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DISARTICULATION AS A THEORY OF INEQUITABLE GROWTH; ARTICULATION AS A STRATEGY FOR EQUITABLE GROWTH (OR WHY COUNTRIES SHOULD BEWARE OF JUMPING THE STAGES OF CONSUMPTION)

by

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The dominant subjects of development economics change over time and follow with a lag the main issues of economic development. Because the profession is deeply divided across ideologies and schools of thought, the interpretations given these central subjects are diverse and often contradictory. Yet, different schools of thought tend to focus on the same subjects at one point in time, resulting in fascinating and often bitter debates on alternative interpretations and policy proposals.

Between the mid-1940s and the mid-1960s, the key question addressed was that of explaining slow growth in the Third World and proposing strategies for catching up with the industrialized countries. This led to proposals for the diffusion of innovations and the elimination of market distortions by modernization theorists; to advocacy of active state intervention and strategies of import substitution industrialization by developmentalists; and to calls for selective delinking and socialist restructuring by members of the dependency school.

By the mid-1960s, it had become clear that a significant number of Third World countries were incurring rapid economic growth. International capital transfers and a gradual shift from import substitution to export-led growth sustained rapid growth throughout the 1970s in these "newly industrialized

countries" (NIC). Yet, worsening inequality in the distribution of income and failure to significantly reduce absolute poverty in a majority of rapidly growing countries placed explaining growth with inequity as the central question for development economists. This led to interpretations ranging from the permanence of surplus labor and still insufficiently rapid or insufficiently labor-absorbing economic growth; to unequal bargaining power among labor categories; to highly unequal distribution of asset ownership at the beginning of the growth period and, hence, the need for land reform and progressive asset transfers; to a price squeeze on agriculture of the type that characterized the Soviet industrialization debate; and to the unleashing of inequalizing growth spirals created by investment in luxury goods and the skilling of the labor process.

With the application of strict monetary policies in the United States, a generalized recession in the more developed countries, and an end-of-the-debt extravaganza for the NIC, the early 1980s saw not only the return of stagnation but highly negative growth rates in many countries. This, again, redefined the main question addressed by development economists as to explaining instability. This led to a variety of proposals ranging from stabilization policies in the context of antistate austerity packages; to New Deal-style, government-led, growth programs; and to further calls for more autonomous growth and horizontal trade.

The current period of stagnation of Third World economies and further worsening in the distribution of income associated with economic restructuring in some way raises simultaneously the above three questions in a normative context: Given the end of both import substitution industrialization and export-led growth, how can a new style of economic development be defined

for Third World economies that can insure growth, promote equity, and offer stability over time? This paper attempts to propose a style of development with these desirable features.

We advance an alternative interpretation, which we call "social disarticulation," of why growth was inequitable in many NIC between the mid-1960s and the end of the 1970s, with Brazil as our principal example. We then propose an alternative style of growth, which we call "social articulation," that should allow for both equitable and more stable growth, while not necessarily (although possibly in the long run) at the cost of slower growth than the current disarticulation alternative.

"Social articulation" is a development strategy aimed at achieving growth with equity without either having to wait for full employment (the "Lewis turning point" and subsequent equitable growth in neoclassical full employment models) or calling on the progressive redistribution of assets (Irma Adelman's and Chenery and Ahluwalia's vision of a society where all citizens, workers included, own productive assets). Social articulation is a wage goods-led growth path where the wage goods sector is the "key sector of economic growth." The key growth sector is defined as that sector which has the highest rate of gross capital formation (i.e., the highest I/K abstracting from differences in sectoral rates of depreciation). "Social disarticulation," by contrast, is a growth path where the key growth sectors are either the capital goods sector (e.g., Algeria) or the luxury consumption sector, or both (e.g., Brazil). Growth paths where the export sector is the key growth sector can be either articulated or disarticulated according to the use made of foreign exchange earnings. If imports are dominated by luxury goods and/or by capital goods for investment in the production of capital goods, of luxuries, or of

further exports, growth is disarticulated. If, by contrast, imports are dominated by wage-goods and/or by capital goods for the production of wage goods, growth is articulated. Trade can, consequently, be either an articulating or a disarticulating force according to how it is used.

I. ALTERNATIVE STRATEGIES OF GROWTH-WITH-EQUITY

The wide variety of strategies which have been advanced to promote growth-with-equity can basically be classified into three categories according to the markets through which adjustments in the distribution of income are expected to occur as growth progresses: labor markets, assets and capital markets, or product markets (see table 1). Each of these strategies must be understood in terms of positive analysis, i.e., of how it explains inequitable growth, and of normative analysis, i.e., of what proposal it makes to achieve equitable growth.

Neoclassical growth models--where there are no market failures and, in particular, where full employment is insured by flexible wages; where there is factor substitutability in production; and where conditions for stable growth hold--tend to imply either equitable growth, asymptotically equitable growth, or a generally insensitive distribution of income to growth. In neoclassical models like Jorgenson's growth of the dual economy, stability in factor shares is directly postulated by technological specifications. Several strategies of growth-with-equity thus attempt to capitalize on this equitable feature of neoclassical growth. Those that seek labor market effects attempt to accelerate transition to the neoclassical world by resorption of surplus labor to eliminate labor market failure [Lewis (1954)]. Strategies of asset redistribution seek to change the structural framework of asset ownership within which growth is to occur while preserving the neoclassical growth mechanisms

TABLE 1

Strategies in Equitable Growth

Strategies for growth-with-equity	Positive analysis: Why is growth inequitable?	Normative analysis: Proposals for equitable growth
Reach the Lewis turning point: labor market effects	Surplus labor (Lewis): -fixed real wages -inequality reinforced by: +terms of trade against agriculture +internal labor markets for skilled labor (Fishlow) +selective tightening of labor markets for skilled +bargaining power skilled (Morley)	Accelerate transition to Lewis turning point (i.e., transition to neoclassical growth) by: -accelerating industrial growth by lower nominal wages, higher share of K, technical change in industry, and higher rate of investment -decelerating population growth -choice of labor-intensive technology (ILO) -investing in labor-intensive sectors: informal urban, family farms
Redistribute assets: land and capital market effects	End of export-led growth, urban bias in public investment, surplus labor unskilled, falling t of t for agriculture	ADLI (Adelman): Redirect public investment toward agriculture for productivity increase with open economy or fixed t of t for agriculture (farmers are the poorest segment of the population, and there is little landless agricultural labor)
	Unequal assets distribution	Redistribute assets before growth (Adelman): all classes own capital; neoclassical growth conditions hold. Greater equity with growth rates not necessarily lower
	Unequal assets distribution and surplus labor	Redistribution with growth (Ahluwalia-Chenery): tax-rich savings to increase asset ownership of poor at cost of lower aggregate growth; convergence in savings rates across classes
Change the social origin of effective demand: product market effects	Belindia: An unequalizing spiral is created by a growing investment in luxury goods, the demand for which originates in the substitution of unskilled for skilled labor in production	None within the Belindia structure
	Price scissors unfavorable to agriculture (Sah and Stiglitz): Surplus labor, wages set to create effective demand, squeeze on agriculture	Turn the t of t in favor of agriculture: higher urban real wages, higher share of peasants and workers in total income but lower industrial investment
	Disarticulation: -investment and foreign exchange allocated toward K goods and luxuries: +role of the state: public sector I in K goods, profitability incentives to I luxuries, wage controls +role of planning theory: I priority toward maximum linkages (K goods and luxuries) +role of international K: MNC, technology transfers, internationalization of consumption -endogenous management of effective demand: +role of the state: consumption credit and tax incentives +role of international labor market: intal opportunity cost of skilled +objective basis for income inequality: bargaining bounds	Investment and foreign exchange allocations toward the wage goods sector; manipulation of effective demand by state interventions; objective basis for social contract

[Adelman (1979)]. In these strategies, the role of the state, while eventually extensive, is not to substitute for market mechanisms but to change the structural context where these mechanisms perform their equalizing functions.

Other strategies, however, call upon state intervention to not only change the structural context of growth but also to tinker with market mechanisms in order to create equitable growth without having to wait for neoclassical market mechanisms to start performing. This includes redistribution with growth (taxing the savings of the rich to transfer assets to the poor) [Ahluwalia and Chenery (1974)]; turning the terms of trade in favor of agriculture [Sah and Stiglitz (1984)]; and making the wage goods sectors the key sectors of economic growth (articulation). In all these models, surplus labor prevails and wages are either exogenous (Ahluwalia and Chenery) or endogenous but not determined by supply and demand on labor markets (disarticulation, Sah and Stiglitz).

1.1. Labor market effects

By far, the most prevalent interpretation of the origins of inequitable growth derives from Lewis' theory of surplus labor. According to this theory, surplus labor implies fixed real wages in spite of rising labor productivity in agriculture as redundant labor is absorbed in industry. Agricultural landlords or a tribute levying state are able to capture productivity gains in agriculture through rent or tax and to exchange it to consume industrial goods. As growth progresses toward elimination of surplus labor, the distribution of income momentarily worsens: The ratio of peasant and worker incomes to capitalist and landlord incomes declines and the share of capital in total income increases. Rising inequality is, however, the engine of growth. Further worsening inequality accelerates elimination of surplus labor and

transition to the neoclassical world of equity at the "Lewis turning point." Inequality will, for instance, be increased by raising rents or taxes in agriculture or by turning the terms of trade against agriculture, both of which reduce nominal wages and increase industrial investment. Inequality can also increase without stimulating growth if it originates in a regressive redistribution of income among labor categories instead of between labor and capital. This is the case if internal labor markets allow rising wages for skilled labor if skill-intensive growth leads to early tightening of the labor market for skilled labor and if skilled workers have a relatively greater degree of bargaining power than unskilled workers [Morley (1982)].

Strategies of growth with equity that seek accelerating the elimination of surplus labor are basically of three types. One consists of attacking surplus labor on the supply side of the labor market via population control programs or immigration policies. A second consists in accelerating industrial growth by lowering nominal wages, increasing the share of capital in the industrial product, or increasing the rate of reinvestment of capital income [Lewis (1954), Galenson (1979)]. While greater inequality results, the waiting time for the transition to full employment and for the trickle down effects to occur via rising wages is also shortened. There are, however, good reasons for these two strategies to fail. Population programs have been notably ineffective and population growth remains far in excess of the job creation capacity of most Third World countries. In addition, modern technologies transferred from the more developed countries imply a growth rate in employment far below that of industrial output in the modern sector. This has led to proposing a third type of strategies to eliminate surplus labor that seek

to promote a type of growth that is more labor intensive, either by use of appropriate technology in the modern sector [ILO (1979)] or by investing in the more labor-intensive sectors of the economy such as the informal urban activities (ILO) or the family farm sector in agriculture [Mellor (1976)].

