INCOME DISTRIBUTION VERSUS GROWTH.
THEORY AND EMPIRICAL EVIDENCE
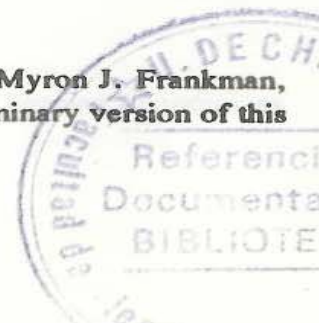
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ABSTRACT

This paper focuses on the relationship between income distribution and growth. It first addresses the theoretical contributions to this issue and secondly it analyzes the empirical evidence available. Three important steps can be distinguished in the theoretical debate. The first one was initiated by D. Ricardo and it deals with factor Income Distribution, a thoroughly relevant theory at the time. The second important step was given by the early neo-Keynesians and the view of the Development Economists, Kuznets being the most prominent representative. Finally the convergence of the endogenous growth models and the so-called new political economy, provides a new interpretation of this economic phenomena. Regarding the empirical evidence, though most of the studies tend to confirm the presence of a significant effect of ID on growth, the existence of a Kuznets type relationship has been questioned.

SINTESIS

Este trabajo se refiere a la relación entre Distribución de Ingreso y Crecimiento. En primer término aborda las contribuciones teóricas al tema y, en segundo lugar, analiza la evidencia empírica disponible. Se puede distinguir tres etapas importantes en el debate teórico. El primero fue iniciado por D. Ricardo y analiza la distribución de ingreso factorial, una categoría totalmente relevante por ese entonces. La segunda etapa importante se da con los primeros neo-keynesianos y la visión de los economistas del desarrollo, siendo Kuznets el representante más prominente. Finalmente, la convergencia de los modelos endógenos de crecimiento con lo que se ha dado en llamar la nueva política económica, proporciona una interpretación renovada de estos fenómenos económicos. En relación a la evidencia empírica, a pesar de que muchos estudios tienden a confirmar la presencia de un efecto significativo de la distribución del ingreso sobre el crecimiento, la existencia de una relación del tipo de Kuznets ha sido cuestionada.

INCOME DISTRIBUTION VERSUS GROWTH THEORY AND EMPIRICAL EVIDENCE*

Leonardo Letelier

1. INTRODUCTION

This paper is aimed at discussing both the theoretical contributions as well as the empirical evidence regarding the relationship between income distribution (ID) and growth. It has been the subject of a protracted theoretical controversy which begins with Ricardo, involves the post-Keynesian shool of Cambridge, continues with Kuznets' well-known contribution and now hinges on the recent contributions of the new theory of growth and the new political economy. The causality between both variables has been presented in both directions throughout the discussion of the topic.

In turn, the empirical evidence available enables to separate the analysis in two parts. One group includes all the works that have attempted to verify Kuznets hypothesis by resorting to cross-section data. Though the bulk of these studies confirm such hypothesis, the most recent evidence does not allow its confirmation. A second position on this topic has been forwarded by Fields, who has posited the hypothesis that most of the variation in ID depends on the type of growth and not on the process of growth itself. The third group of works, represented by the studies of time-series for different inequality indicators, does not make it possible to draw robust conclusions, not only due to the lack of reasonably long series, but also due to the fact that the indicators used are subject to important measurement errors.

The work is divided in two sections. Section 2 discusses three stages in the development of the theory. Section 3 relates to the empirical evidence available, which can be divided in two great groups of studies: cross-section and time-series analyses.

2. THE THEORY

2.1. Preliminary theoretical aspects to Kuznets' thesis

Although it is always possible —within the frame of the mechanics for wealth creation developed by Adam Smith— to bring implications to bear on the distributive issue, David Ricardo was undoubtedly the first classical economist to explicitly address the subject. Ricardo argues that the forces acting on the growth rate are intimately connected to the laws that determine ID. It is to be pointed out, however, that his analysis was related to functional ID, a very relevant classification at the time[1].

In order to understand his contribution, it is essential to consider the historical events originating his thesis. Two episodes of great importance seem to be at the core of the argument. The first relates to meaningful changes in the economic structure and the distribution of political power that was triggered by the Industrial Revolution. The beginnings of the XIXth Century were marked by an important migration from the country to the city and by a notable growth of urban industry. This brought about poverty concentrated in the cities, while at the same time it unleashed a struggle of interests between landholders and industrialists. The former were in favor of what was known as the grain laws and claimed a greater protection of the English agriculture sector. Their arguments were based on the notion of a self-sufficient nation in terms of food. This was, in turn, a fundamental aspect of the public discussion, within the context of the Napoleonic Wars and the struggle for world hegemony waged at the time. The war with France is without any doubt the second significant event to be considered in attempting to understand the political atmosphere that Ricardo lived through. That conflict made the price of foodstuffs increase and stimulated the development of agriculture even further. For the industrialists, the protection of agriculture meant income transferred to a sector of the economy that would in no way encourage any greater physical capital accumulation.

Ricardo was against the grains laws, because he posited, in favor of industry, that only the accumulation of capital would make development and progress possible. Within that frame, an income distribution more favorable to the owners of the land would make profits smaller and growth slower. Taxes levied on grain imports, unnecessarily increased wages, depressed profits of the firms and increased the rents of the lands. It is worth mentioning, however, that such a model anticipated a natural depletion of growth possibilities, as the expansion of the labor force and the demand for food would make it necessary to use less fertile lands in agriculture. Only international trade and the possibility of using

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[1] See Kaldor (1955).

high productivity lands in other nations, could free the British economy from an inevitable stagnation in its possibilities for development. Bronfenbrenner (1971) emphasizes this point when he quotes Ricardo:

> ... But at different stages of society, the proportion of the total product of the land that will be assigned to each one of these classes, under the name of rents, benefits and salaries, will be essentially different...The chief problem of economic policy is to determine the laws regulating this distribution ...

Two interesting aspects should be brought to bear in relation to the subject that concerns us. The first dwells on the pessimistic nature of Ricardo's predictions, an outlook shared by his contemporary and friend T. Malthus. This contrasts with what Heilbroner (1953) calls the "marvelous world" of Adam Smith, directly alluding to the intellectual climate in the XVIIIth Century. The second interesting aspect is a central element in the debate and which we will analyze now. It addresses the causality direction between ID and growth. In Ricardo's opinion, it goes from ID to growth.

The above mentioned historical circumstances were determinant in the contribution made to the subject by the "utopian socialists", of which the most prominent name is that of John Stuart Mill. Though he adheres to Ricardo's hypothesis regarding the evolution of ID to the extent that the economy attains higher levels of economic progress, Mill cautions that wealth creation will have an unavoidable finale called the Stationary State. Once this state is achieved, production laws, deemed to be natural in character by J.S. Mill, could set themselves aside from distribution laws that respond to cultural factors inherent to each society. In his Principles of Political Economy (1848) we can read:

> ...The distribution of wealth, therefore, depends on the laws and customs of society. The rules through which it is determined are what the opinions and feelings of the ruling portion of the community make them, and are very diverse in different ages and countries, and might still be more diverse, if mankind so chose...

Such a thesis, a forerunner of the modern Welfare State, was at its time confuted both in terms of the negative effects which an eventual income redistribution through taxes and/or subsidies might have on production, as well as by the Marxist hypothesis regarding the impossibility of separating production from distribution.

