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Reflections on Distributional Considerations and the Public Finances

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REFLECTIONS ON DISTRIBUTIONAL CONSIDERATIONS AND THE PUBLIC FINANCES

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Introduction and Summary

The plan of this paper is first, to examine some evidence on the distribution of the tax burden among income groups in a few countries. Second, we will extend this analysis to cover the "allocable" parts of government expenditures. The broad conclusion to emerge from these two exercises is that on the whole, tax and expenditure policy can plausibly have only a modest influence on a country's distribution of income, with expenditure policy being the more potent of the two.

The third section of the paper presents some reflections concerning how we (not just economists but also the public at large) should view the role of government on matters connected with "distribution". The argument is presented that, if only because of the practical difficulties of achieving what one seeks, it is unreasonable for governments to think they can effectuate serious changes in a country's overall income distribution. The goals of attacking, alleviating, and in the end even eliminating poverty are much more within the reach of governments, and are correspondingly more meaningful as objectives of policy.

The distribution of the burden of taxes and of the benefits of government outlays is considerably more amenable to the influence of government policy than is the distribution of income per se. But even here, as was shown in Section 1, the limitations are quite severe. Nonetheless, our advice for economists and citizens alike is: in general, changes in the income distribution of a country arise very largely from causes other than the efforts of the government. It is much more productive to think of influencing the distribution of the burden of taxes and the allocable benefits of government expenditures.

In Section 4 of the paper we consider the potential of influencing the distribution of income through the education process. There is no doubt that this is the most potent distributional instrument available to governments, but one has to realize that there is an extremely long gestation period between actions in the education area and their ultimate effect on the income distribution. Given this long gestation period, it is reasonable that public discussion concerning education policy should focus more on extending the coverage and improving the quality of education. These aspects are immediately perceived and (it is hoped) appreciated by the current generation. The benefits relating to income distribution will then come to a later generation as a dividend, perhaps too commingled with other forces to be directly perceived as due to educational policy, but nonetheless present.

Section 5 of the paper deals with specific tax issues as they bear on the distribution of the tax burden. Treated here are:

a) the use of multiple rates within the framework of the value added tax,

b) the potential for development of a progressive structure of sumptuary taxes,

c) the negative income tax as a possible anti-poverty instrument, and

d) the incidence of the corporation income tax in a small, open developing economy.

Greatest emphasis is placed on d), because so few economists have come to understand the strongly regressive nature of the corporation tax in such economies. The suggested solution is to maintain the structure of the corporation income tax, but to mitigate its effects through its integration with the personal income tax.

The final section sums up the main messages of this paper. First, the distribution of income in a country is the product of profound economic forces. It is very difficult to bring about major changes in it by sensible policy measures, either on the tax or on the expenditure side. But there is plenty of room for policies to improve the status of the poor, to raise their incomes and improve their mobility to higher socioeconomic strata. And there is also plenty of room for policies aimed at bringing about a fair distribution of the tax burden among income groups. These are the areas where the real challenges concerning "distributional considerations" are located.

1. On the Distribution of Tax Burdens

Recent professional discussion of the distribution of tax burdens may be said to have taken off from the study by Pechman and Okner (1974). In this study the authors attempted to assign the burden of federal, state and local taxation in the United States across income groups, for the year 1966. Their results surprised nearly all observers. Even though they used a wide range of alternative sets of assumptions concerning how to distribute the burdens of particular taxes, all their answers led to a single conclusion -- the United States tax system is not significantly progressive, and does not exert any major influence on the distribution of income.

Table 1 summarizes Pechman and Okner's results for the most progressive and least progressive sets of assumptions that they used. The changes in income distribution induced by the tax system are indeed surprisingly small, especially when it is realized that the total tax

burden in 1966 amounted to over 25% of total family income. Of this total amount, less than a tenth was reflected in changing income shares (a loss of 2.06 percentage points in the share of the top decile, and of 0.18 percentage points in the 6th decile). These losses of shares were widely distributed, with the lowest decile only gaining an eighth of one percent. And these figures are based on the most progressive set of assumptions examined by Pechman and Okner. On their least progressive assumptions the share of the top and bottom groups hardly change at all. For all practical purposes, one can on either set of assumptions regard the United States tax system as being roughly proportional.

The surprising nature of the results of the Pechman-Okner study led to further work, aimed at seeing whether similar results held for subsequent years. This work was presented in Pechman (1985). Its key results are summarized in Table 2. Note that Table 2 is in a different format from Table 1; here the data are presented in the form of average effective tax rates (total taxes paid ÷adjusted income). Note that later tax rates are higher for the lowest deciles and lower for the highest deciles. Note, too, how close to proportional are the tax rates in nearly every case. This is true in spite of the fact that the maximum marginal rate on the personal income tax was reduced from 70% to 50% (on “earned” income in 1969 and later on “unearned” income as well).

To reinforce the conclusions stated above, we also present in Table 3 comparative data on before-tax and after-tax income distributions for various years from 1966 through 1985. It is very clear from these tables that there was very little change in any aspect, as one moved between the before-tax and the after-tax distribution for any year, under either variant of incidence assumptions.

In Table 4 we turn to the case of Chile, where the overall tax system is also close to proportional -- in this case, moderately regressive (the Gini coefficient is 0.4961 after tax, as compared with 0.4883 before tax). This table is based on a recent study by Engel, Galetovic and Raddatz (1999) in which they undertook a very careful allocation of Chile's tax burden by income group: They found that the average fraction of income paid ranges from 11.8% (top decile) to 16.0% (second decile from the bottom) in Chile. This of course does not prevent the top decile from paying 37% or the top quintile from paying more than half of the total tax (see column 4) that the government collects.

The Chilean case is very significant for it is well known among tax experts that Chile's tax administration is something of a model for developing countries. Its efficiency is quite high and its level of corruption extremely low, compared with the levels prevailing in most developing (and even in some advanced) countries.

The authors of the Chilean study undertake a series of exercises in which they make counterfactual assumptions. These are reported in Table 5. Cases 3 and 4 do not entail modifying the real-world Chilean system except to the extent of: a) eliminating various tax-free allowances that are currently given and b) eliminating these allowances plus the estimated degree of underreporting connected with each decile's observed tax payment.[1]

In case #5, a simulation is made, increasing Chile's value-added tax from 18% to 25%, without offsetting reduction in any other tax. Case #6 takes the tariff rate from 11% (its level in

[1]The underreporting was estimated by comparing, percentile by percentile, the incomes reported in Chile's CASEN survey with the incomes declared by the corresponding percentiles of the total population, as they appear on the tax rolls. Income tax liabilities of each decile were adjusted upward by the ratio underreported/declared. No similar adjustment was made for the value-added tax and specific indirect taxes, because the original estimates of these tax liabilities in effect assumed full compliance (they were obtained by applying the statutory tax rates to household expenditure patterns as revealed by the CASEN survey).