1.2. Land and capital market effects

The basic thesis here is that growth is inequalizing because productive assets are highly unequally distributed at the outset of the economic takeoff and that inequality is reinforced by growth because the rich have higher rates of savings and because growth itself increases the value of the assets. There are three programs of assets redistribution that have been proposed to make growth more equitable.

One is the program of "agricultural demand led industrialization" (ADLI) where public investment is redirected away from services, social overhead, and consumer manufacturing toward agriculture [Adelman (1984)]. It is postulated that investment in agriculture can increase the productivity of that sector by 50 percent. There is surplus labor among the unskilled workers but not among the skilled. Sectoral profit rates are determined endogenously and affect the distribution of income but not the sectoral allocation of investment which is exogenous. And the terms of trade are maintained favorable to agriculture in spite of strong productivity growth, either through government price fixing or through an open economy. Using data for South Korea in a computable general equilibrium model, Adelman shows that "the ADLI strategy generates the same rate of industrialization as does export-led growth, but leads to a higher rate of labor absorption, a better distribution of income, better balance of payments results, less poverty, and a higher rate of growth of per capita gross national product than export-led growth" (p. 6). In this strategy, the

gainers are farmers, agricultural capitalists, and marginal laborers. Because farmers are the largest poverty group, improving their incomes equalizes the distribution of income. This result occurs because an extensive redistributive land reform has already occurred, reducing landlessness to a small percentage of the rural population. The losers are industrial capitalists, service capital, service labor (largely government employees), and organized labor, a rather formidable coalition of interests.

By calling on productivity-enhancing public investments (irrigation, green revolution technology) in small- and medium-scale farms and favorable terms of trade for agriculture, the ADLI strategy is thus a rejoiner to the Mellor-Johnston-Waterson rural development-led growth strategy in a unimodal, post-land reform, farm structure. It, however, raises the question of whether such large productivity gains can be obtained in agriculture, whether highly demand elastic export markets exist for food groups and, if not, whether government can afford extensive programs of farm price support.

A second proposal for equitable growth is that of asset "redistribution before growth" [Adelman (1979)]. What is shown, in this case, is that a redistribution of assets towards workers and marginal farmers (with the result that all social classes own capital) in the context of neoclassical growth can lead to both greater equity and to growth rates which are not necessarily lower than with greater inequality in asset ownership. While stable neoclassical growth implies constancy in the distribution of income, redistribution of assets will be needed if the equilibrium reached is not considered socially acceptable. If workers own more capital, however, capitalists must own less; and redistribution toward the poor may hurt the rich even in the long run pointing out to the real political difficulty of asset redistribution. The main redistributive program called upon is land reform, following

the examples of Taiwan and South Korea. Since land reform can increase total factor productivity, the net social gains from land reform can ideally be partially taxed from the land reform beneficiaries to compensate the landlords from expropriation and allow them to transfer their assets to urban activities. Needed to implement this strategy is a land credit program and an effective rural development program to stimulate small farm productivity [Berry and Cline (1979), Adelman (1981)].

Finally, the third proposal for equitable growth via assets redistribution is Chenery and Ahluwalia's "redistribution with growth." In this case, assets expropriation is considered politically unfeasible and it is proposed instead to redistribute towards the poor part of the incremental assets created by growth. Income inequality is attributed to concentration of productive assets among the rich and increasing inequality to higher rates of savings and lower birth rates at higher levels of income. Every income group is postulated to derive income from both asset ownership and wage earnings. The strategy of equity through redistribution with growth consists in taxing the savings of the top 20 percent incomes to add to the stock of capital of the 40 percent poorest. Equality then results from a rising rate of savings for the poor which eventually catches up with that of the rich (which is assumed not to rise). Because the capital/output ratio is assumed to be higher among the poor, reflecting their lower productivity, redistribution of investment toward them increases equality but reduces the rate of growth of GNP.

1.3. Product market effects

This approach is intended to allow for equitable growth when neither surplus labor can be expected to be resorbed within a socially acceptable foreseeable future nor when the redistribution of asset ownership seems to be

politically feasible. It, consequently, has to be seen as both a temporal and a political expendient to the former two approaches. The necessity for expediency is brought about by both the failure to resorb surplus labor in virtually all Third World countries and by the premature "end of land reform" [Lehmann (1974)]. As Lewis observed [Lewis (1972)], there has been much confusion in testing the surplus labor hypothesis since it does not imply zero marginal productivity of labor in agriculture [see the summary of such tests in Kao, Anschel, and Eicher (1969)] but that the supply of labor exceeds the demand of the modern sector either because the modern sector wage significantly exceeds traditional sector earnings [Todaro (1969)] or because labor supply is growing faster than employment creation in the modern sector. As Chenery observed, the surplus labor hypothesis, with population explosion and laborsaving technology in industry, would, if anything, seem to be even more valid today than when it was originally fomulated by Lewis in 1954. As to the "end of land reform," it is based on the observations that antifeudal land reforms have largely been successfully completed in at least Latin America, Asia, and most of the Middle East and that no significant redistributive land reform has occurred in the last decade except under conditions of revolutionary transformation of the whole economic system [de Janvry (1981), Lehmann (1974)].

A first specification which is meant to apply to newly industrializing capitalist economies is the inequalizing spiral in the "Kelindia" model of Taylor and Bacha (1976). This model has three economic sectors (wage goods, luxury goods, and capital goods) and three social classes (capitalists who only save and invest, skilled workers who save some income and consume the rest in luxury goods, and unskilled workers who spend all their income on wage

goods consumption). There is surplus labor in all labor categories, and the wages of both unskilled and skilled workers are exogenous. In production, capital and labor are complementary, but skilled labor and unskilled labor are perfectly substitutable.

For a given initial total investment demand, the level of skilled labor employment is determined to simultaneously generate enough effective demand to absorb the production of luxury goods and enough savings to complement capitalists' savings in equating total savings to total investment. As the output of luxury goods grows, so does the employment of skilled labor; and unskilled labor is displaced. This, in turn, leads to a fall in the output level of wage goods which only unskilled workers consume. A growing demand for luxury goods further increases total investment demand in the next period. The economy thus becomes increasingly dominated by luxury goods production, and the distribution of income between unskilled and skilled workers becomes increasingly unequal to the advantage of the latter. A technological possibility--the infinitely elastic substitutability of labor skills--thus becomes the (unlikely) equilibrating mechanism between supply and demand for different types of goods on product markets. How these equilibrating decisions on labor substitution (that result in the progressive skilling of the labor process) are taken remains largely unexplicited.

The Belindia model explains inequalizing growth without specifically advancing a strategy to break the inequalizing spiral and promote instead equitable growth. There exists indeed no way of inducing equitable growth within the Belindia model without radically transforming its structure and calling on an active intervention of the state. A structure that would allow for equitable growth would need either a redistribution of assets so that all social

classes save or a fundamental change in investment rules in order to transform the wage goods sector into the key sector of economic growth. This requires extensive government intervention by contrast to the automaticity of the Belindia spiral. In the following models, the role of the state is explicitly introduced in both the intersectoral allocation of investment and in the creation of effective demand to establish which will be the key sectors of economic growth. Manipulation of both investment allocation and effective demand creation allows to satisfy the equilibrium conditions of growth: supply equal demand, saving equal investment, balance-of-payments equilibrium, and a balanced budget.

A second specification of this approach is the Sah and Stiglitz (1984) study of the economics of price scissors, even if their purpose was exactly the opposite of equitable growth, namely, maximum growth in a capital goods-led industrialization program following the Russian model. In this case, turning the terms of trade against agriculture leads to a lower agricultural marketed surplus and lower food availability for urban workers. The state must then adjust effective demand for food by reducing workers' real wages. This leads to lower consumption of industrial goods as well and allows for a greater residual industrial output available for investment in industry. Turning the terms of trade against agriculture accelerates industrial growth but reduces agricultural growth and worsens inequality between peasants' and workers' incomes and state (or capital) income. For a strategy of growth-with-equity based on manipulation of the price scissors, the reverse story would hold true. Favorable terms of trade for agriculture would increase the marketed surplus of agriculture and allow the state to raise urban workers' real wages. Greater equity would follow at the cost of reduced industrial

growth. Yet, agricultural growth might well compensate in maintaining growth in GNP, at least in the short run.

A third specification of this approach is that of social disarticulation. It establishes conditions which are necessary for equitable growth, but reliance on state as opposed to market equilibriating mechanisms implies that they may not be sufficient if the state does not perform accordingly. We develop this approach in section 3 of this paper. But before this, we turn to an analysis of the Brazilian growth "miracle" to establish the validity of the model of disarticulated growth for at least this particular historical experience.

II. DISARTICULATED GROWTH IN BRAZIL

To make the case that the Brazilian "miracle" of 1967-1974 can be explained by the theory of socially disarticulated growth, we proceed in two stages. First, we characterize the key outcomes of this development experience which are:

1. Rapid growth in the capital goods, intermediate goods, and luxury goods producing sectors compared to relative stagnation in the wage goods producing sectors.

2. Extreme inequality in the distribution of consumption of the products of the key sectors of economic growth and increasing inequality in the distribution of effective demand and of income.

Second, we analyze the key structural features of the growth model that will be used to explain the above two outcomes.

3. The permanence of surplus labor in all skill categories in spite of rapid growth.

4. The use of direct and indirect mechanisms by the state to influence the intersectoral allocation of investment and the use of foreign exchange earnings and, hence, the capacity of the state to establish the capital goods, intermediate goods, and luxury goods sectors as the key sectors of economic growth.

5. The capacity of the state to manage the creation of effective demand for consumer goods to correspond to the chosen intersectoral allocation of investment; or the exercise of subjective forces (bargaining power) or of objective forces (skill-intensive growth and internal labor market effects) that played in the direction of creating the required effective demand within the bounds of macroeconomic equilibrium conditions enforced by state supervision of wage concessions.

We now provide empirical information on each of these five points.