Marx had a catastrophal view of capitalism. Capital accumulation in the hands of an increasingly smaller number of individuals as an outcome of the appropriation of the labour surplus generated by labor, would bring about an increasing deterioration of wealth distribution, inevitably steering the system to

a revolution. The mechanics of that process was described within the frame of five fundamental laws designated as the laws of the capitalistic movement. The movement of the system towards an increasing deterioration in ID was centered on technological change, enabling capital owners to permanently replace labor by capital, thereby intensifying the labour surplus appropriation process with the ensuing effect of a greater unemployment rate. According to the law of increasing industry concentration and centralization, the transformation of small scale industry to large industry is another element to be considered within the above process. Technological progress would bring about a constant drop in prices, hence eliminating small productive units.

In contradiction to J.S. Mill and undoubtedly very much afar from Marx, we come upon the contribution to the economic theory made by the neoclassical economists of the end of the XIXth Century and beginnings of the XXth Century. In general, they made no reference to the relationship that we are concerned with, subordinating the distributive issue to the subject of economic welfare[2]. Once the basic concept that factors are paid according to their productivity was in place, the theory tended to give up the interest shown by the classics for growth and conditions of stationary equilibrium. A notable exception to this rule is Pareto's ID law, put forth in 1897. On the basis of very limited statistical information, Pareto was able to estimate a function which related income level (Y), to the proportion of individuals with an income that was equal or higher than Y. The alleged constancy of the estimated relationship allowed Pareto to rank that evidence as a law. Even though manifold subsequent estimations made it refutable, Pareto's incursion in the subject stands for a pioneer effort in the path to relate income and equity. His model can be summarized in the following expression:

$$N = AY^{\alpha} \tag{1}$$

Where N is the number of rents higher than a value Y, with A and α being constant. The parameter α is a measure of the elasticity of the number of rents higher than a given level of income with respect to the change in that income. Higher values of this parameter would reflect a higher distributive equity, with the lower values reflecting a lower equity. Pareto generalized this result only for the income levels higher than the sample mode and was able to estimate α values ranging between 1.5 and 1.7. The alleged constancy of that parameter comes from the fact that its magnitude is independent of the income level. Let M(Y) be the median of the rents higher than a given level Y, then the acceptance of Pareto's basic functional relationship allows to demonstrate that:

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[2] See, for instance, Pigou (1932).

$$M(Y)/Y = \alpha/(\alpha - 1) \qquad (2)$$

Since this relationship is a constant independent from the income level, it can be taken as an index of inequality. If we call that coefficient i, it corresponds to the appreciation which each individual may have of the amount of income higher than or equal to his own rent, and it is a measure of the income which an individual with an income Y might have if all rents above that level were distributed equitably. The alleged constancy of i seems to mean that the sociological equilibrium that a given society is able to arrive at is such that at every level of rents the feeling of inequality is independent from that rent. This would be a confirmation that many people consider themselves poor by reference to many others[3].

Without any doubt, the legacy of the classics and the remarkable theoretical progress attained by the neoclassical economists, are at the core of modern economic theory. It must be pointed out, however, that a new branch of the economic theory was launched at the beginnings of this century, through the contribution of some thinkers that could be grouped under the denomination of Development Economists. This is the case of Rosenstein Rodan and Joseph Schumpeter. If we want to retrieve the essential aspects of their contribution, it hinges on the introduction of a temporal dimension in the neoclassical economic analysis and the identification of key variables of dynamic economic equilibrium. The introduction of the concept of Economic Development itself is ascribed to Schumpeter, an economist belonging to the Austrian School. His best known work, A Theory of Economic Development (1911), focuses its attention on the origin of the process of growth, embodied in the Schumpeterian Entrepreneur. This would be the agent who brings about disequilibrium, steering the system to a level of higher development. Schumpeter designated the constant effort of innovation that is proper to a market economy as the process of Creative Destruction. This mechanism is at the heart of what has been labelled the New Growth Theory, where the process of innovation recovers fundamental importance. The dynamics described by Schumpeter permits an interesting connection between ID and growth. The latter would be the result of the process of Creative Destruction. If it is to take place, there is the need for the presence of an innovative entrepreneur who appropriates himself of the rents accruing from such an innovation. From the above it follows, that a greater growth rate should be associated with important changes in ID[4].

[3] See Allais (1974).

[4] This idea was suggested to me by Elías Dinopoulos. However, the direction in which such changes will convey ID is not clear. Although the above mentioned rents will bring about a transitory concentration of income until the moment they dissipate themselves, the changes in relative prices brought about by innovation can favor individuals who are not related to the process of Creative Destruction.

Although the subject of Economic Development prompted a profuse literature, we do not find an explicit allusion to the topic that concerns us, until the advent of Keynesianism and its effort to explain the short term fluctuations in income. A new generation of growth models, characterized by a theoretical interest to interpret the problem of equilibrium in an expanding economy, was first introduced by Harrod (1939) and Domar (1946), but without making a specific reference to the distributive issue. Harrod's well known result ($g = s/v$) suggests, however, the need to encourage saving so as to equal the guaranteed and effective rate of growth. This premise has important implications in the field of equity[5].

A later generation of models of growth evidencing a clear Keynesian influence was that developed by the Cambridge school in the forties, fifties and sixties. Frequently, the literature on the topic groups them under the classification of neo-Ricardian, a denomination highlighting the importance of functional distribution of income as a part of the argument. A central characteristic of these models relates to an important implicit assumption regarding the degree of rationality of the economic agents individually considered. These agents would not be necessarily guided by a rational process of the type adopted within the neoclassical framework, but in terms of simple rules easily built into an aggregate model[6]. Kaldor (1955) is without any doubt one of the most prominent representatives of this train of thought. His model, unlike the previous contributions of Harrod and Domar, assumes a different marginal propensity to save for workers and capitalists. On the basis of the equilibrium between saving and investment, it is possible to determine the parameters that are determinant of the participation of the rents accrued by capital from income (B/Y). This corresponds to expression 3 and reveals that —if the parameters that define the preference for saving are constant —the relationship mentioned depends only on the investment rate (I/Y).

$$B/Y = [1/(S_b - S_w)] (I/K) - S_w/(S_b - S_w) \tag{3}$$

Several interesting conclusions stem from this result. The first is that as the median propensity to save is a weighted average between the respective propensities of workers and capitalists, it can be altered through changes in the functional distribution of income. If we accept that the marginal propensity to save of the capitalists (S^b) is higher than that of the workers (S^w), the median propensity of the economy will increase as capitalists receive a greater proportion of income. This enables redistributive policies to contribute to the restitution of the equality between the natural and the guaranteed rate of growth that are equivalent only by coincidence within Harrod's model. A second conclusion to

5 See Robinson (1962).
6 For a well-rounded discussion of this point, see Jones (1975).

be considered is that, under the assumption that workers do not save, expression 1 indicates that the ratio B/Y only depends on the marginal propensity to save of the capitalists, a fact having important connotations with respect to the relationship between ID and growth.

Resorting to a similar model where it is assumed that workers also save and, therefore, own a part of the capital, Pasinetti (1961-2) is able to show that the latter's propensity to save, though having an influence on rent distribution between capitalists and workers, does not exert an influence on rent distribution between benefits and wages. Pasinetti's contribution is framed within a logic similar to that of Kaldor's model, even though it does not arrive at an interesting generalization of the argument. Notwithstanding the results, total saving will always be a weighted average between the savings of workers and capitalists.

TABLE 1

	Classical	Neoclassical	Neo-Keynesians	Development Economists
Causality	D. Ricardo	W. Paretto	Kaldor Pasinetti	J. Schumpeter
	ID to Growth	Growth to ID	ID to Growth	Growth to ID
	J.S. Mill: There is no link between the laws of production and the laws of distribution			
	C. Marx: Growth to ID			
Mechanics	D. Ricardo	W. Paretto	Kaldor	J. Schumpeter Passineti
	Only capitalists have the ability to save and accumulate capital.	The relationship between ID and growth is an empirical fact.	There are different propensities to save between workers and capitalists.	The process of Creative Destruction generates rents for successful entrepreneurs
	C. Marx: Labour surplus appropriability leads to an increasing concentration of wealth.			

