usually assume a negative relationship between savings and the functional concentration of income. In Kaldor's model, for instance, there is an *ad-hoc* hypothesis that workers do not save (they consume all their wages). Therefore the more concentrated income is in the hands of capitalists, the higher the savings rate will be. However, it is no more than a hypothesis.

A similar line of reasoning is one that considers investment indivisibilities. If the investment in a productive activity requires a higher minimum amount (large sunk costs) and if there is no credit market, the only way to put together enough money to make such investment possible is to concentrate income and wealth in the hands of a small group in the society. Growth is seen as a simple matter of capital accumulation. As a consequence inequality is necessary in order to surpass the sunk cost barrier and allow the implementation of dynamic industrial sectors.

This "trickle down" approach proposes that the priority for poor or middle income countries should be the increase of aggregated income, leaving distributive issues to a second stage of development. The poor would benefit from the increase of income, although their share in the national income would remain small. Section 5 presents a critique of this argument: inequality may lead to distortion in institutions, and those distortions may reduce long-term growth.

Friedman's (1957) *permanent income* hypothesis analyses the impact of personal income distribution and aggregate savings. His theory unbinds savings from income. He

[6] The initial part of this section is based in Schmidt-Hebbel and Sérven (2000) and Dynan et all (2004).

proposes that high (permanent) income and low (permanent) income individuals save the same proportion of their incomes but save more during good times and less in bad times.

However, models that add a bequest motive to a life cycle savings mechanism, may reintroduce a positive relationship between inequality and saving: if a bequest is something that only the rich can afford, they will tend to save more in order to leave money to their heirs. A similar effect may result from savings related to expected medical expenses at an old age. If only the rich can afford this kind of precaution, the rich will tend to save more.

Becker (1975) takes a different route of reasoning when he argues that the poor and the rich save the same proportion of their incomes. However, the poor tend to save in the form of investments in human capital. If human capital has decreasing returns, the poor (who supposedly are less educated) will get higher returns and, as a consequence, invest more on it. Since expenditure in human capital is recorded as consumption in national accounting, the poor will apparently save less, but the real fact would be that they use a different saving instrument. As observed by Thorbecke and Charumilind (2002, p. 1482): *"at low income levels (…) many forms of apparent consumption such as food, health and education make the worker more productive and should therefore be considered more appropriately as forms of savings-cum-investment"*.

Borrowing constraints is another aspect that may affect the savings of the poor and rich in different manners. If the poor cannot access the credit market (as examined in detail in section 6), they will tend to accumulate assets in good times in order to smooth consumption (Deaton, 1991). In this case, redistribution from the rich to the poor will tend to reduce aggregate savings, since it will alleviate the borrowing constraint of the poor.

On the other hand, if the poor face more uncertainty, are more risk averse and have less access to instruments that allow risk diversification, a redistribution of income from the rich to the poor would result in higher aggregate savings, since the poor would store the extra money to attend to their demand for insurance against risk.

Up to now we could see many different ways through which changes in income distribution may affect savings. What these different approaches show, is that it is far from being a fact of nature that the rich save a higher proportion of their incomes.

Nevertheless, a wave of empirical and theoretical studies on the economic behaviour of the poor tends to indicate that (and explain why) the poor in fact, save less than the rich. Banerjee and Duflo (2011) summarize these studies.

The first barrier faced by the poor is the cost of operating a bank account: not only because of the financial cost of bank fees, but also because banks are usually located in urban areas, far from poor rural communities; which increases the cost to access a bank premise. Furthermore, the banks themselves are not interested in attracting small amounts of savings. Their fixed costs per account are high: they have to comply with financial regulations and safety issues; these require a lot of work per account, despite the amount of money deposited in the account.

Poor people may overcome this barrier to access banks by using alternative instruments for saving. Banerjee and Duflo (2011) argue that, in fact, the poor tend to use other instruments, such as building houses over many years, brick by brick; or buying fertilizers or seeds just after the harvest, when they have available money; or even by means of collective savings arrangements, in which every member regularly contributes with a fixed value to a common pot and periodically, each member has the right to use the entire amount of money accumulated by the group (rotating savings and credit associations – ROSCAs).

However, these instruments are quite inefficient. An unfinished roofless house is useless and the money put on it is "stagnant" and could be alternatively invested in a savings account that accrues interests. Not to mention the risk of a natural disaster destroying the incomplete house or the cost to police the house against thieves or vandals. ROSCAs do not accrue interest as well and there is always the risk that a member of the group fails to honour his commitment.

Even these alternative ways to save may face barriers to be implemented. Take the case of buying fertilizers or seeds just after a harvest. If the shops that sell these inputs do not offer them after the harvest (because the consumption peak is just before the sowing season), those who intend to use this saving instrument will be blocked.

Therefore there is an important difference between the poor and the rich. The last group have many savings instruments available to them: pension funds, savings accounts, advanced purchase mechanisms through the internet, etc. The poor lack the most basic mechanism to save.

Since they cannot invest their extra money the moment they get it, the money is kept in their hands; the temptation to spend may prevent them from saving. This brings up an important issue analyzed by the literature: self-control.

Some studies[7] have shown that people usually behave in a "time inconsistent" way. They set up "responsible" goals to their lives (raise their savings, control their weight, work harder, etc.) but continually postpone the actions needed to achieve these targets. The temptation of an immediate pleasure tends to make us push our plans of responsible behaviour a bit further ahead. I spend more today but intend to save more in the future, or eat sweets today and plan to eat a salad tomorrow. But tomorrow will turn out to be today, and the cycle starts again.

To break this cycle people usually resort to commitment devices[8]. Building houses throughout the years or joining ROSCAs schemes may be seen as a commitment: they reduce the liquidity of assets and make it difficult to spend. The important point here is that although the poor may have access to some commitment instruments, these instruments are less efficient and less available than the ones that are available to the rich. The rich have many institutional mechanisms that help them to commit to long-term financial strategies (for instance, money that is discounted directly in the pay check and deposited in a pension fund), while the poor have to resort to their self-control (or inefficient instruments) to avoid spending the money. The rich also have a variety of insurance devices (health, housing, life, funeral, etc.) that help in bad moments, while the poor are pressed to use their savings, stored at home, in times of need.

Furthermore, living a hard life, full of restrictions, frustrations, and uncertainties, the poor seem to be more prone to being attracted to relieving their tensions through consuming temptation goods; such as alcohol, sugar and tobacco. Even if the rich were as tempted as the poor, they simply could afford these temptations without ruining their budget. For the poor, the simple habit of smoking some cigarettes a week may represent a large drain on their savings perspectives.

In sum, according to these arguments the poor tend to save less than the rich because they are trapped by a combination of: (a) unavailability of saving mechanisms

[7] See, for example, Banerjee and Mullainathan (2010).

[8] Ashraf, Karlan and Yin (2006).

in the financial system that is adequate to their needs, (b) unavailability of efficient mechanisms for commitment, (c) higher propensity to succumb to temptations, (d) a lower margin of extra money to afford the consumption of temptation goods. These factors create an "anti-saving bias of poverty"

There is a similar line of reasoning that points to the inability of the (very) poor to save, based on the concept of "aspiration". People save to get richer and improve their future standard of life: *"poor people who feel that they will have opportunities to realize their aspirations will have strong reasons to cut down on their `frivolous` consumption and invest in that future. Those who feel that have nothing to lose, by contrast, will tend to make decisions that reflect that desperation. This may explain not only the differences between rich and poor but also the differences among different poor people"* (Banerjee and Duflo, 2011, p. 201).

Ray (2006, p. 412) proposes that:

> The aspirations gap is simply the difference between the standard of living that's aspired to and the standard of living that one already has. (…) it's this gap (…) that affects future-oriented behavior.
>
> The aspirations gap is a measure of how far one wants to go. (…) investment (in education, health, or income-generating activities) raises future standards of living. Presumably, this narrows the aspirations gap. At the same time, investment is costly to the individual. Current sacrifices will need to be made. (…)
>
> (…). Individuals whose aspirations are closely aligned to their current standards of living have little incentive to raise those standards. However, individuals whose aspirations are very far from their current standards of living also have little incentive to raise standards, because the gap will remain very large before and after. A lot of investment will cover only a small part of the way: the overall journey is too long, and therefore not worth undertaking in the first place.

This kind of reasoning has an interesting implication concerning inequality and savings. If a society has an extremely unequal income (and wealth) distribution, there will be a large number of poor people whose aspiration gap is too large to stimulate them to save. On the other extreme of the income distribution, the rich will have a narrow aspiration gap and will not save as well. In contrast, a society where there is a large concentration of people in the intermediate level will have a high saving rate, because the middle class have aspirations that are possible to achieve. These households will make an effort to achieve a higher standard of life for themselves or for their descendants. Their large savings result in a boost of aggregate savings. If the

government is able to promote a redistribution that pulls very poor people in the direction of the middle-class, it may increase savings due to "aspirations" motives.

In order to close this section, it is important to see what data says about inequality and savings. Schmidt-Hebbel and Serven (2000) took advantage of the improvement of data availability and quality and re-evaluated many prior studies in the area. They re-estimate the equations proposed in other papers using a cross-country panel-data set compiled by Denninger and Squire (1996). They show that a positive causal relationship from inequality to savings found in prior studies, is not robust to correction in specification errors and to reductions in measurement error. Their final conclusion is that "*there is no support for the notion that income inequality has any systematic effect on aggregate saving" (Schmidt-Hebbel and Serven (2000, p.417)*. They consider this result coherent with the theoretical ambiguity shown in this section, in which many different mechanisms triggered by inequality may induce higher or lower savings.

Dynan et al (2004) use data from the US and conclude that rich people do save more than the poor. However, they consider their result compatible with the idea that changes in inequality do not affect savings significantly (at least in the US):

> increased income inequality should tend to increase aggregate saving, but the magnitudes of such changes are likely to be modest and therefore difficult to find in the time-series data. (Dynan et al, 2004, p. 437)

It is interesting to register the fact that their study shed some light on which kind of theoretical model is more adequate to explain empirical data:

> we suggest that the minimum components of a model to capture the empirical regularity that the rich save more should include a precautionary saving motive against uncertain expenditures late in life, thus explaining the nondissaving behavior among the elderly, coupled with a bequest motive. The different motives need not be exclusive: Households save for precautionary reasons but with a reasonable expectation that they will be able to pass along unspent balances to their children (…) As well, the empirical patterns of the data are consistent with an institutional or behavioral mechanism that systematically leads to low levels of saving among the poor. This may be caused by the absence of financial institutions such as pension plans or home ownership necessary to overcome time-inconsistent saving behavior.

In conclusion, theoretical and empirical studies cannot guarantee that income and wealth concentration boost savings and help a process of capital deepening and growth. It may be the case in specific situations, such as the one in which the country is

poor and equal, and nobody has enough capital to start investments. But it is not a general rule. Other mechanisms, such as the so-called "aspiration" motive, may imply a negative relationship between income concentration and savings.

