The Potential Effect of Income Redistribution
on Economic Growth in Six Latin American Countries

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Discussion Paper No. 13
August 1970

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1. Introduction

Both in the theoretical literature and at the level of practical planning the two goals of "economic growth" and "equity" are often considered to be in conflict. The purpose of this paper is to examine whether, and to what degree, economic growth must in fact be sacrificed for alternative desired increases in equity. Section 2 considers the theory relating income distribution to economic growth. Section 3 contains estimates of consumption functions and simulation exercises calculating the effect which income redistribution would have on savings and growth rates in Argentina, Brazil, Mexico, and Venezuela. Section 4 presents calculations of the effect on imports which income redistribution would have, for Brazil and Mexico, and discusses probable "economies of scale" and "factor opportunity cost" effects for the two countries. Finally, Section 5 discusses the relative merits of alternative policy instruments available for redistributing income.

2. Income Distribution's Effect on Economic Growth: Theory

2.1 Changes in Income Distribution as a Result of Growth

The central concern of this study is the effect which income redistribution would have on economic growth. But first it is useful to consider the question in reverse, and ask whether there are systematic forces changing income distribution as economic growth proceeds. On a basis of neoclassical analysis, one would expect that in the long run rising per
capita income would be associated with greater equality in distribution. The payment of labor is the main source of lower incomes; as the capital stock rises relative to the labor force the marginal product of labor rises and that of capital falls (unless rescued by technological change). If the elasticity of substitution between capital and labor is less than unity, as one expects, then capital's share in national product falls and that of labor rises. This shift in factorial shares would cause equilization in the distribution of income, given the original assumption that capital income goes to high income recipients and labor earnings to low income recipients.

On the other hand, Kuznets\(^1\) has suggested two reasons why the secular trend in income distribution would be toward greater inequality. The first is, to the extent that the savings ratio is higher for higher income groups, upper income recipients will accumulate assets proportionately more rapidly than lower income recipients and the total asset and non-asset income will grow more rapidly for the former than for the latter. The second reason applies more strictly to countries in the early stages of development: as growth occurs, labor shifts from the rural to the urban sector. But the distribution

of income is more skewed in urban than rural sectors.\textsuperscript{1} Under certain assumptions a shift of labor toward the urban sector implies an increase in the inequality of income distribution.\textsuperscript{2} Finally, Kuznets implies that growing political influence of low income groups is the main countervailing influence offsetting the other two forces and giving a net result of increasing equality of income distribution as the economy matures -- after a phase of increasing inequality at the early stage of growth.

Empirically, the case seems to be that the advanced industrial countries experienced increasing equality of income distribution as their per capita income grew.\textsuperscript{3} However, it is

\begin{quote}
\textsuperscript{1}According to Kuznets. However, this difference does not appear to characterize most of the countries of the present study (see Section 3.7.2). Presumably the explanation is that rural income in Latin America is much more unequally distributed than was the case historically in presently advanced countries or recently in India, which Kuznets mentions specifically.

\textsuperscript{2}Yet the absolute levels of all workers could and probably would increase in the process of this shift. Note the implicit assumption that the probability distribution of income levels for new urban migrants is identical to the frequency distribution of income levels in the urban sector in the past. This assumption is questionable since the migrants would presumably move into the low income jobs. So long as the wage for these jobs exceeded the wage of the rural jobs the migrants had held previously, the migration would equalize income distribution.

\textsuperscript{3}Kuznets, \textit{ibid.}, p. 4.
\end{quote}
unclear whether this equalization resulted from increased capital per worker,\(^1\) as implied in a neo-classical interpretation, or from other influences such as intentional social measures.

In the short run the effect of economic growth on income distribution is more uncertain. The short run behavior of income distribution depends much more on specific policy choices\(^2\) than on automatic forces. However, some automatic

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\(^1\)Note that capital and labor shares have remained relatively constant historically in the United States and England. See, for example, Tibor Skitovsky, "A Survey of Some Theories of Income Distribution," in The Behavior of Income Shares, National Bureau of Economic Research, Studies in Income and Wealth, V. 27. (Princeton: Princeton University Press, 1964), p. 21. A logical explanation would be that the declining capital share expected on a basis of a rising capital-labor ratio (assuming elasticity of substitution below unity) is offset by technical change which raises capital's marginal product relatively more than that of labor.

\(^2\)For example, emphasis in agriculture on "modern inputs" (and on mechanization) may cause the medium and large farmers to raise their output rapidly while small farmers without resources to increase investment, and landless workers, lag behind. This pattern, with its increased inequality of agricultural income distribution, seems to have occurred recently in India. See B. F. Johnston and J. Cownie, "The Seed-Fertilizer Revolution and Labor Force Absorption," American Economic Review, 59 (September 1969), pp. 569-582. In contrast, a specific policy of public works, offering employment on projects using labor intensive methods chosen because of "shadow price planning", will increase equality of income distribution.
forces do exist which may cause greater inequality as development proceeds, in the short run. One such force is Myrdal's "backwash" effect: externalities of infrastructure cause capital to continue pouring into the more advanced "development poles" of a country, rather than away from them ("spread effect") as neoclassical analysis would predict.

In sum, in the long run economic growth should cause equalization in income distribution, although in the short run the reverse may occur.

2.2 The "Savings Effect" of Income Distribution on Growth

2.2.1 Profits as the Source of Savings

The influence of income distribution on savings is the aspect of the relation of equity to growth which has received the most attention in the literature. The argument is usually phrased in terms of functional distribution: a higher profit share (lower wage share) is supposed to cause a higher savings rate, on the assumption that the profit recipients save a higher fraction of their income than wage recipients. Thus, in the dual economy model of W. Arthur Lewis, a rising share of saving in national income is explained by a growing weight of the economy's "modern sector", in which entrepreneurial profits comprise a larger share of value added than in the "traditional sector." Using the same reasoning, Lewis observes that
inflation may raise the share of saving in national income because as prices rise and wages lag behind, the profit share in national income rises.\(^1\)

The idea that entrepreneurial profit is the major source of savings is also the basis of Galenson and Leibenstein's argument that in order to maximize the reinvested funds per unit of capital invested, capital intensive techniques should be used rather than labor intensive techniques.\(^2\) Their argument appears incorrect when pushed to their conclusion that the higher the capital/labor ratio, the higher the ratio of profits to capital invested.\(^3\) However, given their assumption that savings come from profits only, the spirit of their argument is correct: the highest profits per unit of physical


\(^3\) Because this extreme conclusion ignores diminishing returns to capital as capital is applied in increasing intensity relative to labor. At some point the marginal product of an extra worker exceeds the fixed wage that must be paid; profit per unit of capital declines when capital per worker is increased beyond this point (or, equivalently, the number of workers is reduced while the capital stock is held constant) because the gain in production that could be obtained by hiring an extra worker for the given capital stock would exceed the worker's wage.
capital will occur at the capital/labor ratio dictated by the "market" prices of capital and labor rather than at the more labor intensive technique which would be determined by social "shadow price" analysis. The latter, in a surplus labor context, leads to the choice of labor intensive technique: labor will be combined with capital to the point where labor's marginal product equals its opportunity cost to the economy, which is zero or at least below the "market" wage. The "shadow price" technique choice gives maximum current production, but the "market factor price" basis for technique choice gives maximum profit per physical capital and therefore maximum reinvestment (savings), under the simple assumption that savings come only from profits.\(^1\)

The implication for the above arguments for personal income distribution is clear: since the number of entrepreneurs will be small relative to the number of workers, a general development strategy favoring a high profit share

\(^1\)This series of arguments is summarized in Amartya K. Sen, "Some Notes on the choice of Capital Intensity in Development Planning," Quarterly Journal of Economics, 71 (November 1957), pp. 561-584. Sen (as well as Chenery, and Eckstein, elsewhere) points out that, given the assumption that only profits are saved, the choice of technique depends on the social discount rate since the choice is essentially between present production and future production.
implies the favoring of a highly skewed distribution of personal income. One might object that the entrepreneur does not really "have" the profit income so long as he reinvests it rather than consuming it. This objection is invalid: the entrepreneur has claim of ownership to the new capital resulting from his reinvested profits, and has the option at any time of liquidating his equity. Therefore in any meaningful sense entrepreneurial profits represent entrepreneurial income even though they are reinvested.¹

To summarize, the economic development literature has emphasized the relation of the savings rate to the share of profits in the "modern sector." By implication, this literature suggests that the more skewed personal income distribution, the higher the savings rate for national income -- so long as the upper-bracket income in question comes from entrepreneurial profit.

Houthakker² has made empirical estimates which tend to support the hypothesis that the propensity to save for entrepreneurial income exceeds that for labor income. Using

¹The argument of claim to equity and therefore real "receipt of income" applies whether the firm is incorporated or not, assuming in the case of the corporation that the share value reflects the value of retained earnings.

eight-year averages for twenty-eight countries, he estimated:¹

\[ S_p = 0.043L + 0.120P \]
\[ (0.022) \quad (0.041) \]

where \( S_p \) = personal saving; \( L \) = employment income plus government transfers, and \( P \) = all other personal income; all data in per-capita terms in 1955 dollars at official exchange rates; figures in parentheses are standard errors.

From this estimate Houthakker concludes: "...the marginal propensity to save out of income from employment is much lower than that for income from property and entrepreneurship."²

However, this conclusion is incorrect if it means that these two propensities differ even when the influence of income level of the recipient unit is removed. Houthakker's data are not observations from within each country, with many different income levels for each type of income; his data are not adequate to the task of testing whether for a given household income level saving is higher if the recipient is an entrepreneur than if he is an employee. The results obtained might be perfectly explained by the normal savings-income relationship with no resort to special propensity by income type. That is,

¹Ibid., p. 216.
²Ibid.
his results say that if two countries are at equal dollar per-capita income levels, the country with the higher share going to non-labor income will have higher savings. But given the correlation of "entrepreneurial income" with "upper income level,"¹ this phenomenon could be completely explained by the fact that the country with higher entrepreneurial share simply has a higher share of income concentrated in the upper income brackets. A normal Keynesian consumption function with a higher savings rate for higher income levels would then explain the higher savings in the country which has a higher non-labor income share.

The present author therefore rejects the view that income type rather than income level (within the country)

¹Which exists despite the inclusion of small farmers' incomes as non-labor income, in most national accounts data. For example, in Argentina in 1961 salaried income recipients comprised 64 percent of the total units with entrepreneurs representing 29 percent, pensioned 7 percent, and renters .5 percent. Yet the corresponding participations in the upper 10 percent income bracket were: 25 percent, 68 percent, 3 percent, and 3 percent. Naciones Unidas, Comision Economica Para America Latina, El Desarrollo Economico y la Distribucion del Ingreso en La Argentina (Nueva York: 1968), p. 108.
determines savings rates, in lieu of further evidence.¹ The issue is important to this study because the calculations below rely heavily on savings behavior by income level, for lack of data on income type. However, for the one country (Brazil) for which data by income type is available, additional tests are made to examine whether type of income influences savings, net of the income level's influence.

For policy purposes, it could be misleading to adopt the conclusion that property income recipients have a higher propensity to save than labor recipients. For example, if tax legislation were designed with lower rates for non-labor income (at given income levels), the result would be inequity without the desired effect of lower reduction of savings, if savings in fact were solely determined by income level. To

¹Even for the United States, analyses on propensity to save by income type net of the influence of income level appear inconclusive. A 1957 study by Friend and Kravis, found, first, that national aggregate data showed an unimportant role of un-incorporated entrepreneurial savings, strongly contradicting the household survey data. Second, the household survey data showed much lower (negative) savings rates for entrepreneurs at low income levels than for urban units generally, but much higher savings rates for entrepreneurs at high income levels. A plausible explanation is that the disturbance of "transitory income" is much greater for entrepreneurial groups than for salaried groups. Irwin Friend and I. Kravis, "Entrepreneurial Income, Saving and Investment," American Economic Review, 47 (June 1957), pp. 269-301.
avoid such a problem the solution would be simple. Income at identical levels would be taxed at identical rates, regardless of income type; however, tax credits would be granted for amounts actually saved (or, easier to identify, invested in specific forms). Healthy propensities would then be reinforced at worst and created at best.

2.2.2 Savings Rate as a Function of Income Level: Redistribution Effects.

While the literature on economic development has emphasized the relation of the savings rate to the kind of income, the more general economics literature is abundant with controversy over the relation of the savings rate to the level of personal income. Four alternative hypotheses summarize the controversy:

a) the average propensity to save rises as income rises (Keynesian consumption function);

b) consumption is a constant fraction of permanent income (Friedman);

c) the savings rate is a function of income level relative to average income in the society (Duesenberry);

d) saving is done for the purpose of retirement plus desired bequests, and the savings rate depends mainly on the individual's age (Modigliani and Brumberg).

It is important to consider the implications of each of these hypotheses for the general question of this section: what effect would income redistribution have on aggregate savings? None of the hypotheses can be dismissed summarily
since no conclusive empirical proof of one as opposed to the others has been established. To the extent that the hypotheses suggest income redistribution would lower aggregate personal savings, a conflict between "equity" and "economic growth" is implied.