A synthesis of the most relevant aspects related to this section are shown in Table 1, which summarizes the causality relationships and the mechanics involved in the theoretical aspects developed by the authors analyzed. The Table shows that the classical authors mentioned do not report the same causality relationship. On the one hand, Ricardo's clear-cut hypothesis, Mill's separation between the laws of distribution and the laws of production and Marx's causality relationship in opposition to the one developed by Ricardo, stand out. On the other hand, causality as defined by Pareto, is basically the fruit of a stylized fact, more than an hypothesis based on a clear mechanism relating both variables. The neo-Ricardian nature of Kaldor and Parinetti make it possible to explain the causality defined by both these authors to reproduce the prediction of Pareto himself. Finally, the process defined by Schumpeter, is a basic antecedent to the understanding of the modern models of growth.

2.2. Kuznets thesis

Kuznets was possibly the first economist after the Keynesian revolution to explicitly address the subject that concerns us within the context of the functional distribution of income. His original article in 1955 put forth an hypothesis that even in our days gives rise to an abundant polemic both at the theoretical as well as the empirical level. The central question raised by Kuznets refers to how inequality in income is affected by the process of growth. The sense given to the problem by this approach is contrary to Ricardo's. In Kuznets' opinion it is the process of growth that affects ID and not the latter having an effect on the former.

It is interesting to observe that despite the lesser significance of the economic and social changes in the fifties regarding the events that surrounded Ricardo's thinking, the process of decolonization of countries that had been conquered by European powers gave a strong thrust to the academic discussion on the process of growth to be followed by the new independent nations. Furthermore, this general context was strongly influenced academically by Lewis' (1954) work —reinforced some years after by Fei and Ranis (1964)— and in which the process of growth is associated with a dual economic structure characterized by the existence of a modern sector and a traditional one.

Resorting to the scanty statistical information on ID available for England, the United States and Germany, the work concludes that relative ID has been moving to equality. This trend would be particularly clear as from 1920, even though it possibly was a process that had started prior to the Second World War. The data examined corresponded to pre-tax income, excluding, in addition, all government subsidies and transfers. From the observation of that evidence, Kuznets ascertained also that this trend to equality had been attended by significant increases in per capita income.

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The hypothesis forwarded went even further, when Kuznets developed his "Inverted U Curve" that results from the influence exerted by the factors recorded in Table 2. During a first stage of development, countries would experience a worsening of their ID, a process that would begin to revert itself as higher levels of per capita income were attained. The substantive elements of this reasoning may be summed up in three great aspects. The first of them addresses the disturbing effect of the Industrial Revolution. Along with this, a second factor would be the growth of the cities, bringing about poverty and several problems of unemployment and crowding. A third substantive element is related to the effects of the drop in the mortality rate and the increase in the birth rate, that would impede the natural decrease of the poor population in the initial stage of growth.

TABLE 2

STAGES OF ECONOMIC DEVELOPMENT
EFFECT ON INCOME DISTRIBUTION

Stage II Deterioration of ID	Stage II Improvement of ID
(1) Industrial revolution and growth of cities.	(1) Development of democratic institutions and participation of citizenry.
(2) Unemployment, poverty and crowding.	(2) Greater pressure on higher income groups to benefit lower income groups.
(3) Drop in mortality rate and increase in birth rate.	(3) Growth rate of richer population is lower than that of the poorer population.
(4) Greater accumulation of wealth in the hands of the rich	(4) Technological development is an enabling factor for the development of an emerging middle class.
(5) Greater relative weight of cities with respect to the urban sector.	(5) Development of the services sector, which increases the income of wage-earners and the poorer groups.

Besides these great forces of progress, several economic and social phenomenons would act. At the stage when ID worsens, Kuznets anticipates a greater hoarding of wealth concentrated in the hands of individuals with the highest income. To this would be added the fact that the growth of the cities would increase their relative weight with respect to the agricultural sector. Under the assumption that ID in the rural areas would be better that in the cities, such phenomenon would act in the direction of worsening equity.

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Finally, the dynamics itself of the above transformations would impose a reversal of the above trend after a certain stage. The political development intrinsic to a democratic regime would tend to neutralize the concentration of income. As a country grows and develops, the pressure on the higher income groups increases to the benefit of lower income ones. The above is added to the fact that the rate of growth of the population in the groups of higher income is below that in the middle and lower groups. This would make the former lose relative weight. In turn, the advent of new enterprises associated with new technologies and oriented to new areas of the economy, would facilitate the appearance of an increasingly greater in number emergent middle class. Finally, Kuznets predicted an increasing importance of income associated with the rendering of services. Given that such activities were a more important source of income for the low income groups, the long term trend would be a relative improvement in the position of those groups.

Independently from the scarce evidence that the work mentioned provides regarding the United States, England and Germany, Kuznets performs some simple simulations that help to support his hypothesis. He also provides some background information on income distribution in Ceylon (now Sri Lanka), Puerto Rico and India, from which he infers a worse situation than that prevailing after the Second World War in the three developed countries considered.

Though the original formulation of Kuznets U hypothesis is framed within the rationale of a dual economy, it resides on a conceptualization of the process of growth that fails to include the rigor needed to be ranked at the level of a theory. An interesting attempt in this direction is the simple though provocative article by Robinson (1976), where, for the first time, he is able to formalize the process put forth by Kuznets within the frame of a simple model. This assumes the existence of two sectors differing both in their median income (Y_1 and Y_2) as well as in the degree of inequality of their distribution, a variable assimilated to the income variance (σ_1^2 and σ_2^2). The model assumes that the participation in the population of sector 1 (W_1) is growing, which is equivalent to a contraction in the participation of the population in sector 2 (W_2). If we call the average level of total income Y, and the average level of the inequality σ^2, we can demonstrate that the latter variable can be expressed as:

$$\sigma^2 = AW_1^2 + BW_1 + C \tag{4}$$

$$A = -(Y_1 - Y_2)^2$$
$$B = (\sigma_2 + \sigma_2^2) + (Y_1 - Y_2)^2$$
$$C = \sigma_2^2$$

Equation 1 allows defining a level of W for which σ^2 will be maximum, a point representing the minimum level of Kuznets U curve. Through a simple

simulation Robinson is able to demonstrate that his model is consistent with Kuznets hypothesis, both for changes in W_1 as well as for variations in relative levels of income between both sectors.

In a later paper, Fields (1979) introduces a clarifying distinction regarding three alternative types of growth within the frame of a dual model, where a traditional sector and a modern sector coexist. The alternatives would be growth based on the expansion of the traditional sector, growth based on the accumulation of wealth by the modern sector and growth based on the expansion of the modern sector. Fields analyzes the distributive implications of each one of these growth patterns using both the criterion of the Lorenz curve, on which Kuznets bases his hypothesis, as well as on the Gini coefficient. The aspect deserving some attention in the classification mentioned is that it enables a discussion of the implications which each of the three types of growth mentioned have on welfare. More concretely, Kuznets inverted curve appears as an inevitable phenomenon when we assume that global growth is the result of the expansion of the modern sector. The inevitability of the relationship between growth and ID mentioned before may also be proven by means of the Gini coefficient[7]. The importance of this result is that Kuznets' original article implicitly assumes a development process based on the expansion of the modern sector. To this he adds the assumption of greater inequality in that sector, a fact that does not alter Fields' conclusions. Despite the seemingly inevitable character of the process described, its implications on welfare are ambiguous.