3.3 SUMMARY ON INCENTIVES AND SAVING

This section has shown that incentives are, in fact, an important source of growth: if individuals cannot privately appropriate the fruits of their efforts, they won't invest or work hard. Therefore, interventions in the economic system that restrict this appropriation, such as taxation or regulation, reduce the potential economic growth. Since redistribution requires that some kind of intervention take place, in order to transfer resources from the rich to the poor, there should be a trade-off between growth and redistribution: trying to reduce the natural tendency to inequality may harm growth.

In relation to the saving channel, it was shown that there is no clear theoretical or econometric basis to the idea that income concentration generates significant higher savings. Even though there are arguments and evidence supporting the idea that the rich save more than the poor, the difference doesn't seem large enough to make income concentration result in higher savings. Furthermore, there is a possibility that redistribution in favour of the middle-class induce higher savings.

4 ROBIN HOOD REDISTRIBUTION

Alesina and Rodrik (1994) and Persson and Tabellini (1994), among others, propose models in which inequality may harm growth. In their models, as in the Solow model, growth results from the accumulation of physical and human capital, and also from technology. Following the "incentives" argument, taxation reduces the net return of production factors, such as capital and skilled labour. The pace of accumulation of those factors slows down when taxes are high, affecting growth.

Individuals differ in their factor endowment. In Alesina and Rodrik (1994) capitalists and educated middle class own "accumulated factor" (capital, skilled labour and technology) while "poor people" are endowed with unskilled labour, that is useful to the production process, but do not "accumulate". In Persson and Tabellini (1994) people differ in their ability to acquire skills and to accumulate productive capital, so that individuals with more skills accumulate more capital. To unify the exposition let's

call those endowed with (more) productive capital or more skills as the "rich" and the others the "poor".

The rich pay taxes that are used to finance transfers to the poor and to finance government services that stimulate growth, such as infrastructure, public goods provision and property rights protection. Therefore, government intervention has two opposite effects on growth: it stimulates growth through productive public goods provision and harms growth by means of income transfers from the rich (who are able to accumulate production factors) to the poor (who do not accumulate)[9].

Similar to the traditional neoclassical growth model and in line with the "incentives" argument, taxing the rich the government reduces the net return of investments and stimulates the rich to reduce investment and increase consumption, thereby affecting economic growth.

Given that higher taxation reduces growth, why does the government raise taxes? Taxes and public spending are decided in the political arena. In a democracy it results from the voting process. The government is not an autonomous entity with the discretion to choose the best taxation policy. It is composed of politicians that are seeking their re-election and political survival. Therefore, the government is sensitive to voters' preference and tends to follow the median voter's choices: tax and spending policies are endogenous.

Unequal societies are characterized by a large number of poor people, which means that the median voter is poorer than the mean voter. In a democratic society it biases governmental decisions in favour of the former group.

The poor tend to prefer redistribution than growth. Since their share in output is low, the growth of the output will not benefit them much, while redistribution could amplify their income and wealth even though there is no growth. The opposite is valid for the rich.

As remarked in section 3.1, "taxation" in these models is a way to refer to governmental intervention with redistributive intention. Regulation policies with redistributive impact play a similar role.

[9] In Persson and Tabellini (1994) government expenditure are only in transfers to the poor.

The political process of an unequal democratic society tends to choose a level of taxation (and regulation) higher than the one that would be necessary to finance public goods that support investment and growth (transportation infrastructure, R&D, property rights, etc.). The result is a slower pace of physical and human capital accumulation, since part of the capital that could be accumulated by the rich is transferred to the poor who simply consume and do not invest.

It is important to notice how the effect of incentives has changed in relation to what was shown in section 3.1. In that section the option to tax and redistribute was exogenously decided by a social planner, who could decide not to interfere in order to maximize growth. The result was a positive correlation of inequality and growth. In the present context, the decision to redistribute or not is endogenously determined by the previous degree of inequality. Therefore, the previous level of inequality causes the level of redistribution and consequently, the growth rate.

The main conclusion of these papers is that equal societies will chose less redistributive policies and as a consequence, will be able to grow faster. Countries where inequality is low, have a large middle class. This means that the median voter is endowed with assets such as land and human capital. Therefore the median voter faces low net benefit in a redistributive policy because his assets would be taxed to finance that policy and, at the same time, he has a higher stake in the proceeds of growth.[10]

In terms of policy prescription, if the government of an unequal country is able to promote a once and for all wealth redistribution, it can put that economy on the right track of development. The rich would face an abrupt loss of wealth but the future returns of their investment would not be affected (provided that this redistribution where not seen as a signal of future similar expropriation), while the poor would be endowed with more capital and would be less interested in redistributive policies.

Of course, such radical wealth redistribution is not easy to implement in a democratic society, where property rights are protected and the rich have political channels to protect their wealth. However, in some extreme historical situations, such as

[10] Barro (1999) argues that if the rich react to redistributive demands of the poor by lobbing the government to prevent the implementation of such policies, the low growth scenario may happen even if redistribution does not occur. The resources deviated from productive activities to lobby will be the cause of low growth.

after-war periods, in which a country's institutions and capital were destroyed or impaired, this kind of redistribution has been observed.

Alesina and Rodrik (1994) give as an example of some Southeast Asian countries, such as South Korea or Taiwan, which promoted land reform after World War II. By doing so, they widened the middle class and reduced the fraction of poor people that could support redistributive politics. Having their assets and income directly affected by taxation and regulation policy, the majority of the population, now formed by middle class households, would prefer a level of taxation and regulation that do not reduce the return of their capital.

In contrast, Latin American countries have not gone through such reforms and remained unequal societies (as shown in Graph 1-A in section 2). As a consequence, the poor maintained support to high taxes, high transfers and redistributive regulation. There was a succession of redistributive initiatives that have hampered growth. In fact, the long term performance of Latin American countries has been much worse than that of South-eastern Asian countries.

Going one step further, we may try to foresee what would be the dynamics of this kind of model. If a country is in a point of extreme inequality and the growth rate that results from redistribution is non-positive, then this economy may be in a growth trap: the pie the government redistributes becomes smaller year after year. In this case *"income inequality is or become so pronounced that it discourages further accumulation of growth"* (Persson and Tabellini, 1994, p. 605).

Another possibility is that the poor somehow manage to accumulate part of the transfer they receive, instead of consuming everything. In this case, the redistributive policy may gradually reduce inequality over time: year after year the stock of capital of the poor increases and their wealth get closer to the middle class. The economy starts in a "bad equilibrium" with high inequality and low growth but as time goes by it moves to a good equilibrium where inequality is reduced, redistribution loses support and growth is boosted. As proposed by Banerjee and Duflo (2003, p. 276): "*in our model high inequality is bad for growth because it creates incentives for hold ups, intended to reduce inequality. But the resulting reduction in inequality makes it less likely that in the subsequent period there will be a hold up and therefore the expected growth rate in that period will be higher than what it would have been, absent the costly change in*

inequality in the previous period (…) we can clearly have shocks to inequality that are costly in the short run but beneficial over a longer horizon".

Saint-Paul and Verdier (1993) propose a model with this flavour, where the redistributive policy takes the form of state financed education to the poor. It increases the human capital of the poor and reduces inequality, inducing the virtuous cycle described above[11]. Section 8 of this essay discusses public education in more detail.

Therefore, the "quality" of the redistributive policy may be decisive. If it has long lasting effects on the wealth of the poor there will be a definitive reduction of inequality, despite of the negative impact it has on growth in the short run. In this case, some years of low growth would be the price to be paid in order to move to a "good equilibrium" of lower inequality and higher growth. On the other hand, if redistribution does not push the poor in the direction of the middle class, the redistributive policy will be a waste of resources (it will improve the quality of life of the poor only temporarily; inequality and low growth will endure).

Section 9 explores the idea that the expansion in the consumption of the poor, made possible by redistribution, may not be a waste of opportunity for growth and could induce a dynamic of decreasing inequality and higher growth. It would happen if the expansion in the consumption by the poor could trigger an industrialization process in the economy.

On the other hand, any eventual positive impact of redistribution on growth may have its effects on inequality and growth reduced if other forces act in the opposite direction. The next section explores the idea that in unequal societies, the rich may use their political power to distort institutions and influence governmental decisions in their favour and by doing so, they increase inequality and create barriers to growth. Glaeser et al (2003) call this kind of redistribution in favour of the rich as "King John" redistribution, in opposition to the "Robin Hood" redistribution analyzed in the present section, in which the government takes from the rich to transfer to the poor.

To conclude this section it is important to notice the effects of redistributive policies on savings. As argued in section 3.2, poor people that are near the middle-class,

[11] This kind of argument may be seen as a distinction between redistribution of income and redistribution of opportunities. While the first may negatively affect incentives and growth, the second may have positive effects on growth. For a detailed distinction between redistribution of income and redistribution of opportunities, see World Bank (2006).

and the middle-class itself may have strong aspirational motive to save and are free from what may be called an "anti-saving bias of poverty". Therefore, if a successful redistributive policy is able to move extremely poor people in the direction of the middle-class, it could boost savings and give additional support to growth.

On the other hand, redistributive policies may reduce aggregate savings due to a reduction in governmental savings. If the government decide to fund redistributive expenditure via public deficit, instead of via tax increases, its savings will be reduced. If there is no ricardian equivalence effect in the economy, the result will be a reduction in the aggregate savings. This kind of effect was (and still is) very relevant in Latin-American economies where populist macroeconomic policies tend to run large public deficits[12].

5 KING JOHN REDISTRIBUTION

In the former model, the poor used the political process to extract income from the rich: the government, following the majority preference, acts as Robin Hood taking from the rich to give to the poor. By doing so, it reduces the incentive capitalists and the middle class have to invest and to promote growth.

This section presents an argument that runs in the opposite direction: the rich may use their political influence to overcome the law and expropriate the middle class and the poor.

Someone who feels threatened by the risk of being expropriated is less prone to invest. Only those rich, powerful, and with the right connections will feel secure to invest in a society where judges are easily bribed, and bureaucrats may change regulations in a casuistic way.

Going to court or procrastinating sentences is usually expensive enough to be afforded by small entrepreneurs. Less affluent people not only have to pay for the judicial costs to make a complaint, but also have to bear the opportunity cost of waiting for years for a definitive sentence. Unequal resources enable some individuals to expropriate others with impunity.

[12] For populist macroeconomic policies in Latin-America see Dornbusch and Edwards (1989).

To be protected against aggressions towards property right, is also easier for the rich. Private security is expensive and has economies of scale, which prevent the poor and small business from using it as much as the rich.

In sum: in unequal societies there is a high probability that the legal, political and regulatory systems do not hold the rich accountable. Property rights and rule of the law are weak and do not protect the poor from being exploited by the rich (Gradstein, 2007).

Besley and Ghatak (2008, p. 56, 60) call "effective states" "*those that support institutions that allow* [all] *household and firms to enjoy secure property rights"*. In societies where the rich have higher influence on state's decision or may restrict access to property rights to the members of an oligarchy, "*there may be little incentive to improve property rights for the wider economy*".

Acemoglu and Robinson (2011, p. 74-75, 76) call this asymmetry "extractive economic institutions" in opposition to the concept of "inclusive economic institutions":

> Inclusive economic institutions (…) are those that allow and encourage participation by the great mass of people in economic activities that make best use of their talents and skills and that enable individuals to make the choices they wish. To be inclusive, economic institutions must feature secure private property, an unbiased system of law, and a provision of public services that provides a level playing field in which people can exchange and contract; it also must permit the entry of new businesses and allow people to choose their careers. (…) Extractive economic institutions [are those which have opposite properties: they are] extractive because such institutions are designed to extract incomes and wealth from one subset of society to benefit a different subset.