2.2.2.1 Keynesian Functions

In the Keynesian case, consumption is related to income either linearly or curvilinearly. If the relation is linear, income redistribution cannot affect aggregate personal savings. This conclusion holds whether the ex ante marginal propensity to consume of each recipient is used as the basis of calculation, \(^1\) or the ex post average propensity to save is used, as in this paper. That is, for all individuals (or family units),

\[
c_i = a + by_i
\]  

(2.1)

where \(c\) = consumption spending, and \(y\) equals income level; \(i\) refers to the \(i^{th}\) recipient unit. Using the ex ante marginal savings rate approach, the increment in consumption after redistribution of income from \(m\) losers (group L) to

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to $n$ gainers (group $G$) must be:

$$
\Delta C = \sum_{i=1}^{n} (\Delta c_{i,G}) + \sum_{i=1}^{m} (\Delta c_{i,L}) \\
= \sum_{i=1}^{n} b(\Delta Y_{i,G}) + \sum_{i=1}^{m} b(\Delta Y_{i,L}) \\
= b\left[ \sum_{i=1}^{n} \Delta Y_{i,G} + \sum_{i=1}^{m} \Delta Y_{i,L} \right]
$$

(2.2)

where $\Delta C$ is the change in aggregate consumption, $\Delta c_{i,j}$ and $\Delta Y_{i,j}$ are the changes in consumption and income, respectively, for the $i^{th}$ member of group $j$. Since the value of

$$\sum_{i=1}^{m} \Delta Y_{i,L}$$

must be exactly the negative of

$$\sum_{i=1}^{n} \Delta Y_{i,G}$$

if the total income is constant, $\Delta C = 0$. There is no change in consumption or in the aggregate personal savings rate resulting from income redistribution.

The "ex post average savings rate" basis of calculation also gives no change in aggregate savings after income redistribution, using the linear consumption function. In this method, instead of applying the marginal propensity to consume "$b$" to the change in income to obtain the change in consumption, one merely applies the whole consumption function to ex post.
income levels and sums across individuals to obtain the new consumption level. Thus,

$$\Delta C = \sum_{i=1}^{n} \Delta c_{i,G} + \sum_{i=1}^{m} \Delta c_{i,L}$$

$$= \sum_{i=1}^{n} (c_{i,G,1} - c_{i,G,0}) + \sum_{i=1}^{m} (c_{i,L,1} - c_{i,L,0})$$

$$= \sum_{i=1}^{n} [(a + by_{i,G,1}) - (a + by_{i,G,0})] + \sum_{i=1}^{m} [(a + by_{i,L,1})$$

$$- (a + by_{i,L,0})]$$

$$= b[ \sum_{i=1}^{n} (y_{i,G,1} - y_{i,G,0}) + \sum_{i=1}^{m} (y_{i,L,1} - y_{i,L,0})] = 0$$

where the third subscript on "c" and "y" is "one" for post-redistribution and zero for pre-redistribution.

If the Keynesian consumption function is curvilinear, then aggregate savings declines after income redistribution. If it is assumed that each household will consume an amount after redistribution equal to its previous consumption plus its pre-redistribution \((\text{ex ante})\) marginal propensity to consume multiplied by its change in income, the decline in savings will be greater; if the household consumes merely in accordance with the general consumption function applied to its new income level \((\text{ex post} \ \text{average savings rate basis})\), the decline in savings will be smaller.
Consider a two household economy. Subscripts i, j refer to pre-redistribution (0) or post-redistribution (1) for i; gainer (G) or loser (L) for j. The asterisk for ex-post consumption indicates behavior according to "ex ante marginal" propensities. The ex-post values without asterisk indicate behavior based on average propensities applied to ex-post income levels. In the diagram, \((y_{0,L} - y_{1,L})\) equals \((y_{1,G} - y_{0,G})\), so that total income is unchanged. Total consumption rises after redistribution. In the "ex ante marginal" case total consumption rises from \((C_{0,L} + C_{0,G})\) to \((C^{*}_{1,L} + C^{*}_{1,G})\), a clear increase as shown in the diagram, and as could be demonstrated with quadratic or log-linear examples of curvilinear consumption function. The rise in total consumption in the "ex post average" case, or \((C_{1,L} + C_{1,G}) - (C_{0,L} + C_{0,G})\) is positive but smaller.
If the income redistribution were considered to be a lasting phenomenon, it is likely that the households would behave according to the "ex post average" case rather than the "ex ante marginal" case. That is, a household with a particular income level after redistribution would consume the same amount that households with that income level before redistribution had consumed. An income-losing household would not consume as much as indicated by its pre-distribution level minus its pre-redistribution marginal propensity to consume times its decrease in income. The latter level of consumption might be maintained during a short period (as hypothesized in Duesenberry's ratchet effect for falls in income) but not over a long time period, during which the family would come to realize it was living beyond its means by a greater degree than other families of identical means.

To summarize, a linear Keynesian consumption function would imply no decrease in aggregate savings after income redistribution. A curvilinear Keynesian consumption function would imply decreased savings after redistribution; the decrease would be greater if "ex ante marginal" propensities to consume prevailed, smaller if ex post consumption were based the consumption function applied directly to the ex post income levels. In the empirical simulations of this study it will be assumed that after redistribution, families would consume according to the latter model, the "ex post average" case.
2.2.2.2 Permanent Income Hypothesis

In the case of Friedman's permanent income hypothesis, redistribution of income would not affect aggregate savings so long as all families believed the new incomes to be permanent. By the Friedman hypothesis, an identical fraction of the believed "permanent" income is consumed by all households, regardless of level of permanent income.\(^1\)

2.2.2.3 Life-cycle Hypothesis

In the life-cycle savings case,\(^2\) redistribution of income would only affect aggregate savings if the "bequest" were an income-elastic consumption item. If not, then assuming length of work-life and retirement-life to be randomly distributed with respect to income level, redistribution of income

\[^1\text{Friedman's consumption function is: } c_p = k(i,w,u)y_p\]

where \(c_p\) = permanent consumption, \(y\) = permanent income, and \(k\) is the average propensity to consume, which is invariant with respect to \(y_p\) but depends on interest rate \((i)\), the ratio of non-human wealth to permanent income \((w)\), and factors specific to the individual \((u)\). Milton Friedman, A Theory of the Consumption Function (Princeton: Princeton University Press, 1957), p. 222.

would not affect aggregate savings. The savings rate would depend on age but would be invariant with respect to income level. However, with demand for bequests income elastic, the high-income recipient would save a higher percent of his income than a low-income recipient of the same age, since the former would be saving to establish a more than proportionately higher bequest.

2.2.2.4 Relative Income Hypothesis

If the average propensity to save depends only on the level of income relative to the national average (or median) income, then income redistribution might or might not affect aggregate savings, depending on the specific form of the relationship. There is no way to judge a priori whether the "relative income" consumption function would be of a form

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1 Unless age and income were correlated. However, the variance of income is so great in developing countries that, while age might have a statistically significant relationship (positive) to income level, this relationship would explain such a small portion of the variance in income that it could be ignored as unimportant.
which would cause aggregate savings to remain constant or to fall after income redistribution.\footnote{As in the case of the Keynesian function, the answer depends on whether the form of the consumption function is linear or non-linear. For example, consider the function \( s = s_u - a(y/y) \) where \( y = \) income level, \( y = \) average income, \( s = \) savings as a fraction of income, and \( s_u = \) the upper limit to the savings ratio. In this function, as income approaches infinity the savings rate approaches \( s_u \); when income equals the average income, the savings rate is \( s_u - a \); as income approaches zero the savings rate approaches negative infinity. With this function, aggregate savings decrease when total income is held constant but is redistributed from high income to low income recipients. In a linear function such as: \( S = S_0 + b(y - y) \), where \( S_0 \) is the level of savings corresponding to average income \( y \), redistribution of income could not change aggregate savings.}

2.2.2.5 \textbf{Summary}

In sum, of the four major alternative consumption function hypotheses, only the curvilinear version of the Keynesian function would unambiguously cause a decline in aggregate savings when income is redistributed from high-income to low-income recipients. The "permanent income" hypothesis implies no change in savings; the life-cycle hypothesis implies decreased savings only if bequests rise more than proportionately with income; and the relative income hypothesis (like the Keynesian hypothesis) gives decreased savings for some specifications of the function but not for a linear specification.
Thus, by using the Keynesian function (and permitting it to be curved) in the empirical exercises below, this study should overstate rather than understate the negative effect of income redistribution on aggregate savings.

2.2.3 Adequacy of Demand

Before leaving discussion of the "savings effect" of income redistribution, it is necessary to examine an argument that runs in exactly the opposite direction -- the notion that income redistribution would stimulate long run growth because consumption would increase and buoy up investment in an otherwise stagnant economy. Certain economists, notably Celso Furtado, argue that lack of consumer demand is causing stagnation in Latin American economies. If one accepts this position, then the negative "savings effect" of income redistribution becomes a stimulus rather than a hindrance to growth. Before considering the stagnation argument in its current context, it is useful to examine precursors of the argument.

The argument that inadequate consumption could cause stagnation goes back to Malthus. Ricardo asserted that high consumption of the landlord class, coupled with a rising rental share due to diminishing returns to capital and labor applied to a fixed amount of land, would hasten the economy
towards a "steady state" where no more capital formation would occur. Malthus objected to the argument that a rising rental share reduced the investment rate: on the contrary, he maintained, without the high consumption of the landlords there would be poor prospective demand and thus little motive for investment. Malthus argued that there was some optimum level of consumption as a fraction of production: high enough to encourage more investment but low enough to leave surplus resources to be used for the investment. Ironically, in the Malthus-Ricardo debate there were no implications for size distribution of income; the debate referred only to distribution of income by type, between rents and profits.¹

Oskar Lange² made the concept of an "optimum propensity to consume" much more explicit. Working in a Keynesian framework, he added one relationship to the normal model: investment was a negative function of the interest rate but a positive function of consumption. The influence of consumption was completely obvious, he maintained, and he criticized Keynes for treating investment and consumption as independent and

¹For a summary of the controversy, see Marc Blaug, Economic Theory in Retrospect.
alternative expenditures for determining aggregate income. Given a fixed money supply, the optimum consumption propensity was that which maximized investment. Consumption had a positive direct effect on investment (higher consumption made investors more sanguine about future sales) but a negative indirect effect: more consumption meant greater income, which required a higher interest rate to release money from speculative demand into transactions demand, but the higher interest rate depressed the level of investment (through the relationship of the marginal efficiency of investment to the quantity of investment).¹

Two aspects of Lange's analysis are crucial for understanding its relevance for the less developed economy.

¹The exact optimal consumption propensity was that at which

$$\frac{\delta L}{\delta Y} = \frac{\delta I}{\delta C}$$

$$\frac{\delta L}{\delta i} = \frac{\delta I}{\delta i}$$

where L = demand for money, Y = income level, i = interest rate, and C = consumption. By dividing out identical items in the expression, there remains $\delta Y = \delta C$, the condition for maximum investment, i.e., $\delta I = 0$. 
First, it assumes a constant supply of money. Lange concludes the analysis by saying that if monetary policy may be controlled adequately, there is no reason why a ceiling "optimum consumption propensity" need exist. Essentially, any increase in interest rate forced by increased consumption and therefore income could be offset by increasing the money supply. Yet in the cases of most of the countries examined in this study, rapid increase in money supply is usually a fact of life; an "optimum consumption" model based on constant money supply is of questionable relevance.

Second, Lange's relation of investment to consumption postulates a point beyond which increased consumption no longer increases the investment rate (i.e., even holding the interest rate constant) because the supply elasticity of factors reaches zero and increased consumption merely raises the cost of factors and therefore does not increase the marginal efficiency of investment. Yet the present author's impression is that this case is the normal state of the less developed economy. There is no generalized excess plant capacity; the short run supply elasticity of capital and foreign exchange approaches zero. Increased consumption

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1Lange did present the model for the case in which money supply varied according to a specific function, \( M = \phi (Y, i) \). In this case the optimum consumption rate occurs where

\[
\frac{\partial M}{\partial Y} - \frac{\partial L}{\partial Y} / (\frac{\partial L}{\partial I} - \frac{\partial M}{\partial I}) = - (\frac{\partial L}{\partial C})/(\frac{\partial L}{\partial I}).
\]
merely raises these factor prices and bids them away from use in investment activities.

For both of these reasons it is unlikely that Lange's approach to the "optimum consumption" rate would yield the conclusion that the countries examined here have suboptimal propensities to consume and therefore do not realize their full investment potential. Quite the contrary: the Latin American economies studied here (probably with the exception of Mexico and Venezuela) have been characterized by government deficits, rapid expansion of the money supply and inflation. These characteristics make a "lack of demand" highly improbable. Secular government deficits reduce the possibility of "under consumption" in two ways. First, the deficits represent increased demand and movement of income toward a higher real or monetary level, using the standard Keynesian analysis. Second, the deficits are typically financed with borrowing from the central bank and thus monetary expansion and inflation. In the face of rapid inflation the hoarding of money becomes highly unattractive, and a drain on demand through leakage of money into speculative holdings -- essential to a Keynesian low level equilibrium -- is highly unlikely.