1. The growth rate of Brazilian industry was extraordinarily rapid during the period of 1966-1977 and especially so during the five years between 1968 and 1973 (table 2). It was, however, highly uneven among sectors of economic activity. The luxury consumption goods, capital goods, and intermediate goods sectors were the key growth sectors, while the wage goods sectors were lagging behind. If we take the average annual growth rate in nondurable goods between 1966 and 1977 as a reference base, we observe that the growth rate in durable goods was 132 percent higher and, in particular, that of transportation equipment was 99 percent higher and that of domestic electrical and electronic products was 182 percent higher. These goods are clearly luxury consumption goods in Brazil since the share of total consumption of the highest 20 percent income levels in 1970 was 94 percent for transportation equipment and 79 percent for domestic electrical and electronic products [de Janvry and Sadoulet (1983)].

Investment goods were the next key growth sector with capital goods growing at a rate 99 percent faster than that of nondurable goods and intermediate goods growing at a rate 70 percent faster. The relatively stagnant nondurable

TABLE 2

Brazil: Average Annual Sectoral Growth Rates by Types of Final Use, 1966-1977

	Share of industrial output	Average annual growth rate	
	1970	1966-1977	1968-1973
		percent	
Consumption goods	50.6	8.2	11.9
Durable goods	8.9	15.6	23.6
Transportation equipment	6.1	13.3	24.0
Domestic, clerical, and electronic	1.8	18.9	22.6
Nondurable goods	41.7	6.7	9.4
Food	26.3	7.5	9.1
Textiles	9.4	4.0	9.0
Clothing	3.5	5.1	7.9
Investment goods	49.4	11.7	14.7
Capital goods	11.9	12.5	18.1
Intermediate products	37.5	11.4	13.5
All industry	100.0	10.0	13.3

Source: Bonelli and Werneck (1977).

consumption goods have the feature of wage goods. The top 20 percent income levels only consume 45 percent of industrial food products and 66 percent of textiles. Expenditures on food and clothing are important categories in the budgets of working class households, absorbing relatively 41 percent and 5 percent of consumption expenditures in 1970-1972 [Wells (1983, p. 306)]. We can thus conclude that the Brazilian growth miracle between 1966 and 1977 was led by the production of luxury consumption goods and of investment goods, with the production of wage goods following that of the other sectors at a much lower growth rate.

2. In looking at the structure of effective demand in Brazil and at how it has been modified by the growth model followed, it is important to recall that the level of income inequality is much greater than in the more developed countries. In the United States in 1970, for instance, the top 25 percent income levels received 39 percent of total income, while they received 62 percent in Brazil [Ahluwalia (1976)]. The result is that there is a much greater differentiation in consumption patterns across income classes in Brazil than there is in the industrialized countries. As table 3 shows, the income level of the upper 10 percent in Brazil, once adjusted for purchasing power parity using Kravis' index [Kravis, Heston, and Summers (1978)], compares in real terms to the income of the U. S. middle class. The income of the upper 20 percent in Brazil spans a range of purchasing power equivalent to that of U. S. households between the lower second and the sixth decile. At the upper end of the distribution of income, Brazilian consumption patterns are, consequently, relatively similar to those of wage earners in the industrialized countries with access to the consumption of cars, television sets, and refrigerators. In the middle range, by contrast, consumption patterns are markedly

TABLE 3

Income Distribution in Brazil and the United States, 1970

	Parity-adjusted per capita income[a]										
	Lowest 10 percent									Highest 10 percent	Average
	U. S. dollars										
United States	1,049	1,573	2,622	3,146	3,671	4,720	5,768	6,817	8,915	14,159	5,244
Brazil	122	214	306	387	510	632	734	1,019	1,549	4,739	1,019
	Income shares										
	percent										
United States	2.0	3.0	5.0	6.0	7.0	9.0	11.0	13.0	17.0	27.0	100
Brazil	1.2	2.1	3.0	3.8	5.0	6.2	7.2	10.0	15.2	46.3	100

[a]Income per capita adjusted for purchasing power parity with the United States; see Kravis, Heston, and Summers (1978).

different with expenditures dominated by food (41 percent), housing (20 percent), and clothing (5 percent) [for data on Sao Paulo industrial working class in 1971-72, see Wells (1983, p. 300)]. This phenomenon of the convergence in consumption patterns between Brazilian upper classes and industrialized countries' middle classes is what Cardoso (1973) labeled the "internationalization of consumption patterns." The sharp contrast between consumption patterns of industrial workers in Brazil and in the industrialized countries, in a context where investment priorities are guided by the internationalization of consumption patterns, is the essence of disarticulated growth.

Two caveats need to be introduced in the characterization of durable goods as luxury consumption goods. The first is that not all durable goods are equally luxury goods and that some clearly assume the character of wage goods. Table 4 thus shows that durable goods such as cars, vacuum cleaners, washing machines, air conditioners, gramophones, and refrigerators had at least 50 percent of their ownership located in the upper 20 percent income levels in 1972 and thus had the clear character of luxury consumption goods [Wells (1977)]. Other durable goods, such as television sets, radios, stoves, electric irons, and bicycles, are durable wage goods with more than 50 percent ownership located in the 80 percent lowest income levels. We, unfortuntely, do not have available the relative weights of these two sets of durable goods in industrial production, but it seems clear that the first is greatly more important than the second. In addition, access to ownership via second-hand markets and greater multiple ownership among the upper 20 percent tend to overestimate the demand for new durable goods by the lowest 80 percent when measured, as in table 4, by the distribution of ownership.

TABLE 4

Social Distribution of Durable Goods Ownership Among Brazilian Households by Social Class, 1972[a]

	Lower 40 percent	Middle 40 percent	Top 20 percent
Luxury goods			
Air Conditioner	0	0	100
Vacuum cleaner	0	14	86
Cake mixer	1	21	78
Washing machine	1	21	78
Motorcar	3	23	74
Floor polisher	4	35	61
Gramophone	6	34	60
Liquefier	6	42	52
Refrigerator	7	43	50
Motorcycle	0	50	50
Wage goods			
Gas and electric stove	15	51	34
Electric iron	13	49	38
Bicycle	22	48	30
Television set	7	45	48
Radio	25	45	30

[a]According to Wells, the bottom 40 percent of the distribution contains the mass of the rural work force, the middle 40 percent contains the working class, and the upper 20 percent contains the middle and upper classes (skilled workers, managers, and capitalists).

Source: Calculated from Wells (1977).

A second caveat is that there has been a rapid diffusion of the ownership of durables among the urban lowest 80 percent of the distribution of income, at least in the large metropolis. Because most households in the upper 20 percent income levels already owned durable goods such as refrigerators, television sets, liquefiers, floor polishers, and gramophones in 1967-68, most new owners between that date and 1974 had to be found in the lower 80 percent of the distribution of income. This occurred, in part, by substituting necessities for durables in consumption. As Wells observed, "substitution in favor of expenditures in durables within low-income budgets was accompanied, at the household level, by an absolute reduction in consumption of necessities such as food and, at the macroeconomic level, by a reduction in the share of resources devoted to public goods consumption" [Wells (1977, p. 271)]. An aggressive credit program also played an important role in providing access to the purchase of durable goods in spite of low income levels. Yet, there are no data available on the distribution of credit by income class to quantify the importance of this source of effective demand. Wells' data are for household ownership by income class and not for demand for new items, including multiple ownership of a particular durable good by a same household. The best proxy to characterize the latter remains the distribution of incremental income between the upper 20 percent and the next 40 percent in the Brazilian distribution of income. Using the census data for 1970 and 1980, we see that the upper 20 percent income levels captured 63 percent of incremental income while the next 40 percent captured 28 percent [Denslow and Tyler (1983, p. 17)]. We take these figures to confirm the fact that the bulk of effective demand for new durable goods was indeed created by expanding demand in the

upper 20 percent income levels, making these goods luxury consumption goods. This does not deny the fact that the next 40 percent income levels rapidly increased their ownership of durable goods in response to an aggressive credit program, access to second-hand durable goods, increased employment of skilled workers as a consequence of a skill-intensive production process in the modern sector, and substitution in consumption of necessities for durable goods. However, the mass of their effective demand for the durable goods sector was of secondary importance relative to that of the upper 20 percent income levels.

There exists abundant information on the inequalizing effect of Brazilian growth. Discrepancies are not on facts but on their interpretation. The Gini coefficient of the distribution of income increased from 0.50 in 1960, to 0.56 in 1970, and to 0.60 in 1976 [Serra (1978), Fox (1982), and Denslow and Tyler (1983)]. The share of the top 20 percent income levels in total income increased from 54.4 percent in 1960, to 61.7 percent in 1970, and to 63.3 percent in 1980, while that of the poorest 50 percent decreased from 17.8 percent, to 15.1 percent, and to 14.2 percent over the same three years. Absolute incomes, however, increased even among the poorest 50 percent with the result that growth was inequalizing but by no means immiserizing. The real income of the poorest 50 percent increased by 16 percent between 1960 and 1970 and by 66 percent between 1970 and 1976. The real income of the richest 5 percent increased, of course, much faster--by 75 percent during the first period and by 134 percent during the second period. The result is that, while in 1960 the average income of the top 5 percent was 15 times greater than that of the bottom half of the distribution of income, by 1976 this ratio had increased to 33 [Serra (1978)].

One of the key determinants of rising inequality has been the differential changes in wages paid to skilled workers and managers relative to unskilled workers. Here, as well, there is little disagreement among the various sources of information available on the fact that wage differentials widened to the benefit of skilled workers and managers and this, particularly, during the phase of most rapid economic growth. Between 1966 and 1976, the real wages of different categories of workers changed as follows: unskilled, -17.1 percent; semiskilled, +3.5 percent; skilled, +25.2 percent; foremen, +39.0 percent; and managers, +42.9 percent [DIESSE (1977) quoted in Morley (1982, p. 187, Table 8.4)]. The wage gap between unskilled workers and managers thus increased from 1.21 times in 1966 to 2.05 times in 1976. Notable is that the real wage of unskilled labor fell between 1966 and 1972 in spite of rapid growth in employment. And all wages lagged behind productivity growth, indicating a regressive redistribution of income not only among labor categories but also between labor and capital. Thus, the ratio of real wages to productivity fell from 1 in 1966 to .46 in 1974 [Bresser (1983)].

There are three structural features of the Brazilian experience that we want to emphasize. These structural features will be part of the model of social disarticulation.