In such a scenario, growth may be hampered by at least four distinct mechanisms. Firstly, there is a reduction in the overall investment rate (because part of the society is afraid of investing). Secondly, there is a concentration of investments in the hands of people who is not necessarily the most capable or efficient (their comparative advantage is not based on technical knowledge or ability, but power, connections and wealth). Thirdly, people spend resources in wasteful rent seeking or defensive activities (bribery, political bargain, private security, etc.) , which could be alternatively invested in productive goods and services. Fourthly, the government is

used by affluent people as an instrument to provide rents, instead of a provider of public goods that are essential to development, such as infrastructure and public education[13].

The result may be not only a lower growth rate but also a vicious cycle, in which inequality produces weak institutions that are biased in favour of the rich, and those biased institutions reinforce inequality through the concentration of investments, human capital, access to credit, wealth, and power. Only those able to protect themselves against expropriation may become rich. A strong middle class cannot flourish in such a society.

This double causal relationship (inequality shapes institutions and institutions perpetuate inequality) may explain why inequality and institutional quality are persistent and do not change much throughout history. Initial colonization conditions may define the path of inequality and institutional quality for more than a century (Acemoglu and Robinson, 2011).

Engerman and Sokoloff (2002) use this reasoning to explain why USA and Canada experienced a different path of development in relation to Latin America and Caribbean countries. They first argue that different factors, endowments (soil, climates, size or density of native populations), created different degrees of inequality in wealth, human capital, and political power. These differences, in turn, shaped different institutions:

> colonies established in the Caribbean or Brazil, enjoyed a climate and soil conditions that were extremely well suited for growing crops, such as sugar, that were highly valued on world markets and most efficiently produced on large slave plantations. Their population came to be dominated by large numbers of slaves obtained through the international slave market, and they quickly generated vastly unequal distributions of wealth, human capital and political power.(…) In contrast, small, family-sized farms were the rule in the northern colonies of the North American mainland, where climate conditions favored a regime of mixed farming centered on grains and livestock that exhibited quite limited economies of scale in production and used few slaves.(…) These initial differences in the degree of inequality – which can be attributed largely to factor endowments, broadly conceived – had profound and enduring effects on the paths of development of the respective economies. (…) The logic is that great equality or homogeneity among the population led, over time, to more democratic political institutions, to more investment in public goods and infrastructure, and to institutions that offered relatively broad access to economic opportunities.(…)[In Latin America] colonists of European descent could enjoy the high incomes that come from a strong comparative advantage in producing highly valued commodities as well as relatively elite status (relying on slaves and Indians to provide the bulk of the manual labor)(…)The principal areas of exception, namely, the northern United States and Canada, were correspondingly less attractive to

[13] World Bank (2006) provides an extensive review of these issues.

> Europeans at first.(…)Efforts to implant a European-style organization of agriculture based on concentrated ownership of land combined with labour provided by tenant farmers or indentured servants, as when Pennsylvania and New York were established, invariably failed. The large landholdings unravelled because even men of rather ordinary means could set up independent farms when land was cheap and scale economies were absent. (Engerman and Sokoloff, 2002, many pages)

Once they have emphasized the difference between the two kinds of colonization and their effects on institutions, the authors argue that those initial different institutions could perpetuate themselves throughout time:

> In societies that began with extreme inequality, the elites were both inclined and able to establish a basic legal framework that ensured them a disproportionate share of political power and to use that influence to establish rules, laws, and other government policies that gave them greater access to economic opportunities than the rest of the population, thereby contributing to the persistence of the high degree of inequality. (Engerman and Sokoloff, 2002, p. 17-18)

Graphs 1-A and 1-B in section 2 (stylized facts) illustrate that inequality is in fact persistent in time, and that Latin American countries are among the most unequal in the world.

Those "elite-biased" institutions had a negative impact on long term growth. The authors argue that it happened by means of land concentration, restricted offer of public education, restrictions in immigration policy, narrowness of the credit market (tight restrictions to bank creation), and slow pace of franchise extension to the poor and the illiterate.

Landless farmers have no collateral to back a bank loan and cannot finance the expansion of their business. A small number of banks reduced competition in this sector, increased interest rates and collateral requirements, making credit affordable only to the rich. Shortage of public education resulted in restricted private returns of education to those who could afford a private school. Restrictions to the entrance of new immigrants into the colonies (which happened mainly in the Spanish America) guaranteed those who arrived first a lower level of competition for the use of local resources (local workers, land and mineral resources). Enfranchising only the rich fraction of the society, made it easier for the upper class to shape institutions and policies in their favour.

Therefore, unequal societies tend to have less competition and weaker incentives to increase productivity, to accumulate human and physical capital, and to explore their endowments efficiently. In the long run this translates into lower growth. Some of these channels will be analyzed in more detail, in the forthcoming sections.

It is important to notice the contrast between the notion that inequality shapes institutions that do not favour long-term growth, with the idea (presented in section 3.2) that inequality may foster growth through the increase in savings. Here, even if inequality increases savings (and allows a higher steady state level of income or a higher income growth), there is a compensatory effect: the distortion of institutions reduces the potential growth rate or the steady state level of income:

> Previous treatments of the impact of inequality on growth typically focus on the impact of inequality on savings or investment rates. Our hypothesis, however, concerns the possibility that the extreme differences in the extent of inequality that arose early in the history of the New World economies may have contributed to systematic differences in the ways institutions evolved. The logic is that great equality or homogeneity among the population led, over time, to more democratic political institutions, to more investment in public goods and infrastructure, and to institutions that offered relatively broad access to economic opportunities. (Engerman and Sokoloff, 2002, p. 4)

A similar contrast may be seen in the incentive to make effort and to be productive. While in the moral hazard (without limited liability constraint) context of section 3.1 higher effort and productivity were maximized in societies that do not posed limits to inequality, in the present context inequality reduces competition and stifle incentives to make effort.

An interesting example of inequality shaping institutions is the Russian "crony capitalism" that emerged after the debacle of the communist system, as reported by Glaeser et al (2003, p. 213)[14]:

> Russia's mass privatization program, conducted between 1992 and 1994, created nearly 40 million individual shareholders in the more than 14,000 medium and large-scale enterprises that were auctioned off. Through secondary trading, however, ownership in many of these firms—particularly the valuable ones—quickly concentrated in the hands of relatively few industrial groups, which often included commercial banks as part of their organizations. Persons controlling these groups, known as oligarchs, moved to consolidate their economic and political control. Using their banks, they acquired additional firms, including those in the energy sector. They used their influence over Parliament and courts to dilute minority shareholders with legal impunity, and thereby to consolidate their control over business groups. They used political contributions, and the government's lack of

[14] For a description of this phenomena in Mexico see Guerrero, López-Calva and Walton (2006).

> funds, to convince the government to pursue a ‘‘shares-for-loans’’ program, which transferred to the oligarchs the control over several of the country’s most valuable enterprises. They used their resources to acquire newspapers and television stations, the crucial instruments of political influence. Last but not least, they used their economic and political power to stop further reforms of law and order, including corporate governance, commercial and central banking, and securities markets. Ultimately, several of the oligarchs simply joined the government.
>
> Subversion of political and legal institutions brought crony capitalism to Yeltsin’s Russia.

The idea that the economic elite have the ability to control political and judicial institutions and, therefore, to amalgamate economic resources, resembles Marxist or radical reasoning. However, it is important to stress a fundamental difference between the theory described above and leftist normative propositions.

Marxists theorists propose the expropriation of the rich. In many countries political revolutions took the rich out of power and expropriated them. However, institutions were not improved after the revolution, a new elite appeared among the new political leaders, and the story of privilege and expropriation was reproduced with new actors.

This phenomenon was called “the iron law of oligarchy” by Acemoglu and Robinson (2011, p. 361, 370, 372, 389), who present many historical examples of it:

> The essence of the iron law of oligarchy (…) is that new leaders overthrowing old ones with promises of radical change bring nothing but more of the same(…) Marx`s vision was a system that would generate prosperity under more humane conditions and without inequality. Lenin and his Communist Party were inspired by Marx, but the practice could not have been more different from the theory. (…) Equality was not part of the equation, since the first thing Lenin and his entourage did was to create a new elite, themselves, at the head of the Bolshevik Party.
>
> The white elite in Rhodesia, led by Ian Smith (…) declared independence from Britain in 1965. (…) The black citizens organized a guerrilla war [led by Robert Mugabe, among others, against the white elite]. The state of Zimbabwe was created in 1980. After independence, Mugabe quickly established his personal control. He either violently eliminated his opponents or co-opted them.(…)Mugabe took a set of extractive economic institutions created by the white regime. These included a host of regulations on prices and international trade, state-run industries, and the obligatory agricultural marketing boards.(…) the institutions remained , with the only difference being that instead of Ian Smith and the whites doing the extraction, it was Robert Mugabe and the Zanu-PF elites filling their pockets.
>
> Laurent Kabila (…) mobilized an army against Mobutu`s dictatorship with the promise of freeing the people and ending the stifling and impoverishing corruption and repression of Mobutu`s Zaire, (…) [but] set up a regime just as corrupt and perhaps even more disastrous.

If we can take a normative proposition from the theory above described, this proposition is that it is important to strengthen institutions in order to protect the rights of the poor and middle class. Notwithstanding, improving institutions in a historically unequal economic environment doesn't seem to be an easy task. Chong and Gradstein (2007, p. 461, 463, 464) claim to have found evidence that the causal relation from inequality to institutions is stronger than the other way round:

> Better institutions appear to be conducive to lower income inequality, but lower income inequality may be conducive to better institutional quality, as well.(…) In fact, the causal direction from income inequality to institutional quality dominates the linear relationship between these variables (…) [This] may help explain why countries with full awareness of the need to pursue dramatic institutional reforms have failed to do so. Institutional reform may be an instrument to reduce inequality; political factors, however, may prevent its implementation.

Finally, it is important to observe that the Robin Hood effect and the King John effect are not mutually exclusive. They may occur at the same time in the same country. The Robin Hood effect operates through democratic choice channels. Politicians seeking votes set up policies that are usually easy to be perceived by the electorate. They intensely publicize these policies in their electoral campaigns. On the other hand, King John's policies occur inside offices, by means of lobby, bribery, and games of influence. It is not difficult to hide them (or their meaning and consequences) from the poor voters[15]. These policies usually involve complex regulation, business or judicial issues. For instance, it is easier for the regular voter to see a link between his personal interests and a minimum wage increase than to understand how he will be affected by a judicial decision concerning a dispute between controlling and minority shareholders.