A central aspect to the verification of Kuznets hypothesis is the selection of an appropriate inequality index. Though Kuznets' work hinges on the Lorenz curve, several indicators can be resorted to so as to study that particular phenomenon. Fields' analysis is based on the study of two of these indices: the Lorenz curve and the Gini coefficient. However, an exhaustive examination of a wider range of indicators provides less conclusive results with respect to Kuznets' hypothesis. Anand and Kanbur (1993a) address this problem both at a theoretical as well an empirical level. These are the existence of a higher level of income and a greater degree of inequality in the modern sector with respect to the traditional sector. This allows them to discriminate between two different sources of inequality, namely: the inter-sectoral inequality and the intra-sectoral inequality. In the first case, we are only interested in the proportion of the population in each sector of the economy and the difference in income between both sectors. In the second, we add the degree of inequality which prevails inside each sector as an additional factor of analysis. If we admit that the global inequality is a weighted average of the degree of inequality in each sector taken separately, the process of development, understood as an expansion of the modern sector, will have both intra- as well as inter-sectoral effects on ID. In order to observe the process with

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[7] See a formal demonstration in Fields (1979), p. 343.

greater clarity, Anand and Kanbur suggest separating the analysis in two stages. The first, associated with the initial stage of development, can be assimilated to the case of an economy where the average income is equal to the income of the traditional sector and that 100 percent of the population is in this same sector. Within that context, any expansion of the modern sector will bring about a greater global dispersion of income, thus reducing the degree of equity. At a second stage, that process reverts itself, leading to a situation where the greater part of population is in the modern sector. In this manner, the intersectoral component will contribute increasingly in the direction of bringing all individuals closer to a level of average income common to all and equivalent to the income prevailing in the modern sector. Such intersectoral phenomenon contributes, then, in an unambiguous manner to reproduce the characteristics of the development process anticipated by Kuznets. However, the fact that the modern sector has a less equitable ID, will lead the aforementioned expansion in that sector to contribute negatively to equity through all the development process. This second factor, an outcome of the intrasectoral difference between both sectors, will strengthen the intersectoral effect in the first stage of development, but will tend to neutralize it in the final stage. It is in this way how —even though the phenomenon reported by Kuznets appears theoretically robust to explain the relationship between ID and growth in economies whose modern sector is still very small— the predictions of Anand and Kanbur cast doubts on their relevance when the modern sector is very important.

2.3. The contribution of the new political economy

Two new theoretical developments have renewed the interest in the subject that concerns us. A first element is related to the advances attained in the interpretation of political phenomena within the frame of the economic rationale. Even though the idea originates from theoretical contributions made during the second half of the XIXth Century, the most significant impulse in this direction was made by authors, such, as Black (1948), Arrow (1951), Down (1958) and Buchanan and Tullock in several papers. In recent years, such an approach has been extended to the macroeconomic domain, a field where one of the topics is precisely the relationship between ID and growth, the theoretical and empirical treatment of which has drawn the greatest interest. To the above we must add, the recent advances in the domain of the growth theory. This second factor —motivated by the inability of neoclassical growth theory to explain some cases of fast growing countries— has allowed to successfully relate variables such as human capital and/or degree of openness of the economy to the rate (and not the level) of growth in the product. Along this path, what has been termed neoclassical convergence is broken, paving the way to a prolific literature making it possible to give theoretical consistency to a wide range of experiences in growth-related matters.

Perotti's (1993) work is probably one of the most original efforts in the direction mentioned. His model distinguishes three categories of income, where the median voter reflects the preferences of the intermediate category. Access to education is only possible for individuals whose post-tax income is equal to or higher than 1. The redistributive mechanism consists in transfers financed with a tax on income (n), that is the outcome of the application of a rate t whose collection is subject to convex costs. The latter aspect is fundamental in the model, since it enables the definition of a maximum and a minimum limit for t, between which each individual, and therefore each income group, can obtain a post-tax income equal to the minimum necessary to invest in education. There are no capital markets and spending in education has both a private (R_e) and public (R_u), return the latter corresponding to the externality associated with collective spending in education. Each individual lives two periods, after which a new generation must once again face an intertemporal optimization process of a linear utility function of the following type:

$$U_t = C_1^i + C_2^i = n_i (1 - t) + (t - t^2)\bar{n} - e + (n_i + R_e + R_u) \qquad (5)$$

The income for the first period corresponds to net post-tax income, minus the expenditure in education, e. The term $(t - t^2)$ evidences the per capita transfer that each individual receives in period 1. In period 2, though there are neither taxes nor transfers, the benefits from the investment in education in period 1 manifest themselves.

Within this context, the median voter must decide during the first period, an optimum value for t, which we denote t_m^*. This allows maximizing the utility function of the median voter, that is given by the sum of the incomes during the first and second periods.

Perotti carries out his analysis around the type of conflict that the median voter could face in the cases of a rich economy with intermediate income and a poor economy with a low income, respectively. The minimum tax rate that enables agent i to have a post-tax income in the first period equal to or higher than 1 is designated by $t_{i.min}$. This corresponds to the rate for which the post-tax income of individual i will be equal to 1. The maximum rate that satisfies this condition we will call $t_{i.max}$. Perotti (1993) establishes a difference between individuals with a low (l), high (h) or intermediate income (m), where the role of the median voter corresponds to the latter.

TABLE 3

TYPE OF ECONOMY

	Intermediate or high income economy	Low income economy
No conflict	$t_m^* \geq t_{l.min}$	$t_m^* \leq t_{h.max}$
Conflict	$t_m^* < t_{l.min}$	$t_m^* > t_{h.max}$

The cases that have been designated as conflictive for the median voter, represent situations where the latter faces two alternative scenarios (table 3). On the one hand, if he decides in favor of rate t that maximizes his income in the first period, he sacrifices the investment in education of that group of agents for which post-tax income would be lower than 1 in the case that $t = t_m^*$. On the other hand, if he decides in favor of a minimum (or maximum) t, allowing the same group of agents mentioned above to invest in education, the median voter will sacrifice income in the first period for the sake of a positive externality in period 2, originated from the higher level of spending in education thus obtained in period 1. In the case of an economy with a high or intermediate income, it is only the group with the low income which could lose its possibility of investing in education if the preferences of the median voter favor a lower transfer to the necessary minimum for that group of individuals to educate themselves ($t_m^* < t_{l.min}$). This is the situation of conflict in the first column in Table 3. For a low income economy, only the rich can have an education, which determines a maximum taxation which can possibly be levied without leaving that group without an income sufficient to invest in education. When the preferences of the median voter favor a rate higher than this maximum ($t_m^* > t_{h.max}$), the median voter will also face a conflict. If the median voter favors a t different to t_m^* for the sake of allowing an investment in education by that group whose decision in this respect depends on t, the economy will grow more, generating a greater income in period 2. If to the contrary, the median voter decides to impose t_m^*, which maximizes his income in the first period, total income will be lower in the second period, with a lower level of growth being recorded.

Within the frame of the mechanics outlined above, and assuming that the individuals leave an heritage to the next generation, Perotti (1993) makes a simulation of his model assuming three alternative cases of economies whose per capita incomes are originally equal, though there is a difference in terms of ID. This result permits to ascertain that both the excessive concentration of income, as well as the excessive equity, would not be favorable to growth. The result

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mentioned is consistent with the intuition. In a poor economy where only the richer can have an education, only the latter will invest in human capital. In a poor economy with a very equitable distribution, no group will have an income sufficient to invest in education. Only a poor economy with a minimum degree of inequity, will allow all income groups to have an education, once a number of generations have lived. In long-term dynamic equilibrium (steady-state), the economies with a very egalitarian ID will have a low per capita income. A slight degree of inequity will induce a relatively high per capita income, while a high degree of inequality will tend to generate an equilibrium per capita income of an intermediate level.