Celso Furtado's version of the under-consumption argument incorporates the specific features of Latin American industrialization through import substitution.¹ His central

hypothesis is that as import substitution moved from simpler consumer goods to more sophisticated consumer durables and capital goods, the capital/labor ratio increased, and, given a wage held constant in real terms by a pool of unemployed, increasing capital intensity meant that the value added generated in the new industries was increasingly concentrated in the hands of the owners. To Furtado, this process meant a lack of prospective consumer demand; implicitly the industrial workers themselves constituted the principal market for the producers, and since the growth of their aggregate earnings was slow, investment by the producers was discouraged. The result was stagnation of the economy in the late stages of import substitution.

There are various considerations Furtado's analysis ignores. First, it is not obvious that capital intensity must increase as production moves from consumer goods to capital goods: machine tools, for example, can be labor intensive -- although the labor required is skilled labor. But suppose Furtado's assumption about secularly increasing capital intensity is correct. Then a second, more important qualification of the argument is that prospective demand for goods sold by the new industries is not limited to the purchasing power of the industries' own workers. Government demand and demand from the agricultural and services sectors probably represent the bulk of demand for industrial goods, and with growing agricultural production and government
activity there is no reason to expect demand from these quarters to be stagnant. If one objects that agriculture holds no prospects as a market because the masses of agricultural workers are at subsistence income and are out of the market, the answer is simply that the agricultural purchasing power is in the hands of landlords, and the question is not one of quantitative lack of demand but one of composition. To point out that landlords' demand (investment and consumption) represents a major market for the new industries is not to condone the rural distribution of income but merely to show that an argument suggesting "no rural demand exists" is fallacious.

Third, the Furtado argument ignores demand coming from the industrial profit recipients themselves. This demand may be in the form of more investment in the firm (which is questioned because of the supposed lack of prospective market) or in the form of investment in activities outside the firm, or in the form of increased consumption. Indeed, only in a few special cases will the entrepreneurs' use of profits be such that a depressing influence results. One such case would be simple remission of profits abroad; another would be use of profits for consumption of imported goods. A third would be the hoarding of profits -- unlikely in an inflationary context.
In sum, lack of sufficient demand in the economy, as formulated by Furtado, seems improbable.

At the heart of the under-consumption issue is the question of whether it is likely that the economy can be below full employment. Full employment here necessarily refers to full utilization of plant capacity, since disguised and open unemployment of labor are typical features of the less developed economy even when it produces at full capacity. It is worth reiteration that the prevalence of government deficits and inflation make it highly unlikely that conditions permitting production below "full employment" exist. However, one must resolve the apparent contradiction between this assertion and data showing excess capacity in certain industries in Latin American countries.¹

There are considerations which would explain excess plant capacity as a phenomenon that does not indicate inadequate demand or "below-full employment." First, in a period of short-run stabilization after rampant inflation, it is highly likely that production will be below capacity; this adjustment does not indicate long run stagnation. Instead, it represents a rational trade-off of some current production in return for an increased stream of future production which

would be unattainable unless rampant inflation and attendant uncertainty of future business calculations were eliminated. Second, a foreign exchange bottleneck can cause lack of imported intermediate materials and thus keep production below full capacity. In this case the adequacy of demand is not an issue; greater domestic demand would merely place greater pressure on imports.

Third, and most important in my view, any excess capacity is most likely not generalized to the economy but is focused in individual sectors. As such, it represents a problem not of inadequate over-all demand but one of balanced growth. Indeed, excess capacity can represent an optimal strategy of unbalanced growth\(^1\) if it exists in sectors which have economies of scale and where large plants have intentionally been built ahead of demand in order to attain efficient scale. Without the "intended economies of scale" consideration, sectoral imbalance merely represents a lack of coordination in sectorial expansion; but whether the excess capacity is intended or unintended, the sectoral imbalance phenomenon cannot be solved by increased general demand -- which will merely cause prices to rise in the bottleneck sectors where production is at full capacity. Presumably the sectoral imbalance problem is solved

either by investment in the lagging sectors (those producing at capacity), by exportation of production from the sectors with excess capacity, or by price policies (e.g. subsidization) which twist consumption and investment demand in favor of the sectors with excess capacity.

To summarize, the various arguments that savings is not a constraint but lack of consumer demand is, are unconvincing to this author. Therefore, the "savings effect" calculations below, examining the size of the negative effect of decreased savings after income redistribution, are important. The reader who adheres to an under-consumption analysis need simply note that the growth effects of redistribution would be more favorable than those calculated below, if the inadequate demand hypothesis were true.

2.2.4 Concept of Savings

Finally, concerning the savings effect of income redistribution on growth, it is necessary to clarify the definition of savings. The usual problem is how to treat consumer durables. National income accounts conventionally treat expenditure on home construction as investment, but expenditure on other consumer durables as consumption. To be sure, from the viewpoint of the individual, housing and other consumer durables represent assets that comprise part of a total portfolio; he presumably reaches some equilibrium portfolio decision in placement of his funds
among these consumer durables and other, liquid, assets. And one might argue that an individual's purchase of consumer durables represents saving because the individual is appropriating future services of the good in exchange for self denial of alternative immediate or current consumption.

Nevertheless, for analysis of economic growth, "savings" must exclude consumer durables -- including housing. There are two reasons for this approach. First, purchase of a consumer durable may provide future services -- but it represents commitment of resources to consumption over a finite period, whereas liquid savings represent uncommitted resources which may be used for investment goods which will yield consumption goods and services at a much more distant future, with much greater productivity. The second reason is that liquid savings have an inherent "externality." Consider the "dual economy" model (i.e. of W.A. Lewis, and of J.C.H. Fei and G. Ranis). An individual's liquid savings permit capital formation in the modern sector; the demand curve for labor shifts out; modern sector production and employment increase. Product increases by the increment in the integral under the marginal product of labor curve. The portion of the increment above the labor supply curve belongs to the saver -- it is the increased profit and thus the return to the saver for his
deposit of liquid capital. The present value of the future stream of this increased profit equals the amount the saver deposited plus the present value of the interest reward he required for his deposit. Yet this amount does not exhaust the increment in production: the increased area under the labor supply curve -- i.e. the amount of goods going out as new modern sector wage payments -- is the rest of the increased annual production. Thus the saver's deposit of liquid assets has created an increment in production which exceeds his deposited capital and the present value of its interest reward. There is, in sum, an externality involved when the saver places his assets in the form of liquid capital available to the modern sector; there is no such externality involved when he purchases a consumer durable.

In the empirical analysis below, the concept of "savings" from personal income will not include expenditure on consumer durables, since the interest of this study is in growth from the standpoint of the economy as a whole rather than in the portfolio asset decision of the individual.
2.3 Effects on Composition of Demand

2.3.1 Import Effect

While redistribution of income should not affect total demand (i.e., consumption plus investment demand) in the economy, it may cause important changes in composition of demand. The discussion of the "savings effect" above may be seen as treating one of these changes: the shift in the shares of investment and consumption in total demand. Two other compositional shifts may be important. First, the shift in consumer goods demand may not be neutral with regard to imports. Second, the demand shift may not be neutral with respect to economies of scale.

Before considering the "import" and "economies of scale" effects, it is useful to clarify that the composition of demand shifts away from income-elastic toward income-inelastic goods when income is redistributed. A graphical example demonstrates this fact.
Returning to the example of the two-household economy, if $\Delta y$ is transferred from the rich household ($r$) to the poor ($p$), the decline in $r$'s consumption of the income elastic good ($A$) exceeds the increase of $p$'s consumption of the good (that is: $b_{r,0} - b_{r,1} > b_{p,1} - b_{p,0}$). The increase of $p$'s consumption of the income-inelastic good ($A$) rises more than $r$'s consumption of the good falls (or: $a_{p,1} - a_{p,0} > a_{r,0} - a_{r,1}$). Thus the composition of demand shifts in favor of the income inelastic good, $A$.

Turning to the "import effect", if the average propensity to import rises with income, shift of demand toward more basic consumer goods should lower the demand for imports. A reduced import bill can be important if foreign exchange is a bottleneck restraining growth. The fact that most consumer goods are produced domestically because of a past policy of import substitution does not rule out an "import effect" of the shift in demand toward basic goods. If the import content -- including required capital and intermediate goods -- is higher for income elastic goods than for income inelastic goods, the shift in demand composition after income redistribution will lower import demand.

2.3.2 Differential Economies of Scale

The second compositional influence is that of economies of scale. If income inelastic goods have greater economies
of scale than luxury goods, the decrease in demand for luxury goods following income redistribution will release resources which, when applied in income-inelastic goods, will cause a more than compensating increase in production, since the scale of production for the basic consumption goods will increase and thus so will production efficiency for these goods. One could argue that even though economies of scale are important for some luxury goods such as automobiles, in the relevant range of domestic demand the efficient scales would not be reached, whereas if the same quantum of purchasing power were shifted into a mass market for basic goods, the scales of demand for these goods would be sufficient to achieve economies of scale in them.\footnote{The "differential economies of scale" argument is implicit in arguments such as those presented by Strassmann and Navarette. Strassmann asserts, for example: "...consumption inequality ... is likely to channel workers away from mass-production industries into luxury handicraft industries and personal services." W. Paul Strassmann, "Economic Growth and Income Distribution," Quarterly Journal of Economics, 70 (August 1956), p. 431. A similar idea is expressed in Ifigenia de Navarre, La Distribucion del Ingreso y el Desarrollo Economico de Mexico (Mexico: Escuela Nacional de Economia, 1960), p. 27.}
2.3.3 **Supply Rigidity Costs**

A short run cost of income redistribution's demand composition effect is that the supply pattern would no longer match the demand pattern; idle capacity in some sectors and scarcities in others would result. This problem would occur to the extent that resources in the income elastic goods are not transferrable (e.g. are in fixed plant and equipment). The escape of exporting luxury goods in return for imported basic consumer goods would probably not be an option, since the luxury goods which had been supplying the protected domestic market probably would have to sell at substantial losses to be internationally competitive and even then might not sell due to quality and brand considerations.

In the longer run the fixed-capacity problem disappears, since even with more equal income distribution demand will grow to the point where the capacity in income-elastic goods sectors is again fully utilized.

2.3.4 **Differential Factor Opportunity Costs**

A potentially important effect of income redistribution is that the resulting change in the composition of demand may shift demand away from goods requiring factor inputs with high opportunity costs and toward goods requiring factors with low
opportunity costs.¹ A concrete example of this shift would be the increase in demand for foodstuffs requiring low-cost labor and a decrease in demand for certain consumer durables requiring scarce capital inputs. The net result for the economy would be increased production possibility for its same set of available resources.

2.4 Interpersonal, Intertemporal Welfare Maximization

In addition to the effects of income redistribution on savings, imports and economies of scale, the direct impact of redistribution on the social welfare function must be considered. In an economy in which planning takes place, a social welfare function is at least implicitly being used in decision making. Therefore, it is useful to consider the growth-equity trade-off in a specific form, although this study makes no empirical estimates using social welfare functions because of their arbitrary nature.

To simplify the problem, suppose the import and scale effects of income redistribution would be negligible but the savings effect would be substantial and negative. Suppose

¹This idea is suggested by Celso Furtado, *Um Projeto para o Brasil* (Rio de Janeiro: Fundo da Cultura, 1969). In an excellent analysis Furtado separates growth sources into capital accumulation, technical change, and demand change, and asserts that the change in world demand towards coffee favored Brazil in the late 19th and early 20th centuries, since coffee production required almost no capital but much labor, and Brazil's labor supply was abundant and the climate was appropriate for coffee).
there are \( n \) persons in the economy and capital formation comes solely from personal savings. Then the income distribution decision becomes: choose the income distribution so as to maximize the welfare function over the planning horizon, subject to some terminal capital stock requirement. Thus:

\[
(2.4) \quad a) \quad \operatorname{Max} \sum_{t=1}^{T} W_t
\]

where \( T \) is the number of years in the planning horizon, and \( W_t \) equals the value of the welfare function in year \( t \). Note that there is assumed to be a zero rate of pure time preference.

\[
b) \quad W_t = \sum_{i=1}^{n} \ln y_{i,t}
\]

where \( y_{i,t} \) is the income of the \( i \)th person in year \( t \). Here the particular utility function chosen is logarithmic. Furthermore, total income is chosen as the source of utility since the individual has claim to total income -- not just consumption.