6 CREDIT CONSTRAINT

The two previous sections dealt with political economy issues. The present section analyzes how inequality may harm growth by means of a failure in the credit market. Credit is a powerful tool to reduce poverty and to allow social mobility. As proposed by Ray (1998, p. 227): "*credit is necessary to (a) start a small business, (b) educate oneself or one`s children, (c) buy inputs so that you can rent land and farm it, (d) smooth out consumption expenditures in a fluctuating environment and a whole host of other things*

[15] Besley and Ghatak (2008, p. 51-52) shows that two groups may be treated differently by the government when there is restriction in the information flow about governmental policies.

besides". Ghatak and Jiang (2002, p. 206) highlight the possibility of "*adopting efficient technologies or choosing profitable occupations"* when credit is available.

The present section aims to show how the credit market may create a causal relationship from inequality to growth, taking the following steps: (1) the poor have no assets to offer as a collateral when applying to a loan, which reduces their access to credit; (2) credit constraints may restrict occupational choices and the social mobility of the poor: when it happens their children will also be poor and credit constrained, which puts them in a poverty trap - they are poor today because their parents and grandparents were poor in the past; (3) since the non-poor are not credit constrained, the distribution of wealth in a point in time determines the proportion of credit constrained individuals in the economy; (4) an economy whose much of the individuals are credit constrained will face higher barriers to grow; (5) therefore, two economies that start with the same level of income and similar preferences and technologies but differ in the proportion of credit constrained individuals, may end up with different levels of income.

This is how inequality in wealth distribution, may in certain circumstances (but not always) create a path of lower growth and put an initially unequal country, in a steady state level of income below the one reached by a more equal country.

Each one of the five points listed above is developed in sections 6.1 and 6.2 below.

6.1 COLLATERAL AND CREDIT RATIONING

A central issue in the credit market is that borrowers may not repay their debts. To reduce the probability of this event, banks require that borrowers give them an asset as collateral. In case of default, the bank seizes and sells the asset, which helps to recover part of the loss and, at the same time, punishes the defaulting debtor. Following Ray (1998, p. 229-30) we may find a relationship between the amount of a loan and the corresponding amount of collateral required by the bank.

Suppose that someone intends to start-up a business that requires an initial investment of I. The potential entrepreneur has assets value $a < I$. He cannot finance the investment by himself and goes to a bank to ask for a loan, offering "a" as collateral. The new firm will produce q using m workers and will pay a salary of w to each of them. The exogenous interest rate is δ. To make notation easier, lets consider $r = (1 + \delta)$.

The firm lasts only one period. At the end of the period the borrower repays the loan plus the interest. The profit *P* at the end of the period will be:

$$P = (q - wm) - r.I$$

At the end of the period the borrower may have incentive to default if doing so guarantees him a higher profit. If he defaults and no penalty is imposed on him, his profit becomes:

$$(q - wm)$$

which is higher than $(q - wm) - r.I$. The gain from defaulting is r.I.

However, the bank may seize his collateral, whose value at the end of the period will be *a*.r . He may also be sued and condemned to pay a fine or the costs of litigation whose expected value is *F*. In addition, the bank may obtain in the court, the confiscation of a fraction *g* of the profit. Thereby, the borrower will not default if the payment of the debt is lower than the expected value of the punishment for defaulting:

$$r.I \leq a.r + F + g(q - wm)$$

Being aware of this incentive to default, banks will lend money only to those individuals who offer collateral big enough to make the default option unattractive. Rearranging the former equation we have:

$$a \geq I - \frac{F + g(q - wm)}{r}$$

This equation establishes the necessary condition for a loan approval by the bank. It says that banks will offer credit only to people whose initial wealth (*a*) are high enough to cover the risk of default. If someone does not have enough assets to offer as collateral he cannot convince the bank that he will not *default*. Therefore, the credit market has a bias against the poor. Only those with sufficient wealth will have access to credit.

This condition provides other interesting information. If F and/or g increase, the threshold level to access credit (a) goes down. F and g may be seen as the quality of institutions that protect property rights. A high F means that the expected cost of defaulting is high: the probability that the courts will convict the defaulting debtor will be high; the sanctions imposed on him will be high as well. A high value of g means that the bank will not spend much time and money trying to recover their credit and/or will be able to seize a large part of the debtor's profit. In sum: when there is a large probability

that judicial institutions will be fast and effective in punishing defaults and that the bank can recover a major part of its loss, the collateral required for a loan will be lower.

It is another way to say that effective protection of property rights benefits the poor, as stated in section 5, which analyzed the King John effect. On the other hand, if F and g equals zero, the credit market simply doesn't work and one has to finance an investment entirely by using his own capital (a = I).

Another important observation is related to the concepts of inequality and the exclusion from the credit market. It is intuitive that an unequal society will have some "rich" people with wealth over the threshold level of wealth required to get a loan and a lot of people under this threshold (the "poor"). Therefore we may be tempted to think that as wealth inequality increases the percentage of the population excluded from the credit market increases as well.

However, there is not a one-to-one relation between inequality and the share of the population excluded from the credit market. Take a simple example where a society is formed by 3 individuals whose wealth are (4, 5, 10) and the threshold level to access the credit market is $Z = 6$. In this case two individuals are credit constrained (poor) and one is "rich". Another society where the wealth distribution is (3, 6, 10) is more unequal than the first one (we can go from the first to the second distribution by means of a regressive transfer from the poorest individual to the second poorest), but the credit constraint applies to only one individual in the second (and less equal) society.

One can imagine many other situations in which inequality and credit constraint do not move in the same direction. Exogenous redistributions between individuals of the same group (constrained or unconstrained) that do not move anybody from one group to the other may change inequality indexes (such as the Gini index) but do not affect the credit constraint. Alternatively, redistribution from the "rich" to the "poor" may push some "rich" people under the threshold level (making them "poor") without releasing any "poor" from the credit constraint.

In a society where everybody is equally poor and has wealth under the threshold level required to obtain credit, the credit constraint will apply to everybody and the sunk cost of investments cannot be funded by anyone. In this case, income concentration may be a way to allow some individuals to start a business and trigger a growth process. It is exactly the same situation showed in section 3.2, where, due to sunk costs of

investments and credit market imperfection, income concentration increases savings and allow those who benefit from the concentration to invest.

Therefore the relevant distributive measure to be used when thinking about credit constraint is the proportion of constrained to unconstrained individuals.

6.2 CREDIT CONSTRAINT AND OCCUPATIONAL CHOICE

Banerjee and Newman (1993), Galor and Zeira (1993) and Ghatak and Jiang (2002) propose models in which the credit constraint imposed on the poor reduces their options of occupational choice and may create a poverty trap: the poor cannot leave poverty, because they are denied access to the credit required to invest in profitable activities[16].

Suppose a world where there are three possible occupational options: (a) a low productive subsistence sector; (b) to work as an employee in a high productive firm; (c) to be an entrepreneur that runs a high productive firm and employs those who have chosen option (b).

The lowest possible salary of an employee is equal to what someone may earn when working in the subsistence sector. The highest possible salary is equal to the income of an entrepreneur. Therefore, in a state of the world in which salaries are low, it is indifferent to be an employee or to work in the subsistence sector. In a state of the world in which salaries are high, it is indifferent to be an employee or an entrepreneur. The level of salaries is defined by supply and demand in the labour market.

The technology used by the entrepreneur is more efficient than the one used in the subsistence sector. Therefore, it is always better to be an entrepreneur. The production of the firm is high enough to pay employee's salary and to guarantee the entrepreneur an income higher than that he could obtain working in the subsistence sector.

However not everyone can be an entrepreneur. To choose this occupation, one has to make an initial investment. This investment requires that he obtains credit from a bank. Due to credit constraint and the collateral restriction shown in the previous section, only those who have enough wealth (a_{it}) are able to access the credit market and finance the investment *I*.

[16] The remainder of this section is based in Ghatak and Jiang (2002).

Each individual starts with an asset of value a_{it}, received as a bequest from his parents. At the end of the period this individual receives income according to his occupation. He consumes part of this income and saves the other part. His savings will be transfered to his descendants and represents the bequest left to the next generation. Therefore, people working in the subsistence sector or as employees (when salaries are low) will bequest small assets to their descendants, while entrepreneurs and employees (when salaries are high) will leave big bequests.

Based on these conditions, Ghatak and Jiang (2002) show that there are two possible short run equilibriums:

a) When the majority of the population has wealth below the required level to provide collateral, there will be a small number of entrepreneurs (and firms). The rest of the population has no other option than to search for a job as an employee or to work in the subsistence sector. There will be an excess of supply in the labour market. The equilibrium wage will be low, and entrepreneurs will obtain large profits (due to low salary costs). Furthermore, some individuals will not get a position as employees, because there are not many entrepreneurs and firms. They will have to work in the subsistence sector, which has a lower level of productivity. Therefore, there will be income inequality between the group of entrepreneurs (the "rich") and the rest of the individuals in this society (the "poor": workers and subsistence producers). The economy will be less productive than it could be, as part of the population is working in the subsistence sector.
b) When the majority of the population has enough wealth to provide collateral, an opposite dynamic will set in. There will be lots of entrepreneurs seeking for employees. There will be excess of demand in the labour market and salaries will go up to a level in which employees earn as much as entrepreneurs. Nobody will have to work in the subsistence sector. Per capita income will be higher than in the former case, there will be no inequality and the productivity of the economy will be higher as well.

   Case (a) may be called a "low income – low productivity - high inequality" equilibrium, while case (b) may be called a "high income – high productivity - low inequality" equilibrium.

It is important to note that these two different equilibriums are caused solely by differences on the initial percentage of individuals whose wealth was below the investment threshold (I). All the other things are the same: the technology used in the entrepreneur's sector, the technology used in the subsistence sector, the preferences for saving, the threshold level of investment, the conditions of the credit market (F, g).

This means that the initial percentage of individuals excluded from the credit market determines their occupational choices, creates "income inequality" or "income equality" and affects the level of productivity and per capita income.

But this is merely the short run equilibrium. There is a possibility that as time goes by poor families will save enough money to make the bequest a_{it} grow generation after generation. If they are able to make $a_{it} > I$ and trespass the threshold level, they will be able to become entrepreneurs. In this case, the initial distribution of wealth will not matter for the long-term distribution and level of income.

In fact, Ghatak and Jiang (2002) show that there are three possible long-term scenarios:

a) If the threshold level of the investment (I) is low[17], everyone will be able, in the long-run, to accumulate savings and in some point in time become an entrepreneur. In this case, the economy goes to a "high income – high productivity - low inequality" long-run equilibrium. The initial credit constraint has no long lasting effects. The connection we are looking for in this essay (between inequality and the steady-state level of income) does not exist in this case. Initial inequality (to be more precise, initial borrowing constraint of a large part of the society) is completely overcome as time goes by: the poor catch-up with the rich's level of income. The initial credit constraint doesn't matter at all for the determination of inequality or the level of per capita income.
b) In the opposite case, when the threshold level of investment (I) is extremely high[18], even the richest families are unable to remain as entrepreneurs in the long-run. They will be unable to keep their wealth above the threshold level I, and the economy will go to an equilibrium where everybody works in the subsistence sector. Since the income in this sector is the lowest possible, this economy will be one where everybody is poor. In this case the credit constraint does not affect inequality in the steady-state (everybody is equally poor) but affects the level of per capita income. This is a long-run "low income – low productive - low inequality" equilibrium. As in the first case, initial inequality conditions do not matter. The economy will tend to this equilibrium despite the initial proportion of credit constrained individuals.
c) For intermediate values of (I), poor families will never be able to save enough to become entrepreneurs, and rich families will be able to keep their position as entrepreneurs forever. Therefore, the long-run equilibrium will be one of "low income – low productivity - high inequality".