1996) all the way to zero (readers should note that it had been reduced to 6% by 2003). Case #7 doubles the excise tax on gasoline but leaves other rates unchanged. Finally, cases #8 and #9 simulate the replacement of Chile's personal income tax by a so-called flat tax. This flat tax is somewhat progressive because it incorporates a high exemption level (over U.S. $2000 per month), an assumption imposed by the authors so as to maintain a degree of comparability in total revenues. In case #8, the replacement of the income tax by a flat tax takes place in the context of the actual 1996 situation, with the prevailing levels of allowances and of nonreporting. In case #9 this same replacement is simulated in the context of case #4, which is based on the elimination both of allowances and of underreporting.

Each of the cases presented in Table 5 is represented by two statistics -- the Gini coefficient and a "multiple", the latter representing the ratio of income in the top decile to income in the bottom decile of the population. It is easy to see that neither of these statistics exhibits any important change as one moves from case to case. This simply shows that the insensitivity of the income distribution to the tax system itself, and to plausible modifications in it, is not a phenomenon peculiar to the United States or to advanced countries. This same insensitivity is also observed in Chile, a middle-income country with a rather modern tax system and good administration. I believe it is correct to infer that, a fortiori, the income distribution will be even less sensitive to tax systems and tax changes in developing countries with less modern tax structures and with poorer administration.

2. The Distribution of Government Expenditures

Given the difficulty of achieving important modifications in the income distribution via the tax system, it is quite natural to ask whether that distribution is similarly insensitive to

plausible changes in expenditures. To examine this question, we shall here report on two studies -- one by Pechman (1985) and the other by Engel et al. (1999).

Pechman examines the impact of government transfer payments on the distribution of income. His study incorporates mainly those transfers that come in the form of cash or its near equivalent (social security and unemployment benefits, welfare payments, workers compensation, food stamps, medicare and medicaid). They do not include benefits, like those of public education, that are given in kind, and/or in a form in which benefits are not recorded as going to specific individuals or households.

Table 6 records transfer payments by income decile for the United States in 1980. Column 1 shows how very progressive these payments are. They represent almost exactly 100% of the market income of the first decile, while they amount only to 2.6% of the income of the top decile. However, when one looks at the absolute amounts received by each decile (column 2 expresses these as a fraction of the total income of all U.S. households), one finds they are fairly evenly distributed across the deciles, with the bottom decile only getting about 45% more than the top decile. This characteristic of transfer payments comes up again and again as different cases are examined. In the U.S., social security payments are by far the most important transfer payments. Although these rise as a function of a worker's total contributions to the system, their distribution across the deciles is strongly affected by the fact that there is an upper limit to benefits (as there is also to social security taxes). These upper limits lead to social security benefits being distributed in a fashion that is much closer to "equal benefits per capita" than it is to "benefits proportional to income." This phenomenon helps explain why the distribution of benefits from total transfers is so close to the "equal benefits per capita" line (see column 2 once again).

Pechman (1985) also presents estimates of how transfers affect the income distribution. Unfortunately these data are not precisely comparable to those presented in other parts of his study. The reason is that for his study of tax burdens, family income is counted inclusive of transfers, while in his analysis of transfers themselves, the baseline estimates are for family income exclusive of both transfers and taxes. The Gini coefficients in this basis are 0.483 for Pechman's most progressive variant and 0.477 for his least progressive variant. After transfers but before taxes, these figures are reduced to 0.445 and 0.440. After both transfers and taxes they become 0.435 and 0.444. The important conclusions to draw from these results are: a) that transfers have, in the U.S., a bigger influence than taxes upon the distribution of income, and b) that even so, the distribution of income is quite insensitive to both.

The study by Engel, Galetovic and Raddatz focuses mainly in the tax side, but devotes some attention to the effects of government expenditures on the distribution of income. In their empirical work dealing with expenditures, these authors rely on results from a CEPAL study by Schkolnik (1993), according to which the poorest quintile received 37.5% of all transfers, with subsequent quintiles receiving 28.0%, 19.5%, 11.8%, and 3.2%, respectively. This pattern is very progressive, but it is important to realize that transfers, in cash and in kind, only account for a part of total expenditures. Engel, et al. present (Table 12, p. 181) an allocation of taxes and transfers, in which these two operations together reduce the Gini coefficient from; 0.4883 to 0.4300. However, their footnote 49 implies that this treatment entails an allocation of general government expenditures as well as transfers. I much prefer to leave unallocated such expenditures as general administration, defense, the police and justice systems, etc. In my view, one should allocate expenditures that have clearly identifiable beneficiaries, and not the rest.

In order to clarify for myself the concepts that are entailed in the analysis of government expenditures, I have built Table 7. This is based on the data presented in Engel, et al. but only takes as allocable expenditures an amount equal to 37.4% of total taxes. This is the fraction of government expenditures that Schkolnik (1993) allocated to transfers, both in cash and in kind. Readers should be aware that pensions fall in a separate category from these transfers, and are already counted in the income concept used by Engel, et al. In Table 7, an amount equal to 37.4% of tax revenues is distributed among the quintiles of the income distribution according to the quintile factions (.375, .280, .195, .118, and .032) mentioned above. The result is a change in the Gini coefficient from .4552 to .4158. (Though based on the same data, the Gini coefficient for income before tax is different from that of Engel, et al. The difference stems from our working with quintile data, which necessarily yields slightly lower Gini coefficients than are obtained when decile data are used.)

As expected, when we explicitly allocate only transfers in cash and in kind, the incorporation of government expenditures leads to a smaller reduction in the Gini coefficient than that found by Engel, et al. -- from 0.4552 to 0.4158, as compared with their Table 12 reduction from 0.4883 to 0.4300. However, our result appears to be comparable to the case reported in their footnote 49 (p. 181): "If we assume that general government expenses do not benefit anybody, the ... Gini fall(s) [from 0.4883] to 0.4512."

3. The Political Economy of Government Budgets

This section is devoted to some brief reflections concerning the relatively low sensitivity that we have found, for both the United States and Chile, of the income distribution of a country to either its tax or expenditure system.

The first point to be made is that in a market economy the income distribution among households is going to be largely determined by the factor rewards obtained by people in those households, on the basis of the labor and capital factors that they own or command. It will always be true that skilled medical doctors will earn significantly more than skilled nurses, and that these, in turn will earn much more than those who simply provide menial labor. In nearly every occupation there are vast differences of aptitude, training, skill and experience, all of which lead to important differences in market wages. Skilled specialists often earn ten times the salaries of "standard" doctors. This multiple is much bigger for outstanding lawyers and architects, not to mention actors and musicians. And, of course, there are very significant gaps between the average incomes of different professions, largely reflecting the amounts of human capital that they involve. The bottom line here is that, in a market economy, neither the tax system nor the expenditure system is likely to greatly alter the basic pattern of differential earnings that stems from the underlying distribution of human earning power on the one hand and of capital assets on the other.

Attempts to modify the income distribution through taxes were quite common half a century or more ago. The highest marginal tax rate in the U.S. federal system reached 91% during and immediately after World War II, and that in the United Kingdom got as high as 95%. These rates were clearly confiscatory, and stimulated economic agents to put more effort into tax evasion (illegal) and tax avoidance (legal) than they put into earning more income. Over the decades the barrenness of such confiscatory rates became increasingly apparent, and maximum marginal rates drifted down.