The assumption with respect to the importance of the median voter in what relates to investment in human capital, has also been taken up by Persson and Tabellini (1991) in a model of overlapping generations. Under the assumption that individuals live two periods, they must maximize a utility function v_i depending on the consumption made when the individual is young, C_{t-1}^i, and consumption when the individual is old, d_t^i.

The latter process is subject to the budgetary restriction indicated by equations 6.1 and 6.2. Each individual maximizes:

$$v_i = U(C_{t-1}^i, d_t^i)$$
(6)

subject to:

$$C_{t-1}^i + K_{t-1}^i = y_{t-1}^i$$
(6.1)

$$d_t^i = r_t \left[(1 - \theta_t) k_t^i + \theta_t k_s \right]$$
(6.2)

In the first period $(t-1)$, per capita consumption and accumulation of physical capital, k_{t-1}^i, cannot exceed income for the same period, since there does not exist any capital market. In the second period, individuals live on their rents alone, where these are the fruit of a weighted average of their own capital accumulation and the average per capita capital stock in the economy, k_t. The weighting is given by θ_t, a coefficient representing the tax rate on the rents of capital accumulated by each individual. In turn, the income of each agent at his first period of life, is explained by a production function in the following manner:

$$y_{t-1}^i = (W_{t-1} + e_{t-1}^i) K_{t-1}^i$$
(7)

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The variable W_{t-1} is the per capita stock of human capital of the economy in the initial period. In turn, e_{t-1}^i is the specific stock of human capital possessed by individuals. The median voter decides the value of θ which is to hold during the second period of his generation and in the following first period. A key aspect of the model is the proportion of income in period 1, which the agents devote to saving, and hence to the accumulation of physical capital. If preferences are homotetic, the relationship between consumption in both periods might be expressed as:

$$d_t^i / C_{t-1}^i = D(r_t, \theta_t)$$
$$D_r > 0; \quad D_\theta < 0 \tag{8}$$

The smaller D is, the greater the consumption and the lower the investment in $t-1$, thus involving a lower rate of growth of the economy (g). The substantive issue is then to determine the factors which have a bearing on the decision of the median voter. Persson and Tabellini show that the median voter will choose a $\theta = \theta^*$ in terms of three variables. They are: the average human capital stock (W), the rate of return on capital (r), and the level of income of the median voter e_{t-1}^m.

In turn, considering the determinants of Y_{t-1}^i stemming from function (7), capital accumulation will depend on W, r and θ. All the above can be summed in equations (9) and (10):

$$\theta^* = \theta^* (W, r, e_{t-1}^m) \tag{9}$$

$$g_t = G (W, r, e_{t-1}^m) \tag{10}$$

The higher the average level of human capital (W), the opportunity cost associated with the payment of proportion θ of the rents of the capital will be higher, and therefore the accumulation of capital and growth will be lower. In turn, given that a higher rate of interest will produce both an income effect as well as a substitution effect, its effect on growth is ambiguous. As regards θ, a higher value of this parameter reveals a lower degree of appropiability of the rents of capital, thereby having a negative effect on growth. A central aspect of the model is related to the behavior of e_{t-1}^m, the income of the median voter. The model assumes the following function:

$$e_{t-1}^m = E(K_{t-1}, \epsilon_{t-1}^{min}, \epsilon_{t-1}^{max}) \tag{11}$$

In essence, the income of the median voter is a function of three factors. On the one hand, it depends on the level of income of the economy, which in turn is a function of k_{t-1}, the per capita average level of physical capital. On the other, it depends also on the minimum and maximum feasible values of e_i in the range of the potential voters. Such limits appear as a constraint to the spectrum of voters participating in the decision of θ. Incorporating the function (11) into (9) and (10), the latter become:

$$\theta^* = \theta^* (W, r, E(K_{t-1}, \epsilon_{t-1}^{min}, \epsilon_{t-1}^{max}) \tag{12}$$

$$g_t = G(W, r, E(K_{t-1}, \epsilon_{t-1}^{min}, \epsilon_{t-1}^{max})) \tag{13}$$

Equation (13) enables us to examine the basic determinants of growth. An increase at the upper level of income of the spectrum of voters (ϵ), will increase the income of the median voter and bring about, all other things being equal, a greater accumulation of capital in the first period. The latter increases the amount of tax paid in the second period for a given rate θ, biasing the decision of the median voter in favor of a lower θ^*. We know, from equation (5), that such a variation will produce a consumption substitution in favor of period 2, which is only compatible with a higher k, and therefore with a greater growth. In turn, a greater w will lead to, all other things being equal, a higher level of income which, as above, increases the amount of the tax paid in the second period. This, in turn, reduces θ, encouraging the accumulation of capital in period 1. A key aspect of the model is the assumption that ID follows a pattern in time which adjusts itself to that of Kuznet's thesis. This means that at a first stage of development the value of k for the median voter will tend to be lower than the average of the economy. Though the process tends to become more acute until the income of the median voter reaches a minimum as a function of k, ID and, consequently, the income of the median voter will begin to improve as from that minimum point onwards. Given that it is related to a high θ, there will be a negative relationship between inequality and growth.

The above result, only valid in a democratic context, is also obtained by Alesina and Rodrik (1993). The inclusion of a term called "G" in the production function is the basis of the result:

$$y = AK^\alpha G^{1-\alpha} L^{1-\alpha} \tag{14}$$

G stands for government expenditure in productive investment and social infrastructure. This must be financed with taxes on the rents of capital. The taxes thus collected can also be transferred to the workers, who do not have any saving capacity. Within a frame in which the government can use the revenues both to

increase G as well as to increase the proportion of such resources allocated for those transfers (λ). Alesina and Rodrik examine the performance in terms of growth for different alternatives of λ and τ (the tax rate). The result is intuitively clear; an economy will grow faster to the extent that λ is smaller, because as taxes are distorting elements with respect to investment decisions, and recognizing that only public spending in G permits encouraging growth, there will be an optimum value of τ for which growth will be maximum.

The introduction of the median voter combined with the assumption that all individuals have some capital and some labor, makes it possible to conclude that a worse distribution of the wealth between capital and labor, understood as the distribution of capital among individuals, will induce a value of τ higher than that necessary to maximize growth. This result will hold even if we assume that λ = 0, the only case analyzed in that context given the requirement of decisional unidimensionality in the median voter theorem. The implicit intuition is clear. Since the median voter enjoys the benefits of growth but faces a lower proportion of the costs related to the payment of tax on the rents of capital as long as the distribution of such capital are more unequal, a situation of greater inequity will make him lean to a higher τ.

An important conclusion stems from the works analyzed in this section. They recognize causality from ID to growth, which contrasts with Kuznets' original idea, whose hypothesis posited an inverse causality. In turn, the validity of the models mentioned is subordinated to the case of economies in which the election system is democratic. This, however, is to be assumed within the frame of each model. In the case of Persson and Tabellini the idea of defining the median voter within an exogenous range of income, paves the road for different political regimes, though always within a frame of free elections.

3. EMPIRICAL EVIDENCE

3.1. The kind of evidence available

The reasonably exhaustive examination of the empirical evidence available, calls for a preliminary definition of the type of inequality indicator used. Fields (1980) distinguishes four types of possible indicators, each one of which involves different value considerations regarding the direction of the changes in social welfare associated with growth. These are the relative inequality, absolute income, absolute poverty and relative poverty approaches. The bulk of the studies revised concentrate their attention on what is known as relative inequality, which is based on the information contained in the Lorenz curve.