The last one is the case in which the initial credit constraint of the poor creates a long lasting income inequality and puts the economy in an inferior level of per capita income. If in the initial moment credit constraint applies to less than half of the population, the country ends up rich and equal. Otherwise, it ends up unequal and with a lower level of per capita income. The two main hypotheses that sustain this result are the requirement of a minimum amount of: (a) investment to start a business ($I>0$) (sunk costs) and (b) assets available to collateralize a loan ($a \geq I$).

[17] Lower than the steady-state level of wealth of the workers and those in the subsistence sector.

[18] Higher than the steady-state level of the wealth of the entrepreneurs.

These divergent paths of growth, determined by initial wealth distribution resonates with the description made by Engerman and Sokoloff (2002) of the development process in the USA and in Canada (starts equal and ends up equal and rich) and in the Latin America and the Caribbean (starts unequal and ends up unequal and poor).

What kind of normative prescription does this theory bring about? The first one (already emphasized in the beginning of this section), is that improvements in property rights, in the work of courts and all other institutions that make lending a less riskier activity would improve the access of the poor to the credit market.

Public credit subsidies to the poor would be another way to reduce the threshold level of the credit constraint. However, this kind of policy has proven to be expensive and ineffective: default rates are high, local elites tend to capture the money, lending decisions and bailouts are decided according to electoral interests (Banerjee and Duflo, 2011).

Legalizing properties, by means of titling urban land occupied by poor families in slums, may give the poor the possibility of collateralizing assets that they already own but that are not legally guaranteed, freeing them from the collateral restriction and opening the access to credit[19].

Technological improvements may increase entrepreneurs' returns as well as employees' wages. This would accelerate the capital accumulation by workers, allowing them to bequest high value assets, and release their descendants from the credit constraint. Which means that productivity enhancement reduces the credit constraint.

Robin Hood redistributive policies would have an ambiguous effect. They could increase the ability of the poor to accumulate wealth and escape from the poverty trap. On the other hand, if they were financed by taxes on entrepreneurs or represented any kind of regulation that reduces profits, such as minimum wage rule, they would reduce the return of entrepreneur's investment and, therefore, the level of income of the society, reducing the rate of wages increase and the accumulation of assets by the poor.

A possible alternative would be a once and for all redistribution of wealth, which would not affect incentives to invest and, at the same time, would open up the credit market to a large fraction of the population. Once more the land reform in Southeast Asian countries after the World War II appears as an example.

[19] Soto (2003).

It is an alternative (or complementary) explanation to the one provided by Alesina and Rodrik (1994) who claimed, as stated in section 4 above, that land reforms worked in favour of a subsequent high economic growth by reducing inequality and, as a consequence, lowering the demand for redistributive policies.

However, as stated before, this kind of transfer would be difficult to be put in place in "normal times". Only calamities that promote major shifts of power, such as a war defeat, may open opportunity to radical wealth transfers.

6.3 LIMITED LIABILITY AND INCENTIVES

In the former section the credit market imperfection created a link between inequality and growth through the exclusion of the poor from the possibility of getting a loan and, therefore, restricting their occupational choice. The argument does not rely on incentive considerations[20]. Aghion et al (1999), using standard results of a moral hazard model, show that credit market imperfection may create a situation in which inequality induces lower effort and, as a consequence, lower growth.

Suppose a situation in which the return or success of a project depends on the effort made by the individual responsible for its implementation. At the same time, the effort made by the individual represents a cost for him. Therefore, the effort brings a higher probability of success and higher financial reward, but implies a higher cost. The individual should find an optimal level of effort that equilibrates expected rewards and costs.

As in the former section, this individual does not have the amount I required for the initial investment in the project, and applies for a loan to finance it. He offers his assets as a collateral whose value is $a < I$. Different from the former section he gets a loan (he is not excluded from the credit market despite having assets lower than the threshold level required to launch a project). The lender (principal) cannot observe the effort made by the borrower (agent).

Once the agent gets the loan, in case he defaults, the lender cannot recover the total amount lent. The maximum the lender can get is the asset a. This limited liability comes

[20] To be precise, in the former section incentives play a role because they are behind the collateral requirement. Borrowers may have incentives to default, even though they have money to pay for the loan, and banks ask for collateral to protect themselves. The present section explores the idea that borrowers may have incentive to apply low effort in their business when they are financed by loans.

from the legal framework of modern societies that impede that debtors be punished by imprisonment, forced work or any other means besides the confiscation of his assets.

In this context it can be shown[21] that:

a) The effort made by the borrower will be a positive function of *a*: the higher the value of his asset retained as collateral, the more effort he will make to avoid the failure of his project and the consequent loss of his wealth. Alternatively: the more he has to borrow to finance the project (the higher the difference between *I* and *a*), the less incentive he has to make effort, because the profits of success will be shared with the lender, while the loss caused by a failure will be supported solely by the lender (the borrow pays up to the limit of his assets value *a*);
b) The payoff of the borrower is a positive function of his effort: the benefits of the effort increase at a higher rate than the costs of the effort.

If effort increases with the wealth (*a*), as proposed in item (a) above and the social production increase with effort (as proposed in item (b)), therefore the social production increases with *a*. It means that a society in which a large number of individuals have low assets tends to achieve lower levels of income.

The interplay of limited liability and lack of resources will influence the level of effort from the poor: if they succeed they have to pay a large share of the project payoff to the lender as interest. If they fail the lender will bear a large part of the loss.

As in the model presented in the former section, a redistribution of wealth that could transfer assets from individuals that are above the investment threshold level (*I*) (in an amount that keeps them above the threshold) to those that are below this level would increase the collateral offered by borrowers and, as a consequence, would foster growth.

Once more there appears to be a situation in which lump-sum redistribution could reduce inequality and induce growth.

Section 3.1 (incentives) described a model of moral hazard with unlimited liability and perfect credit market in which there was no initial threshold level to start an investment, and the principal was free to set rewards and punishment in order to force the agent to apply the optimum level of effort. A consequence of that model is that any attempt to reduce inequality, by the imposition of limits to punishment and rewards, would harm growth.

[21] Ghatak (2010).

When one considers the possibility of credit constraints and limited liability, there appears a situation in which inequality may harm growth and redistribution may improve growth perspectives. In this scenario redistribution is a way of creating opportunities or enlarging the possibilities of occupational choices of the poor.

6.4 CREDIT CONSTRAINT AND CAPITAL DEEPENING

Galor (2000) offers an interesting interpretation of credit constraint and growth. He argues that the binding restriction for countries in the initial process of development is the availability of physical capital. They have to accumulate this capital in an environment where there is no credit or capital market. There is no other way to foster investment in this economy than concentrating income. That is the argument shown in section 3.2 (savings): concentrate income to generate savings in an amount sufficient to surpass sunk costs of investments.

When the country achieves a higher level of physical capital, the marginal return of this capital goes down and the returns to human capital (complementary to physical capital) go up, due to the small availability of educated workers. At this moment, the credit constraint that precludes the poor to take credit and pay for their education starts to bind. The inequality that stimulated growth in the initial phase of the development process becomes a barrier. Redistribution, in this second stage, brings new stimulus to growth. Countries that cannot redistribute wealth in this stage stay trapped in a middle-income stage, while those who manage to redistribute continue to grow and may achieve a higher level of per capita income:

> The fundamental insight of this approach stems from the recognition that human capital accumulation and physical capital accumulation are fundamentally asymmetric. In contrast to physical capital, human capital is inherently embodied in humans and its aggregate stock would be therefore larger if its accumulation would be widely spread among individuals in society. This asymmetry between human and physical capital accumulation suggests therefore that equality is conducive for human capital accumulation as long as credit constraints are largely binding, whereas provided that the marginal propensity to save increases with income, inequality is conducive for physical capital accumulation. Inequality therefore stimulates economic growth in stages of development in which physical capital accumulation is the prime engine of growth, whereas equality enhances economic growth in stages of development in which human capital accumulation is the dominating engine of economic growth and credit constraints are still largely binding. (Galor, 2000, p. 709)

However, he considers that in modern days international capital flows reduces the importance of domestic physical capital accumulation: in contrast to development processes started in past centuries, nowadays these investments may be financed by a foreign investor. Furthermore, the increasing role of technology increases the return to human capital. Therefore he concludes that *"in currently less developed economies, equality is largely beneficial for economic growth"* (Galor, 2000, p. 710).

7 VOLATILITY

Berg and Ostry (2011) propose that what prevents unequal poor or middle income countries to join the club of high income countries is their inability to sustain growth for long periods. It is the "power of compounded interests" that makes someone rich. If a country cannot sustain growth for long periods and experiences a stop-and-go processes of growth it turns out difficult to achieve a high level of per capita income. It is not difficult to start a growth process. Some fiscal and credit stimulus may guarantee growth for some years. The hard part is to make growth last for a period long enough to put the country in a sustainable high level of per capita income.

Table 3 shows the contrast between poor/middle-income Latin American countries and developed countries in relation to the volatility of their growth rate. It shows the variance in the real GDP growth rate between 1970 and 2011. Developed countries clearly have a more stable growth, while developing countries seem to experience alternation between short lived jumps and depressions that make their growth variance larger.

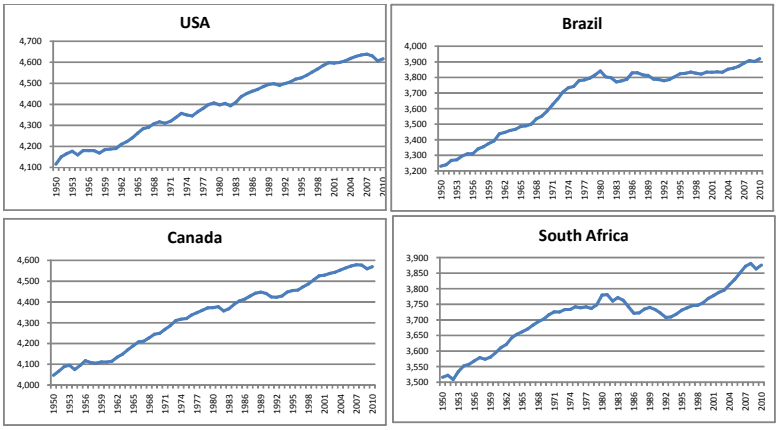
Table 3 Variance of annual real GDP growth rate: 1970-2011

France	3,13
Canada	4,49
United Kingdom	4,66
USA	4,74
Italy	4,80
Germany	7,18
Japan	8,76
Mexico	13,32
Brazil	17,52
Paraguay	18,75
Uruguay	19,08
Chile	28,92
Argentina	29,89
Venezuela	31,61

Source: IMF - IFS

Graph 3 illustrates this fact by plotting real per capita income of two developed (Canada and USA) and two middle-income (Brazil and South Africa) countries from 1950 to 2010. While developed countries show a smooth process of growth, the other two countries present a turbulent path: Brazil grew fast from the 50's to the 80's and then stagnated; South Africa experienced intense growth until the 80's, followed by a dip in the 90's and a posterior recovery.