3. In spite of rapid economic growth and, hence, of rapidly growing employment opportunities in industry, surplus labor persisted among unskilled workers. Also, in spite of a skill-intensive growth path, neither was surplus labor eliminated among skilled workers and managers. The feature of surplus labor in all occupational categories will thus be a characteristic of disarticulated growth.

Morley's calculations of the supply of skilled labor between 1960 and 1970 show that, while the demand for skilled labor (more than six years of

schooling) increased by 74 percent, supply increased by 145 percent, twice as rapidly. This oversupply continued to grow between 1970 and 1973. The result is that "workers with primary and secondary education were being pushed into occupations that had been manned by either illiterates or people with less than primary education in 1960" [Morley (1982, p. 221)]. Yet, in spite of this growing oversupply of skilled workers and managers, their real wages increased rapidly; and the wage gap between skilled and unskilled workers widened, an observation that clearly cannot be explained by the forces of supply and demand on the open labor market.

Several nonmarket explanations of wage determination have been advanced. One explanation proposed by Bacha (1977) is that compression by the state of minimum wages and rapidly rising labor productivity led to very large profit levels for the firms. Skilled labors and managers were able to use their key bargaining positions in the firms to raise their own wages and capture part of these profits for themselves. Another explanation proposed by Singer (1975) and by Cardoso (1973) is that the wage levels for the educated classes in managerial positions are set on the basis of what is deemed to allow a decent standard of living in relation to international consumption patterns. The income levels of administrators, technicians, and professionals need, thus, approximate the income levels of the middle class in the advanced countries to give them access to similar consumption patterns. And a third explanation developed by Morley is based on a combination of internal labor market effects and bargaining power of skilled workers. According to him, rapid growth gives high-level employees additional bargaining power because their particular skills and experience, which are to a large extent specific to the firm that hires them, become increasingly valuable when markets are expanding rapidly

[Morley (1982, pp. 227 and 228)]. In spite of surplus labor in the open labor market, firm-specific skills give employees power on the internal labor market, a power which they can use to press successfully for higher wages.

We agree that each of these theories is part of an explanation. Nonmarket theories, however, fail to place objective limits on the scope for bargaining and fail to explain how a macroeconomic equilibrium is obtained between supply and demand on product markets and between savings and investment. In the theory of social disarticulation, subjective determination of wages under conditions of surplus labor is bound by macroeconomic equilibrium conditions, and the state is the guardian that restricts wage bargains and income transfers to macroequilibrium (closure) requirements.

4. The state had an active role in establishing the capital goods, intermediate goods, and the luxury consumption goods sectors as the key sectors of economic growth. What we want to show here is that the intersectoral allocation of investment was largely exogenous either through the direct instruments of public investment or through indirect incentives to private capital. To do this, we look first at the Brazilian industrial policy and its rationales and second at the instruments that have been used to implement this policy.

Brazil's industrial policy and the choice of key sectors of economic growth were largely made in the 1950s under the Kubitscheck administration. The goal was to promote import substitution industrialization not only in specific consumer goods, such as the automobile industry, but also in intermediate and capital goods industries such as utility vehicle construction, tractors, shipbuilding, heavy machinery, and telecommunications. The rationales for this were several including (1) the deepening of import substitution industrialization as an attempt at alleviating foreign exchange constraints

and stabilizing the access to investment goods [Baer (1973, 1983)]; (2) increasing the autonomy of domestic industry and enhancing national security; and (3) obtaining access to international technology by attracting direct foreign investments [Evans (1979]. The choice of investment sectors was basically guided by the developmentalists' theory that capital is the scarce good and that investment priorities should be chosen to maximize the growth effect per unit of invested capital. This theory was formalized in Hirschman's (1981) principle of intersectoral allocation of investment according to the strength of backward and forward linkages and later in de Bernis' (1972) strategy of choosing "industrializing industries" as leading sectors. This has led to identifying as key growth sectors such industries as iron and steel (intermediate goods), machine tools (capital goods), and durable goods such as the automobile and electric appliances (luxury goods). As we will see, our theory of social disarticulation is a fundamental indictment of the developmentalists' theories that placed growth as the prime objective of economic planning. Justification for this was faith that the Lewis (1954) turning point could be reached rapidly, thus allowing sidestepping of the question of the style of growth (i.e., the question of the social impact of the choice of alternative leading sectors) under conditions of surplus labor.

In addition to the theory of industrializing industries that led to identifying the luxury goods sectors as key growth sectors among consumption goods, there are other elements of the Brazilian industrial policy that reinforced this choice. One is that the explicit policy of attracting direct foreign investment to finance investment embodies a bias towards luxury goods. This is because the same good produced by a multinational corporation in both advanced and less-developed economies will be a ~~luxury~~ wage good in the former and

luxury
a ~~wage~~ good in the latter in accordance with differences in wage levels in the two types of economies. Calling on foreign direct investment in the production of consumption goods thus embodies a bias toward luxury goods production. A second source of this same bias is the internationalization of consumption patterns that defines the types of consumption goods desired by the upper income groups. In addition, as Singer (1975) observed, the desire to accede to the consumption patterns of the middle classes in the advanced economies leads to defining what is considered to be a proper level of renumeration for the managerial classes. Here again, the internationalization of consumption patterns in the context of enormous real wage differentials (of the order of the 7 to 1 for wage earners between the United States and Brazil) results in a same good being a wage good in an industrialized country and a luxury good in a less-developed economy. And a third source of this bias is the fact that import substitution industrialization occurred in a context where the initial distribution of income was highly unequal. In the production of wage goods, import substitution industrialization was largely completed in the 1930s; and failure to redistribute income--via, for instance, land reform programs and labor intensive technological options--led to increasingly locating the dynamics of demand growth in the upper income levels.

Kubitscheck's industrialization programs were promoted by a mix of special import privileges for capital goods and raw materials and financial assistance programs managed by the development bank, Banco Nacional do Desenvolvimento Economico. The automobile industry, in particular, was successfully developed by calling on foreign capital, granting privileges for the import of manufacturing equipment and automotive components, classifying the automobile firms as "basic industries" to allow them to receive subsidized credit, and

inducing Brazilian companies to move into the production of automotive parts, to make technical assistance agreements with foreign firms, and to act as subcontractors for the multinational automotive firms.

Exogeneity of the intersectoral allocation of investment in many capital goods, intermediate goods, and durable goods industries is demonstrated by these policies. It also shows in the emergence of a global overcapacity in Brazilian industry starting in 1962 and reaching a maximum in 1967. For 1967, Bacha (1977) estimated a global excess capacity of 18 percent. For 1965, Baer and Maneshi (1971) estimated an excess capacity of 47 percent in capital goods, 38 percent in household consumer durables, and 39 percent in vehicle manufacturing. These data show that investment occurred largely independently of demand and more in response to government industrial policies. Excess capacity at the beginning of the 1967 boom was thus a condition for easy growth but not the cause of future growth. It was to occur when the state actively engaged in the creation of effective demand for the key growth sectors which had been put into place by Kubitscheck's investment program. These policies led to the full elimination of excess capacity by 1974. After the military coup of 1964, the same intersectoral investment priorities were maintained, and disarticulated growth was put into motion by a program of effective demand creation for the luxury goods sectors.

The investment program of the military was manipulated by a combination of (1) public investment in infrastructure projects and in many intermediate goods industries, (2) the modernization of capital markets to increase the savings rate, (3) creation of a system of controls and incentives to direct investment toward the sectors and areas chosen as priorities by government, and (4) the attraction of foreign capital by management of a favorable

"investment climate." We briefly discuss each of these elements of the Brazilian investment program.

4.1. Public investment: According to Baer (1973) and Baer, Kerstenetzky, and Villela (1973), in 1969 government investment (both direct government investment and investment from public enterprises) represented 61 percent of total gross capital formation while private investment accounted for only 39 percent. Direct participation of state enterprises was dominant in the areas of mining, metallurgy and steel, public utilities, and petroleum refining and distribution [Visão (February, 1973)]. Public control over key intermediate goods was used as an instrument to channel these inputs selectively toward the government chosen priority industries in the private sector.

4.2. Captital markets: Major reforms in the banking system and the capital markets in 1964 and 1965 allowed substantially increasing the total volume of loans. The annual growth rate in real term loans averaged no less than 21 percent between 1967 and 1972. Special funds and programs were established in the three major banks to channel credit selectively to the priority sectors identified by the federal government.

4.3. Sectoral tax, foreign exchange, and price incentives: Besides preferential credit terms, subsidies for capital accumulation in specific industries were provided through a complex system of value added tax, sales tax, and custom tariff exemptions [Malan and Bonelli (1978)]. Differential tariffs in 1966 and 1967 show much lower rates for capital goods imports and markedly different rates across sectors. Price controls were introduced in 1968 whereby all proposed price increases had to be submitted and justified to a price commission with the threat of suppression of credits from the national banks and of special subsidies if the commission's directives were not followed.

This price policy led to a general and dramatic increase in public utilities prices to generate an investable surplus in the public sector during the 1964-1967 period after which utility prices were kept at par with other prices. Steel prices were kept very low as instruments to combat inflation and to subsidize the private sectors to which favored deliveries were granted. And price recommendations for the private sector took into account cost information to allow adequate price incentives [Baer, Kerstenetsky, and Villela (1973)]. Average rate of return in multinational corporations was thus allowed to rise from 11 percent in 1967-1969 to 23 percent in 1971-1973 [Evans (1979)]. At the same time, the rate of return in public enterprises was held lower rising from 5 percent to 15 percent during the same period. It is thus evident that state manipulation of credit, taxes, tariffs, exchange rates, and prices was used to stimulate and direct private investment toward the chosen key sectors of economic growth.

4.4. Foreign capital investment: During the 1950s, Brazil was known among developing countries for having one of the most favorable foreign investment legislation. Convinced of the crucial role of foreign capital to both finance the expansion of the country's productive capacity and provide access to modern technology and advanced systems of management, the military regime after 1964 was committed to assure continuation of this policy. This led to a rapid growth of foreign assets. In Brazil, U. S. assets grew by 140 percent between 1966 and 1973, while U. S. assets in the whole of Latin America grew by 109 percent. The assets of specific multinationals related to the automobile industry grew particularly rapidly. Between 1967 and 1973, the percentage growth in assets of Volkswagen was 214 percent; of General Motors, 97 percent; Pirelli, 62 percent; Shell, 107 percent; and Esso, 86 percent.