In a manner similar to that in other areas of empirical research, in the field of Economic Development the topic we are dealing with has been empirically

analyzed under a double prism. A first group of studies addresses the subject by means of cross-section data, with Kuznets himself appearing as an important precursor of this approach. The great interest in improving the estimations thus arrived at during the seventies has been to a great extent the fruit of the greater availability of information on personal distribution of income published by the World Bank on the basis of the well-known compilation made by Jain (1975). In a second group of studies we find some attempts, habitually less conclusive, to make a more in-depth analysis of the evolution in time of ID in given countries. We now present these two groups of studies in a separate manner.

3.2. Cross-section studies

3.2.1. ID explained as a function of growth

Cross-section studies in the sphere of the determinants of growth presume two basic facts. The first is that developing countries follow a similar trajectory on their road to growth. The second, is that the results obtained only reveal the average behavior of the sample, overlooking the numerous particularities of the countries considered. Despite the above, this technique has been widely used in the subject that we are concerned with.

Adelman and Morris's (1973) contribution is the first exhaustive work in this aspect. By using 35 economic, social and political indicators for the period 1957-1962 they examine the effects of growth on equity in a sample of 43 developing countries. The technique used combines regression analysis with a prior separation of the sample aimed at maximizing the explanatory ability of the indicators involved. This work represented a remarkable effort in terms of developing the variables resorted to, with most of them allowing to gather qualitative aspects of growth. Adelman and Morris use four quantitative variables, namely: the participation in income of the poorer 60 percent, the poorer 40 percent, the intermediate 20 percent and the richer 5 percent. As regards the poorer 60 percent, Adelman and Morris observe that their participation registers the shape of an inverted non-symmetric U, an evidence coinciding with Kuznet's thesis. At the extremes of very high and very low growth there is greater equity. However, the phase of improvement in the participation of this group only takes place at a higher stage of growth. Adelman and Morris illustrate this point by resorting to "advanced" countries in the sample[8], which would have an ID similar to that of other nations that have not had a significant development[9]. The case of the poorer 40 percent would be more dramatic. The bulk of the evidence found by Adelman and Morris indicates that their participation continues to deteriorate

[8] Argentina, Chile, Taiwan and Israel.
[9] Chad and Nigeria.

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both in absolute as well as relative terms, even when the economy abandons the "dual" structure, which according to the paper mentioned, would be the keynote in the evolution of the economies under review. Inflation, population growth, the introduction of capital intensive techniques and the process of urbanization would be the explanatory factors for this phenomenon. Finally, though the participation of the intermediate 20 percent does not seem to vary substantially in the course of growth, the 5 percent with the higher income is notably benefitted at the initial stage.

The great diversity of conclusions which may be possibly drawn from Adelman and Morris' work can, however, be summed up in the following basic points. The first is the authors' avowal to the dual model of development. In that context, the relative abundance of natural resources and the concentration of assets in the hands of transnational companies, would be elements that deteriorate ID. In turn, the emphasis on spending in education, the greater diversity of manufactured exports and the expansion of the fiscal sector, would contribute to neutralize the seemingly unavoidable trend to deterioration in the participation of the poorer groups. A central aspect of the work is its emphasis on the absence of an automatic spill-over mechanism of the benefits of growth.

In a later work, Paukert (1973) makes a lucid review of the figures on ID used by Adelman and Morris (1973). This work resorts to a revised and expanded version of the sample used by Adelman and Morris and includes 56 countries. Though his analysis is focused exclusively on the relationship between ID and per capita income, the conclusions that he draws are remarkable, as regards both the simplicity of the analysis as well as the clarity of the information contained in the data. The classification of the countries into 7 categories of income allows to ascertain that both the Gini coefficient, as well as what is called the maximum percentage of levelling[10], reflect a behavior compatible with that in the Kuznets thesis. Two additional elements may be concluded. The first is that the evolution mentioned for ID is essentially the outcome of the changes in income share of the richest 5 percent. A second aspect relates to the fact, already mentioned by Kuznets (1963), relative to the systematic lower participation in the income of the poorer in countries with a very low income vis à vis those having very high income. This would not be so clear for those countries featuring intermediate levels of growth.

Chenery and Syrquin's (1975) effort to identify the processes of structural change in the course of growth, is, like Adelman and Morris (1973), an in-depth analysis of the subject. Although, in Chenery and Syrquin's case, the distributive issue represents only one of the three subjects analyzed, the evidence obtained on the basis of a regression analysis of 52 countries in the period 1950-1970 seems

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[10] Percentage of income that has to be distributed to obtain a perfectly equitable ID.

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to once again support Kuznets hypothesis. Chenery and Syrquin identify three exogenous variables which enable to account for more than 50 percent of the variance in the income share for the 20 percent with a higher income, the intermediate 40 percent and the lower 40 percent. These variables are school enrolment —as a measure of educational attainment—, participation of primary exports— as a measure of the degree of dualism —and primary production— as a measure of the importance of agriculture. Inasmuch as education and the importance of primary production seem to favor the participation of the poorer groups, the greater degree of dualism seems to have the opposite effect. These general conclusions coincide to a great extent with the evidence found by Adelman and Morris (1973), not only in the emphasis regarding the importance of economic dualism and the level of education as explanatory variables of the distributive process, but also in terms of directly identifying per capita income as a central element in the problem.

Probably the two empirical works published by Ahluwalia (1974 and 1976) have been the empirical studies which have generated the greatest debate in the subject that concerns us. Taking a sample made up of 62 countries, of which 14 are developing countries and 6 are socialist economies, Ahluwalia is able to prove the existence of the functional relationship stated by Kuznets. This result is based on a regression analysis with cross section data to which the following function is fitted:

$$PARI_i = a_1 + a_2 Log(GDPPC)_i + a_3 [Log(GDPPC)_i]^2 + a_4 (TCGDP)_i + a_5 \Omega_i + u_i \qquad (15)$$

The dependent variable represents the income share of percentage i of the population. Ahluwalia distinguishes 4 groups. The 20 percent with the higher income, the intermediate 40 percent, the lower 60 percent and the lower 40 percent. The variable GDPPC is the per capita product, while TCGDP is the rate of product growth. The omega (Ω) term embraces 6 different variables, all of which capture the effect of long-term structural changes in ID. These are the illiteracy rate, secondary school enrolment, population growth rate participation of agriculture in the product, proportion of urban population and a dummy variable for the socialist countries.

The presentation which Ahluwalia makes of the problem adds at least one important factor to the debate on Kuznets basic idea. This relates to the differentiation between short and long-term factors which have a bearing on ID in the process of growth. In essence, Kuznets' reasoning emphasizes the impact of structural changes on income distribution. Such factors, picked up in the omega variable would operate in a parallel manner to short term forces related to the lack of mobility of the factor labor to easily move from the traditional sector to

the modern sector of the economy. The variable TCGDP would be measuring this effect.

Ahluwalia estimates equation 15 for the four income groups defined above. Two basic conclusions stem from the results. The first is that coefficient a, is significant and has the correct sign for all estimates. More concretely, the participation in income of the poorer 40 percent and the poorer 60 percent, respectively, first declines and then increases. The percentage of income going to the poorer 20 percent reflects the opposite behavior. The second is that the rate of growth is not significant for any of the regressions. Though such a result would reject Ahluwalia' hypothesis regarding the relevance of the short-term factors mentioned, he points out that the particular experience of the different countries considered is very varied, a fact which is to be taken as the chief conclusion in this respect.

In turn, the set of variables included in (omega) are also significant and have the correct sign. The rate of growth of the population would be negatively related to the distribution of income, and both the illiteracy rate and secondary school enrolment would have a positive ratio. Growth of agriculture would have a positive impact on the 40 percent with intermediate income and a negative effect on the 20 percent with higher income. The effect of a greater urban population would negatively affect the participation in income of the richer 20 percent in favor of the poorer groups.