Tax theory has always favored lump-sum taxes on efficiency grounds -- these are taxes that are levied on some base that is independent of the actions of economic agents. Such bases

are hard to find, however, and the second best solution to the same problem is to try to concentrate taxation on inframarginal units, so that it doesn't affect marginal decisions. This principle leads to marginal income tax rates that decline as income rises, since every tranche of income is marginal only to that one income group. While the lower tranches are inframarginal to all higher groups, there are fewer and fewer groups that are inframarginal as one moves up the income scale.

The literature on "optimal" income taxation is replete with examples of the above-mentioned type. However, I know of no case in which it has been suggested that such a system be implemented in the real world. The closest one gets in real-world proposals is the so-called "flat" or "linear" income tax, which has a considerable base of supporters in many countries around the world.[2]

The flat or linear tax system has a single marginal rate, but is nonetheless a moderately progressive tax, so long as it operates with incomes exempt from tax up to a certain limit. Thus, if the marginal tax rate were 20% and the exempt level 10,000 pesos, a person with an income of 20,000 pesos would be paying 2000 in tax (average rate = 10%) while one with an income of 100,000 pesos would be paying 18,000 in tax (average rate = 18%). Needless to say a flat tax of this type, even though progressive, is not going to be the engine of any major redistribution of income.

On the expenditure side, there is much greater potential for income redistribution, but there are political limits to how strong such redistribution can be. The problem concerns how

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[2]See Edgar K. Browning and Jacqueline M. Browning Public Finance and the Price System, 4th ed. (New York: Macmillan, 1994), pp. 294-47, and Robert E. Hall and Alvin Rakushica The Flat Tax, 2nd ed. (Stanford: The Hoover Institution, 1995).

one assembles majority support for redistributive programs. The rule seems to be that one can only go a limited distance with programs whose benefits are concentrated, say, on the bottom fifth of the income distribution. When the programs reach a certain magnitude -- e.g., when they encompass public education and medical care -- it seems to be political necessary to extend the benefits to the middle three quintiles, typically (at least formally) to the whole population.[3]

The political-economy principle that underlies this behavior is very simple. The middle income groups are willing to see their tax money spent in part on benefits for the poor, but they want to share in the benefits of major programs like education and medical care. It is also worth noting that public schools in middle-income neighborhoods typically provide higher-quality education than schools in low-income neighborhoods. Not only do middle-income students arrive better prepared to take advantage of what the school system has to offer, also there is a greater degree of parental interest and vigilance over how the schools do their job. Finally, the task of the teachers is usually a lot easier in middle-income neighborhoods, so those jobs are coveted by the best and most experienced teachers. Thus, it is fair to say that more benefits of public education are perceived by the middle quintiles of the population than by the bottom quintile even though the official policy (and the law) may say equal education for all.

University education is a special case, more so in Latin America, perhaps, than in the U.S. and Canada, but the basic elements of the story are nonetheless much the same everywhere. When university education is free, or subsidized quite broadly, the benefits typically go to families in the upper reaches of the income distribution. This is because a much larger fraction

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[3]The top percentiles of the population, at least in Latin America, typically eschew the benefits of public education and medical care, preferring to turn to private sources for these. This same reticence, however, does not seem to apply to the case of public or publicly subsidized university education (see below for more on this subject).

of their children go on to this educational stage. This phenomenon takes an exaggerated form in many Latin American countries, where the typical recipients of free public university education are the children of wealthy families who have got their primary and secondary education in expensive private schools. This has been the case from the beginning of public university education in Latin America. But it should be noted that it is even true in the state university systems of the United States where tuition charges are substantial.

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I think that from all of this the proper conclusion to draw is that we should be realistic. Society is not going to bring about major changes in the income distribution by operating either on the tax side or on the expenditure side of the budget of the public sector. Moreover, it does not really help much for us to be thinking of a given income distribution (or change in it) to be the objective of public policy. It is more realistic to think of the struggle against poverty to be a major goal. Helping meet the basic needs of the poor, providing opportunities for socioeconomic advancement via the educational process, seeing to it that basic medical care is available to those who cannot afford it -- these are reasonable components of any country's social and political agenda.

Once a public agenda is set, the question arises as to how to pay for it. And here the task is to distribute the cost of government in a way that fits a society's own view of what is fair, and also fits that society's own capacity for tax administration and compliance. We know from experience that in actual fact, real-world tax systems do not turn out to be much more than proportional -- but with income distributions like those in Latin America, this means the top decile often pays more than half the tax, which can hardly be considered shirking their part of the burden. In my opinion, the time is ripe for less distributional polemics, and more serious

concern for societies addressing the problem of poverty and the challenge in generating a higher degree of true socioeconomic mobility.

4. Education, Socioeconomic Mobility and the Distribution of Income

The starting point for thinking about social progress is the traditional class-based social structure that characterized most societies until very recently. The United States may have been the first country to manage a significant (even though far from complete) break with this structure. When asked what makes me most proud to be a U.S. citizen, I have no hesitancy in responding that it is the degree to which socioeconomic mobility has turned this country's social system into a pretty effective meritocracy. If we divide our presidents into those coming from the bottom two-thirds and those from the upper one-third of the socioeconomic scale, we come out about half and half. Hoover, Truman, Eisenhower, Nixon, Ford, Reagan and Clinton came from the bottom two thirds. Roosevelt, Kennedy, and the two Bushes came clearly from the upper third. Johnson and Carter might be borderline cases. Not many other countries can claim such a record, but many are moving in this direction. European politics was dominated by aristocrats before World War I, and in many countries until after World War II. By now, socioeconomic mobility has changed the face of Europe and is fast exerting its vital influence in a number of Asian countries.

Latin America has occupied some sort of middle ground on this scale. Without a doubt the Latin American countries have been like the United States in welcoming immigrants, particularly from Europe and the Middle East. These groups have had little trouble planting roots in Latin America, even when they arrived with only pennies in their pockets. Such families have thrived (viz., presidents Alessandri in Chile and Frondizi and Menem in Argentina.)

Unfortunately, the story is not the same for the native populations or the mestizo lower classes that arose in the colonial period and persist to the present day. Not many have succeeded in moving out of these roots to positions of leadership in society, though I contend that there has been a substantial amount of "escape from poverty" for members of this socioeconomic segment.

There can be little doubt that the wide reach of public schooling was the main factor in imparting a high degree of socioeconomic mobility to the United States economy. Nor is there any doubt that education has played the biggest role in other countries' movements toward greater mobility. Of course, it is reasonable to ask whether, while obviously contributing to socioeconomic mobility, education at the same time brings greater equality. (That it need not do so should be clear, for one plausible outcome of greater educational effort would be to shift the entire income distribution upward, by increasing each decile's income by a given percentage. This would leave most measures of equality unchanged, though naturally everybody would end up better off.)

An ongoing study by Richard Roll and John Talbott (2002) sheds some light on the issue. Let me preface my citation of their work by acknowledging that I have always approached cross-country regressions with great trepidation and skepticism.[4] Nonetheless, I recognize that such regressions can be quite straightforward in some applications, even though very treacherous in others. In the education results I report here, I see no immediate caveats beyond the usual ones concerning the direction of causation, which the authors explicitly recognize (note 3, page 4).