Profit incentives were generously provided to foreign capital, resulting in an average annual rate of return on assets of 16 percent between 1967 and 1973. The inflow of finance capital also allowed international reserves to grow at an annual rate of 24 percent between 1969 and 1974, when they had been growing at the rate of 2.7 percent between 1949 and 1969.

As table 5 shows, the sectoral pattern of investment that resulted from the industrial policies of the Brazilian state heavily favored the capital goods and the durable goods sectors. Using the ratio of the share in industrial investment to the share in industrial output as an indicator of sectoral investment priority, we see that the average annual ratio for the years 1969-70 and 1973-1975 was 1.9 for metallurgy, 1.9 for transportation equipment and cars, 1.6 for nonmetallic minerals, 1.2 for chemicals, and 1.0 for electrical equipment. This compares to 0.3 for food, 0.5 for plastics, 0.6 for apparel, 0.8 for pharmaceutical products, and 1.0 for textiles.

We thus conclude that the Brazilian growth model of 1966-1974 occurred under a considerable degree of government intervention in the intersectoral allocation of investment, both through the direct mean of public investment and through the indirect mean of investment incentives in chosen leading sectors. These sectors were principally capital goods, intermediate goods, and durable (luxury) consumption goods industries.

5. While actively involved in guiding the intersectoral allocation of investment, the Brazilian government was also actively engaged in a program of effective final demand creation for the sectors that had been chosen as key growth sectors. This took the form of export promotion, consumer credit, clamping down on unskilled worker wages, and lenient concessions in wage negotiations with skilled workers and managerial employees. We develop each of these mechanisms of demand creation in the following section.

TABLE 5

Sectoral Investment and Output Shares

	Share in industrial investment					Share in industrial output at 1970 prices				
	1969	1970	1973	1974	1975	1969	1970	1973	1974	1975
	percent									
Production goods										
Nonmetallic minerals	8.5	12.5	4.1	3.6	3.9	4.2	4.2	3.9	4.1	4.3
Metallurgy	9.8	9.6	27.1	35.5	34.5	13.0	12.5	11.6	11.3	11.9
Machinery	3.4	2.8	3.6	4.1	5.6	5.4	5.7	7.3	7.6	8.4
Electrical equipment	3.7	3.5	7.9	5.8	5.0	5.0	4.7	5.8	5.9	5.7
Transport equipment	24.2	20.5	19.7	16.0	15.8	8.2	8.2	10.8	11.9	11.5
Chemicals	13.3	12.2	15.8	13.9	11.9	10.1	10.9	11.6	11.3	11.2
Other[a]	0.1	4.9	3.5	3.0	5.5	4.2	6.4	4.5	3.9	3.7
Consumption goods										
Pharmaceutical products	2.6	1.9	0.8	0.8	1.5	b	2.1			2.1
Perfumery	1.0	0.6	0.8	0.7	0.7	1.4	1.4	1.3	1.3	1.3
Plastics	1.3	1.0	0.9	1.0	1.2		1.7	1.9	2.1	2.2
Textiles	13.2	14.0	5.2	4.7	5.3	10.3	9.3	8.1	7.3	7.2
Apparel	3.3	2.1	1.1	1.2	1.1	3.2	3.4	2.6	2.4	2.5
Food	6.6	7.0	6.6	6.0	4.7	20.6	20.2	17.4	17.1	16.6
Beverages	2.6	3.9	1.6	1.8	1.8	1.9	1.9	1.7	1.8	1.8
Tobacco	2.2	2.5	0.5	0.5	1.0	1.0	1.0	0.8	0.8	0.8
Miscellaneous			0.4	0.7		11.6	4.1	10.9	11.3	9.0

[a]Paper, rubber, and leather.

[b]Blanks indicate data not available.

Source: World Bank (1983, Tables 2.1 and 2.13 of Annex).

5.1. Starting in the mid-1960s, the Brazilian economic policy has been directed toward increasing industrial exports in order to relax the country's foreign exchange constraint and broaden its export base. The result was a rapid growth in manufactured exports that averaged the annual growth rate of 39 percent in current dollar terms between 1964 and 1974 [Serra (1979)]. Export incentives were both fiscal and financial, taking the form of a duty drawback system, export tax credits, the reduction in corporate income tax, and the financing of exports [World Bank (1983, pp. 53 and 54). Manufactured exports remained, however, a small fraction of total demand for industry. On the average, between 1965 and 1975, the share of exports in industrial production was only 2.3 percent, and export growth represented only 5 percent of total production growth of the exporting sectors. Except for very specific sectors (footwear, engines, machinery, and electrical equipment), export promotion did not play an important role in effective demand creation. Brazilian growth, consequently, cannot be explained in terms of an export-led model.

5.2. Rapid expansion of consumer credit started in 1966 as a consequence of the banking and capital market reforms. The risks associated with consumer credit were transferred from commercial banks to specific public financial institutions. Creation of the Banco Nacional da Habiatacao in 1966 gave an impulse to the construction sector. The share of consumption credit in total credit to the private sector rose rapidly from an average of 6 percent in 1963-1965, to 15 percent in 1970, and 17 percent in 1972. In real terms, consumer credit increased at the average annual rate of 31 percent between 1963-1965 and 1970-1972. Credit, as a percentage of total private consumption, grew from 1.4 percent in 1964-65 to 4.2 percent in 1970-1972. Of the stocks owned in 1972, 71 percent of televisions, 66 percent of refrigerators, 69 percent of passenger cars, and 58 percent of washing machines has been

purchased on credit [Wells (1977)]. Credit lines were specifically targeted toward the consumption of durable goods in a purposeful effort at creating effective demand for the chosen key sectors of economic growth.

5.3. Wage policy forced a decrease of the minimum legal wage between 1964 and 1970-1972. As table 6 shows, the extent of the fall in real minimum wages depends upon the deflator and the particular cost-of-living index used. Yet, it is clear that, whichever is used, real wages fell by 20 to 60 percent between 1964 and 1970-1972. This wage policy, combined with the superior bargaining power of managers and internal labor market effects, led to a rapidly widening earnings gap between workers and managers. Bacha (1977) thus calculated an average annual growth rate of real minimum wages for workers of 3.1 percent between 1966 and 1972 and a growth rate of 7.2 percent for managers [Bacha (1977)]. And the wage spread in public enterprises, where it is more directly controlled by government income policy, increased more rapidly than in private firms [Bacha and Taylor (1978)]. All wage concessions in the private sector had, however, to be approved by the state whose role in supervising wage negotiations is to reconcile firms' level demands with macroeconomic equilibrium conditions. The wage policy also induced a shift in the functional distribution of income from wages to profits. As mentioned earlier, the gap between productivity and real wages increased annually by 6.8 percent between 1966 and 1974.

We thus conclude that the pattern of effective demand for final goods was manipulated by the state, explicitly or implicitly, in order to match its investment program toward durable goods. This included both an incomes policy and a policy of purchasing power creation for durable goods through consumer credit, tax incentives, and price controls. In the model of disarticulated

TABLE 6

Real Minimum Wage Index, 1964-1974

	Bacha[a]	Morley[b]	Sadoulet[c]
	1	2	3
1964	110.8	129	163.8
1965	103.2	118	134.0
1966	94.6	110	117.1
1967	91.4	105	109.3
1968	92.5	107	106.2
1969	89.3	102	101.4
1970	86.0	100	100.0
1971	87.1	100	99.7
1972	89.3	103	100.7
1973	82.1	107	99.8
1974	d	101	97.7

[a]Includes extra monthly salary.

[b]Each month has been deflated by the Rio de Janeiro cost-of-living index and then the average has been taken over the year.

[c]In February, 1964; March, 1965 to 1968; and May, 1969 to 1974, the minimum wage was deflated by the cost-of-living index for the model income class.

[d]Data not available.

Sources: Column 1, Bacha (1977), column 2, Morley (1982), and column 3, calculated.

growth, we thus specify a causal sequence in the determination of effective demand that runs as follows:

1. State fixing of minimum wages under conditions of surplus labor determines the real-wage level for unskilled workers.

2. For given real unskilled wages, the intersectoral allocation of investment between capital goods and luxury consumption goods sectors determines the growth rate of the economy. This intersectoral allocation occurs exogenously through public investment responding to government economic policy and for private capital through profit incentives managed by government interventions.

3. This determines the levels of effective demand necessary to equilibrate supply and demand on the consumption goods markets.

4. Subjective forces (pressures of organized lobbies, negotiations between employers and skilled workers) determine the real wage of skilled workers. This subjective wage determination occurs under supervision of the state which is influenced by the observations of excess capacity or of inflationary pressures on product markets for the goods consumed by skilled workers. Product market equilibrium conditions thus place objective bounds on subjective wage determination.

5. State manipulation of short-run effective demand allows adjustment of equilibrium effective demand to subjective determination of effective demand. The main instruments used by the state for this purpose are:

- Consumption credit for durables
- Tax incentives to the consumption of durables
- Price controls on durable goods.

III. MODELS OF GROWTH UNDER SOCIAL DISARTICULATION OR SOCIAL ARTICULATION

In this section three models will be presented that illustrate the growth path under social disarticulation for a closed and for an open economy in opposition to the growth path under social articulation.

For these theoretical models, the economy has been aggregated into four sectors: a capital goods sector, a luxury goods sector, a wage goods sector for the closed economy, and an export sector for the open economy.

In the case of social disarticulation, state intervention in the sectoral allocation of investment concerns the capital and the luxury goods sectors only, as the wage goods sector is not an explicit part of the development strategy. The capital goods industry is largely state owned, and the important role of the state in this sector is justified on the grounds of a definite industrial strategy (independence from the international market, national security, further import substitution, or provision of the basic inputs for a comprehensive industrial structure). Direct state intervention thus creates a demand for investment in this sector. Indirect intervention through profit incentives prevails in directing private investment principally to the luxury goods sector and also to the capital goods sector. In the models these incentives have been specified by the possibility for the state to insure sectoral profitability levels appropriate to guide the intersectoral allocation of private investment in accordance with the development strategy.

The opening of the economy adds an instrument of state intervention in the allocation of foreign reserves between luxury goods imports and capital goods imports. In both cases state intervention boils down to determining the relative supply of capital goods and luxury goods to the economy.

Three social classes are considered: capitalists who derive their income from the return to capital and only save, managers (executives and skilled

labor) who spend all their income on the consumption of luxury goods, and workers who only consume wage goods. Underlying this structure is the assumption of an initial distribution of income which is sufficiently unequal to create a highly differentiated consumption pattern.