On the basis of the projections of the explanatory variables in equation 1, Ahluwalia (1979) uses the parameters estimated for that function in order to make predictions on the absolute magnitude of poverty. He carries this exercise out on a sample of 36 countries. Despite the diversity of cases represented by each country in the sample, the overall figure obtained is 600 million poor for the year 2000.

An additional fact addressed by Ahluwalia is whether the process under consideration only affects the income share of the groups mentioned versus the possibility that absolute income also is affected. None of the estimates shows a deterioration in absolute income of the poor associated with a higher per capita income.

Ahluwalia's results have been confirmed by different authors. One of them is the case of Fields (1980), who by resorting to the same sample of 56 countries used by Paukert (1973), estimates a regression with six dummy variables, each of which assumes a value 1 for the corresponding TCGDP segment of per capita income and zero for any other case. The results is consistent with Kuznets hypothesis. Fields has been, however, very active in advocating the hypothesis whereby the deterioration of ID as an outcome of the process of development is far from being an unavoidable problem. Despite the fact that he admits that his own regression

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analysis confirms the hypothesis in question, Fields also estimates that a fifth of the variance of the Gini coefficient would be explained by the level of income.

Probably the most rigorous criticism levied against Ahluwalia's conclusions is the work by Saith (1983), who identifies two fundamental weaknesses in the above results. The first relates to a substantive aspect regarding the use of cross-section samples in the analysis. Such a practice would overlook the obvious specificities of the countries considered, incorrectly assuming that the position of the countries with a lower per capita income in the present corresponds to a stage which developed countries have already undergone under similar conditions at some other time. Saith rescues some concepts put forth by Kuznets in that direction, recalling also the role played by the colonies in the development of the countries which are now developed ones as an important factor which blurs the comparison.

A second group of objections relates to three methodological aspects –which even if the use of Ahluwalia's sample is accepted– would make serious weaknesses in the results manifest. The first factor considered is the evident heterogeneity of the data used. The fact that both developed and developing countries are included in the sample, involves assuming, as has already been pointed out, some type of historical continuity in the determination of ID. The second element relates to the instability of the results in the face of relatively marginal alterations in the sample. Among others, it is worth mentioning the effect of omitting the dummy variable included by Ahluwalia in the case of the socialist countries and the change in the value of the coefficients when the sample is restricted only to countries with a low income. The estimates are also sensitive to the exclusion of a small number of "outliers" made up by countries with a higher income in the category of the less developed ones. Finally, Saith holds that over and above the heterogeneity across countries, the sample used would also be very heterogeneous in terms of the relevant definition of income for the four segments considered.

It is important to point out that the conclusions obtained by Saith are particularly valid for the poorer 20 percent of the sample, though the same objections can not be easily extended to the regressions for the remaining segments. This is the point of departure in the work of Campano and Salvatore (1988), that restores the validity of Ahluwalia's original estimations. They use an extended and improved sample of 95 countries which allows obtaining 143 observations. On repeating the exercise developed by Saith with the new sample, they conclude that none of the anomalies that he detected invalidate what Ahluwalia ascertained. The sole exception relates to the only regression on which Saith concentrates his criticism, namely, the one representing the poorer 20 percent of the population.

TABLE 4
EMPIRICAL STUDIES ON THE RELATIONSHIP BETWEEN ID AND GROWTH

Author(s)	Year	Number	Inequality	
Adelman and Morris	1973	43	Lorenz Curve	Kuznets hypothesis holds in the long run	1) The deterioration of relative participation in income of the poorer 60 percent and the relative and absolute deterioration of the poorer 40 percent is a phenomenon that is inherent to the initial stages of growth. This phenomenon seems to be partially neutralized by: a) the rate of improvement of human resources b) government participation in academic activity c) strength of labor movements 2) ID is less equitable in the presence of: a) higher degree of socio-economic dualism b) relative abundance of natural resources c) structure of exports concentrated in primary products
Paukert	1973	56	Gini coefficient	Kuznets hypothesis holds in the long run	1) Though the behavior of all segments of income record a behavior compatible with the Kuznets hypothesis, this is especially clear for the richer 5 percent 2) The poorer segment of the population systematically shows a lower participation in income in developed countries vis à vis very poor countries
Chenery and Syrquin	1975	52		Kuznets hypothesis holds in the long run	Fundamental variables in ID changes are: 1) school enrollment participation 2) participation in primary exports. 3) primary production

Continuación Table 4

Author(s)	Year	Number	Inequality		
Ahluwalia	1974	62	Lorenz curve	ID also affected by: 1) literacy rate 2) rate of growth of population 3) relative weight of agriculture 4) importance of population in agriculture sector	Kuznets hypothesis holds in the long run
Fields	1980	56	Gini coefficient	The regression analysis shows that only a fifth of the total variance of the Gini coefficient in the sample can be explained by the variation in per capita level of income	Kuznets hypothesis holds in the long run
Saith	1983	62	Lorenz curve	As regards the results of Ahluwalia: 1) they are very sensitive to small changes in the sample 2) the sample used by Ahluwalia includes far too wide a range of countries	It is not clear that Kuznets thesis is valid
Campero and Salvatore	1988	95	Lorenz curve	The only segment that does not fit and holds in the long term is that which corresponds to the 20 percent	Kuznets hypothesis holds in the long run
Anand and Kanbur, (a) and (b)	1993	60	Lorenz curve	If we use different functional forms compatible with Kuznets' function: 1) not all results are favorable to Kuznets' function. 2) the functional forms whose estimation supports Kuznets' function suggest different levels of per capita income at the minimum point of the function. 3) it is not possible to discriminate which is the valid functional form 4) a minimally consistent sample made up of data on ID yields results contrary to Kuznets' function	It is not clear that Kuznets thesis is valid

If we were able to define the current status of the empirical discussion on the subject, it would be implicit in the results obtained by Anand and Kanbur (Anand and Kanbur, 1993a and Anand and Kanbur, 1993b). Anand and Kanbur (1993b) examine the robustness of Ahluwalia's estimates for different possible functional forms of the inverted U in Kuznets, with all of them functionally compatible with the function mentioned. Using the same sample of 60 countries as Ahluwalia, Anand and Kanbur (1993b) distinguish two groups of estimations. A first group is made up by all 60 countries. The second group only includes 40 developing countries.

Even though Anand and Kanbur (1993b) use different criteria in order to discriminate functional forms, the results are far from conclusive. Using a "minimally consistent" sample of data on ID, Anand and Kanbur (1993b) repeat the exercise previously carried out with Ahluwalia's original data. Despite the greater reliability of this second sample, the estimates obtained are incompatible with Kuznets hypothesis, to the extent that they even suggest that the statistically dominant form would be exactly the opposite one.

3.1.2. Growth explained as a function of ID

The evidence available on the effects of ID on growth are connected to the estimation of the theoretical models developed by Persson and Tabellini (1991) and Alesina and Rodrick (1993). The first of these works, using a sample of 56 countries with ID data drawn on the basis of Paukert's work mentioned in this section, are able to demonstrate that a greater degree of equity generates greater growth. When the sample is divided into democratic and non-democratic countries, it is clearly observed that the positive relation mentioned has the correct sign and is statistically significant only for democratic countries. The estimations made use as explanatory variables: (i) income, share of the third decile as a proxy of equity, (ii) per capita level of income, and (iii) proportion of the corresponding age group that attends school. The coefficients estimated to measure the impact of the latter two variables do no seem to be sensitive to the political regime. It is to be added, however, that the regressions obtained only allow explaining from 20 to 49 percent of the total variation of growth.