Roll and Talbott's regressions cover 113 countries for the decade of the 1990s. The education variable is, as one would expect, extremely powerful (t-values ranging from 4 to

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[4]See my "A Vision of the Growth Process," American Economic Review, March, 1998: pp. 1-32.

almost 9, when it is used as an explanatory variable in a large multiple regression) for the average level of income. This covers cases in which the income level being explained is the average of the lowest quintile, that of the three bottom quintiles, or that of the top quintile.

The education variable is less powerful, but still important, in explaining variations in measures of inequality. It achieves a t-value of -2.29 in explaining the Gini coefficients of the different countries, one of 1.76 in explaining the fraction of income accruing to the lowest quintile, one of 2.23 in explaining the fraction of income going to the bottom three quintiles, and one of -2.37 in explaining the fraction of income going to the top quintile (Roll and Talbott, Table 4, p. 30). I think that the proper way to understand these results is that the very top people have somewhat comparable levels of education as one moves from country to country. As a country develops and modernizes, the education of its top people may improve, but not as dramatically as those of the lower quintiles. This makes the distribution of the population by educational attainment less and less extreme as the country develops.

What policy lessons can be extracted from this exercise? In my view they are twofold. First, as a country's income grows, whatever may be the sources of growth, its people are likely to demand more and more educational investment, which will not only carry with it a further impulse to the level of income but will also likely contribute to the reduction of economic inequality. This first conclusion regards the education effort as mainly endogenous, responding to economic growth, whatever may be its cause. The second conclusion is that there is plenty of room for volition on the part of a society and its government. They can move fast or slowly; they can consciously seek to improve the opportunities for those at the bottom of the socioeconomic scale, or alternatively treat these population segments with "benign neglect". They can perpetuate highly subsidized university education for the children of the upper income

groups, or they can work toward a system in which these groups pay a good share of their own costs, with ample scholarship aid for those from the lower income brackets.

In short, education policy is an area in which significant choices can be made. On the whole it can be said that education always adds to the country's GDP by improving the earning capacities of the students who receive it. To the extent that these are poor students, and their earning capacity is improved, education policy is a weapon in the battle against poverty. Then, to the extent that education provides gains to the poorest deciles that (in percentage terms) are greater than those it provides to the higher deciles, it also will have an impact on relative measures of inequality like the Gini coefficient and the ratio of the top group's income to that of the bottom group.

In all of this, one important caveat should be borne in mind. Economists can easily understand and appreciate the direct mechanism by which increased education adds to a country's GDP -- by adding to the market earning power of those who are educated. These benefits of education are both private (benefiting the students themselves through their later lives) and social (benefiting the society as a whole by adding to its real income).[5]

The main point to be made about the direct benefits of education is that they add to the equilibrium level of a country's GDP, not to its equilibrium growth rate. If the average education of the labor force moves from 8 years to 10, the growth rate will be affected during the transition period, but not permanently. If there is a lasting effect of education on a country's growth rate, it is to be found in education's indirect effects, not in its direct ones. The main indirect effect is through the possible ways in which the rate of increase of total factor

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[5]Strictly speaking, the private benefits should be measured by the extra after-tax earnings brought about by education, while the social benefits should be reflected in the extra gross-of-tax earnings.

productivity (also called technical advance or real cost reduction) is stimulated by having a better educated population or labor force. So far, no very strong evidence has been found to support this view. (Convergence, or catch-up-growth, by which poorer countries have the possibility of growing faster by adopting or adapting techniques that have already been developed and applied in the advanced countries, works in the opposite direction, assuming the education level of the catch-up countries are well behind those of the advanced ones.)

The bottom line of this caveat is that one should recognize that the profoundly solid effect of education is on a country's level of GDP. An effect on the growth rate is clear only as a country transits from one education level to another, and it is not of huge magnitude (In most work in which the transition effects of improvements in the quality of labor have been measured, they typically add something less than half a percent to the annual growth of a country's GDP.)

In my opinion, it is best for us (and for policymakers) to look at education on its own very substantial merits. It improves and enriches the lives of those it reaches. It adds to the productive power of the country. It provides the clearest path to upward socioeconomic mobility for those starting in the lower income groups. All of this is true even when educational efforts have no important effect on a country's distribution of income. How pleasant, then, is the knowledge that the available evidence suggests that to the degree that education has an impact on national income distribution, that impact has been to reduce the degree of relative income inequality.

5. Specific Tax Issues and Reforms

In Section 1 we saw that there is not much hope for governments to bring about major changes in income distribution by the instruments of changes in the tax system. This does not mean, however, that governments should not be vigilant about how the burden of taxation is

shared among income strata and other groupings of the population. We noted at several points that real-world tax systems do not in practice get very far from being proportional. Yet in order to be proportional, a tax system really has to contain progressive components, simply because some important standard components are almost certainly regressive. One such component is the standard, uniform-rate value-added tax. This turns out to be quite significantly regressive in most, and probably all countries. This regressiveness results from: a) the fact that the rich tend to save a greater fraction of their income than the poor, which renders a VAT based in total consumption outlays regressive; b) the fact that many of the goods and services that the rich buy within the country (e.g., domestic service, educational outlays for private schools, medical care in private clinics, the imputed rent from owner-occupied housing) tend to fall outside the web of the VAT; and c) the fact that the fraction of income consumed outside of the country is a strongly increasing function of the level of family income.

A way to try to offset this regressive tendency of value-added taxation is to employ multiple rates with the VAT system itself. This has long been the practice in France and other European countries, and it is certainly a tempting option for the political authorities of developing countries. On the whole, however, the best advice is for them to be very cautious about taking such a step, because of the great administrative complications that multiple rates introduce.

In nearly every country that has a VAT, it is a tax of the consumption type, administered by the credit method. With a uniform rate covering all commercial activities of a business firm, the base of the tax is that firm's total sales. The tax actually due is the tax rate times sales, minus a credit equal to the value-added taxes paid on the firm's purchased inputs (including investment goods). The credit is typically calculated on the basis of receipts that can be matched to the sales

of the companies that supplied the firm's inputs. In short, the task of administration is quite straightforward and uncomplicated when the VAT rate is uniform.

Complications arise, however, when multiple rates enter the picture. If a bakery's pastries are taxed at a high rate, while its bread faces a much lower rate, the firm will have an incentive to falsify its output mix, exaggerating the fraction consisting of bread and minimizing that accounted for by pastries. Standard end-of-year audits will have a hard time picking up this kind of evasion -- to do so will more likely require a small army of inspectors, doing their detective work on the actual premises of each firm.

The advice of the experts, then, is for countries (particularly developing countries where administrative talent and resources are scarce) to try to maintain a uniform rate and a broad base for the value-added tax. In most countries the VAT is the first or second most important source of revenue for the government, so it is particularly important to keep its administration as simple as possible and its compliance correspondingly high.

This advice may seem harsh, because it obviously means creating a VAT structure that is bound to be regressive. But the story does not end there. For it is quite possible for countries to introduce selective indirect taxes side-by-side with a uniform value-added tax, and to structure these in such a way as to bring a significant element of progression into the tax system.