The remaining elements of the problem would be:

\[
c) \quad \sum_{i=1}^{n} y_{i,t} = Y_t
\]

\[
d) \quad y_t = F(K_t, L_t) = G(K_t) = AL_0^\alpha K_t^\beta
\]

\[
e) \quad K_t = K_{t-1} + S_{t-1}; \quad k_{t=1} = K_1
\]
\[ s_t = \sum_{i=1}^{n} s_{i,t} = \sum_{i=1}^{n} (y_{i,t} - c_{i,t}) \]

\[ c_{i,t} = e^{a y_{i,t}} \]

\[ \sigma_t = \left[ \sum_{i=1}^{n} (y_{i,t} - \bar{y}_t)^2 \right]^{1/2} / \bar{y}_t \]

\[ \bar{y}_t = \frac{1}{n} \left[ \sum_{i=1}^{n} y_{i,t} \right] \]

\[ K_T \geq \bar{K}_T \]

Equation c) constrains the sum of individuals' incomes to total income or production. Equation d) is the production function; a constant population is assumed, therefore there is a constant labor force \( L_0 \). \( K_t \) is capital stock in year \( t \). Equation e) shows capital stock is increased by yearly personal savings \( (S_t) \); there is no depreciation. Equations f) and g) show savings as a function of incomes; a log-linear consumption function is chosen. Equation h) shows the decision variable; the standard deviation of income level as a fraction of average income. Thus \( \sigma_t \) measures inequality of income distribution in year \( t \), and equals zero for perfect equality. Equation i) defines average income in year \( t \) \( (\bar{y}_t) \), and equation j) specifies the minimum required terminal capital stock.
The optimal inequality of income distribution for each year, \( \sigma_t \), will depend on the parameter \( \beta \) (reflecting the productivity of capital), and "a" and "b" (reflecting difference in average propensity to save associated with different income levels).

Computer simulation could be used to search for the optimal \( \sigma_t \) as a function of various hypothesized values of \( \beta \), a, and b, and of given variables such as \( K_T \), \( L_o \), A, and \( \alpha \). However, the results would depend strictly on the mathematical forms chosen for the welfare function, \(^1\) production function, and consumption function, and specific results would be of questionable informative value. The important point is that the above model clarifies the influences of the income distribution choice. The optimal distribution will be more equal (lower \( \sigma_t \)) the more rapid the decline in marginal utility of income (reflected by the choice of welfare function), the lower the elasticity of output with respect to capital (lower \( \beta \)), the lower the required terminal capital stock \( (K_T) \), and the closer the marginal propensity to consume to constancy over all income levels (the closer "b" to unity).

\(^1\)Alternative welfare functions might be:

\[
\begin{align*}
\text{a) } W_t &= \sum_{i=1}^{n} Y_{i,t} \\
\text{b) } W_t &= \sum_{i=1}^{n} \left( B - \frac{z}{Y_{i,t}} \right) .
\end{align*}
\]
2.5 Labor Productivity

A final consideration is the impact of income distribution on labor productivity through health and education. Myrdal argues in the context of countries such as India, standards of living of the masses are so low that increased consumption would improve labor's health and therefore productivity more than enough to compensate for the decline in savings associated with the increased consumption. Similarly, if the particular form of income redistribution were increased government spending on mass education financed by taxation on upper income groups, there would presumably be some increase in production. These two effects are mentioned for completeness; they are not measured in this study.

2.6 Summary

In sum, there are four major effects on growth which income redistribution (equalization) may cause: a decrease in aggregate savings, a change in the share of imports in total demand, a change in the possibilities for production at efficient scale in specific goods, and a shift in demand toward goods requiring factor inputs with lower (or higher) opportunity costs.

---

If one assumes the net effect of these influences is that some growth must be sacrificed for increased equity, then the policy choice between the two objectives may be conceptualized in terms of a production possibility- indifference curve graph. Let the vertical axis represent an equity index, with increasing values for increasing equality. The variable 1-G where "G" is the Gini coefficient of income concentration\(^1\) would be one such index. Let the horizontal axis represent the growth rate for the economy (and, assuming population growth to be independent of the policy choice, the growth rate of per capita income). The production possibility curve PP shows the possible combinations of equity and growth rates; the social indifference curve II shows the planner's relative valuation of the two goals (or that of the combined influence of "dollar votes" and political influence in an unplanned economy). Policies should then be followed which place the economy at the optimal combination -- the point where the indifference curve is tangent to the production possibility curve. Note that the indifference curve

---

\(^1\)The Gini coefficient is the ratio of the area between the Lorenz curve and the diagonal to the total area under the diagonal in a Lorenz diagram of cumulative percent of recipients (horizontal) plotted against cumulative percent of income (vertical).
would reflect both society's valuation of immediate equalization (i.e., its notion of the marginal utility of income and application of this notion on an interpersonal basis) and its time-discount rate (for the relative weight of growth).

In case A below, society would choose policies which would attain high equity with little sacrifice in growth; in case B more growth and less equity would be chosen because the technical trade-off between them (shown by the production possibility curve) requires greater sacrifice in growth for a given increase in equity.

While this study will not attempt to estimate the exact shape of the production possibility curve (and certainly not that of the indifference curve), it does attempt to make empirical estimates of the savings effect and the import effect under specific hypothesized income redistributions. The savings effect is examined on a basis of estimated consumption functions relating consumption to family income level. The import effect
is examined by investigating change in the composition of demand by product after income redistribution and calculating the direct and indirect effects of this change on imports. These two estimates (in Chapters 4 and 5 respectively) follow an initial examination (Chapter 3) of data presently available for income distribution in six Latin American countries.

3. **The Savings Effect: Estimates**

With the estimates of income distribution data obtained in the previous section, the study may now turn to analysis of the trade-off between growth and equity. The first estimates are of the "savings effect."

3.1 **Consumption Function Estimates**

As a basis for the calculations of income redistribution's effect on savings, this section presents statistical estimates of consumption functions for Argentina, Brazil, Mexico, and Venezuela, after first describing the data used for the estimates. For all four countries the data are cross-sectional and are drawn from household budget surveys. Family consumption data are not available to the author for Chile or Colombia.

3.1.1 **The Data**

3.1.1.1 **Argentina**

In 1963 the "Joint Tax Program" of the Organization of American States, the Inter-American Development Bank, and the
Economic Commission for Latin America conducted a household budget survey for urban areas in Argentina. The sample included four thousand households. In most cases, the housewife was interviewed. The interviewer asked the monthly income of all persons in the household (excluding domestic servants); their expenditure during the previous year (1962) on consumer durables, vacation, medical expenses, transportation, and certain other annual items; and their expenses during the most recent "normal" month in some forty categories of frequent expense, such as foodstuffs, domestic servants, and household items. The survey included repeat interviews in cases where consumption seemed highly inconsistent with reported income, thus increasing the reliability of the data for consumption function analysis. Although the survey included questions on the household's change in real and financial assets during the year, as a check on income minus consumption as the estimate of savings, there was a high rate of failure to respond to these questions and their results were not processed.

Only aggregative results of the survey are available to the author.¹ The observations for the consumption function estimates are average family income and average family consumption in each of ten income classes.

¹As published in the CONADE report, Consejo Nacional de Desarrollo, Encuesta..., 1965, op.cit..
It is noteworthy that the study treated consumer durable purchases as consumption, registering as consumption the payments actually made on the durable good during the year.

3.1.1.2 Brazil

In 1963 and 1964 the Getulio Vargas Foundation conducted family budget surveys in the major capital cities\(^1\) of Brazil and in several smaller interior cities. Also in 1963 the Foundation carried out a rural budget study in coordination with a survey of characteristics of agricultural production; however, the family budget data from these rural studies were not yet published as of mid-1969.

The urban surveys were relatively large: 4,625 families were included in the surveys of eight capital cities and the surveys of interior cities included 2,684 families. The households visited were selected from the census register of households which had been included in the 25 percent coverage in the "economic survey" of the 1960 census. The observations were chosen so as to be representative of the income distribution according to the 1960 census economic survey.

The published results\(^2\) for the urban studies show average family income, before and after direct taxes, and average family

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\(^1\)Fortaleza, Recife, Salvador, Belem, Rio de Janeiro, Sao Paulo, Belo Horizonte, Curitiba.

\(^2\)Fundacao Getulio Vargas, Instituto Brasileiro de Economia, Pesquisa Sobre Orcamentos Familiares, Op.cit..
expenditure by major category, for nine income groups. For the consumption function analysis below, consumption includes the category "current expenses" as well as expenditures on automobiles, housing, and furniture. These consumer durables are thus excluded from the concept of savings, as discussed above in section 2.2.4. The income data refer to disposable income. The data for each income bracket are aggregated across all capital cities (1961-62 data) on the one hand, and across all interior cities (1962-63 data) on the other hand, after appropriate sample expansion based on the universe population of each city.

The reliability of these data is subject to challenge primarily because the interview data was so long after the period to which the answers were supposed to pertain, in the face of rapid inflation in the interim. For example, for the capital cities the interview dates fell between August and December of 1962, whereas the year to which the data referred was July 1, 1961 to June 30, 1962. In the period December 1961 to December 1962 wholesale prices rose by 53% in Brazil. Yet the questions on income and current expenditures referred to average monthly values during the year in question. One wonders, then, whether the typical respondent answered questions in terms of values current at the interview data or in terms of values truly relevant for the average over the period July 1961 - June 1962. ¹

¹ This and other weaknesses in the date were called to the author's attention by Professor Albert Fishlow.
For interpretation of the estimated consumption functions, it is necessary to ask what bias would result if the respondents answered thinking in terms of monthly data for the interview date of, suppose, October 1962 instead of the monthly average for July 1961-June 1962. There are essentially four possible cases. First, all respondents answered perfectly, accurately recalling values of roughly a year previous. Second, all respondents answered thinking of values current at the interview date, and thus roughly 50% higher in monetary terms than true values for the period requested. Third, some respondents answered perfectly and some erroneously on a basis of values at the interview date, but the proportion of right to wrong responses was not related to income level. Fourth, the proportion of right to wrong responses was related to income level: in this case one would expect the lower income groups to have been the less sophisticated and therefore the more likely groups to answer erroneously (giving values relevant to the interview date) while the higher income groups answered correctly.

In the first and second cases the estimated consumption functions should be satisfactory. In the first case there is no problem at all. In the second case one need only interpret the absolute values as cruzeiros of late 1962 instead
of cruzeiros of late 1961; and if the results are used for estimation of savings propensities by relative positions in the income distribution, the absolute units drop out and cause no problem.

In the third and fourth cases biases occur. In the third case the whole consumption function estimate is biased upward; at any income level expressed in 1961-62 cruzeiros, estimated consumption is higher than true consumption. The reason is that the estimate is an average of the curve for erroneous respondents and that for accurate respondents. The curve for erroneous respondents lies everywhere above that for accurate respondents; all consumption and income values for erroneous respondents are 50% above what they should be for true 1961-62 values. Thus as observed income level \( y^* \) for an incorrect response represents a true income of \( \frac{2}{3} y^* \) and thus, given normal consumption propensities, will be associated with a higher fraction of income consumed than that associated with true income of \( y^* \). For any observed income level \( y^* \), observed consumption for the erroneous respondents will therefore always exceed that for accurate respondents.

In the fourth case, the bias in toward overestimation of consumption for low income levels and true estimation for high income levels, and thus also a strong downward bias in the marginal propensity to consume.
To summarize, consumption functions based on these data will, if biased, have either a bias toward over-statement of consumption at all income levels or a bias toward over-statement of consumption at low-income levels.

Finally, in preparation of the data for consumption function analysis, the author included in the same regressions data for interior cities and data for capital cities, by deflating the former (which were for the year 1962-63) by the wholesale price index change from December 1961 to December 1962 -- the midpoints of the two survey periods. To test for error resulting from this inclusion, dummy variables were first included in the consumption functions, to see whether parameters differed significantly for interior versus capital cities. These shift variables would have represented a mixture of: error in the wholesale price index, changes in consumption behavior over one year, and true difference in consumer behavior between smaller and larger cities. However, the dummy variables were not significantly different from zero and joint estimation from the two sets of data appeared valid.

3.1.1.3 Mexico

In 1963 the Banco de Mexico S.A. carried out a family budget survey with the primary purpose of projecting future
demand for agricultural products. The publication\(^1\) containing results of the survey, expanded to universe magnitudes, warned of a tendency of high income respondents to understate both income and consumption, and a tendency of low income respondents to overestimate their consumption but understate their income. The study therefore warned against use of the data for income distribution or consumption function analysis. Since this set of data is the only source available for consumption function analysis for Mexico it is used in this section but the results must be interpreted with the warning of bias in mind.

The survey included 5,070 households, interviewed in 327 rural and 165 urban population centers. The sample was random, stratified in an attempt to get higher representation of higher income geographic regions, under the valid assumption of higher variance in consumption and income variables for higher income units. Interviewers asked for the annual income of the household, including "own-consumption" of goods produced (especially important on farms) as well as imputed rent for owned housing (with this imputed rent also recorded as an expenditure). The income concept requested was disposable income after deduction of direct taxes and contributions for social security and labor fees. Data requested for

\(^1\)Banco de Mexico, S.A., Encuesta ... 1963, op.cit.
consumption expenditures referred to weekly outlays for food, beverages and tobacco; monthly, for housing, fuels, electricity, and other services; yearly, for clothing, vehicles, furniture, and appliances. The week, month, or year immediately preceding the interview was the period of reference. Due to price stability in Mexico in the period, adjustment of data for inflation was not necessary. Outlays on consumer durables were counted as family expenditures; the amounts of payments actually made on these items during the year were recorded as the expenditure (i.e. not the total purchase prices in the case of items bought on credit).

