Income Distribution, Politics, and Growth

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After being the subject of a heated debate in the 1960's and early 1970's, the study of the role of income distribution in the growth process went through a period of neglect in the academic literature. In recent years, however, there has been a resurgence of interest in the subject, following the general revival of growth theory sparked by the work of Paul Romer and Robert Barro. Schematically, recent work on income distribution and growth has developed along two paths: one path concentrates on the role of imperfect capital markets (see e.g., Oded Galor and Joseph Zeira, 1988; Abhijtt Banerjee and Andrew Newman, 1991), while the other analyzes the effects on growth of the political outcome generated by a given income distribution. This note is about the second approach. In particular, because of space limitations, I will concentrate on those models in which the equilibrium is explicitly based on a voting process, specifically, those due to Alberto Alesina and Dani Rodrik (1991; henceforth, A-R), Torsten Persson and Guido Tabellini (1991; henceforth, P-T), Gilles Saint-Paul and Thierry Verdier (1991; henceforth, SP-V), and Perotti (1991; henceforth, P).

I. Economic Structure and Political Mechanism

The common feature to all these models is the assumption of a nondegenerate initial pattern of income or wealth distribution and the presence of a government sector that finances public investment in production services (A-R), public investment in education (SP-V) or redistribution (P-T; P) through proportional taxation. Since there is no representative agent, it is possible to endogenize the level of government expenditure in a nontrivial way by assuming a voting process on the level of the tax rate and a balanced budget. It is then useful to distinguish a *political mechanism* and an *economic structure*. The former makes explicit the process through which agents' preferences over the government-expenditure variable are aggregated; the latter formalizes the link between the level of government expenditure and the rate of growth. The two components together constitute a complete description of these models.

The four models differ mainly in their economic structure and to a smaller degree in their political mechanism. In A-R, growth occurs through public and private investment in physical capital, while in P-T the channel is the accumulation of "knowledge useful for technical progress." In both cases, government expenditure affects growth through its effects on the return to investment as perceived by a private agent. In A-R, agents are infinitely lived, and government revenues from taxation of capital are spent on productive services as in Barro (1990); in P-T taxes are used for redistributive purposes, and the structure of the economy is a standard overlapping-generations model (OGM) in which agents live for two periods. In the first case, as the tax rate increases, productive government expenditure increases too and therefore the pretax marginal product of capital rises; however, a lower fraction of it can be approximated by a private agent. These two opposite effects explain the inverted-U relation between taxes and growth, as in Barro (1990). Since taxes are used only for redistribution in P-T,

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here a higher tax rate unambiguously depresses the after-tax return to private investment and therefore growth. In SP-V, individuals live for one period, and generations do not overlap. Taxes are used for public education, which is the source of growth. With nondistortionary taxation, there is therefore a positive association between the level of public expenditure on education and growth. The economic structure of my model is based on an OGM in which each agent can belong to one of three classes based on pretax income. Growth is the result of private investment in education. Since there are no capital markets, only those agents whose after-tax income is at least equal to the cost of education will invest in human capital and will have a higher pretax income next period. Consequently, the level of the tax rate and, therefore, the level of redistribution determine which classes of agents can invest in human capital. In turn, this determines the rate of growth of the economy and how income distribution evolves over time.

To obtain empirically testable predictions from these models, one only needs to specify the political mechanism. In all cases, this is essentially some version of the standard median-voter result. In A-R, individuals are infinitely lived, and the ratio of the relative labor-capital endowments between any two individuals remains constant over time because of homothetic preferences. This means that the tax rate preferred by each individual is constant over time, and therefore it is as if all individuals voted once and for all on the level of the tax rate. In P-T, there is no intergenerational altruism, and in each period only the young vote over the tax rate of the *following* period. It is then easy to see that in both cases the problem of aggregating preferences essentially boils down to a static one with single-peaked preferences. The same is true in SP-V, since here individuals care only for the income of their immediate offspring. Proving the existence of a stable equilibrium in the collective choice process of my model is slightly more complicated because of two factors. First, indirect preferences over the tax rate turn out not to be always single-peaked. Second, the problem is intrinsically dynamic and cannot be reduced to a static one. The reason is that agents are altruistically linked across generations and at the same time are perfectly rational. Therefore, individuals take into account the effects of their proposals, if accepted, on investment in education by all groups because this affects the evolution of the pretax income distribution. Since voting takes place every period, the evolution of income distribution in turn affects the future path of the tax rate, and therefore the after-tax income of all descendants of each individual, which is reflected in the individual's utility through the assumption of intergenerational altruism. Thus, the problem is essentially one of repeated voting with full rationality and a state variable that evolves endogenously over time. However, it is still possible to show that the median voter is the decisive voter. In all these cases, the main outcome of the political mechanism is consistent with the static case studied by Thomas Romer (1975) and by a number of other authors (with some qualifications for my model, to be spelled out below): the lower the pretax income of the median voter relative to the average, the higher her preferred tax rate and therefore the share of government expenditure in GDP. This is a consequence of the fact that taxes are proportional, but revenues are either spent on a public good or are redistributed in constant amounts across all agents.