Automobiles, and motor vehicles in general, are easy targets of the suggested kind of indirect taxation. Vehicles have the "advantage" (from the tax administrator's point of view) of not only being quite visible assets but also usually requiring annual registration. Taxes can thus be placed not only on the original sale of a vehicle within the country, but also on its successive annual registrations. Both types of tax are automatically progressive, simply because vehicle ownership in developing countries is increasingly prevalent, the higher up the income scale one

goes. But they can be made more progressive by using ad valorem rather than specific (fixed amount per vehicle) taxes, and still more progressive by having the ad valorem rate itself increase with the market value of the vehicle.

Other areas in which similarly progressive component can be added to the indirect tax system are hotel rooms (taxes varying by category), alcoholic beverages, air fares (a single ad valorem rate), etc. A word of caution is due, however, concerning the temptation to use external tariffs as an instrument of such a progression-oriented indirect-tax policy. The broad principle is that an indirect tax should be levied equivalently on imported and domestically-produced goods. There is no good reason to protect luxury-goods production more than that of so-called necessities. Indeed, Latin America's unfortunate era of inward-oriented industrialization often had precisely this effect of giving the greatest stimulus to the production of domestic substitutes for the luxury goods that were penalized by tariffs of 100%, 200% and even 400%. A modern policy of progressive excise taxation should not fall into the same trap. The principle of equal taxation of luxury and sumptuary goods should be absolute, regardless of whether their origin is domestic or foreign. The fact that no domestic production exists today is not a good excuse to use an import tariff as the means of implementing a luxury-oriented excise tax. Instead, that tax should from the beginning be labeled an excise, and not a tariff, and should apply equally to the affected commodities, regardless of whether their origin is foreign or domestic. The signal must be clear to new producers who might in the future initiate domestic production of such goods, as well as to any who may already be engaged in such activity.

The negative income tax is often suggested as a device for combating poverty and at the same time making the tax system more progressive. Its appeal is somewhat superficial, however. Here is a case where surely "the devil is in the details." For no country is likely to be willing to

implement even a modest negative income tax, in which the only or principal basis for receiving the subsidy (implied by the term negative tax) is the simple fact of having a low income. Teenagers and university students would declare as independent households and claim the subsidy. Older people with ample wealth but low income would also stand in line. Other families would seek ways of splitting the family income into three or four parts, each eligible for the negative income tax.

The end result is that in order to avoid "abuse" of the negative income tax principle, it is virtually essential for a series of requirements or "filters" to be imposed, limiting the recipient of the negative tax to those who are demonstrably (in some bureaucratic sense) truly in need. In order for the negative income tax to serve as a substitute for welfare and public assistance programs (which implies relatively large subsidies in many cases), the filters would have to be much more severely restrictive -- so much so that the tax collectors would in effect be turned into welfare program administrators.

My own judgment is that a negative income tax is a bad idea for poor and even middle-income countries. They are better served by welfare programs that identify the most needy segments of society and provide for some of their most pressing requirements. Examples are free pre-and post-natal care for poor mothers, free school lunches in public schools in poor neighborhoods, subsidized housing for poor families. Bonuses for school attendance and good school performance by children of poor families represent a promising recent example.

The corporation income tax represents an extremely difficult problem for those who, like Pechman and Engel, et al. attempt to allocate a country's actual tax collections among income groups. The problem here is the phenomenon of a given group bearing more than 100% of the burden of a tax. This phenomenon is more serious and more relevant than most people imagine.

But in order to appreciate its significance one must travel down the road of general equilibrium analysis.

The key insight of general equilibrium analysis is that if one starts from a position of equilibrium in the capital market, one cannot have the equilibrium rate of return go down (to reflect the tax) in one sector (the corporate sector) but stay at its old level in the rest of the economy (the non-corporate sector). This may happen at the moment a new tax is imposed, but it does not represent the new equilibrium. That new equilibrium will entail rates of return (after tax) being equalized in the two sectors (with due allowances for risk) in the presence of the tax, just as they were equalized in its absence.

In a closed-economy analysis the "plausible limits" of corporation tax incidence are given by the cases: a) where the rate of return to capital, net of tax, does not change when the corporation income tax is imposed, and b) where that rate of return falls by the full amount of the tax. In case a) the gross-of-tax rate of return has to rise in the corporate sector to reflect the full tax, and the tax ends up being borne by the demanders of the products of the corporate sector. This leads to a rather standard allocation of the burden of this tax, in accordance with total household consumption, or, in a more refined calculation, in accordance with household consumption of the corporate sector's products.

Case b) is the anomalous one. If the rate of return to capital falls (say, from 10% to 7%) to reflect the full amount of the tax, so that the pre-tax rate of return remains the same (in the corporate sector) as in the absence of the tax, then the rate of return in the non-corporate sector must in a general-equilibrium setting, also fall to 7%. The government is the beneficiary of the 30% corporation income tax that is actually paid by the corporate sector. But the beneficiaries of the fall in the rate of return in the non-corporate sector are the consumers of that sector's product.

Capital loses an amount equal to $\rho\tau(K_X,K_Y)$ where ρ is the rate of return gross of tax (10%), τ is the tax rate (30%), and K_X and K_Y are the amounts of capital in the corporate and non-corporate sectors, respectively. Since government tax collectors are simply $\rho\tau K_X$, it is obvious that capital's burden is equal to $(K_X+K_Y)/K_X$ times what the government gets. This is what we mean by capital bearing more than 100% of the burden of the tax.

The above example, dealing with a closed economy, is useful as an introduction to the general-equilibrium way of thinking, bit it is not germane to the problem of allocating the corporate tax burden in a small, open developing economy. Here one has to realize that the country in one sense or another faces a world capital market. If the country's own market is well-integrated with New York, London, and other financial centers, flows of foreign capital will help determine rates of return with the country. In the extreme, if foreigners were getting a 10% return before the corporation tax was imposed, they may end up with a 10% return in the new equilibrium in the presence of the tax. Now can that happen? -- by them withdrawing capital from the country until the reduced capital stock has a high enough marginal productivity -- 14.44% in this case, so that investments yield a 10% return after the 30% tax has been paid.

So in this case capital bears <u>none</u> of the burden of the tax. Who, then, will bear it? The answer is that the burden will likely fall between consumers on the one hand, and the workers of the country on the other.

I like to think of a 4-sector economy in this regard -- a corporate tradable sector (manufacturing), a corporate non-tradable sector (public utilities and transport), a non-corporate tradable sector (agriculture) and a non-corporate, nontradable sector (services). In this vision, the main action takes place in the corporate tradable sector. Here the rate of return cannot change because of the international capital market, and the prices of the products cannot change

because of the international product markets for tradable goods. So the only "cushion" to absorb the tax is payments to labor. Its wage must fall by enough so that the activity can keep operating, when both the rate of return and the product price are determined internationally. Thus $L_x\Delta w = -\rho\tau K_x$. This is how the change in the wage rate Δw is determined. Labor in manufacturing (L_x) absorbs the full burden of the tax paid by manufacturing.