Alesina and Rodrick's estimate obtains a similar result with a somewhat larger sample. It uses the income participation of the five quintiles as a proxy of growth, adding an estimation which replaces this variable by the proportion of income going to the richer 20 percent of the population. Their results are completely consistent with Persson and Tabellini's findings. However, the proportion of the total variation of growth explained by the variables used is even lower than in the previous case, not exceeding 30 percent.

TABLE 5

EFFECT OF ID ON GROWTH

Author(s)	Year	Number of Countries in the Sample	Inequality Indicator	Central Conclusion	Other Conclusions
Persson T. Tabellini G.	1994	56	Third quintile Lorenz Curve	Only in democratic regimes there is a positive relationship between ID and growth	Both per capita income and level of educational attainment here an effect on *growth* which is independent from the political regime
Alesina A. Rodrik D.	1993	67	Several quintiles Lorenz Curve	There is a positive relationship between equity and growth	The relationship shown is only statistically significant in democratic countries

3.2 Time-series studies

The evident lack of suitable statistical information regarding the temporal evolution of ID is a basic obstacle in terms of drawing robust conclusions by means of this type of studies. Despite the above, there are many studies which have ventured conclusions for specific countries. Probably Kuznets' (1963) work is a first glance at the data on the basis of a group of 9 developed countries. After observing the evolution of the data on income participation of the richer 5 percent segment and the richer 20 percent segment, respectively, Kuznets concludes that such participation has been falling since the end of the last century until the end of the fifties. The data also suggest that the evolution in the direction of a greater equality could have started between the First and the Second World Wars. Table 6 summarizes the information on the participation in the pre-tax income of the richer 20 percent in 5 of the 9 countries considered by Kuznets (1963).

TABLE 6

EVOLUTION OF THE PARTICIPATION (%) IN INCOME FOR RICHER 20 PERCENT. PRE-TAX DATA

West Germany		England		Denmark		Switzerland		United States	
1913	50	1880	58	1908	55	1935	56	1929	54
1928	49	1913	59	1925	53	1945	51	1935-36	52
1936	53	1929	51	1939	51	1948	46	1941	49
1950	48	1938	52	1949	45	1954	34	1944-47	46
1955	43	1947	46	1955	44			1950-54	45
1959	43	1957	41.5					1955-59	45
1981	39*	1979	39.5*	1981	38.6*	1981	36.9*	1985	41.9*

*Most recent data recorded by World Bank.

The table mentioned shows the unequivocal trend to a greater equality in the developed countries in the sample. Only in some cases it is possible to perceive some deterioration in the years following the First World War, a phenomenon recorded both in Germany and in England. Kuznets implicitly recognizes that the evidence found corresponds to the second phase of growth, in which ID improves. The author attributes such a phenomenon to the remarkable expansion in the non-agricultural sector as the per capita income increases, a fact which would reduce intersectoral inequality.

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A similar evidence stems from the remarkable work of compilation carried out by Soltow (1968) for England. On the basis of the information from 8 different studies he reconstructs the Gini coefficient from 1688 to 1963. This coefficient shows a significant decrease in the period considered, with the only exception of the years immediately before First World War, for which the evidence is not very clear. If we take the information recorded for England by Anand and Kanbur (1993) it can be seen that the Gini coefficient has dropped from 0.551 in 1688 to 0.339 in 1975.

In the case of the developing countries a study widely cited is that conducted by Weisskoff (1970) for Puerto Rico, Argentina and Mexico. Table 7 shows an unequivocal worsening of ID for the data considered if we measure inequality by using the Gini coefficient.

TABLE 7

INEQUALITY BY THE GINI COEFFICIENT

Puerto Rico		Argentina		Mexico	
1953	0.415	1953	0.412	1950	0.526
1963	0.449	1959	0.463	1957	0.551
1975	0.453	1961	0.434	1963	0.543
		1975	0.437	1975	0.583
		1988	0.461		

Source: Weisskoff (1970) and Anand and Kanbur (1993).

The cases of Barbados, Hong Kong, Jamaica, Korea, Singapore, Taiwan and Trinidad Tobago were also analyzed in a temporal context by Fields (1984). The scarce information available on distributive matters allows Fields to compare the performance of the Gini coefficient for a limited number of periods in the countries mentioned. On complementing that evidence with data regarding salaries, employment and poverty, Fields concludes that while the structure of employment, average level of salaries and absolute level of poverty have been evolving in the desired direction in the four countries of South East Asia included in the sample, the Caribbean economies record a less promising evolution. The case of Taiwan would be particularly clear, because the Gini coefficient for that country shows an important drop in the period 1950-1978. Although the evidence is not very clear for Korea and Singapore, the Gini coefficient for Taiwan seems to record an important drop in the period 1950-1978.

The very scarce information derived from the studies in the cases mentioned, does not permit a robust conclusion regarding the temporal structure of distributive changes. This is in essence the conclusion explicitly mentioned by Fields (1988). The differences across countries would be accounted for by the *type* of growth strategy pursued and by the growth rate in itself. An element making this result weak is, however, the very scarce information available[11]. On the basis of the results provided by Anand and Kanbur mentioned in the previous point of this same section, Fields (1988) holds that only 50 percent of the variation in ID would be accounted for by the per capita income, where the difference is the outcome of specific policies in each country. In turn, if we analyze the sources of variation on the basis of the intra-sectoral differences as opposed to the inter-sectoral ones, the bulk of the inequality would be explained by the inequality inside each sector, that is, the intra-sectoral inequality. Fields (1988) surmises that differences in income from labor are the chief explanatory variable of such a phenomenon.

4. CONCLUSIONS

1) There exist four important episodes in the theoretical development of the relationship between ID and growth. The first corresponds to the contribution made by Ricardo in the context of personal distribution of income. The second corresponds to the post-Keynesian revision of the growth theory developed in the school of Cambridge by economists such as Kaldor and Pasinetti. The third begins with the contribution of the Development Economists as from the fifties. Its chief precursor was Kuznets, who predicted —unlike Ricardo and like Kaldor and Pasinetti— a causality relationship from the level of income to ID. Finally, the convergence of the new growth theory with the development of the new political economy in the second half of the eighties, has been the groundwork for a new revision of the hypothesis originally forwarded by Kuznets.

2) The empirical evidence available may be divided into two groups. The studies which resort to cross-section data are included in the first group; these cross-section studies have experienced a remarkable increase in the seventies with the development of better data bases. The case studies on countries which use temporal series in order to find some evidence regarding the relationship between level of income and ID are to be found in the second group. The latter studies are less conclusive owing to the lack of sufficiently long temporal series.

3) Even though the bulk of the studies with cross-section data seem to confirm Kuznets' hypothesis, the most recent evidence developed by Anand and

[11] The explicit acknowledgement to the fact that nothing final can be said regarding the comparison of ID across countries is, however, not new. Oshima (1962) adopted this thesis in one of the first contributions to this protracted debate.

Kanbur shed a reasonable double on the existence of the relationship assumed by Kuznets. A minimally consistent sample of data suggest an exactly opposite relationship. That is, an improvement in ID in the first stage of growth and a worsening towards the final stage. In turn, authors like Fields have been the precursors of a third position to the alleged unavoidability of the process stated by Kuznets. That is, what happens to ID during the process of growth depends fundamentally of the type of growth and of the growth of per capita income itself.

4) The studies of temporal series confirm a systematic improvement in the ID for the developed countries during long periods of time, and a scarcely conclusive evidence in the developing countries. In the case of the three Latin American countries analyzed, the data seems to indicate a slight deterioration in the Gini coefficient over the last thirty years. The latter evidence is however not very robust, not only due to the lack of a protracted series, but also due to the fact that it does not come from homogeneous sources. To the latter are added the difficulties of measurement inherent to the inequality indicators used.

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