II. Income Distribution and Growth

When the economic structure and the political mechanism are combined, one obtains a reduced-form relation between the rate of growth and the pattern of income distribution of an economy. Both A-R and P-T predict that higher inequality (i.e., a lower share of the third quintile) is associated with a lower rate of growth. In the case of A-R, this is so because the empirically relevant part of the relation between the tax rate and growth is downward-sloping. In fact, when the distribution of capital/labor endowments is skewed to the right (as is the case in all distributions of the real world) it

is intuitive that the median voter will choose a tax rate *on capital* to the right of the growth-maximizing one: the lower a voter's capital income relative to her labor income, the less she will pay of the productive services financed by a proportional tax on capital, while at the same time benefiting like the other agents from the public-good nature of these services. In P-T, the inverse relation between inequality and growth is even more immediate, since a poorer median voter prefers high redistribution and redistribution depresses growth monotonically. By contrast, in SP-V the relation between growth and the share of the third quintile is monotonically *negative* (at least with nondistortionary taxation), since higher expenditure on public education is good for growth.

An important implication of my model is that there is an asymmetry between poor and rich countries, and that the pattern of income distribution that is associated with high rates of growth varies greatly with the level of per capita income of an economy. To understand this, note that the political equilibrium can be interpreted as the solution of an intertemporal trade-off faced by the median voter. Consider first the case of a poor economy. Since the relative cost of higher education decreases with per capita income, in a very poor economy only the upper income class can potentially invest in human capital. This is because even when redistribution is at a maximum the low-income groups will not have enough after-tax income. If the high-income class invests, there will be more resources available in the future for redistribution to all agents in the economy. However, to bring about investment by the high-income class, the median voter might have to implement a lower redistribution than she would otherwise find optimal. Thus, the median voter trades off a present loss to a future gain. If the latter outweighs the former, high growth will result. This will occur if the middle class is not too distant from the high-income class, or if the high-income class is so rich to start with that no level of redistribution can prevent it from investing. Therefore, in a poor economy there will be growth under two preconditions: first, the high-income group must be rich enough to start with. Second, the middle class (where the median voter is) should not be too distant from the high-income group, in order not to have an incentive to tax heavily the rich now and prevent them from investing in education. The configuration of income distribution that is most favorable to growth in a rich economy is essentially the opposite. Here, high growth will result if the low-income class invests in education. Therefore, high growth will occur under two conditions: first, the low-income class should not be so poor to start with that no level of redistribution will enable it to invest in education. Second, the middle class should not be too much richer than the low-income class: otherwise, it will be too costly (relative to the future gain) to the median voter to enact the level of redistribution that enables the low-income group to invest in education. In fact, in a rich economy, the median voter trades off *more* redistribution than desired now against a higher per capita income in the future.

It is now clear that growth occurs in the model through a "trickle-down" process by which investment by one group today increases resources available for redistribution in the future and therefore enables other groups to invest in turn. This process will proceed, and growth will continue, only if the political process delivers the right amount of redistribution *at every level of income* along the growth path. One can see that the initial conditions on income distribution are crucial in determining whether this is indeed the case. This strong path-dependence also accounts for an important feature of the overlapping-generations version of the model: its ability to generate *endogenously* an inverted-U curve relation between levels of inequality and per capita income, the famous Kuznets curve. It was seen above that in a poor society the upper class will invest in education only if income distribution is very inegalitarian. Such an economy will reach an intermediate level of income with an even more inegalitarian income distribution; but then it will get stuck there, because at that level of income what is needed for growth is essentially an egali-

tarian income distribution. By contrast, poor economies with a very egalitarian income distribution will not grow at all, because the only potential investor, the upper income class, does not have enough resources. Only in countries with an intermediate level of inequality will the trickle-down process go all the way, until all classes have invested in education and the economy has reached the highest level of income. At this point, these countries will have a lower level of inequality than those that got stuck at an intermediate level of income. If one assumes countries to be in steady state, this will generate an inverted-U curve in cross sections, while in time series only the richest countries will generate this shape. This seems to be consistent with the available empirical evidence. Note also that, if one assumes that the investment externality is through the production function rather than through redistribution, the presence of voting in the model is not necessary to generate an inverted-U curve. Thus, the result is indeed not limited to democracies.