But, in a general equilibrium setting, wages cannot fall in manufacturing alone. They will fall generally throughout the economy, if we are to have a new equilibrium. Hence labors loss is equal to $\Delta w(L_x+L_y+L_z+L_s)$, where x is manufacturing, y is agriculture, z is public utilities and transport, and s is services. The government's total tax collection (from <u>both</u> manufacturing and public utilities and transport) is $\rho\tau(K_x+K_z)$. So labor's loss ÷ government revenue is equal to:

$$\frac{\text{Labor's Burden}}{\text{Government Revenue}} = \frac{\Delta w(L_x + L_y + L_z + L_s)}{\rho\tau(K_x + K_y)}.$$

Substituting for Δw $(= -\rho\tau K_x/L_x)$, we get

$$\frac{\text{Labor's Burden}}{\text{Government Revenue}} = \frac{(L_x + L_y + L_z + L_s)}{L_x} \bullet \frac{K_x}{(K_x + K_y)}.$$

This is going to be greater than one as long as the fraction of manufacturing capital in total corporate capital $[K_x/(K_x+K_y)]$ is greater than the fraction of manufacturing labor in the total labor force $[L_x/(L_x+L_y+L_z+L_x)]$. It is extremely likely that this will be true. Manufacturing labor is rarely as much as a quarter of the country's total labor force, while manufacturing capital is very likely to be more than a quarter of the country's <u>corporate-sector</u> capital.

So long, then, as the above inequality is satisfied, labor in a small, open developing economy will not just bear the full burden of the corporation income tax, but will bear more than its full burden.[6]

What is the mechanism by which all of these consequences are brought about? Very broadly speaking, it is through the exodus of capital from the country. It is perhaps not intuitively obvious that a tax on the earnings of capital in the corporate sector will have a powerful impact on wages. But it should be obvious that an exodus of capital from a country will cause its equilibrium wage level to be lower.

If the country's capital market is not particularly well-integrated with those of New York or London or other major financial centers, it will perhaps not have major international investors as players in its local capital market. But even in such a case its own capitalists will be players in the markets of New York, London, Paris, Frankfort, Zurich, Tokyo, etc. When the tax is imposed, these local capitalists will be induced to reduce the fraction of their own capital held locally, and to increase that held in the major world centers. The result is an exodus of capital similar to that analyzed in the previous case. And the end result is also similar. With less capital in the country, the equilibrium level of real wages will be lower, and labor will bear a large burden. If the capitalists of such a country are content with an expected return of 10% on their local investments when there is no corporate tax, the most plausible assumption to make is that

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[6]This is not the place to enter into a full analysis of the incidence of the corporation income tax in the open-economy case. A useful introduction can be found in Arnold C. Harberger (1995). It is shown there that, in addition to the effects described above, agricultural landowners will benefit (from the fall in wages induced by the tax), as will the consumers of services (for the same reason), while the consumers of the products of the corporate nontradables sector (public utilities and transport) will suffer from somewhat higher prices for these products (due to these activities, being more capital intensive than manufacturing, having to pay more tax per unit of product than is compatible with prices staying constant as the wage rate goes down).

after such a tax is imposed, they will again be content with a 10% after-tax return in the new equilibrium. So long as this is the case, the full analysis presented above will still hold, without modification, leading again to the presumption that labor will bear significantly more than the full burden of the corporation income tax.

It now remains for us to draw the implications of all of this for the broader subject of this paper. What this analysis says is that the assumptions used by Pechman, Okner, Engel, et al. and many others to assign the burden of the corporation income tax give a progressive bias to their results. Rather than being assigned to capitalists or consumers (the two most typical allocations), the burden should be assigned to workers. More accurately, something more than 100% of the corporation tax burden should probably be assigned to workers, with some offsetting benefits accruing to agricultural landowners and the consumers of services.

Thus, when we say that available studies show not much progressivity in the overall tax system of the typical country;, we should recognize that the actual degree of progressivity is probably significantly less than what those studies show. Does this change our general conclusions? I think not. It just should make us all the more resigned to the fact that the tax system really is not an instrument for effectuating major changes in the distribution of income.

Policy changes can, however, help to blunt the regressive effects just analyzed. A natural, though radical, response would be to simply abolish the corporation income tax. Although such a recommendation has a sound theoretical underpinning, I do not believe that it represents the wisest move, at least for most developing countries. There are two sources of revenue that would be given up through such an abolition, which I feel that most developing countries would not (and should not) want to forego. These are: a) corporation income taxes paid by multinational companies, and b) the corporation taxes that fall in what we economists

would classify as monopoly profits of local firms. In most cases, the profits of multinational companies are taxable (later if not sooner) in the country of their home base. But these same firms can normally receive tax credits for the taxes paid to the countries where branches are located. Thus, if Uruguay fails to tax the Uruguay income of a branch or subsidiary of a multinational, this will not be a particularly strong stimulus to that firm to expand its operations in Uruguay, because it will nonetheless be liable for tax in its home base (say the U.S.) on that Uruguayan income. Hence it is often said in tax circles that for Uruguay to abolish its tax on such income is like Uruguay's making a gift to the U.S. Treasury. Why should it want to do so?

With respect to monopolies, one must first recognize that monopoly power and monopoly profits are much more of a problem in small developing economies than they are in advanced industrial countries. The reason is that in small countries, economies of scale may dictate that only one or a small number of firms will dominate particular activities. Free trade is the answer when it comes to tradable goods, but in the nontradables sector there is no corresponding way to ensure the discipline of competition. It is here, then, that monopoly profits can be important, even when the country pursues a sensible trade policy.

A sensible compromise, in which the country avoids some of unwanted consequences of the corporation income tax while at the same time keeping revenue from multinationals and from monopoly profits, can be found by pursuing the line of integration between corporate and personal income taxes. An idealized form of integration (complete integration) would entail individual shareholders paying full personal tax in their pro rata share of a corporation's income. This has proven to be very difficult to implement in practice (one problem is that of attributing the income of a year among the various owners of shares that have changed hands several times during the same year). It is much easier to work with dividends, as the stock market

automatically approximates a correct imputation (ceteris paribus, the stock price would rise over the year to reflect anticipated dividends, then fall on the date of the dividend). The easiest scheme of partial integration entails having a corporation tax rate equal to the maximum personal tax rate, then allowing dividends to be free of tax at the personal level.

This extremely practical scheme (as well as others treating dividends as taxable at the personal level, with the corporate tax on those dividends being treated as a prior withholding) has the property that taxes paid by multinationals stay in the country and that the government gets a τ-percent share of any local monopoly profits that are generated. It mitigates the size of the tax wedge implied by the corporation income tax, but it fully eliminates that wedge only if all profits are paid out in dividends. It is not a perfect solution, but it is far preferable to the alternative of having a corporation tax on top of a personal income tax without any effort at integration.

6. Concluding Remarks

I am afraid that some readers might take this paper as a counsel of despair. If, looking at the tax system, we find it is a very weak instrument for bringing about major changes in a country's distribution of income; if, looking at the expenditure side we find it only moderately more potent than the tax system in accomplishing the same objective; and finally if, looking at educational policy we find its effects on distribution to be uncertain in sign, though probably moderately beneficial, but surely distanced well into the quite remote future -- if all these conclusions are accepted, should we not just pack up our tents and steal quietly away?