Labor surplus conditions are supposed to prevail in these two broad categories of labor. Workers' real wage is fixed exogenously. In the wage goods sector, production is then determined by the effective demand derived from workers' incomes. Under constant real wages, growth only comes from horizontal market expansion, i.e., from increased employment of workers in all sectors. With an employment elasticity lower than one in the dynamic sectors, this horizontal expansion leads to a growth rate of the wage goods sector lower than that of the other two sectors.

As capitalists only save and managers only consume luxury goods, the investment decisions taken on the supply side of the economy will require a corresponding consumption and saving capacity from managers and capitalists. With consumption being directly related to income in these models, this will, in turn, require a definite distribution of income between capitalists and managers; otherwise, excess capacity or shortages will appear in the capital goods and the luxury goods sectors.

The growth rate of the economy as a whole depends on the priority given to the capital goods industry relative to the luxury goods industry. This is the usual investment-consumption alternative which has often been considered in terms of a trade-off between long-term and short-term growth. What the model shows is that, once this decision on aggregate growth has been taken, there is only one level of manager income that will insure equilibrium of supply and demand in the product markets. Choice of a growth rate under social

disarticulation is thus based on a pact between managers and capitalists in determining their relative shares of total income.

Growth of the wage goods sector is residual in this context. However, a lowering of the workers' wage rate means that less investment needs to be diverted to the production of wage goods. This will then lead to an increase in the growth rate of the two key sectors and, therefore, in the overall growth rate of the economy. Profits and the managers' incomes will both benefit from this.

Growth under social disarticulation leads to an increasing divergence between the output level of the key sectors of the economy and of the wage goods sector and to a corresponding increased inequality between the income level of the capitalists-managers coalition and that of the workers.

Opposed to this scheme is the growth pattern under social articulation. In this strategy, development of the wage goods sector is an explict goal, and investment will be directed to this sector through the different incentive programs that were reserved to the luxury goods sector in the previous case. In the model, these incentives are also reduced to state managed profitability.

The two key growth sectors are in this case the capital goods sector and the wage goods sector, while the luxury goods sector will be left with lower profitability and lower priority in the investment strategy. Correspondingly, the real wage of the workers is no longer exogenous but will be allowed to increase in order to match the demand for wage goods with its supply.

The solution of the model will give the distribution of income among capitalists, managers, and workers that is necessary for an equilibrium between production capacity and demand in the product markets. As always, the growth rate of the economy depends on the choice between capital goods and

consumption goods in the investment strategy; but once the overall growth level has been decided, the social pact is now between the supply side decision-makers (the state and producers of wage goods) and the workers.

Model 1: Disarticulation in a closed economy

The economy has been aggregated in three sectors producing capital goods (sector 1), luxury goods (sector 2), and wage goods (sector 3), respectively. The initial capital endowment K_i determines the production capacity, X_i^c, in all three sectors. Capital is assumed to be the limiting factor in the high priority sectors (1 and 2) and production X_i corresponds to full capacity utilization. Production in sector 3 will be demand determined, leaving excess capacity of production in that sector.

$$X_i^c = \frac{1}{\gamma_i} K_i \qquad i = 1, 3 \tag{1.1}$$

$$X_i = X_i^c \qquad i = 1, 2. \tag{1.2}$$

Both labor categories (unskilled labor L and skilled labor M) are complementary factors of production to capital with an employment elasticity of less than one for unskilled labor (in sectors 1 and 2 at least; constant coefficient has been assumed in sector 3) and constant labor coefficients for skilled labor

$$M_i = \beta_i X_i \qquad i = 1, 3$$

$$L_i = X_i^{\alpha_i^*} \qquad \alpha_i^* < 1 \qquad i = 1, 2 \tag{1.3}$$

$$L_3 = \alpha_3 X_3.$$

The labor output ratios $\alpha_i = L_i/X_i$ are then variables for sectors 1 and 2. The real wage $\bar{w}_L/p_3$ of unskilled labor is exogenous. Therefore, demand for wage goods and production X_3 only depend on total employment,

$$X_3 = \frac{\bar{w}_L}{p_3} (L_1 + L_2 + L_3). \tag{1.4}$$

This equation solves for the production X_3 as a function of X_1 and X_2:

$$X = \frac{\bar{w}_L}{p_3 - \alpha_3 \bar{w}_L} \left(X_1^{\alpha_1^*} + X_2^{\alpha_2^*} \right).$$

Profits in sector 3 are residual. The profit rate r_3 essentially depends on the capacity utilization X_3/X_3^c,

$$r_3 = (p_3 - \alpha_3 \bar{w}_L - \beta_3 w_M) \frac{X_3}{K_3}. \tag{1.5}$$

Market equilibrium in sector 2 determines the real wage w_M/p_2 which will generate enough demand for luxury goods to ensure full capacity utilization in sector 2. An exogenous profit rate r_2 is guaranteed in sector 2 and cost of production is passed on to price,

$$X_2 = \frac{w_M}{p_2} (M_1 + M_2 + M_3) \tag{1.6}$$

$$p_2 = \alpha_2 \bar{w}_L + \beta_2 w_M + \gamma_2 \bar{r}_2. \tag{1.7}$$

With an exogenous guaranteed profit rate, r_1 (although eventually at a much lower level than r_2), savings are known. Equilibrium on the capital goods market is reached by a price adjustment mechanism:

$$p_1 X_1 = \sum_i r_i K_i \text{ (savings)}. \tag{1.8}$$

Note that the Walras law shows that the equilibrating price level p_1 is also equal to the production cost:

$$p_1 = \alpha_1 \bar{w}_L + \beta_1 w_M + \gamma_1 \bar{r}_1.$$

Total investment is determined by savings deflated by the price of investment goods

$$I = \frac{\sum_i r_i K_i}{p_1}. \tag{1.9}$$

It is, therefore, also equal to the quantity of capital goods produced in this period

$$I = X_1.$$

Investment allocation rules are as follows: Investment in sector 3 is an increasing function of capacity utilization in that sector. In sectors 1 and 2, the allocation depends on the state strategy of development, with direct influence in the public sector investment, and indirect influence through guaranteed profit rates in the private sector. At the level of aggregation

considered in the model, both public and private enterprises are present in both sectors (although public firms are predominant in the capital goods sector and private firms in the luxury goods sector), and the control variable θ of this investment allocation is expressed as a function of the two exogenous profit rates in these sectors, $\bar{r}_1$ and $\bar{r}_2$:

$$I_i = k_i \, I \qquad i = 1, 3$$

with

$$\begin{cases} I_3 = f\left(\dfrac{X_3}{X_3^C}\right), \qquad f' > 0 \\ \theta = \dfrac{k_1/K_1^0}{k_2/K_2^0} = \theta(\bar{r}_1, \bar{r}_2) \\ k_1 + k_2 + k_3 = 1 \end{cases} \tag{1.10}$$

where K_1^0 and K_2^0 represent initial endowment of capital in sectors 1 and 2.

Not considering any depreciation of capital, the pattern of sectoral capital growth is described by the following dynamic equation:

$$\frac{dK_i}{dt} = I_i . \tag{1.11}$$

The model above completely describes the growth path of this economy with 27 equations that can be solved for the 27 endogenous variables K_i, X_i^C, X_i, L_i, M_i, I, I_i, p_1, p_2, r_3, w_M, k_i, and θ. The nominal workers' wage $\bar{w}_L$ and the profit rates $\bar{r}_1$ and $\bar{r}_2$ are exogenous, and the price of wage good p_3 is taken as a numeraire.

The analysis of this model can be separated in two successive steps. First, the static equations [(1) to (9)] give the level of the variables that come out of equilibrating mechanisms that are assumed to take place within an elementary period. These are production, employment, and prices. But no mobility of capital is allowed in such a short period, and capacity changes will only occur in the dynamic part of the model. Thus, within an elementary period, investment is exogenous. It is indeed completely determined by the supply of capital goods, itself dependent only on the capacity installed in sector 1 at the beginning of the period. However, as opposed to the more common investment driven models, savings and income distribution do not have to adjust since the price p_1 serves as the equilibrating variable between real investment and savings in the capital goods market.

The exogeneity of the other variables--the real wage rate of workers and the profit rates in sectors 1 and 2--has been previously justified on the basis of state intervention through incentives and price controls. The most specific feature of the model is the heterogeneity of the equilibrating mechanisms in the three different sectors, reflecting the different roles that these sectors have been assigned in the economic strategy.

The dynamic relations unlock some of the rigidities set in the static model by explicating the adjustment procedures over time. In particular, the investment function is specified by an investment allocation rule. The real wage rate for workers and profit rates, which need not be constant over time, could then be given either rules of adjustment or exogenous variations. Real wage, in particular, might in the real world respond to the tension on the wage goods market or to the employment growth rate, and profit rates respond to wage levels and production growth rates. However, factors which are

external to the model, such as political or social tensions, power structure in the wage negotiations, and financial constraints or inflationary pressures, are considered more important in the determination of the wage and the profit rates which then have to be kept exogenous. For methodological reasons, the model will be solved assuming constant values over time for unskilled workers' wage and profit rates in the capital and luxury goods sectors, and comparative static exercises can be performed to study the impact of changes in their values on the rest of the economy.

Solving the system of equation (10) will give, at any point of time, k_3 as a function of the production levels X_1 and X_2 and the capacity X_3^C. Since k_3 is an increasing function of the demand for wage goods, it is also an increasing function of $\bar{w}_L$. But it does not have any particular time trend. Investment allocation in sectors 1 and 2 is then given by:

$$k_1 = \frac{1 - k_3}{\theta K_1^0 + K_2^0} \theta K_1^0 \quad \text{and} \quad k_2 = \frac{1 - k_3}{\theta K_1^0 + K_2^0} K_2^0,$$

which are both decreasing functions of $\bar{w}_L$, with k_1 an increasing function of θ and k_2 a decreasing function of θ.

Sectoral growth rates can then be calculated as:

$$\dot{X}_1 = \frac{k_1}{\gamma_1}$$

$$\dot{X}_2 = \dot{X}_1 \frac{e^{\int k_1/\gamma_1}}{(\theta - 1) + e^{\int k_1/\gamma_1}}$$

where $\int k_1$ is the integral $\int_0^t k_1(t)\,dt$. At the initial time, $\dot{X}_2^0 = 1/\theta\ \dot{X}_1^0$. Both growth rates converge to the same value over time.