Graph 3 - Per capita real GDP (log scale)



Source: Alan Heston,Robert Summers and Bettina Aten, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Nov 2012

Berg and Ostry (2011) use a duration econometric model to show that inequality is negatively correlated to the length of growth spells: unequal countries are more prone to an stop and go growth behaviour. Which mechanisms could create a causal relationship from inequality to shorter growth spells? Three channels analyzed above (Robin Hood redistribution, King John redistribution and credit constraints) may provide complementary explanation to this link.

7.1 DISTRIBUTIVE CONFLICT AND VOLATILITY

In the Robin Hood redistributive model presented in section 4 it is implicitly assumed that the democratic regime is not disrupted by the conflict between the rich and the poor. The story told in that section is one in which both groups dispute year after year on the size of public expenditure and fiscal burden, but there is no revolution, no cup d'etat, not even an (unrealized) probability of a policy radical change. The society goes through a long period of low growth but with a stable political regime. Likewise, in the King John story of section 5 there is a hypothesis that the rich can expropriate the poor for a long time without the risk of an upheaval.

It is easy to imagine a situation in which the distributive conflict degenerates into political instability. Alesina et al (1996) and Perotti (1996) present models in this way. Political instability makes the future uncertain and reduces investment and growth. In a society with two antagonistic groups there is a high potential of conflict and disruption. Every time that one group substitutes the other in power, radical changes in the economic policy and in the legal regime take place and disrupt economic activity.

Easterly (2001) summarizes the link between inequality and instability calling attention to the lower level of conflict in more equal societies, which he calls "the middle class consensus":

> Societies that are polarized tend to focus on redistribution between polarized factions that alternate in power. Societies that are not polarized are able to reach a consensus on public goods and overall economic development (…) relatively homogenous middle-class societies have more income and growth, they have more human capital and infrastructure accumulation, they have better national economic policies, more democracy, less political instability, more "modern" sectoral structure, and more urbanization.(Easterly, 2001, p. 318, 332)

This redistributive conflict, *per se*, could explain a higher probability of sudden stops in a growth spell of an unequal country. But other ingredients aggregate even more volatility to this scenario.

In section 5 (King John redistribution), it was shown that Engerman and Sokoloff (2002) call attention to the fact that countries with comparative advantage in the production of large scale agricultural commodities and mineral extraction became unequal due to the way in which these economic activities were organized (land property concentration, forced labour, etc.). This historical feature has continued to the present, and the most unequal countries in the present day still have an important part of their economy associated with commodities export (mainly in Latin America, Africa and middle-east oil exporters). It is well known that commodities international markets are volatile[22].

The association of sub-optimal and unstable economic policy (due to distributive conflict) with commodity markets volatility tend to put the economy of unequal commodities exporters in a pro-cyclical mood. When commodity prices are high the economy grows and the distributive conflict is softened. There is more income to be shared between the opposing groups. Public redistributive expenditure grows (making

[22] Céspede and Velasco (2012) analyze the relation between commodity prices and economic volatility.

the poor happy), taxes are reduced (making the rich happy), and the fiscal deficit is financed by external debt (international markets are happy to lend money to a country that has a lot of international reserves to cover the debt).

When there is a downturn in the international price of commodities, these countries are forced to adjust abruptly. Suddenly the government has a balance of payment crisis and an external debt to deal with. Fiscal adjustment requires sacrifice. The distributive conflict becomes acute. Berg and Ostry (2011) describe many political conflicts and disruptions that are ignited by cuts in redistributive public programs, such as subsidies for public transportation or food, in a context of fiscal and balance of payment adjustment.

Unequal countries have less degree of freedom to allocate the costs of adjustment. The government usually gets afraid of making some adjustment decisions that may hurt the poor and stimulate political instability, while the rich have a disproportionate amount of power to protect themselves by means of lobby (Rodrik, 1999). Moreover, the rich usually pay a large share of taxes (because the taxable income of the poor is too small)[23] and there is not much room during crises, to increase even more the tax burden.

In line with this idea, Berg and Sachs (1988) show that unequal societies experienced deeper debt crises in the 1980's, due to less degree of freedom to allocate the costs of adjustment.

Even if an unequal country manages to go through economic crisis without a serious political disruption, after some years of fiscal and external adjustment there will be political pressure made by the poor median voter in favour of fiscal expansion. It creates the temptation for a populist economic policy. Due to the adjustment, public debt is under control and there is idle capacity in the economy, which seems to be a leeway for expansion. The temptation of an expansionary fiscal policy is high, and the economy may grow for a time until it achieves a bottleneck created by the inconsistency of the populist economic policy (Dornbusch and Edwards, 1991). Once more the growth experience turns out to be short.

[23] For instance, Braceda, Rigolini and Saavedra (2008) estimate that in Latin America the highest income quintile pays 61% of the tax burden, compared to only 43% in the United Kingdom.

In summary, the interplay between commodity dependency (that historically generated inequality), persistence of inequality along the years (as shown in Graphs 1-A and 1-B of section 2 – stylized facts) volatility of external commodity markets, and a dysfunctional political decision process under unequal polarized societies may create the conditions that prevent long growth spells.

7.2 CREDIT CONSTRAINT AND VOLATILITY

Aghion, Banerjee and Piketty (1997) propose an alternative (but not rival) explanation to the link between inequality and economic volatility that works through the credit market. They propose a model in which there is credit constraint due to the collateral problem and there is unequal access to investment opportunities due to indivisibilities in the amount invested, which is pretty similar to what has been shown in section 6.

Those individuals with wealth under a threshold level will not be able to invest and will have to deposit their savings in a bank, while those with enough wealth will be able to apply for loans to finance investments.

They argue that when the level of credit constraint is high (large fraction of population with no access to credit and to the possibility of investing) there will be more volatility in the GDP. In periods of slow growth there is an excess of savings in relation to the debt capacity of potential investors. The level of income of those who are above the threshold required to obtain credit is not high enough to absorb all the available savings. It means that interest rates are low (because there is an excess of supply in the credit market) and that the debt level of investors is low as well.

In this lower phase of the economic cycle, investors can retain a high proportion of their profits (payments of debt interest and amortization are low) and can accumulate wealth and gradually increase their debt capacity and expand their investment. A growth cycle will be triggered and will last until the growing demand for credit starts to push interest rates up. When interest rates increase, the debt burden increases, reducing capital accumulation and imposing limits to the amount of credit investors are able to take from banks. Investment will collapse and the economy enters into a new period of low growth.

The authors show that the lower the percentage of the population that can become entrepreneurs; the higher the volatility of GDP. That is how inequality (in the sense of a high percentage of credit constrained individuals in a population) may result in lower probability of long growth spells.

8 EDUCATION

Education is a fundamental motion to growth: it increases the probability that innovations will boost productivity and makes workers and the general population able to deal with complex tools and social networks. It produces many other externalities, such as the ability to take care of personal health, the reduction in the probability of contagious disease, or the ability for screening good candidates from bad ones in an election. For all these features, education is considered a public good.

It also has a component of private good. Those who increase their educational level are able to grab the economic returns of it in the form of higher income. Since this economic return is high enough (and the literature shows that this is the case[24]), everyone who is aware of these returns has an incentive to invest time and money in their own education. However, people may not have enough money to pay for their own education, or for their childrens' education. One possibility is to borrow to finance education and, in the future, when the person is collecting the fruits of his education, repay the loan.

The problem is that before getting educated, the person may have low income and low assets. In this case, the credit constraint analyzed in section 6 appears once more as a barrier against the increase of personal and aggregate income. The rich and the middle class can pay for the education of their children, while the poor cannot[25].

Due to this credit market constraint and to the public good features of education, free state financed education is usually offered by governments.

However, as argued by Gradstein (2003), public expenditure in general, and public education in particular, tends to be biased in favour of more influential population groups. Table 4, reproduced from Gradstein (2003), shows how public

[24] The literature in labour economics estimates that an additional year of schooling increases wages by approximately 10% (Jones, 2002).

[25] Galor and Zeira (1993) and Lee and Roemer (1998) model the problem of credit constraint in investments in human capital.

expenditure in primary and secondary education favours the highest income quintiles in a set of developing countries.

Table 4 – Public spending in education by income quintile in 21 developing countries (various years)

Country	Year	1st poorest	2nd	3rd	4th	5th - richest
Armenia	1996	7	17	22	25	29
Côte d'Ivoire	1995	14	17	17	17	35
Ecuador	1998	11	16	21	27	26
Ghana	1992	16	21	21	21	21
Guinea*	1994	9	13	21	30	27
Jamaica	1992	18	19	20	21	22
Kazakhstan	1996	8	16	23	27	26
Kenya	1992/3	17	20	21	22	21
Kyrgyz Republic	1993	14	17	18	24	27
Madagascar	1993/4	8	15	14	21	41
Malawi	1994/5	16	19	20	20	25
Morocco	1998/99	12	17	23	24	24
Nepal	1996	11	12	14	18	46
Nicaragua	1993	9	12	16	24	40
Pakistan	1991	14	17	19	21	29
Panama	1997	20	19	20	24	18
Peru	1994	15	19	22	23	22
Romania	1994	24	22	21	19	15
South Africa	1993	21	19	17	20	23
Tanzania	1993	13	16	16	16	38
Vietnam	1993	12	17	16	19	35

Source: Gradstein (2003). Primary source is World Bank – World Development Report 2000/2001.

Note: (*) includes only primary and secondary education.

This author proposes a model in which the ability to influence decisions on public expenditure depends on income or wealth: countries where inequality is high will favour students from rich households in the allocation of the public education budget.

In the long run, the result will be the maintenance or increase of inequality and a weak performance in terms of economic growth. On the other hand, an egalitarian public education would foster social mobility, reduce inequality and, according to the models presented in sections 4, 5 and 7, increase long term growth.

Furthermore, restrictions on the education of the poor translates into losses of potential output growth. This loss would result not only from a lower mean level of education in the country but also from the waste of poor people with high IQ potentials, together with overinvestment in well-off students who are not intellectually gifted.

A very common way to bias public education in favour of the rich is the prevalence of spending on tertiary education over primary education. The rich are the main beneficiaries of state financed universities, since the poor rarely overcome the

steps to be admitted to a university. Birdsall and James (1989, p. 9-12) describe this reality:

> Many countries spend a disproportionate share of their total educational budgets at the tertiary level. This is also the level which heavily benefits upper income groups; a large expenditure is concentrated on a small number of advantaged students in contrast to primary education which disproportionately benefits the poor. (…) Public universities typically do not have price barriers to entry. However, they have academic barriers which are more likely to be surmounted by high income families, whose children complete primary school, attend a high quality secondary school, pay for after-school tutoring, and pass the entrance exam to the prestigious public institutions.