III. Empirical Results

All the models analyzed so far deliver precise empirical implications on the reduced-form relation between income distribution and growth. In the versions of A-R, P-T, and SP-V, one can estimate the reduced form by running a standard growth regression à la Barro and adding the share of the third quintile to the right-hand side. According to A-R and P-T, the coefficient should be positive, while it should be negative under the null hypothesis of SP-V (again assuming nondistortionary taxation). When these models are estimated using a sample of about 40 democracies at all levels of per capita income, results seem to support the first type of model: in general, the coefficient of the share of the third quintile comes out positive and strongly significant. The reduced form of my model differs from the previous two in two important respects: first, what matters for growth is not only the share of the third quintile, but also its distance from the other income groups whose investment in education depends on the tax rate chosen by the median voter. Second, the relation between the share of the third quintile and growth is different at different levels of per capita income. Roughly speaking, *given the share of the top quintile*, a higher share of the third quintile enhances growth in a poor economy, but it is harmful for growth in a rich economy. The estimable reduced form then becomes:

$$\Delta GDP = \gamma_0 + \gamma_1 GDP + \gamma_2 \mathbf{X} + \gamma_3 MID + \gamma_4 GDPMID + \gamma_5 TOP + \gamma_6 GDPTOP + \varepsilon$$

where ΔGDP is the rate of growth of per capita GDP during the sample period, MID and TOP are the shares of the third quintile and top quintile, respectively, at the beginning of the sample period, MIDGDP and TOPGDP are interaction terms between the income distribution variables and GDP, and $\mathbf{X}$ is a vector of controls familiar from the work of Barro. Under the null hypothesis, $\gamma_3 > 0$, $\gamma_4 < 0$, $\gamma_5 > 0$, and $\gamma_6 < 0$. Results are highly consistent with the null hypothesis for the 1970–1985 period: all coefficients of the income-distribution variables have the right signs and are strongly significant. Note that it is reasonable to estimate the model for 1970–1985 rather than for 1960–1985 (the usual sample period in the recent growth literature) because most income distribution data refer to the late 1960's or early 1970's. Estimation over the longer period would therefore introduce an endogeneity problem, which is difficult to solve with an instrumental-variables procedure because of the lack of reliable instruments for income-distribution variables. It is also worth noting that adding a Latin American dummy variable to the set of regressors greatly reduces the absolute value of the coefficients of the third quintile, causing it to become insignificant except in the specification of my model (see Perotti [1991] for details). This result is easily understandable, since Latin American countries were characterized by high inequality and low growth during the sample period.

Although space limitations preclude a more detailed presentation of the empirical results, it seems fair to conclude that these models are indeed capturing some channel by which income distribution affects growth. However, it is important to sound a note of caution, which is at the same time a stimulus for further research in this area. While the estimates just reported refer to the reduced form of the model and some version of the economic structure has been tested in the work of Barro, no cross-section test of the political mechanism was available so far. Empirically, all these models predict that one should observe an inverse relationship between the share of the third quintile and the share of public investment in GDP (A-R), or the share of government transfers in GDP (P-T;P), or the share of public expenditure in education in GDP (SP-V). Previous attempts to test the inverse relationship between the relative income of the decisive voter and some public-expenditure variable used micro data or time-series data. Micro tests (often using data on school-district referenda) are probably not very informative for the macro questions (see Romer and Howard Rosenthal [1979] for a survey of micro tests of the median-voter hypothesis. That paper also discusses the econometric and logical problems of testing the hypothesis. Some of these problems are common to the cross-section tests mentioned in this paper). Time-series tests (Allan H. Meltzer and Scott H. Richard, 1983) are clearly affected by the fact that year-to-year variation in income distribution is minimal, while a time trend understandably accounts for most of the fit. However, using the Heston-Summers data set (Robert Summers and Alan Heston, 1988), it is now possible to test the relationship between government expenditure and income distribution in cross sections at the macro level. It should be obvious that these estimates cannot be interpreted as tests of the median-voter result. The goal is necessarily much more limited: to find empirical support for the presence of the reasonable relationship between income distribution and government expenditure that has been incorporated in a very stylized way in the models analyzed above.

A test of the relationship would therefore be

$$\text{GOVEXP} = \theta_0 + \theta_1\text{GDP} + \theta_1\text{X} + \theta_3\text{MID} + \theta_4\text{ID} + \varepsilon$$

where GOVEXP is the relevant government-expenditure variable (government transfers, social security and welfare payments, public investment, and public expenditure on education), ID is a set of other income-distribution variables that are less relevant for the purposes of this brief survey and X represents again a set of controls. Natural candidates are the level of urbanization, the percentage of workforce employed in agriculture, the literacy rate, and the proportion of the population over age 65. For example, the age structure of the population is important to the extent that government transfers include a large social security component. Under the null hypothesis, θ_3 should be negative. However, when the model is estimated over the 1970–1985 period, θ_3 turns out to be always insignificant and to be negative only for public investment. The coefficients of the other income-distribution variables in general have the wrong sign, too. In contrast, the share of agriculture in GDP and especially the proportion of the population over age 65 strongly influence the level of government transfers, the former negatively and the latter positively.

The empirical verdict on these models is then still open: the reduced form seems to be capturing something while the main element of novelty of these models, the underlying political process, seems to be less well supported by the data. However, research in this area is clearly in its infancy: in view of the well-known problems with income-distribution data, and because of the potential importance of the subject for the growing area of political economy, the subjects briefly surveyed here deserve a deeper look.

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