My answer to this hypothetical query is in a sense yes -- but only in a sense. I am quite comfortable with the idea of crossing income distribution off the list of major goals of government -- not because it is fundamentally uninteresting but because of the very limited capacity of public policies to influence it in a major way. Yet in country after country, I have

seen governments enter new political campaigns bragging mightily about how, in their term of office, the distribution of income had become more equal. And similarly in country after country (sometimes the same countries but in different periods), I have seen opposition parties entering election campaigns loudly blaming the incumbent government for an adverse shift in the income distribution. In truth, I have very little patience with either of these brands of political posturing. Distributions of income do change, for the better and for the worse, but on the whole these movements are beyond the reach of sound government policies. Governments are typically wrong in taking credit, and opposition parties are likewise wrong in assessing blame.

An interesting case is the recent trend toward freer trade and more open economies. There is no doubt that the relative prices of cheap clothing, toys, household utensils, etc., have fallen over recent decades, largely due to the competition of major new sources of supply in China, India and Southeast Asia. Competition from these sources has without a doubt held down what might otherwise have been significant wage increases for low skilled workers -- directly operating on those in low-end manufacturing, but extending, of course, to the whole economy as it seeks its new equilibrium. It might indeed be possible for governments to offset these effects by returning to the high-protection, inward-oriented policies of the past. But would this be a good thing for the countries concerned? The only way this could work is by making low-end manufactures more expensive; it is their customers who would bear the extra cost involved -- and most of those customers are the low-end labor force of the country itself.

A sounder policy is for each country to seek and find its items of genuine comparative advantage. This is accomplished through precisely the policies of greater openness that have characterized the past few decades. And with few if any exceptions, countries following policies of liberalization and openness have benefited as a result.

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So the message of this paper is, indeed, to cross income distribution off the list of major policy objectives, simply recognizing that the forces that determine it are not amenable to control through sensible government policies.

But the rest of this paper's message is that yes, one should be concerned with reducing poverty, with promoting social mobility, with giving greater educational opportunities, particularly to the children of the poor. And one should also be concerned with achieving a distribution of the burden of taxes that accords with the society's own sense of what is reasonable and fair.

Policies to supplement a general value-added tax with additional indirect taxes on luxury products, policies to reduce or eliminate the huge subsidies that many countries grant to the rich through free (or nearly free) university education, policies to mitigate (through integration) the anti-labor bias of the corporation income tax in small, open economies, policies that target the poor and the children of the poor as beneficiaries of social expenditures -- all these are fully compatible with the main message of this paper. False perceptions of reality and the naive setting of grand goals are the enemies of sound policies for economic and social improvement. One can without doubt accomplish more, and maintain a better and sounder path of economic development, through policies based on a deeper understanding of reality and a recognition of the constraints that define the relevant field of action for policymakers.

REFERENCES

Browning, Edgar K., and Jacqueline M. Browning, Public Finance and the Price System, 4th ed. New York: Macmillan, 1994.

Browning, Edgar K., and William R. Johnson, The Distribution of the Tax Burden, Washington: The American Enterprise Institute, 1979.

Chenery, Hollis, Montek Ahluwalia, C.L.G. Bell, John H. Duloy and Richard Jolly, Redistribution With Growth, Oxford: Oxford University Press, 1974.

Engel, Eduardo M.R.A., Alexander Galetovic and Claudio E. Raddatz, "Taxes and Income Distribution in Chile: Some Unpleasant Redistributive Arithmetic," Journal of Development Studies, v. 59 (1999): pp. 155-92.

Fullerton, Don and Diane Lin Rogers, Who Bears The Lifetime Tax Burden? Washington: The Bookings Institution, 1993.

Harberger, Arnold C., "Monetary and Fiscal Policy for Equitable Economic Growth," in Vito Tanzi and He-Young Chu (eds.) Income Distribution and High-Quality Growth, Cambridge: MIT Press, 1998, pp. 203-41.

_____, "A Vision of the Growth Process," Presidential address to the American Economic Association, American Economic Review, March 1998, pp: 1-32.

_____, "The ABCs of Corporation Tax Incidence: Insights Into the Open-Economy Case," in American Council for Capital Formation, Tax Policy and Economic Growth, Washington: ACFF, 1995: pp. 47-76.

Pechman, Joseph A., Who Paid The Taxes 1966-85?, Washington: The Brookings Institution, 1985.

_____, The Rich, The Poor and the Taxes They Pay, Boulder: The Westview Press, 1986.

Pechman, Joseph A., and Benjamin A. Okner, Who Bears The Tax Burden?, Washington: The Brookings Institution, 1974.

Roll, Richard and John Talbott, "The End of Class Warfare: An Examination of Income Disparity," Finance Working Paper #05-02, Anderson School at UCLA, 2002.

Schkolnik, M., Estudio de Incidencia Presupuestaria: El Caso de Chile, Santiago: U.N. Economic Commission for Latin America, 1993.

United States Congress, Joint Committee on Taxation, Methodology and Issues in Measuring Changes in the Distribution of Tax Burdens (Washington: Government Printing Office, 1993).

TABLE 1

Distribution[a] of Family Income, Before and After Tax

Decile	Most Progressive Variant[b]			Least Progressive Variant[c]		
	Before Tax	After Tax	Net Change	Before Tax	After Tax	Net Change
1	1.21	1.33	0.12	1.25	1.27	0.02
2	2.67	3.01	0.34	2.73	2.81	0.08
3	4.25	4.46	0.21	4.31	4.37	0.06
4	5.79	5.85	0.06	5.86	5.77	-0.09
5	7.24	7.50	0.26	7.41	7.43	0.02
6	9.06	8.88	-0.18	9.29	8.83	-0.46
7	9.80	10.59	0.79	10.16	10.58	0.42
8	12.27	12.69	0.42	12.43	12.63	0.20
9	15.16	15.20	0.04	15.48	15.26	-0.22
10	32.55	30.49	-2.06	31.08	31.05	-0.03
Gini Coefficients	.4367	.4158	-02.09	.4252	.4240	-.0012

Source: Joseph A. Pechman and Benjamin A. Okner Who Bears the Tax Burden? (Washington: The Brookings Institution, 1974). Based on Table 4-6, p. 56.

[a]Data refer to Federal, State and Local taxes in the United States for the year 1966.

[b]Pechman and Okner's variant 1c.

[c]Pechman and Okner's variant 3d.
(Variants differ due to different assumptions used in distributing tax burdens across income groups.)