Addison and Rahman (2001, p. 2, 7) argue in the same line, and present quantitative evidence that high economic inequality is correlated with a high ratio of primary to tertiary education:

> Economic power and the wealth associated with it enable the affluent to buy favourable policies from politicians. In contrast, the poor lack the resources with which to lobby and they are less organized (…) [and] face a particularly severe collective action problem. (…)
>
> An interest group's formation as well as its bargaining power depends on the group's resources; in exchange for favourable policies, politicians receive monetary transfers—either donations to political parties in systems with competitive elections and/or direct bribes. Consequently, the more unequal a society's income distribution, the lower will be the bargaining power of the poor compared to the rich, and thus the greater will be the extent of allocations in favour of the rich.(…)
>
> Quantitatively, holding other things constant, one standard deviation increase in the Gini coefficient would decrease the ratio of primary spending to tertiary spending by 0.20 points.

The idea that the rich may be more influential than the poor in the delivery of public education matches with the King John redistribution presented in section 5: rich and influential people have access to governmental decisions and may shape education in favour of their own group in the same manner as they can influence governmental or judicial decisions.

However, this *rationale* seems to be at odds with the idea that voters influence public decisions. In a democratic process, if the median voter is poor and demands more education, politicians will try to meet this demand, in order to guarantee re-election. In this case there would be no room for a public education biased towards the rich. If Robin Hood polices took the form of public expenditures in education, as proposed by Saint-Paul and Verdier (1993), it could create a virtuous cycle of decreasing inequality and increasing per capita income.

However, this would be the case only if education was a top priority for the poor median voter. But the poor may not put education as a priority.

As proposed by Banerjee and Duflo (2011), education has some features that may reduce the interest of the poor on it:

a) Education is something that a person acquires today but the economic returns of it will come only in the future;
b) The person who will be educated is not the one who decides how much education to acquire: parents take this decision on behalf of the children.

Since the returns of education will come only in the future, the poor may have more pressing needs, such as food and housing. The work of children may be pivotal to the survival of the family. Therefore, even if education is offered for free, sending kids to school represents an opportunity cost to parents, in terms of forgone hours of kids work.

Even if child labour is not essential for the family, the simple fact that life expectancy of the poor is lower may reduce the incentive to send them to school. The returns of education will be higher the longer one stays working (and receiving salaries according to their level of education). If one dies early, the returns from education stop flowing. For instance, Jayachandran and Lleras-Muney (2009) show that an abrupt reduction in maternal mortality increased life expectancy of women in Sri Lanka, which resulted in an increase in the education of girls.

The gap of time between the period one is educated and the moment he starts to receive returns from it may make it difficult to quantify and perceive the benefits of education. Therefore, misperception of education returns may also reduce the demand for public education. Banerjee and Duflo (2011, p. 88) argue that "*[poor] parents tend to believe that the first few years of education pay much less than the next ones (…) In reality, available estimates show that each year of education increases earnings more or less proportionally*". If the poor foresee that their children may face obstacles in order to complete the entire primary and secondary education, and if they believe that only a complete secondary education may bring economic return, there is no point in going to school for a few years. By misperceiving the real returns from education, poor people reduce their demand for education and create a poverty trap.

A signal that education is not among the preferred options of the poor median voter is in the fact that many countries have to offer cash transfers to induce parents to send and keep children at school.

Even if the poor median voter demands more and better public education, and the government is stimulated to attend his demand, it will not be easy to set up a good educational system. The delivery of public education is done by teachers who are civil servants and this creates a principal-agent problem. For instance, in developing countries absenteeism of school teachers is widespread[26] and the quality of state schools tends to be much lower than the private ones[27].

Educational systems are not easy to reform[28], and may remain biased towards the rich for a long time even if there is a political decision to reform it. If initial conditions are such that rich people may influence its design (for instance, an unequal and undemocratic society), even after the transition to a democracy, educational standards may remain bespoke to the rich. It will take decades until a new model of public education could be put in place.

For instance, Banerjee and Duflo (2011, p. 89-90) argue that in many developing countries

> [the] curriculum and organization of schools often date back to a colonial past, when schools were meant to train a local elite (…) teachers still start from the premise that their mandate remains to prepare the best students for the difficult exams that, in most developing countries, act as a gateway either to the last years of school or to college.
>
> For all these reasons, education may simply not be a priority for the poor median voter. He may not be interested in educating his children, or even if he sees value in education, he may foresee that it will be hard or impossible for the government to improve the quality of the education already offered.

In this last case, it is a rational choice to demand redistributive policies whose quality does not depend on the effort of civil servants or on the well functioning of public institutions. If this is true, poor median voters would prefer policies such as cash transfers, pensions, housing subsidies, land distribution, and free food delivery. All these policies give money, consumption goods or assets directly to the poor, in

[26] See, for instance, Chaudhury et al (2006).

[27] Banerjee and Duflo (2011, p. 84-89).

[28] One should not underestimate the barriers to reform public education: teachers Unions may oppose reforms, the political agenda tends to prioritize urgent problems instead of long term issues (such as education), there are potential conflicts among different levels of government concerning financing and decentralization.

opposition to policies such as health and education, whose real effects on the lives of the poor will depend on an intermediate stage, in which the quality and quantity of the service provision will not be controlled by the poor or by the government, but by their agents.

Therefore, even in societies were Robin Hood redistribution is remarkably intense, public education may be of low quality and be kept out of the list of voters' and government's priority[29].

As emphasized before, Robin Hood policies (that do not prioritize education) and the King John policies (that bias public education in favour of the rich) may occur simultaneously. Both contribute to a vicious cycle of inequality and low growth through the educational channel.

9 MARKET SIZE

Murphy, Shleifer and Vishy (1989) [from now on MSV] argue that inequality may affect growth by means of a small market for industrialized goods.

The departure point is to assume that the industrial sector produces positive externalities that stimulate growth. As put by MSV (p. 540):

> industrialization seems to lead to the improvement of living standards. Rosenstein-Rodan [1943] accordingly associates industrialization with a shift to a better equilibrium growth path. This would be true if industrialization yielded technological spillovers that become a source of new wealth, or if it paid for an infrastructure that improved the opportunities to trade and to produce.

Due to these externalities, MSV argue that the fastest way to increase per-capita income is to embark in an industrialization process. However, industrial activities usually involve high set up costs, which means that they present increasing returns to scale (or decreasing average costs). For a country to industrialize, industry sales should be high enough to reduce average cost and allow firms to break even.

If the economy is closed, or if international trade is costly, the domestic market will play a central role. If the local economy faces no barriers to export industrialized

[29] For a different perspective, see Bourguignon and Verdier (2000) who present a model where education becomes a priority in order to reduce the risk of political disruption. Dictators may be interested in creating an educated middle class to reduce the risk that lack of education and of economic perspectives result in a revolution. The education of the middle class may generate a virtuous cycle of growth and democratization.

products, it may have industries irrespective of the size of its internal market. However, if there are considerable restrictions to send industrialized production abroad, the internal market rests as the only option and becomes pivotal to the economic viability of industrial activity.

It is reasonable to suppose that consumers diversify their basket of goods as their income increases. Very poor households spend almost all their income buying food. As we go up in the income scale, we may observe a fall in the weight of food in the household's budget, and some other goods are included in the consumption basket. MSV model this fact stating that there is a threshold level of food consumption (z) which is the minimum required to survive. If income is lower than (z), 100% of consumption is of food. If income is higher than (z) the household starts to consume industrialized goods whose productive process involves mass production and decreasing returns of scale.

The higher the number of people able to consume manufactured goods, the lower the average cost of industrial activities. Therefore, in a society where the vast majority of households are below the threshold level (z), the space for industrialization is narrow.

MSV also propose that very rich people tend to prefer exclusive handmade or imported luxury products, not feasible to be produced on a large scale.

Therefore, if the income distribution is such that there are only very poor and very rich people, industry will not flourish. The poor will demand food and the rich will demand luxuries. On the other hand, if there is a large middle class, whose income is higher than z, there might be enough demand for industrialized products and so industry takes off.

Here is the link between inequality and growth.

Notice, however, that inequality is not the only factor conditioning industrialization and growth. A perfectly equal society where everybody is poor and has income lower than z will demand only food and there will be no room for industrialization. This situation is similar to the one shown in section 6 (credit constraint), in which everybody was under the threshold level to get a bank loan and could not become an entrepreneur, or in section 3.2 (savings) where generalized poverty prevents the accumulation of savings. The threshold here is given by the minimum

amount of food consumption needed to survive (and by increasing returns in the industrial technology).

MSV propose that industrialization may be triggered by increases in the productivity and income in the agricultural sector. But it will depend on the existence of the correct demand size and composition: economies where property and wealth in the agricultural sector are concentrated will not create enough demand for industrialized products.

MSV (p. 539) mention as example the Colombian case:

> In the 1850s and 1860s Colombia experienced a large boom in tobacco exports, which, however, failed to lead to widespread economic development. From about 1880 to 1915, Colombia went through a boom in coffee exports, the effect of which on industrialization has been much more widely pronounced. Harbison [1970] explains the difference between the two episodes by the fact that, technologically, tobacco had to be grown on large plantations and hence the income from the boom went to a very small number of plantation owners who spent it on luxury imports, whereas coffee was grown on small family enterprises with the result that income accrued to a large number of people who then demanded domestic manufactures[30].

Another historical example presented by MSV (p. 538) refers to the industry in the USA being more dynamic than in England during the 19th century due to differences in the demand composition:

> In contrast to high quality handmade creations of the English artisans, American producers offered standardized mass-produced utilitarian items such as rifles, cutlery or balloon-frame houses (…). This difference in production techniques seems to be accounted for by the difference in the composition of demand [Rosenberg, 1972]. Whereas in England manufactures were demanded by the quality-conscious upper class, that could not have possibly generated a large market, the American demand came from a large number of relatively well-off farmers. The large demand from this land-rich middle class enabled American manufactures to profitably sustain mass production.

Once industrialization is triggered, employment will be created in the industrial sector. If industrial workers are more productive than those in agriculture, the mean wage of the economy tends to rise. It may reduce poverty, put more people over the income threshold (z) and reduce inequality (by means of the reduction of poverty and the increase of the middle class). Therefore a virtuous cycle sets in: initial equality

[30] Notice the parallel of this example with the analysis made by Engerman and Sokoloff (2002) about the impact of inequality on growth in Latin America, presented in section 5. While those authors consider that institutional factors determined the persistence of inequality and the low potential to growth; in this section the demand composition appears as an additional (and not rival) hypothesis.

promotes economic growth and fosters more equality. When industrialization is not triggered due to extreme inequality or extreme poverty, then there may be a poverty trap.

That is the main story of MSV. Equality associated to booms in agriculture or commodity export sectors may trigger industrialization and a virtuous cycle of economic growth that reinforces equality. Extreme poverty or inequality may fail to create conditions for growth by means of industrialization.

It is important to note that, as in the case of credit constraint, there is a tricky use of the concept of inequality. What really matters in the present case is the absolute size of the population able to consume industrialized products. If the total population of a country is small, even if there is equality and the middle class has an average income higher than z, there may not be enough scale to allow the industry to break even. On the other hand, an unequal country with a large population may have conditions to develop industry: its middle-class may represent a small fraction of the total population, but in absolute numbers it is large enough to allow the industry to produce at low average costs. For instance, compare Brazil and Uruguay. Brazil has a large population and is extremely unequal. Uruguay has a more even income distribution but has a small population. Despite being more unequal, Brazil always had a bigger market for industrialized products.