The growth rate of sector 3, $\dot{X}_3$, is

$$\dot{X}_3 = \alpha_1^* \frac{L_1}{L_1 + L_2} \dot{X}_1 + \alpha_2^* \frac{L_2}{L_1 + L_2} \dot{X}_2.$$

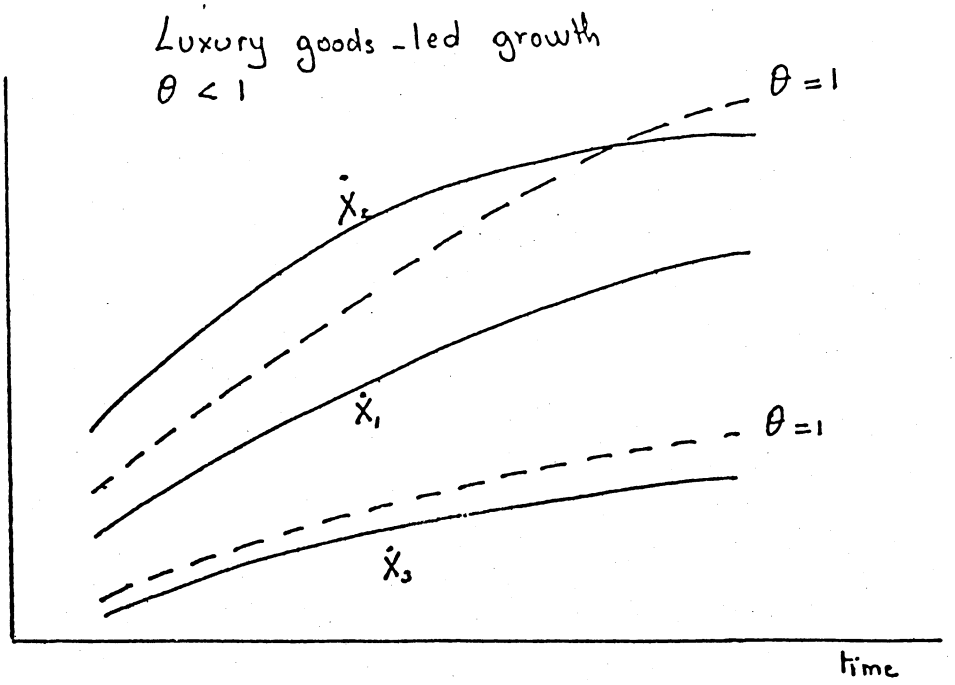
For reasonable values of the employment elasticities α_i^*, the growth rate of sector 3 will be smaller than the growth rate of both sector 1 and sector 2.

The global growth rate of the production of the two dynamic sectors X_1 and X_2,

$$Y^D = p_1 X_1 + p_2 X_2,$$

is an increasing or a decreasing function of θ depending on the production coefficient, but it also converges to $\dot{X}_1$.

Thus, depending on the value of θ, relative investment emphasis among the two key sectors and, hence, the pattern of growth differs. For $\theta > 1$, it is a capital goods-led growth path and, for $\theta < 1$, a luxury goods-led growth path (see figure 1). The solution of the model shows that the growth rate of sector 1 determines the long-run growth rate of the "dynamic" part of the economy (sectors 1 and 2). Capital goods-led growth thus leads, in the long run, to a higher growth rate of the economy although, in the short run, there might be a slower growth rate depending on the relative size of the two sectors and on the technological parameters. On a luxury goods-led growth path, sector 2 starts with a higher growth rate than sector 1, but its growth slows down to that lower level. In both cases, X_3 follows a horizontal



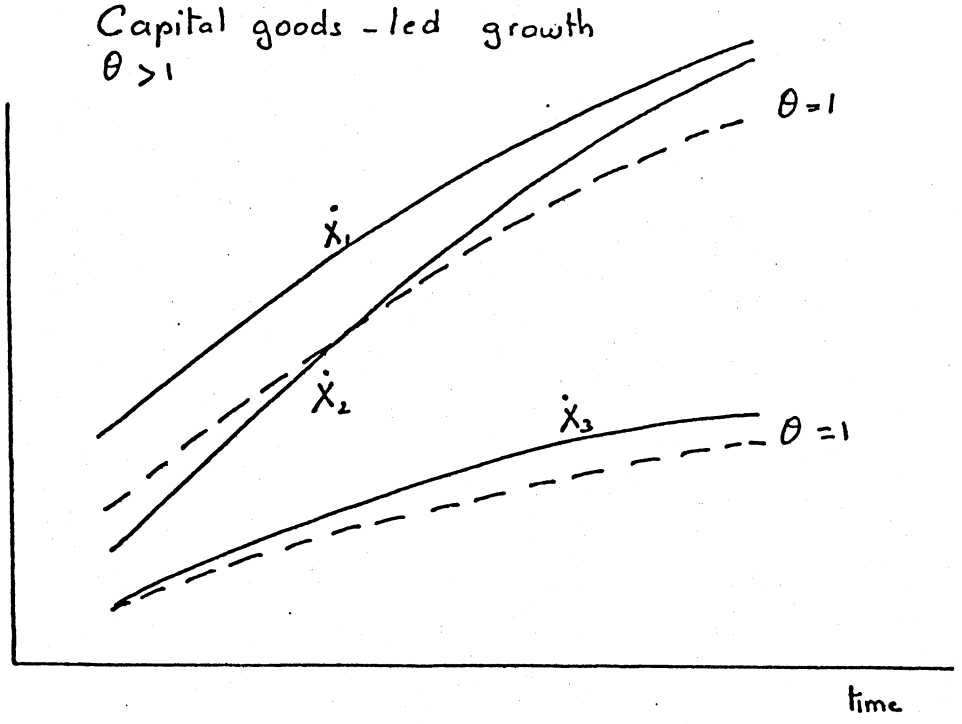


Fig. 1. Growth under social disarticulation in a closed economy.

market expansion due to employment increase in sectors 1 and 2. Its growth rate is lower than either growth rate of sector 1 or 2.

Then, at any given time, wages and profit can be related to the production levels X_i. The manager's salary is

$$w_M = \frac{\alpha_2 \bar{w}_L + \gamma_2 \bar{r}_2}{\beta_1 \frac{X_1}{X_2} + \beta_3 \frac{X_3}{X_2}},$$

and their real wage is

$$\frac{w_M}{p_2} = \frac{1}{\beta_1 \frac{X_1}{X_2} + \beta_2 + \beta_3 \frac{X_3}{X_2}}.$$

In terms of class income, the ratios of managers' income and profit bills to unskilled workers' wage bill are:

$$\frac{w_M M}{\bar{w}_L L} = \frac{p_2 X_2}{p_3 X_3} \quad \text{and} \quad \frac{\sum_i r_i K_i}{\bar{w}_L L} = \frac{p_1 X_1}{p_3 X_3},$$

with

$$\frac{p_i X_i}{p_3 X_3} = \left(1 - \alpha_3 \frac{\bar{w}_L}{p_3}\right) \frac{X_i^{\alpha_i^*}}{X_1^{\alpha_1^*} + X_2^{\alpha_2^*}} + (\beta_i w_M + \gamma_i r_i) \frac{X_i}{X_3} \qquad i = 1, 2.$$

Both ratios increase over time with X_i/X_3 unless the growth rate of X_i is very much lower than that of the other key sector.

The ratio of managers' income to profit bill is:

$$\frac{w_M M}{\sum_i r_i K_i} = \frac{\alpha_2 \bar{w}_L + \beta_2 w_M + \gamma_2 \bar{r}_2}{\bar{r}_1 \gamma_1 \frac{X_1}{X_2} + \bar{r}_2 \gamma_2 + r_3 \gamma_3 \frac{X_3}{X_2}} .$$

Therefore, when the economy is in expansion, managers' wage w_M will increase if the economy is luxury goods led or both luxury goods and capital goods led but will decrease if much higher priority is given to X_1 over X_2. Unless very high priority is given to X_1 (and X_2 is kept almost stagnant) the real wage of managers w_M/p_2 increases. Under that same condition, the ratio $w_M M/w_L L$ increases. The ratio of profit income $\Sigma r_i K_i$ to workers' income always increases. Thus, inequality increases to the detriment of the workers. The ratio of profit income to managers' income decreases if the economy is luxury goods led.

The widening of income inequality between the two categories of labor has then two different origins: the increase in the ratio of the wage rates w_M/w_L and the differential elasticity of employment of the two groups. The increase in the individual wage of managers or skilled workers leads to a deepening of the market for luxury goods sector, with a drive toward even more sophisticated goods as per capita income increases. At the same time, there is a relative expansion of the market when employment of skilled workers increases rapidly in this relatively skill-intensive growth.

Finally, note that a lower value of the exogenous wage rate $\bar{w}_L$ leads to a lower increase in wage goods production X_3. Then, since less capital has to be diverted for the production of wage goods, growth rates of the two other

sectors can be increased, leading to a higher global growth rate of the economy as a whole, higher savings, and higher managers' income.

Model 2: Disarticulation in an open economy

In order to concentrate on the role of the import policy as an alternative way for the state to influence the supply mix of goods and its impact on income distribution issue, this model considers a relatively simple economy in which import substitution has been implemented in the luxury goods sector but not yet in the capital goods sector. Also, the exports are neither wage goods nor luxury goods but specific products, mineral or agricultural commodities usually. The economy has thus been aggregated in three sectors: sector 1 produces exports only, sector 2 produces luxury goods, and sector 3 produces wage goods. There is no domestic production of capital goods.