For the purposes of this section, the data used were those published on total income, total consumption, and total number of families, grouped in nine income categories. For each income category average family consumption and average family income were calculated and used as the variables for the functions below.

The Mexican data appear to have a bias toward overstatement of consumption relative to income in the lower income brackets -- as warned by the authors of the study. The observed dissaving is very high in lower brackets, and roughly the bottom seventy percent of the population supposedly have expenses in excess of income. One wonders where financing of large amounts of dissaving would come from, especially for low income families.
Finally, there is a second source of consumption function data for Mexico. The income distribution study published by Navarrete in 1960 contains a table of income and consumption in each income bracket.\textsuperscript{1} By adding "income in kind" both to monetary income and monetary consumption, figures for average real income and consumption per family may be obtained for each income bracket. These figures are used below for a second set of consumption function estimates. Since the banco de Mexico data are published in much greater detail and are used below in the demand composition analysis, they remain the basic data reference for Mexico in this study. The Navarrete data are used primarily as a check, to indicate the probable direction of bias in the Banco de Mexico data.

3.1.1.4 \textbf{Venezuela}

The family consumption data for Venezuela come from a family budget survey of 1962 conducted by the government's "Central Office of Coordination and Planning.\textsuperscript{2} A sample of 3,697 households was taken on a random basis, with stratification to give higher representation to urban areas in view of higher income in urban areas than in rural. The sample was taken between June and November of 1962. The income

\textsuperscript{1}Navarrete, op.cit., p. 115.

\textsuperscript{2}Reported in Oficina Central de Coordinacion y Planificacion, et. al, Primera Encuesta... \textit{op.cit}.
recorded included regular salaried or business income as well as own-consumption of farm produce and imputed rent of owned housing. Expenditures were collected on a basis of weekly outlays on each item in a detailed list, plus other expenditures on a monthly or annual basis.

The publication points out that the overall monthly spending in the sample exceeds total monthly income (by about 10%) and attributes this difference not to true dissaving but to exaggeration of reported consumption expenses and underreporting of income by respondents.

To obtain the over-all average family income and consumption levels by income category, used below in the consumption function estimates, it was necessary to expand the publication's data for each of the three regions (urban, minor urban, rural) by the ratio of population to sample size for each. The publication's aggregate data appeared incorrectly based on simple summation of data for the three regions.

3.1.2 Results

The forms of the consumption function estimated are:

a) Linear: \[ C = a + by \]

b) Quadratic: \[ C = a + by + cy^2 \]

c) Log-linear: \[ C = e^{a+y} \text{ or } \ln C = a + b (\ln y) \]
where $C = \text{family consumption}$ and $y = \text{family disposable income}$. Table 3.1 shows the results for these three models.

The very high $R$-squared values for all models of all countries are due in large part to the small number of observations. The small number of observations is not damning; the functions should be valid as central tendencies since each of the observations represents an average for all sample observations within a given income bracket, and therefore a highly representative datum. The variation around the function would be much higher if each sample household were treated as an individual observation in the regression, but the values of the function's parameters could be expected to be the same as those estimated here.

A visual plotting of the observations clearly shows the consumption function to be curvilinear for Argentina, Brazil, and Mexico, but linear for Venezuela. This fact is confirmed by the statistical significance of a negative coefficient for $y^2$ in the quadratic model for each of the first three countries but lack of significance of this coefficient for Venezuela.

The data for the functions for Mexico in Table 3.1 are from the Banco de Mexico study (1963). As a check on these basic data, functions based on data from the Navarrete study
TABLE 3.1: Consumption Function Estimates

<table>
<thead>
<tr>
<th>Country</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>65.04</td>
<td>.5128</td>
<td>--</td>
<td>.9767</td>
</tr>
<tr>
<td></td>
<td>(12.9)</td>
<td>(.03)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>28.74</td>
<td>.7677</td>
<td>-.2145 x 10^-3</td>
<td>.9968</td>
</tr>
<tr>
<td></td>
<td>(7.5)</td>
<td>(.04)</td>
<td>(.3 x 10^-4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.077</td>
<td>.7711</td>
<td>--</td>
<td>.9956</td>
</tr>
<tr>
<td></td>
<td>(.1)</td>
<td>(.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>107.9</td>
<td>.7134</td>
<td>--</td>
<td>.9856</td>
</tr>
<tr>
<td></td>
<td>(30.2)</td>
<td>(.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.911</td>
<td>1.008</td>
<td>-.7057 x 10^-4</td>
<td>.9994</td>
</tr>
<tr>
<td></td>
<td>(8.3)</td>
<td>(.02)</td>
<td>(.4 x 10^-5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.5628</td>
<td>.9050</td>
<td>--</td>
<td>.9978</td>
</tr>
<tr>
<td></td>
<td>(.06)</td>
<td>(.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>798.7</td>
<td>.5631</td>
<td>--</td>
<td>.9533</td>
</tr>
<tr>
<td></td>
<td>(254.3)</td>
<td>(.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>256.1</td>
<td>.9152</td>
<td>-.2907 x 10^-4</td>
<td>.9974</td>
</tr>
<tr>
<td></td>
<td>(83.9)</td>
<td>(.04)</td>
<td>(.5 x 10^-5)</td>
<td></td>
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<tr>
<td></td>
<td>2.244</td>
<td>.7062</td>
<td>--</td>
<td>.9931</td>
</tr>
<tr>
<td></td>
<td>(.17)</td>
<td>(.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venezuela</td>
<td>257.9</td>
<td>.6770</td>
<td>--</td>
<td>.9709</td>
</tr>
<tr>
<td></td>
<td>(99.1)</td>
<td>(.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>232.7</td>
<td>.7177</td>
<td>-.689 x 10^-5</td>
<td>.9713</td>
</tr>
<tr>
<td></td>
<td>(129.2)</td>
<td>(.13)</td>
<td>(.2 x 10^-4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.751</td>
<td>.7529</td>
<td>--</td>
<td>.9864</td>
</tr>
<tr>
<td></td>
<td>(.19)</td>
<td>(.03)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Units; Number and range of observations:
Argentina: Monthly, 1000 pesos of March 1963. 10 obs. Max=1185 Min=39
Brazil: Yearly, 1000 cruzeiros of Dec. 1961. 18 obs. Max=4533 Min=52
Mexico: Monthly, pesos of 1963. 9 obs. Max=13,539 Min=216
Venezuela: Monthly, bolivars of 1962. 12 obs. Max=6488 Min=76
Models: L=linear Q=Quadratic LL=Log-linear (Naperian base)
are shown in Table 3.2 below. The log-linear (LL) form is most easily compared for the two sets of results. Since the constant is lower and the exponent of income (b) higher in the results for the Navarrete data, the average propensity to consume is lower at low income levels and the elasticity of consumption with respect to income higher in these results than in those from the Banco de Mexico data. This difference tends to confirm the observation above that the Banco de Mexico data overstate consumption at low income levels.

Table 3.2: Consumption Functions
Mexico, Navarrete Data

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>192.4</td>
<td>.64039</td>
<td>--</td>
<td>.9940</td>
</tr>
<tr>
<td></td>
<td>(36.4)</td>
<td>(.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>93.0</td>
<td>.81506</td>
<td>-.3178x10^-4</td>
<td>.9992</td>
</tr>
<tr>
<td></td>
<td>(21.1)</td>
<td>(.03)</td>
<td>(.5x10^-5)</td>
<td></td>
</tr>
<tr>
<td>LL</td>
<td>.9990</td>
<td>.83816</td>
<td></td>
<td>.9994</td>
</tr>
<tr>
<td></td>
<td>(.05)</td>
<td>(.01)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Monthly pesos of 1956, 10 observations. Maximum income observed = 5496; Min = 185. L = linear, Q = Quadratic, LL = log-linear (Naperian base).
In addition to the estimation of the over-all consumption functions, for Brazil it is possible to make a highly interesting hypothesis test; do entrepreneurs have a significantly higher savings rate than other persons receiving identical levels of income? To the extent that entrepreneurs save more than others at similar income levels, the analysis of this study ignores an important consideration; the analysis below of the "savings effect" of income redistribution considers income level as the only determinant of personal savings and thus could be misleading if the type of income is of major importance, net of income level's influence. The Brazilian data include one stratification with all family heads classed in one of four categories: "employer", "employee," "retired," or "not working." While this stratification includes only data on disposable income and on "current" expenses, but not on consumer durable expenditures, any differential savings propensity for "employers" as opposed to others should be evident even though the consumption data are only for "current consumption."

Using average family income and family "current consumption" data\(^1\) for each of nine income brackets, with

\(^1\)With consumption of "own production" added both to income and consumption.
data aggregated from six cities\textsuperscript{1} weighted by their populations relative to their sample sizes, and with one set of observations for "employers" and another for all other income recipients, the following models were estimated:

\begin{align*}
\text{a)} & \quad \ln C = a + b \quad \ln y + cD \\
\text{b)} & \quad \ln C = a + b \quad \ln y + dD (\ln y) \\
\text{c)} & \quad \ln C = a + b \quad \ln y + cD + dD (\ln y) \\
\text{d)} & \quad \ln C = a + b \quad \ln y
\end{align*}

where \( C = \text{family "current" consumption, } y = \text{family disposable income, and } D = 0 \text{ for "employers" and } D = 1 \text{ for all others.} \)

The results are shown in Table 3.3.

\begin{table}[h]
\centering
\begin{tabular}{lrrrrr}
\hline
\textbf{Model} & \textbf{a} & \textbf{b} & \textbf{c} & \textbf{d} & \textbf{R-squared} \\
\hline
\text{a)} & .7799 & .8534 & .0385 & -- & .9925 \\
 & (.12) & (.02) & (.045) & & \\
\text{b)} & .796 & .850 & -- & .0071 & .9926 \\
 & (.12) & (.02) & & (.007) & \\
\text{c)} & .662 & .840 & -.145 & .0299 & .9928 \\
 & (.16) & (.03) & (.24) & (.039) & \\
\text{d)} & .803 & .853 & -- & -- & .9921 \\
 & (.12) & (.02) & & & \\
\hline
\end{tabular}
\caption{Hypothesis Test for Difference in Savings Propensity: Entrepreneurs versus Others, Brazil}
\end{table}

\textsuperscript{1}Belem, Fortaleza, Recife, Salvador, Rio de Janeiro, São Paulo.
It is clear that the dummy variables "D" and "D (ln y)"
have coefficients that are not significantly different from
zero. A positive, significant coefficient "c" would mean
that non-entrepreneurial consumption is always a multiple
e^c times entrepreneurial consumption, for any given income
level. If the coefficient "d" were statistically signifi-
cant and positive, then non-entrepreneurial consumption
would be greater than entrepreneurial consumption at a given
income level, and the multiple would increase as income
level increased. But neither of these two "shift" variables
is statistically significant, and one must therefore reject
the hypothesis that entrepreneurial consumption differs from
non-entrepreneurial consumption for a given income level. ¹
The analysis below of the "savings effect" of income redis-
tribution, which is based solely on level and not type of
income, should therefore not be misleading.

¹This finding contradicts the implicit conclusion of
Houthakker, that the marginal propensity to save is greater
for entrepreneurs than for non-entrepreneurs -- although
Houthakker is vague as to whether his conclusion refers
to a difference net of the influence of income level.
See section 2.2.1 above.
3.2 Savings Effect Simulation

3.2.1 Method

The basic elements in calculation of income redistribution's effect on savings are: The over-all consumption function, the present income distribution, and the alternative hypothesized new income distributions. The purpose is to apply the estimated consumption function to the new or simulated levels of income for the new income distributions and aggregate the implied savings to determine new aggregate personal savings for comparison with original personal savings. It is important to keep in mind that the consumption function assumed is the curvilinear Keynesian function, which automatically gives a negative savings effect for income equalization. Thus, the estimates here should be viewed as maximum statements of the negative effect of income redistribution. Alternative consumption function theories (Friedman, Modigliani-Brumberg) would hold that there is no savings change at all after income redistribution.

The savings effect calculation first considers twelve income distribution brackets: the lowest nine deciles of recipients, then the brackets 90%-95%, 95%-97.5%, and 97.5%-100%. Let $\lambda$ be a vector of twelve elements with the $j$th element $\lambda_j$ being the fraction of total disposable personal
income going to the \(j^{th}\) income bracket. Let \(\bar{Y}\) be overall average family income, taken from the set of data for which the consumption functions (cf section 3.1) are estimated. Let \(w_j\) be the fraction of total recipients in the \(j^{th}\) bracket. Thus \(w_j\) equals .1 for the first nine brackets, and .05, .025, .025 for the final three.