In order to make a connection to the preceding sections, we could speculate that in countries where the number of potential consumers of industrialized goods is small, governments could implement redistributive policies in order to create conditions for industrialization. As in section 6 (credit constraint), where a once and for all redistribution of assets would include poor people in the credit market, here this kind of redistribution would change demand composition and set the conditions for industrialization.

However, as commented on in section 4 (Robin Hood redistribution), radical redistributions of wealth face political and institutional constraints. Therefore, the second option would be the use of distortionary redistributive Robin Hood policies.

As argued in section 4, Robin Hood redistribution may harm growth by means of the reduction of net returns of entrepreneurs. Furthermore, in section 4, it was also argued that Robin Hood policies could stimulate growth if they were set up in ways that

could allow the poor to increase their human and physical capital. However, in section 8 (education) it has been argued that education is not a top priority of the poor voter and that agency problems may induce a preference for cash transfers and other redistributive policies that stimulate consumption (and not investment) by the poor. By these arguments, redistributive policies could hardly stimulate growth.

However, the arguments presented in the present section may be interpreted in a way that even if all the income distributed to the poor is used in consumption (and not in investment, education included) it may stimulate growth by raising the income of the poor over the threshold z, allowing the consumption of industrialized products.

Therefore, the positive "market size" effect could compensate the negative effect of lower expected entrepreneurs' returns (Robin Hood effect) and lower accumulation of capital by the poor (credit constraint and education effects).

What may go wrong with this rationing? The hypothesis of closed economy may be quite strong in the present day. Although there are barriers to trade everywhere, we live in a world where Asian industrialized products are sent to every part of the world. A redistributive policy that allowed the poor to consume industrialized products may simply result in increased imports. The stimulus for the creation of an industrial sector would be small.

When we see the arguments presented in this section as a tool to understand the past, the effect of market size in demand composition makes sense. Korea, Taiwan and other Southeast Asian countries protected their industries in the first half of the 20th century, at the same time they redistributed income and wealth by means of land reform (and invested in education). Therefore internal markets may have been important to the initial push in industrialization at that historical moment, which was then followed by an export led strategy.

However, one cannot jump from this observation of the past to a policy prescription that says that Robin Hood redistribution and the creation of an ample market for the local industry is a good way to foster development. The economic conditions of the 21st century globalized economy are certainly different from the one faced by Asian countries more than 50 years ago.

Furthermore, the assumption that rich people prefer hand-made and luxury goods may be a good description of the late 19th century consumption preferences.

However, in the 21st century the poor and the rich are eager for mobile phones, computers, tennis shoes and branded clothes that are all produced under increasing return production functions and on a global scale. The distinction between the poor and the rich preferences is a mere question of brands.

Of course there are still some markets that may not be affected by imports and may be opened by a Robin Hood redistribution: non-tradable goods such as heavy components for building works, processed food that depend on local produced inputs, and so on. However, these markets may not necessarily be enough important to boost the growth of industry. In this case the power of the demand from the new middle class to stimulate industrialization may be weak.

Since the majority of tradable industrial goods may be obtained through imports, a redistributive Robin Hood policy would have a higher internal impact on the demand for non-tradables, especially on the services sector. One needs some hypothesis about the externalities generated by the specific sectors on the economy, benefited by the redistribution, in order to see if redistribution may trigger growth.

Taking the risk of making considerations about the macroeconomic impact of a Robin Hood transfer without having a formal macroeconomic model to back such assertions, one can guess that redistributive policies could in fact harm the local industry if it causes inflation in the non-tradable sector, while the prices of industrialized goods remain constant due to increased imports. The result would be the overvaluation of the real exchange rate, and a reduction in the competitiveness of the local industry. Instead of stimulating the industrial growth, such strategy would in fact be harmful to the local industry.

10 WHAT CAN THE DATA SAY?

The former sections presented arguments in favour and against the idea that inequality may harm growth. The competing theories should, therefore, be submitted to econometric analysis in order to validate their propositions. What can the data say?

The former econometric analyzes based on the former versions of Deninger and Squire (1996) dataset tended to show a negative relationship between inequality and growth. Most of these estimations where simple OLS models, since there were not enough time series data to allow a panel estimation. The estimated negative coefficient

stimulated the formulation of models based on political conflict and Robin Hood transfers. Benabou (1996) summarizes 23 papers that estimated the causal effect of inequality on growth or investment. He concludes 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 economic growth (Benábou, 1996, p. 13)

Some years later, when the Deninger and Squire dataset had been improved in size and quality of data, Forbes (2000) reassessed the relationship between inequality and growth, substituting the OLS cross-section estimation with a fixed effect panel data estimation and found an opposite result[31]:

> Panel estimation makes it possible to control for time-invariant country-specific effects, therefore eliminating a potential source of omitted-variable bias. Results suggest that in the short and medium term, an increase in a country's level of income inequality has a significant positive relationship with subsequent economic growth. (Forbes, 2000, p. 869)

Banerjee and Duflo (2003) reanalyzed the data and argued that both prior evaluations produced biased results due to misspecifications and other econometric problems. Their main argument is that the former studies imposed a linear relationship between inequality and growth, when the reality is that this relationship is not monotonic, let alone linear. They use non-parametric methods that show a relation between inequality and growth as an inverted U curve: changes in inequality in either direction reduce subsequent growth.

It is not difficult to find in the different theories exposed in this essay reasons for a non-linear relationship between inequality and growth. Take, for example, the proposition of Galor (2000) in which income concentration in the initial moments of development allows capital deepening and growth, but in a subsequent moment inequality prevents growth through credit constraint. An econometric model that follows one country over time would have to show a non-monotonic relationship between inequality and growth throughout time.

Every theory that relies on threshold levels (of consumption of industrialized goods, of collateral to obtain credit, of sunk costs to install an industry), as those described above, creates discontinuities or non-linearities that should be considered

[31] Li and Zou (1998) present similar results.

when formulating an econometric strategy. Identifying this non-linearity in a cross-section of countries that are in different moments of the development process does not seem to be easy.

Consider, as an additional illustration, two countries where redistributive Robin Hood policies take place. In one of these countries redistribution results in a sustained reduction of inequality: growth is reduced in the short run but boosts in the long run. In the other country redistribution cannot affect long term redistribution, and growth is slow in the short and in the long run. There is not only a non-linear effect in the former country, but it is also impossible to identify a general effect of inequality on growth when one looks at the average data of the two countries. The spam of time considered for the growth spell influences the result as well. If one adopts a short time horizon, then both countries will exhibit slow growth (which gives support to the idea that redistribution reduces growth), while a long run perspective would show a higher average growth and support the opposite conclusion.

The idea that unequal countries present shorter and more volatile growth spells, imposes additional difficulties to the econometric identification. Since the data available does not have a long temporal dimension, it may cover a period in which unequal-commodity exporter countries are in a boom (and the result will show a positive correlation between inequality and growth) or in recession (and the result will be an inverse correlation).

Non-linearity and heterogeneity are not the only challenges to access a causal effect of inequality on growth. Banerjee and Duflo (2003) list other hard barriers that need to be overcome before one can claim to have fond a causal relationship from inequality to growth: measurement error, reversal causality, variable definition, and sample bias.

Measurement errors are important because inequality is not easy to measure and because countries use different methodologies. Even though the Deninger and Squire and WIID2C dataset have been improved throughout the years, there still remain relevant measurement errors.

Another problem related to the quality of data is sample bias. Since it is not easy to produce statistics on income inequality (wealth inequality is even harder), poor countries, whose governments are less able to deal with difficult measurements, tend to

be underrepresented in the dataset, which bias the result in the direction of the relationship of inequality and growth found in richer countries. Barro (2000) found that poor and rich countries have clear differences in the correlation between inequality and growth: while poor countries seem to show a negative relationship, rich countries show a positive one.

Just to give an idea of this bias, in the 91 countries used to draw Graph 1-A in section 2 (those who have high quality income inequality statistics), the median per capita income is US$ 13 thousand per year, whereas in the 191 database of Penn World Tables the median per capita income is US$ 8,6 thousand per year. A simple check of Graph 1-A reveals that there are only 6 African countries in the sample.

Reverse causality is a clear potential problem. Although the theories described in this essay did not cover the causal relation from growth to inequality, it is not difficult to imagine a possible mechanism. For instance, a country that faces bad geographic features (landlocked, poor soil, high disease incidence) has low growth perspectives and, as a consequence, the different groups will dispute intensely about the (small) national income: if the perspectives of growth are poor, fighting for redistribution is a better strategy for all groups. In this case low growth causes conflict, instead of conflict causing low growth (as in the Robin Hood style models). The existence of causal relation going from growth to inequality does not mean that the other way of causation is irrelevant, which prevents the proposition of a credible identification hypothesis.

It is easy to see how variable definitions may affect estimations. In the description of the different channels that link inequality to growth, this essay called attention to the fact that in many situations the relevant causal variable is not exactly "inequality" (as measured by the Gini index or by percentile proportions) but the percentage of population under a threshold level of wealth (credit constraint models) of income (market size model) or of savings (capital deepening models). There are some measures of inequality that may be closer to these effects than the Gini index (the percentage of the population under a certain level of income or wealth, for instance). Since the majority of the econometric studies use the Gini index as a measure of inequality, they do not capture the correct effect of the restrictions mentioned above.

All these problems together seem to show that a unified universal theory and statistical evidence to relate inequality and growth seem to be unachievable. A much

more promising way is to analyze country or regional cases, in order to find which channels were more important in the definition of that particular development experience. That is what I intend to do as a continuation of this essay: a qualitative evaluation of which channels between inequality and growth have been more important in the Brazilian growth experience.

11 CONCLUSION

This essay presented a literature review on the causal relationship from inequality to growth. There is a traditional view that inequality fosters growth by means of incentives (let those who are able to perform better to get rich and do not try to redistribute income) and savings (income concentration increases savings and investments because the rich save more than the poor).

The saving channel does not have enough empirical support. The most recent econometric studies on the impact of inequality on savings could find no significant relation. There is no theoretical consensus on the sign of the relationship between inequality and savings as well.

The view based on incentives is usually taken as a general principle and do not take into account some details of the "real world" that may interfere in the relation between inequality and growth. Of course incentives matter: the failure of the communist experiment is a clear demonstration that rewarding people for their effort and avoiding excessive redistributive intervention of government is fundamental for growth.

However, the literature reviewed in this essay shows that once the models consider the interplay of inequality with market imperfections and political and institutional features of a country, there are many situations in which inequality may be harmful to growth. More specifically, it was shown that inequality may hurt growth when: (a) the governmental redistributive policy (taxes, spending, regulation) is endogenously determined by the political system (Robin Hood redistribution); (b) property rights and other institutions may be shaped by inequality (King John redistribution and public education biased towards the rich); (c) credit markets suffer from informational problems and investments require some upfront expenses; (d) inequality may result in a narrow consumer market for the industrialized making

industrialization difficult; (e) unequal countries have a more volatile political and economic environment and may not be able to sustain long growth spells.

Unfortunately the efforts to measure the impact of inequality on growth have been frustrated by a series of econometric problems, such as the non-linearity of the relationship, data quality, reverse causality, measurement error and sample bias. Advances in the understanding of this issue will probably have to rely on country or regional case studies.

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