TABLE 2

Effective Rates of Federal, State, and Local Taxes

By Population Decile, Selected Years, 1966-85

Population Decile	1966	1970	1975	1980	1983
			Most Progressive Variant		
1[a]	16.8	18.8	21.2	20.6	21.9
2	18.9	19.5	19.9	20.4	21.3
3	21.7	20.8	20.5	20.6	21.4
4	22.6	23.2	22.0	21.9	22.5
5	22.8	24.0	23.0	22.8	23.1
6	22.7	24.1	23.3	23.3	23.5
7	22.7	24.3	23.6	23.6	23.7
8	23.1	24.6	24.4	25.0	24.6
9	23.3	25.0	25.3	25.7	25.1
10	30.1	30.7	27.1	27.3	25.3
All Deciles[b]					
			Least Progressive Variant		
1[a]	27.5	25.8	29.6	28.9	28.2
2	24.8	24.2	24.2	25.7	25.6
3	26.0	24.2	23.4	24.6	24.6
4	25.9	25.9	24.6	25.2	25.2
5	25.8	26.4	25.3	25.8	25.3
6	25.6	26.2	25.3	25.9	25.6
7	25.5	26.2	25.5	26.0	25.4
8	25.5	26.4	26.0	27.1	26.3
9	25.2	26.1	26.3	27.2	26.1
10	25.9	27.8	24.2	24.9	23.3
All Deciles[b]	25.9	26.7	25.5	26.3	25.3

Source: Joseph A. Pechman, Who Paid The Taxes, 1966-85? (Washington: The Brookings Institution, 1985), p. 68.

aIncludes only units to the sixth to tenth percentiles.

bIncludes negative incomes not shown separately.

TABLE 3

Distribution of Adjusted Family Income,

Before and After Federal, State, and Local Taxes

By Population Quintile, Selected Years 1966-85

Population Quintile	1966	1970	1973	1980	1985
			Most Progressive Variant		
Before Tax					
First	3.9	4.1	4.6	4.1	4.2
Second	10.0	10.1	10.2	9.7	10.0
Third	16.3	16.2	15.6	15.4	15.8
Fourth	22.0	23.0	21.8	21.9	23.3
Fifth	47.7	46.5	47.9	48.9	47.7
After Tax					
First	4.3	n.a.	4.8	4.3	4.4
Second	10.3	n.a.	10.5	10.1	10.2
Third	16.4	n.a.	15.8	15.6	15.8
Fourth	23.3	n.a.	22.0	22.0	22.4
Fifth	45.7	n.a.	46.8	48.0	47.3
			Least Progressive Variant		
Before Tax					
First	4.0	4.1	4.6	4.1	4.2
Second	10.2	10.2	10.3	9.8	10.0
Third	16.7	16.5	15.8	15.6	15.9
Fourth	22.6	23.5	22.1	22.1	22.5
Fifth	46.6	45.7	47.2	48.4	47.3
After Tax					
First	4.1	n.a.	4.6	4.1	4.2
Second	10.1	n.a.	10.4	9.9	10.0
Third	16.3	n.a.	15.7	15.4	15.6
Fourth	23.2	n.a.	21.9	21.8	22.2
Fifth	46.3	n.a.	47.5	48.8	48.0

Source: Joseph A. Pechman, Who Paid the Taxes, 1966-85? (Washington: The Brookings Institution, 1985), p. 74.

TABLE 4

Taxes and Income Distribution in Chile, 1996

Income Decile	Income Share Before Tax (1)	Income Share After Tax (2)	Taxes as % of Group Income (3)	Taxes as % of Total Income[a] (4)
1	1.45	1.40	14.4	0.21
2	2.74	2.63	16.0	0.44
3	3.77	3.62	15.8	0.60
4	4.73	4.59	15.2	0.72
5	5.56	5.47	15.0	0.84
6	6.76	6.64	14.3	0.97
7	8.22	8.21	13.8	1.13
8	10.60	10.61	13.1	1.40
9	15.42	15.75	12.2	1.88
10	40.75	41.09	11.8	4.81
Total Avg.	100.00	100.00		13.00
Gini Coef.	0.4883	0.4961		

Source: Eduardo M.R.A. Engel, Alexander, Galetovic and Claudio E. Raddatz, "Taxes and Income Distribution in Chile: Some Unpleasant Redistributions Arithmetic," Journal of Development Economics, v. 59 (1999), p. 172 (Table 5).

[a]Calculated from Col. (1) × Col. (5).

TABLE 5

Distribution of Income In Chile (1996)

Under Alternative Assumptions

CASE Description	Gini Coefficient	Income of Top Decile ÷ Income of Bottom Decile
1. Actual Distribution Before Taxes	0.4883	13.41
2. Actual Distribution After Taxes	0.4961	14.12
3. Case #2, With Allowances Eliminated	0.4954	14.07
4. Case #2, Eliminating Both Allowances and Underreporting of Income	0.4837	13.37
5. Case #2, Increasing VAT from 18% to 25%	0.5003	14.44
6. Case #2, Eliminating Import Tariffs	0.4906	13.64
7. Case #2, Doubling Excise Tax on Gasoline	0.4958	14.08
8 Case #2, Replacing Personal Income Tax By a Flat Tax With High Exemption Level	0.4995	14.35
9 Case #4, Replacing Personal Income Tax By a Flat Tax With High Exemption Level	0.4925	13.92

Source: Eduardo M.R.A. Engel, Alexander, Galetovic and Claudio E. Raddatz, "Taxes and Income Distribution in Chile: Some Unpleasant Redistributions Arithmetic," Journal of Development Economics, v. 59 (1999), p. 172-176 (Tables 5, 6, 8, 9).

TABLE 6

U.S. Transfer Payments By Income Decile, 1980

Decile	Transfers as % of Family Income[a]	Transfers as % of Total Income[b]	Family Income as % of Total Income
1	99.8	1.3	1.3
2	56.5	1.6	2.8
3	34.7	1.5	4.2
4	23.7	1.3	5.6
5	15.5	1.1	7.1
6	10.7	0.9	8.5
7	7.7	0.8	10.1
8	5.6	0.7	12.0
9	4.3	0.7	15.3
10	2.6	0.9	33.1
			100.0

Source: Joseph A. Pechman, Who Paid The Taxes, 1966-1985? (Washington: The Brookings Institution, 1985) Tables 4.6 and 4.7, pp. 52-53.

[a]The percentage in this column are the averages of the percentages given by Pechman in Table 4-7 for transfers under his variants 1c and 3b. They show transfers received by each group as a percentage of the income of that group.

[b]The percentages given in this column are the averages of those in Table 4-7 for Pechman's variants 1c and 3b. These show transfers received by each group as percentage of the total income of all the groups (deciles) taken together.

TABLE 7

Taxes, Transfers and Income Distribution

In Chile, 1996

Income Quintile	Income Share Before Taxes & Transfers[a]	Quintile Taxes As % of Total Income[b]	Quintile Transfers As % of Total Income[c]	Income Shares After Taxes & Transfers
1	4.19	0.65	2.25	5.96
2	8.50	1.32	1.68	9.54
3	12.32	1.81	1.17	12.60
4	18.82	2.53	0.71	18.35
5	56.17	6.69	0.19	53.55
Sum	100.00	13.00	6.00	100.00
Gini Coef.	0.4552	-	-	0.4158

[a]Based on Table 4, column (1).

[b]Based on Table 4, column (4).

[c]Total Transfers (6.00) equal to .374 times Total Taxes (13.00). Distributed across quintiles by fractions specified in Schkolnik (1993).