The first step in the savings effect calculation is then to calculate the original average savings rate in each income bracket. To do this, the average family income for each bracket is calculated as:

\[
(3.1) \quad \bar{Y}_j = \bar{Y} \left( \frac{\lambda_j}{w_j} \right)
\]

Then the level of consumption occurring at this income level is calculated as

\[
(3.2.a) \quad \bar{c}_j = a + b \bar{Y}_j + c \bar{Y}_j^2
\]
or

\[
(3.2.b) \quad \bar{c}_j = e^a \bar{Y}_j^b
\]

that is, the consumption at each bracket's average income level is estimated by applying the quadratic or log-linear consumption function (from section 3.1) to the average family income level.\(^1\)

---

\(^1\)Proof: by definition \(\bar{Y}_j = Y_j/N_j\) where \(Y_j = \text{total income in bracket } j\) and \(N_j = \text{total number of recipients in the bracket.}\) But \(Y_j = Y \lambda_j\) and \(N_j = N w_j\) where \(Y\) is total income and \(N\) total population. Thus \(\bar{Y}_j/N_j = Y \lambda_j/N w_j = (Y/N)(\lambda_j/w_j) = \bar{Y}(\lambda_j/w_j) = \bar{Y}_j\). Q.E.D.
income level for the bracket. Note that the linear consumption functions of section 3.1 are ignored since one knows a priori that they will yield no savings change after income redistribution.

The average savings rate for each income bracket is then calculated as:

\[(3.3) \quad \bar{s}_j = 1 - \left( \bar{c}_j / \bar{y}_j \right) \]

The original over-all average savings rate for personal disposable income will then be the sum of each bracket's average savings rate weighted by its fraction of disposable personal income. If \( S \) is defined as a vector with \( \bar{s}_j \) as its \( j \)th element, then the total average savings rate for the community (from personal disposable income) defined as \( \bar{s}_T \) is:

\[(3.4) \quad \bar{s}_T = \left( S' \right) (\lambda) \]

At this point, the original average savings rate for personal income is estimated. Note that the savings effect estimate concerns only personal savings, not savings by incorporated businesses or by government. Since much of business is unincorporated in the countries in question, much of business saving should be included in the personal saving of upper income brackets as shown in the family budget data.
To simulate the effect of income redistribution on savings, the next step is to define a new vector $\lambda^*$ of fractions of total income going to each of the original 12 income brackets. (The fraction $w_j$ of recipients in each bracket is unchanged.) In the two calculations made below, one assumption is that the new $\lambda^*$ equals that of disposable income in England; the other assumption is that the new $\lambda^*$ is such that enough income is taken from the upper brackets to insure a minimum income of one-half total average family income to all lower brackets. Given the hypothesized $\lambda^*$ a new set of income and consumption levels is calculated for the twelve brackets, and a new average over-all savings ratio $\bar{s}_T^*$ is calculated. That is, all of the above steps of equations 3.1 through 3.4 are repeated but in the initial equation $\lambda^*_j$ is substituted for $\lambda_j$, and in the subsequent equations $\bar{y}_j, \bar{c}_j, S$, and $\lambda$ are replaced by their "starred" counterparts.

3.2.2 Results

Table 3.4 shows the $\lambda$ vectors (shares of income by bracket) for England, for each of the four countries examined in this section, and for "experiment 2" (minimum income equals one half over-all average family income) for each of the four countries. Table 3.5 shows the estimated "original"
average savings rates by income bracket on both the quadratic and log-linear consumption function bases. Table 3.6 shows the simulated savings effect of the two income redistribution experiments, under the two assumed consumption functions.

The data for the income distribution vectors \( \lambda \) are the following. For Argentina, the United Nations data for families in 1961 are used. For Brazil, the income distribution chosen is that of "active non-agricultural workers" from the population census of 1960. For Mexico, the income distribution data come from the Banco de Mexico survey of 1963, and for Venezuela the data are from the family budget survey of 1962 (the only source available to this study).

It appears from table 3.6 that income equalization to the degree of equity in England would cause little decline in personal savings in Argentina but declines on the order of 5-1/2 percent of personal income in Brazil and 7.6 percent of personal income in Mexico (on the log-linear basis). In Venezuela the linear consumption function appears the best and the savings effect of income redistribution would be zero.
<table>
<thead>
<tr>
<th>Percent Position Recipients</th>
<th>English Distrib.</th>
<th>Argentina</th>
<th>Brazil</th>
<th>Mexico</th>
<th>Venezuela</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>O</td>
<td>E₂</td>
<td>%</td>
<td>E₂</td>
</tr>
<tr>
<td>0-10</td>
<td>2.4</td>
<td>2.9</td>
<td>5.0</td>
<td>1.4</td>
<td>5.0</td>
</tr>
<tr>
<td>10-20</td>
<td>3.7</td>
<td>4.1</td>
<td>5.0</td>
<td>1.6</td>
<td>5.0</td>
</tr>
<tr>
<td>20-30</td>
<td>5.0</td>
<td>4.8</td>
<td>5.0</td>
<td>2.3</td>
<td>5.0</td>
</tr>
<tr>
<td>30-40</td>
<td>6.8</td>
<td>5.5</td>
<td>5.5</td>
<td>3.3</td>
<td>5.0</td>
</tr>
<tr>
<td>40-50</td>
<td>8.3</td>
<td>6.1</td>
<td>6.1</td>
<td>4.1</td>
<td>5.0</td>
</tr>
<tr>
<td>50-60</td>
<td>9.8</td>
<td>7.0</td>
<td>7.0</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>60-70</td>
<td>11.9</td>
<td>8.0</td>
<td>8.0</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>70-80</td>
<td>13.6</td>
<td>9.6</td>
<td>9.6</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>80-90</td>
<td>15.4</td>
<td>12.9</td>
<td>12.9</td>
<td>11.6</td>
<td>11.6</td>
</tr>
<tr>
<td>90-95</td>
<td>10.1</td>
<td>9.7</td>
<td>9.7</td>
<td>12.2</td>
<td>12.2</td>
</tr>
<tr>
<td>95-97.5</td>
<td>5.8</td>
<td>9.3</td>
<td>9.3</td>
<td>22.9</td>
<td>16.7</td>
</tr>
<tr>
<td>97.5-100</td>
<td>7.2</td>
<td>20.1</td>
<td>16.9</td>
<td>22.9</td>
<td>16.7</td>
</tr>
</tbody>
</table>

Notes: O= Original  E₂= Experiment 2


Other countries: see text.
Table 3.5: Original Average Savings Rates (%) by Income Distribution Bracket

<table>
<thead>
<tr>
<th>Distribution Position</th>
<th>Quadratic basis</th>
<th>Log-linear basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>-14.5</td>
<td>-11.4</td>
</tr>
<tr>
<td>10-20</td>
<td>-2.4</td>
<td>-10.0</td>
</tr>
<tr>
<td>20-30</td>
<td>2.1</td>
<td>-6.6</td>
</tr>
<tr>
<td>30-40</td>
<td>5.5</td>
<td>-4.2</td>
</tr>
<tr>
<td>40-50</td>
<td>7.9</td>
<td>-3.1</td>
</tr>
<tr>
<td>50-60</td>
<td>10.8</td>
<td>-1.9</td>
</tr>
<tr>
<td>60-70</td>
<td>13.3</td>
<td>-0.9</td>
</tr>
<tr>
<td>70-80</td>
<td>16.6</td>
<td>-0.6</td>
</tr>
<tr>
<td>80-90</td>
<td>21.4</td>
<td>2.5</td>
</tr>
<tr>
<td>90-95</td>
<td>27.9</td>
<td>8.3</td>
</tr>
<tr>
<td>95-97.5</td>
<td>40.3</td>
<td>34.8</td>
</tr>
<tr>
<td>97.5-100</td>
<td>57.8</td>
<td>34.8</td>
</tr>
</tbody>
</table>
Table 3.6: Aggregate Average Savings Rates for Disposable Personal Income. Simulated.

<table>
<thead>
<tr>
<th></th>
<th>Original</th>
<th>English Distribution (Experiment 1)</th>
<th>Experiment 2 Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>24.6%</td>
<td>19.2%</td>
<td>23.1%</td>
</tr>
<tr>
<td></td>
<td>22.6</td>
<td>19.8</td>
<td>21.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>16.3</td>
<td>3.1</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>12.0</td>
<td>6.5</td>
<td>9.0</td>
</tr>
<tr>
<td>Mexico</td>
<td>-2.3</td>
<td>-7.3</td>
<td>-6.0</td>
</tr>
<tr>
<td></td>
<td>-3.5</td>
<td>-11.1</td>
<td>-9.3</td>
</tr>
<tr>
<td>Venezuela</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>-0.5</td>
<td>-5.1</td>
<td>-4.8</td>
</tr>
</tbody>
</table>

Notes: Q = quadratic consumption function basis
LL = log-linear consumption function basis.
* = for Venezuela linear consumption function used in place of quadratic (quadratic term not significant).

Various clarifications of the results of Tables 3.5 and 3.6 are necessary. First, in the calculation of average savings rates by income bracket, for brackets with income levels in excess of the maximum income observed in estimation of the consumption function the savings rate was not calculated by direct application of the consumption function. Instead, it was assumed that the consumption equaled that at the maximum income observed (in estimation of the consumption function) plus the difference between
the bracket average income and maximum observed income multiplied by the
marginal propensity to consume at the maximum observed income. This method
avoided absurdly high savings rates for the quadratic function in which the
negative term for \( y^2 \) makes the consumption function unreliable for values
outside the original range of estimation.

Second, the large negative savings rates at low income levels in
Mexico and Venezuela (Table 3.5) are very questionable. Nevertheless, the
simulated savings change can be perfectly correct even with an incorrect
set of original absolute savings rates. More explicitly, under the condition
that the true consumption function is exactly parallel to the observed
function (i.e., the observed minus a constant value), the change in savings
after income redistribution will be accurately measured even though the
observed consumption function overstates consumption everywhere. This fact
may be seen in the graph below.
In the two-household example the measured increase in consumption is identical for the measured consumption function (\( CM \)) and for the true consumption function (\( CT \)) even though the measured function lies above the true -- because the two are parallel. In sum, while the absolute levels of the Mexican and Venezuelan savings rates seem very questionable, the savings effect calculations for the two countries should be more reliable since these calculations refer to differences in levels before and after redistribution and do not hinge crucially on the absolute savings levels observed. Nevertheless there does appear to be downward bias (in terms of what seems reasonable \( a \text{ priori} \)) in the measured savings rates for low income levels in Mexico and Venezuela, although it is hard to determine whether the bias represents a parallel or non-parallel distortion from the true consumption function.

Third, from the negative savings rates at low income levels shown in Table 3.5 one might immediately conclude that income redistribution would have to yield very negative savings effects. Consider for example the large difference between the 23% savings rate in the top 5% bracket and the -15% rate for the bottom 10% bracket in Brazil (log-linear case). However, one must remember that it is not these \( \text{ex-ante} \) savings rates that are relevant for the "savings effect" but rather
the *ex-post* savings rates at the after-redistribution income levels that matter. (This distinction is emphasized in the discussion in section 2.2.2.1 above).

Fourth, for the Mexican case there is a check on these results available from estimates based on the Navarrete data (discussed above). The savings simulation calculation applied to the Navarrete data yields much more reasonable savings rates. These range from an average savings rate of -22% in the bottom bracket to 34% in the top bracket, as opposed to a range from -94% to 35% for the corresponding brackets in the Banco de Mexico data (Table 3.5), using the log-linear basis for both sets of data. The original aggregate savings rate is 14.7% in the Navarrete data (simulated, log-linear basis) versus -3.5% in the data of Table 3.5. The aggregate savings rate after change to the English distribution is 10.6%; after change to the Experiment 2 distribution it is 11.7%, for the Navarrete data (log-linear basis.) Thus the alternative data set implies smaller decline in savings after income redistribution (a decline of 4.1% of personal income versus the decline of 7.6%, for the English distribution.)

Fifth, it should be remembered that the calculations for Argentina and Brazil refer to urban data, both for income distribution and consumption functions. It is impossible to
say \textit{a priori} whether inclusion of the rural sector would make the negative savings effect of redistribution larger or smaller. One might expect the savings rate for a given income level to be higher in the rural sector given the immediate outlet for investment in the farm and given the more obvious consumption pressures of the demonstration effect in the cities. The overall lower income level in the rural sector might offset a higher savings rate at specified income for purposes of the savings effect calculation. In the absence of rural data for these two countries, it is assumed below that the results for the urban sector apply validly to the whole economy.

3.3 \textit{Growth Implications}

To translate the "savings effect" calculations of Table 3.6 into figures for sacrifice of growth rates, two parameters are required: the incremental capital output ratio and the fraction which disposable personal income constitutes in gross national product. If "d" is disposable personal income as a fraction of GNP, "B" is the incremental capital output ratio, and "v" is the decrease in savings due to income redistribution expressed as a fraction of aggregate personal disposable income, then the decline in the growth rate of the economy as a whole ($\Delta g$) equals

\begin{equation}
\Delta g = \frac{dv}{B}
\end{equation}
from a simple Harrod-Domar growth relationship \( g = \frac{s}{B} \)
where \( s \) is average savings rate for the whole economy and
\( g \) is the growth rate. To obtain an approximate idea of the
growth costs implied by the calculations of savings results,
it may be assumed\(^1\) that personal disposable income represents
.7 of GNP and the incremental capital output ratio is 3.
Table 3.7 shows the change in the economy's growth rate implied
by each of the savings declines shown in table 3.6.

---
\(^1\) Assumption of these parameters is necessary since actual
data from national accounts are either non-existent or un-
reliable. National accounts frequently do not show private
income distinctly separated into retained corporate earnings
versus personal income. Savings data are notoriously in-
accurate and are usually derived as the residual between
foreign capital inflow and domestic capital formation. Of
the countries examined here, the United Nations data on
household savings as a fraction of capital formation include
only Venezuela -- for which the fraction was an average of
about 30% during the period 1960-67. United Nations,
International Tables, p. 129.
Table 3.7: Decline in Percentage Growth Rate of the Economy Resulting from Redistribution of Income.

<table>
<thead>
<tr>
<th></th>
<th>English Distribution (Experiment 1)</th>
<th>Experiment 2 Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q</td>
<td>.35%</td>
</tr>
<tr>
<td>Argentina</td>
<td>LL</td>
<td>.65%</td>
</tr>
<tr>
<td>Brazil</td>
<td>Q</td>
<td>3.40</td>
</tr>
<tr>
<td></td>
<td>LL</td>
<td>1.28</td>
</tr>
<tr>
<td>Mexico</td>
<td>Q</td>
<td>1.17</td>
</tr>
<tr>
<td></td>
<td>LL</td>
<td>1.77</td>
</tr>
<tr>
<td>(Navarrete data)</td>
<td>LL</td>
<td>.96</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Q*</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>LL</td>
<td>1.07</td>
</tr>
</tbody>
</table>

Notes: Assumes incremental capital/output ratio = 3 and aggregate disposable personal income = .7 (GNP). Q = quadratic basis, LL = log-linear basis. * Linear function.

As an example of the results of Table 3.7, suppose the economy is growing at 4% annually in Argentina. Redistribution of income to the level of equality found in England will then reduce the total growth rate by 1.26% to a rate of 2.74% — assuming the quadratic function is the basis for calculation.
The most serious damage to the growth rate is in the quadratic case for Brazil, in a shift to English equality. Detailed investigation of the consumption function data and estimates strongly suggests that the quadratic function overstates savings in the upper income bracket,\(^1\) despite the precaution taken for observations beyond the original range of observed data (described above). The quadratic case for Brazil may therefore be ignored.

The sacrifice of growth due to income equalization is relatively small for Argentina and is nil for Venezuela (assuming the linear function for Venezuela). For Mexico the loss is relatively high for the English experiment -- 1.77% is lost (log-linear basis). But the Navarrete data for the same experiment find only a .96% loss. In light of the discussion above of these two data sources for Mexico, the latter should be considered more accurate.

To summarize, a redistribution of income towards the level of equality found in England would cause decreases in growth rates on the order of 1% in Brazil and Mexico and smaller decreases in Argentina and Venezuela. While one

---

\(^1\) Estimated average consumption by income bracket differs by only about 1% for the log-linear versus the quadratic function in the lower 10 brackets but is approximately 15% lower for the quadratic function than for the log-linear in the two top brackets.
percentage point is a serious growth sacrifice, it might very well be a reasonable price to pay for a country growing at 5% with inequality so extreme that political instability is chronic. For Brazil and Mexico this characterization is fairly accurate.

4. **Effects on the Composition of Demand**

This section examines the effect income redistribution would have on growth through influence on the composition of demand. The effect on imports is examined for Brazil and Mexico, and economies of scale effects as well as factor cost effects are discussed briefly for these two countries.

4.1 **Detailed Consumption Function Estimates**

Brazil and Mexico are the only two countries of this study for which detailed data are available to permit estimation of demand composition effects of income redistribution. Two types of data are required: consumption functions by product, and input-output data. While detailed consumption function data were available for Argentina, the most recent input-output data available were for 1953, so Argentina was excluded from this analysis.
For Brazil the Getulio Vargas Foundation family budget studies of capitals and interior cities in 1962 and 1963 show average family income as well as average family expenditure on twenty "current consumption" items and two consumer durables -- housing and automobiles. The Brazilian input-output table for 1960\(^1\) included 32 sectors. The author determined the correspondence between the input-output sectors and the products of the Getulio Vargas Foundation study and then estimated log-linear consumption functions for individual or combined products from the budget study data.\(^2\) A similar method was used to estimate from the Banco de Mexico study with 44 products, consumption functions corresponding to each of the 45 product sectors of the 1960 Mexican input-output table.\(^3\)

\(^1\) Instituto de Pesquisa Economico-Social Aplicada (IPEA). Ministerio de Planejamento e Coordenacao Geral, Relacoes Inter-industriais no Brasil.

\(^2\) The data were first expanded by population and aggregated. Six capitals were included (Belem, Fortaleza, Recife, Salvador, Rio de Janeiro, Sao Paulo) and nine interior cities (with appropriately deflated data) were included (those from Rio de Janeiro/Expirito Santo, Minas Gerais and Sao Paulo).

\(^3\) Banco de Mexico, S.A., Cuadro de Insumo Producto de Mexico, 1960 (Mexico, 1966).
4.2 Import Effect

4.2.1 Method

To calculate the effect income redistribution would have on imports, it is first necessary to calculate the change in the final demand which would result for each product sector; then input-output analysis may be used to determine the resulting change in imports. The full version of the analysis was applied only to Mexico and follows these steps. First, let

\[(4.1) \quad c_i = e^{ai} y_i\]

be the consumption function for the product of the \(i\)th production sector in the input-output sector (as determined from the budget study -- input-output correspondence discussed above). Here, \(c\) = consumption expenditure per family and \(y\) = average family income.\(^1\) Then calculate a "numeraire" vector \(\theta\) with \(n\) elements (for an \(n\)-sector input-output table) where the \(i\)th element of \(\theta\) is

\[(4.2) \quad \theta_i = \sum_{j=1}^{m} e^{ai} y_j^{(b_i-1)}\]

---

\(^1\)As shown in the appendix tables, consumption functions including family size were also calculated. The results were erratic in some cases and the author chose to deal with only income-consumption functions. In most cases the income elasticities in the two types differ very little.
where $\bar{y}_j$ is average family income in the $j^{th}$ income bracket and $\lambda_j$ is the fraction of total personal disposable income received by the $j^{th}$ bracket and there are $m$ income brackets altogether. It is apparent in equation 4.2 that $\theta_i$ essentially represents the aggregate fraction of personal income spent on good $i$. That is, the first two elements combine to represent the average propensity to consume good $i$ in income bracket $j$, and the third element $(\lambda_j)$ is the weight of the bracket in aggregate personal income. The interpretation of $\theta_i$ as the aggregate average propensity to consume good $i$ is imperfect, because in the transformation from budget study data to input-output sectors certain products overlap -- they may enter in more than one sector "i" for example. Thus $\theta$ is merely considered as a numeraire, and the object is to determine a new level of $\theta$ for each sector after income redistribution. Naming the new level for sector $i$ "$\theta_i^*$", the calculation of the value is:

\[
(4.3) \quad \theta_i^* = \sum_{j=1}^{m} e^{ai} \bar{y}_j^* (b_i-1) \lambda_j^*
\]

where the variables are as in equation 4.2 but starred values correspond to levels after income redistribution.

Given each element of vector $\theta$ and vector $\theta^*$, a new vector is constructed giving the ratio of the two vectors'
elements. The new vector $\hat{\rho}$ has element $\hat{\rho}_i$ calculated as:

$$\hat{\rho}_i = \frac{\theta^*_i}{\theta_i} \quad (4.4)$$

The vector $\hat{\rho}$ is now used to calculate a new vector of final private consumption. If final private demand in the $i$th sector was $P_i$ before income redistribution, it will be $P_i\hat{\rho}_i$ after redistribution. In matrix notation, convert vector $\hat{\rho}$ into a diagonal matrix $\hat{\rho}$ which has original element $\hat{\rho}_i$ as its $i$th diagonal element and zeros elsewhere; then the new vector of final demand $P^*$ is:

$$P^* = \hat{\rho} P \quad (4.5)$$

To calculate the effect of the change in the vector of final private demand on imports, two further steps are required. First, a new vector of gross output by sector must be calculated, corresponding to the new vector of final private consumption demand. Second, the vector of non-competitive import coefficients $\mu$ is applied to the new vector of gross output to determine the new total of intermediate imports. This amount is added to the original level of "competitive" imports (which for the Mexican data are not specified by sector) to obtain the new total of imports.
If $X_i$ is gross output (original) in sector $i$ and the imports of intermediate inputs used in sector $i$ equal $M_i$, then the vector of intermediate import coefficients $\mu$ has as its $i^{th}$ element:

\[(4.6) \quad \mu_i = \frac{M_i}{X_i} .\]

The calculation of the new vector of gross output $X^*$ is as follows. Two versions are used. In the first, final private consumption varies but final demand for exports (vector $E$), government (vector $G$) and private investment (vector $V$) do not change. Total final demand (vector $F$) thus becomes:

\[(4.7.a) \quad F_i^* = P_i^* + E + G + V .\]

In the second version, the sum of final demand is constrained not to exceed the original final demand total. Exports are assumed not to change by sector, so the difference must be absorbed by decreased $G$ and $V$ in each sector. This new set of $G_i$ and $V_i$ for the $i^{th}$ sector is calculated such that

\[(4.7.b) \quad \sum_{i=1}^{n} G_i^* + \sum_{i=1}^{n} V_i^* = \sum_{i=1}^{n} G_i + \sum_{i=1}^{n} V_i - \left[ \begin{array}{cc} \sum_{i=1}^{n} P_i^* - \sum_{i=1}^{n} P_i \end{array} \right].\]
and

\[(4.7.c) \quad G^*_i = G_i \frac{\left[ \sum_{i=1}^{n} G^*_i + \sum_{i=1}^{n} V^*_i \right]}{\left[ \sum_{i=1}^{n} G_i + \sum_{i=1}^{n} V_i \right]} \]

and \(V^*_i\) similarly equals \(V_i\) multiplied by the final fraction in equation 4.7.c.

Given the revised vectors \(G^*\) and \(V^*\) (in the second version), the revised final demand vector is:

\[(4.8) \quad F^*_2 = F^* + E + G^* + V^* \]

If the matrix "A" of nxn dimensions is defined as the technical input-output coefficients matrix, where element \(A_{ij}\) equals

\[(4.9) \quad A_{ij} = \frac{Z_{ij}}{X_j} \]

where \(Z_{ij}\) is the value of inputs from sector \(i\) into sector \(j\) and \(X_j\) is the value of gross output in using sector \(j\), then the new vector of gross output \(X^*_1\) equals:

\[(4.10) \quad X^*_1 = (I - A)^{-1} F^*_1 \]

where \(I\) is the identity matrix, and the alternative (second
version) new vector of gross output $X_2^*$ equals:

$$
(4.11) \quad X_2^* = (I - A)^{-1} F_2^* .
$$

Finally, if original "competitive" imports equal $M_0^*$ and if the vector of intermediate import coefficients $\mu$ is converted into a diagonal matrix $\hat{\mu}$ with the $i$th diagonal element equal to the original element $\mu_i$ and zeros elsewhere, then total imports after income redistribution equal:

$$
(4.12) \quad M_1^* = M_0 + (\hat{\mu})_{\text{n}x\text{n}} (X_1^* )_{\text{n}x\text{l}}
$$
or, in the second version,

$$
(4.13) \quad M_2^* = M_0 + (\hat{\mu})_{\text{n}x\text{n}} (X_2^* )_{\text{n}x\text{l}}
$$

The above series of calculations is applied for the Mexican data. For the Brazilian case, the input-output data do not give intermediate imports for each sector. Instead, the authors (Rijckeghem and Camargo) assume that all imports are competitive and place them as a column in the final demand section of the table. For the Brazilian data, if the imports contribute the value $m_i$ to availability of the good of sector $i$, then define the fraction of total availability of good $i$ coming from imports as $\gamma_i$ where
\[ (4.14) \quad \gamma_i = \frac{m_i}{x_i + m_i} \]

Then the calculation of the change in imports is more simple than in the full model used for Mexico. For Brazil, with the new vector of final demand calculated as in equation 4.7.a, the new level of imports will be greater than the original level by:

\[ (4.15) \quad \Delta N = \sum_{i=1}^{n} \gamma_i (F_{1i} - F_i) + \sum_{i=1}^{n} (1-\gamma_i)(\sum_{i=1}^{n} \gamma_j A_{ji})(F_{1i} - F_i). \]

In this calculation the first set of elements represents the direct import propensity as applied to the increase (decrease) of demand for the good in question; the second set of elements accounts for the indirect demand -- working through the import propensity for the intermediate goods required as inputs for the increase (decrease) of demand for the good in question.

4.2.2 Results

The results of the import simulation are surprising: imports decline but by negligible amounts. For Mexico, imports after a move to the English income distribution are only .8% less than original imports (version 1) or 2% less than original...
imports (version 2). In the income redistribution of "experiment 2" (see section 3) imports decline by .5% (version 1) or 1.5% (version 2). For the Brazilian case, the calculations yield only a 1.7% decrease in imports if a shift to English equity occurs and a .8% decrease in imports if a shift to equity of "experiment 2" occurs.

In sum, careful calculation of direct and indirect import changes after income equalization suggests that the resulting decreases in imports would be very minor. Thus, income redistribution could not be expected to help growth substantially through reduction of the import bill.

4.3 Other Demand Composition Effects

4.3.1 Economies of Scale

Aside from the effect of income redistribution on imports, two other demand-composition effects were suggested in section 2.3 above: the "differential economies of scale" effect and the "factor opportunity cost" effect. While it is beyond the scope of this study to analyze these effects in detail, a brief examination of demand shifts with regard to these influences is useful.

Of the sectors in the Brazilian input-output table, the following are the most likely to have economies of large scale production: electricity (3), metallurgy (11), machine
tools (12), electrical materials (13), transportation materials (14), rubber (18), plastics (23). In the other sectors returns to scale seem less likely. In agriculture particularly returns to scale as such are probably constant. Similarly, textiles are presumably produced with labor-intensive methods with constant returns to scale.

The final private consumption demand for the sectors listed above declines (except for electricity) after income redistribution. The percentage decline for rubber and transportation materials is particularly large (about 75% in the English distribution case); however, the weight of these sectors in the over-all total of final demand is not large. More important is the sector "electric materials" which does not suffer as large a decline in demand after income redistribution (approximately a 27% decline).

In sum, for the Brazilian case it appears that there would be no gain from increased demand in sectors with returns to scale, after income redistribution; instead, there might be some loss since the sectors most likely to have economies of scale would experience some decline in demand.

For Mexico the analysis may be made in terms of gross output rather than in terms of private consumer demand alone, since in the simulation exercises above the new vector of gross output after income redistribution was calculated for Mexico. Gross output is more significant for analysis than
private consumption demand alone, since it is gross output that is relevant to the sector's productive capacity and therefore relevant to economies of scale in the sector.

In the Mexican input-output sector list, the sectors most likely to have economies of large scale production are the following: petroleum (7), paper (17), rubber (20), chemicals (21), plastics (22), fertilizer (23), pharmaceuticals (25), basic metals (29), metals (30), machinery (31), electrical machinery (32), transport equipment (33), automobiles (34), and electricity (37). Of these sectors, substantial declines in desired gross output would occur in only a few: automobiles (17% decline in one estimate), and transportation materials (13% decline) are the main cases. On the contrary, gross output required would increase in some of the others of these sectors with increasing returns to scale: petroleum, plastics, fertilizers, pharmaceuticals, electrical machinery would experience small percentage increases.

It is informative to compare the implicit structural change of production based on final private demand against the change based on gross output, just examined. The changes in gross output are smaller in percentage terms than those for final demand. For instance, in the case of automobiles, Mexican final demand would decrease by 4.9% (Table XI, experiment 1) but gross production of automobiles would fall by only 17%.
Thus, accounting for intermediate use of the goods may make the decline of demand for certain products less than the fall implied through analysis of final demand alone. Thus, one should place more confidence in the Mexican results than in those for Brazil, concerning demand composition. The Mexican case (using gross output for analysis) suggests that there would little incidence of loss through decline in demand for sectors with economies of large scale production.

To summarize, while the Brazilian data suggest possible loss after income redistribution due to declining demand for sectors with returns to scale, the Mexican data (with analysis on the more relevant gross-output basis instead of a final demand basis) suggest little such loss. Furthermore, it must be remembered that any excess capacity in large-scale sectors caused by income redistribution could possibly be used for vent-of-surplus exports, and moreover the general level of the economy would presumably grow to the point where the capacity would once again be fully utilized at the large scale.

4.3.2 Factor Opportunity Cost

Only one major aspect emerges, concerning the effect of change in demand composition on factor costs. The main sectors to benefit from demand change after income redistribution would be agriculture, food products generally, and to some extent textiles. Yet these two general sectors tend to
be labor intensive. The land input is available at little cost (presumably less cost in Brazil than in Mexico). In contrast, some of the sectors for which demand would decrease are presumably capital intensive: automobiles, transport material, rubber, electrical materials. An exception is construction (for which demand would decrease, in the Brazilian case): the sector is labor intensive. On balance, the very large weight of agriculture and foodstuffs in the increased demand suggests that income redistribution would raise over-all economic efficiency by shifting demand to a sector with low factor opportunity cost (land and labor) and away from sectors with high factor opportunity cost (capital). However, as in the case of the economies of scale analysis, it is beyond the scope of this study to present a rigorous analysis of the question. Such an analysis would require data on factor coefficients by sector and economy-wide shadow prices for factors.

5. Methods of Income Redistribution

To this point the present study has suggested that income redistribution would have little influence on imports but some negative effect, perhaps not excessive, on savings and growth. The general implication of these findings is that any policy which tends to equalize income distribution
will tend to have these hypothesized and estimated effects. However, the exact effects of an income redistribution depend on the particular policy used to bring about redistribution. Certain redistributive policies would seem more efficient than others in terms of effect on production. The policies that are most usually considered for income redistribution include: a) increased progressiveness of income tax and decreased weight of indirect taxes on basic consumer goods; b) increased employment opportunities; c) expenditures on specific items of welfare such as education and health; d) a negative income tax; e) high legal minimum wages. Of these policies, the most efficient and effective appears to be expansion of employment opportunities; in contrast, high minimum wages are likely to be detrimental to production and even to income equalization.

The possibility of increased progressiveness of personal income tax is relatively low in the countries in question. The rates already in the law are quite progressive, and tax evasion is the problem. Increased enforcement of collection (through, for example, more serious punishment of evasion) would help equalize the distribution of disposable income. A shift in indirect taxes away from basic goods toward luxury goods would further help income equalization.
While improved collection of income taxes and revised indirect taxes would presumably improve equity, it seems that a more basic policy for income equalization is an employment policy aimed at maximizing the expansion of employment in "modern sector" jobs. Thus, policies which stimulate investment in sectors and in techniques (within sectors) which are labor intensive will increase the transfer of workers from activities with low marginal productivity of labor and low "institutional wage" to activities with a higher wage and labor productivity. This type of strategy has the advantage of being efficient in terms of international comparative advantage; the abundant factor of the countries in question is unskilled labor.

A specific policy which might be considered to increase the opening of employment opportunities would be a tax rebate for employment. A corporation would receive a tax rebate of a fixed amount per employee. The general level of corporate profits taxes could be raised to recapture the revenue thus lost, since a transfer from the government to the private sector is of questionable value from a growth viewpoint (assuming the marginal propensity to invest is higher for the government than for the private sector, since it is government consumption that tends to be fixed -- salaries of functionaries, e.g., -- and government investment that tends to be variable.) The
corporate tax would then become a burden primarily on those firms which chose capital intensive techniques rather than labor intensive techniques. Furthermore, the exact amount of the tax rebate could be set equal to the difference between the "modern sector wage" and an estimated shadow price for unskilled labor in the economy at large. Thus the effective price of labor to firms would come to equal labor's shadow price, and firms would have the proper incentive for techniques choice.

Income redistribution through government expenditure on welfare items such as education and health may have serious limitations. If analysis shows that the return to investment in education is high in a productive sense, then there is a happy coincidence between efficiency and equity concerning education policy (so long as the high return is not limited to advanced degrees to be earned primarily by the upper and upper-middle classes). However, if education and health are expanded on grounds that they are consumer items for low-income families, then the simple question arises, why not make $100 available to the family for spending as it wishes, rather than earmarking the $100 for expenditure only on education or health?

The negative income tax is an unrealistic method for redistributing income. The requirements for checking the validity of reported income would exceed reasonable possibilities.
High minimum wages and artificially low rates for urban services are examples of inefficient means of redistributing income. In the case of minimum wages, an increase in the wage will only increase the income of laborers as a group if the price elasticity of demand for labor by firms is less than unity. While this condition may exist in a few sectors, it certainly should not exist in the economy at large. Wage increases even in sectors with inelastic labor demand will be detrimental to workers at large, to the extent that the raises spill over into other sectors where the demand for labor is elastic. High minimum wages will merely cause still further distortion in the incentives affecting choice of technique between capital and labor, and will further limit future expansion of employment opportunities.

Low prices for urban services and for foodstuffs similarly distort economic incentives and are ultimately self-defeating since they discourage investment for future supply expansion.

To summarize, it is the author's view that tax incentives and direct government activity which tend to expand employment opportunities in the modern sector constitute the best policies for income equalization. Revisions in income and excise taxes may be helpful but involve the traditional problems of collection
(for income taxes) and perhaps the problem of transferring income from the government to the private sector (to the extent that reduced excise taxes on the poor cannot be offset by increased excise and income taxes on the rich.) Finally, land reform is a policy which is both efficient and income-redistributive, since appropriate reform should be capable of increasing agricultural production.¹

6. Conclusion

6.1 Theory

The major theoretical conclusions of this study are that income redistribution may have a negative effect on savings and therefore growth; redistribution may have growth effects through changes in demand composition affecting the levels of imports, the exploitation of economies of scale, and the incidence of demand for scarce productive factors; but that alleged increases in "market size" from income redistribution are dubious since redistribution would change composition but probably not the level of total demand in the economy. Concerning the savings effect, it is important that several consumption function theories (those of Friedman, Modigliani-Brumberg, and a linear Keynesian hypothesis) would predict no change whatsoever in savings after income redistribution. Only a specific

¹See William R. Cline, Economic Consequences of a Land Reform in Brazil (Amsterdam: North-Holland Publishing Company) forthcoming.
form (curvilinear) of a Keynesian consumption function (or a similar "relative income" hypothesis) yields a decline in savings after income redistribution.

6.2 **Empirical Findings**

On the basis of the best available estimates among several alternative data sources for each country, it was found that equality of income is greatest in Argentina, Chile, and Venezuela, and distribution is much more unequal in Mexico, Brazil, and Colombia.

Using the estimated income distributions and consumption function estimates from family budget studies, simulation exercises suggested that for Argentina, Brazil, Mexico, and Venezuela income redistributions toward equality of the level found in Britain would cost on the order of 1% annual growth in GNP (with the sacrifice of growth slightly less in Argentina and Venezuela). Since these calculations assumed the curvilinear Keynesian consumption function, they represent a maximum statement of the growth loss: alternative theories would suggest no change in savings despite income redistribution. Even assuming the calculations to be realistic, one might conclude that the sacrifice of 1% in growth rates would be worth the improved equity, especially in countries where unequal distribution is the basic source of political instability. Furthermore,
if a welfare function were actually applies, the gains from increased equity could outweigh the loss from a decreased stream of production. Nevertheless, the trade-off does appear to exist between production and equity, under the assumptions yielding a negative savings effect of income redistribution.

Contrary to what one might expect a priori, the import effect of income redistribution appears to be negligible. Calculations for Brazil and Mexico show that demand composition changes after redistribution would cause very slight declines in the import bill, including both direct import effects and indirect effects calculated through use of the input-output table.

Similarly, demand composition changes appear to have little effect on opportunities for exploitation of economies of scale, on a basis of cursory examination of the changed vectors of gross output for Mexico (or of final consumer demand for Brazil.) However, the large shift of demand toward foodstuffs after income redistribution suggests that gains in economic efficiency could be obtained due to the low opportunity cost of factors essential in agriculture -- land and labor.

6.3 Policy Implications

The major policy implication of this study is that even under conservative assumptions income redistribution would
not do irreparable damage to economic growth and the growth costs could be very reasonable in comparison with the resulting equity gains. However, the opposite view that redistribution would be a great stimulus to growth seems to have little theoretical or empirical basis. The arguments concerning "market size" or "import effects" appear incorrect (for the former) or of little empirical significance (for the latter). The main possible growth stimulus from redistribution appears to be the possible utilization of low-cost factors for agricultural production to meet new demand for foodstuffs.

The policy measures by which income redistribution may be achieved are varied, but the most promising seems to be any set of policies (e.g., taxation or government investment) stimulating production in labor-using sectors and techniques within sectors. The resulting increase in employment opportunities appears to be economically efficient and would channel a larger share of national income to the working class, while alternative measures -- especially high minimum wages or artificially low prices for urban services -- are less efficient or self-defeating.

In sum, it is the hope of the author that this study contributes to an increased clarity of the equity versus growth issue in the economic development literature, both in theoretical terms and in terms of empirical magnitudes affecting policy decisions.