The production functions are similar to those of the closed model with the capacity X_i^c determined by the initial capital endowment K_i, the assumptions of full capacity utilization in sectors 1 and 2 and demand determined production in sector 3, the employment elasticities of unskilled labor L_i of less than one, and the employment of skilled labor M_i proportional to the production

$$X_i^c = \frac{1}{\gamma_i} K_i \qquad i = 1, 3 \tag{2.1}$$

$$X_i = X_i^c \qquad i = 1, 2 \tag{2.2}$$

$$M_i = \beta_i X_i \qquad i = 1, 3$$

$$L_i = X_i^{\alpha_i^*} \qquad \alpha_i^* < 1 \qquad i = 1, 2 \tag{2.3}$$

$$L_3 = \alpha_3 X_3$$

and

$$X_3 = \frac{\bar{w}_L}{p_3} (L_1 + L_2 + L_3). \tag{2.4}$$

The prices of exports and of imports are international prices ($\bar{p}_e^*$ and $\bar{p}_M^*$), and the exchange rate $\bar{e}$ is exogenous. Then the prices in local currency are

$$p_1 = \bar{p}_e^* \bar{e} \quad \text{and} \quad p_m = \bar{p}_m^* \bar{e}. \tag{2.5}$$

The external demand for exports is infinitely elastic; and total imports, Im, are determined by the balance-of-trade equilibrium. Imports can be either capital goods for investment (Im_K) or luxury goods (Im_2) for consumption. The share of investment goods in total imports μ is a policy parameter which is directly or indirectly set by the state through either direct imports or systems of tariffs, quotas, and specific fiscal incentives,

$$\begin{aligned} Im &= \frac{1}{p_m} p_1 X_1 \\ Im_K &= \mu \, Im \quad \text{and} \quad Im_2 = (1 - \mu) \, Im. \end{aligned} \tag{2.6}$$

Total supply of luxury goods thus equals domestic supply plus imports at prices p_2 and p_m, respectively.

Simultaneous equilibria on the luxury goods and the capital goods market require a certain level of the wage w_M for skilled workers and of the profit rate r which is assumed to be the same in these two sectors:

$$\begin{cases} w_M M = p_2 X_2 + p_m Im_2 & (2.7) \\ r(K_1 + K_2) + r_3 K_3 = p_m Im_K & (2.8) \end{cases}$$

with the price p_2 equal to the cost of production

$$p_2 = \alpha_2 w_L + \beta_2 w_M + \gamma_2 r \qquad (2.9)$$

and the profit rate in sector 3 residual

$$r_3 = p_3 - \alpha_3 w_L - \beta_3 w_M. \qquad (2.10)$$

Note again that, from the Walras law, the cost of production in sector 1 also corresponds to the internationally determined price of exports p_1.

The dynamic relations of this open economy model are the same as those of the closed economy model, although the case of equal priority to export and luxury goods sectors is here considered:

$$\frac{dK_i}{dt} = I_i = k_i Im_k$$

with

$$\begin{cases} I_3 = f\left(\dfrac{X_3}{X_3^c}\right), \qquad f' > 0 & (2.11) \\ \theta = \dfrac{k_1/K_1^0}{k_2/K_2^0} = 1 \\ k_1 + k_2 + k_3 = 1. \end{cases}$$

Equations (2.1) to (2.11) amount to 31 relations which can be solved for the 31 endogenous variables X_i^c, X_i, K_i, L_i, M_i, Im, Im_K, Im_2, p_1, p_m, p_2, r, r_3, w_M, k_i, I_i, and θ, with the workers' wage rate, $\bar{w}_L$, and the international price of imports and exports, $\bar{p}_M^*$ and $\bar{p}_e^*$, exogenous and the wage good price, p_3, taken as the numeraire.

The solution of this model is very similar to that of the closed economy model. The sectoral growth rates are

$$\dot{X}_1 = \dot{X}_2 = \frac{k_1}{\gamma_1} \mu \frac{p_1}{p_m}$$

$$\dot{X}_3 = \alpha_1^* \frac{L_1}{L_1 + L_2} \dot{X}_1 + \alpha_2^* \frac{L_2}{L_1 + L_2} \dot{X}_2$$

which are all increasing functions of μ and of time.

The profit rate r is:

$$r = \frac{\beta_1 \mu p_1 X_1 + [\beta_3(p_1 - \alpha_1 w_L) - \beta_1(p_3 - \alpha_3 w_L)] X_3}{\beta_1 \gamma_1 X_1 + \beta_1 \gamma_2 X_2 + \beta_3 \gamma_1 X_3}$$

which is an increasing function of μ and of time if μ is not too low.

From (2.7),

$$w_M = \frac{\gamma_2 r X_2 + \alpha_2 w_L X_2 + (1 - \mu) p_1 X_1}{\beta_1 X_1 + \beta_3 X_3}$$

which will also increase over time.

In terms of class income, the ratios are:

$$\frac{w_M M}{w_L L} = \frac{p_2 X_2 + (1 - \mu) p_1 X_1}{p_3 X_3}$$

and

$$\frac{\sum_i r_i K_i}{w_L L} = \mu \frac{p_1 X_1}{p_3 X_3}$$

with

$$p_2 = \left[\left(\frac{\alpha_2}{\beta_2} - \frac{\alpha_1}{\beta_1}\right) w_L + \left(\frac{\gamma_2}{\beta_2} - \frac{\gamma_1}{\beta_1}\right) r + p_1\right] \beta_2.$$

Then skilled workers' income and profit income will increase relative to unskilled workers' income.

These results are very similar to those of the closed economy. The global growth rate of the economy depends on the share of the capital goods in total supply. However, in an open economy, this value is the outcome of two decisions: the priority given to the export sector and the allocation of the foreign exchange thus earned between capital goods imports and consumption goods imports. Since the specific feature of the open economy is this import policy, the case of equal priority to sectors 1 and 2 was only considered. In this case, X_1 and X_2 are growing at the same rate, which is an increasing function of the share of capital goods in imports and of time, and a decreasing function of the workers' wage $\bar{w}_L$. Meanwhile, X_3 has a horizontal expansion since labor increases and, therefore, total income of workers increases also.

Under reasonable assumptions on the parameters, profit rate and skilled labor wage rate increase while unskilled labor wage is kept constant. The ratio of total skilled workers' income to profit income depends directly on the share of luxury imports on total imports. But, for a given import policy, it is fairly stable and only slightly increases over time. The ratio of

unskilled workers' incomes to either profit incomes or skilled workers' incomes decreases. Therefore, inequality increases to the detriment of the workers.

Unfavorable terms of trade for the country exports will decrease the supply of imports corresponding to a given export capacity. It will then lower the growth rate of the economy and the relative growth of skilled workers and profit incomes thus improving the equality in the country by losses in the high income groups.

Model 3: Articulation in a closed economy

In this growth model under social articulation, the growth of the wage goods sector and the increase of workers' wages become explicit goals of economic policy. The limiting factor of production in all three sectors is capital, and production is assumed to correspond to full capacity utilization. Constant labor coefficients are considered to simplify the mathematics, although this is not an essential feature of the model.

The production function can then be written as:

$$X_i^c = \frac{1}{\gamma_i} K_i \qquad i = 1, 3 \tag{3.1}$$

$$X_i = X_i^c \qquad i = 1, 3 \tag{3.2}$$

$$L_i = \alpha_i X_i \qquad M_i = \beta_i X_i \qquad i = 1, 3. \tag{3.3}$$

The real wages of both categories of labor vary. Market equilibria in the consumer goods sectors 2 and 3 determine the real wage rates w_M/p_2 and w_L/p_3 that will generate a demand that corresponds to the supply of goods in accordance with the growth strategy,

$$\frac{w_L}{p_3}(L_1 + L_2 + L_3) = X_3$$

$$\frac{w_M}{p_2}(M_1 + M_2 + M_3) = X_2. \qquad (3.4)$$

Relative profit rates in the three sectors are manipulated by the state to influence the intersectoral allocation of investment. Thus, the r_i are exogenous, one of them serving as the numeraire. Total savings is then determined, and the price of capital goods p_1 adjusts for the demand for investment goods to match the supply

$$p_1 X_1 = \sum_i r_i K_i. \qquad (3.5)$$

Prices in the consumer goods sectors 2 and 3 follow costs of production

$$p_i = \alpha_i w_2 + \beta_i w_M + \gamma_i \bar{r}_i \qquad i = 2, 3. \qquad (3.6)$$

Note again that, from the Walras law, this relation also holds for the price p_1.

The growth path of the economy is given by the investment allocation rules in which high priority is given to both the capital goods sector and the wage goods sector (i.e., θ_3 is close to 1), and low priority is given to the luxury goods sector ($\theta_2 > 1$)

$$\frac{dK_i}{dt} = I_i = k_i I \qquad (3.7)$$

with

$$\begin{cases} \dfrac{k_1}{K_1^0} = \theta_2 \dfrac{k_2}{K_2^0} = \theta_3 \dfrac{k_3}{K_3^0} \\ \\ k_1 + k_2 + k_3 = 1. \end{cases}$$

The solution of the model gives a constant growth rate for sector 1

$$\dot{X}_1 = \frac{k_1}{\gamma_1} = X_1^0 \frac{k_1}{K_1^0} .$$

For any value of investment allocation k_i, the growth rates of sectors 2 and 3 are monotonous functions of time converging to X_1:

$$\dot{X}_i = \dot{X}_1 \frac{e^{k_1/\gamma_1 \, t}}{(\theta_i - 1) + e^{k_1/\gamma_1 \, t}} \qquad i = 2, 3$$

with

$$\theta_i = \frac{k_1/K_1^0}{k_i/K_i^0}.$$

The growth rate $\dot{X}_i$ is lower than $\dot{X}_1$; and then the ratio of sectoral production X_i/X_1 decreases, if and only if $\theta_i > 1$, i.e., if higher priority is given to sector 1. Considering the case where equal priority is given to both sectors 1 and 3 ($\theta_3 = 1$) and low priority to sector 2 ($\theta_2 = \theta > 1$), X_1/X_3 is constant and

$$\frac{X_2}{X_3} = \frac{X_2^0 \left(1 - \frac{1}{\theta} + \frac{1}{\theta} e^{k_1/\gamma_1 t}\right)}{X_3^0 e^{k_1/\gamma_1 t}}$$

decreases over time at a decreasing rate in absolute value (see figure 2).

Now, in any elementary period of time, individual wages and class income can be related to the production structure. Simultaneous equilibria on the product markets 2 and 3 give:

$$w_L = \frac{\bar{r}_3 \gamma_3 (\beta_1 X_1 + \beta_3 X_3) + \bar{r}_2 \gamma_2 \beta_3 X_2}{\alpha_1 (\beta_1 X_1 + \beta_3 X_3) + \beta_1 \alpha_2 X_2} \frac{X_3}{X_1}$$

and

$$w_M = \frac{\bar{r}_2 \gamma_2 \left(\alpha_1 + \alpha_2 \frac{X_2}{X_1}\right) + \bar{r}_3 \gamma_3 \alpha_2 \frac{X_3}{X_1}}{\alpha_1 \left(\beta_1 \frac{X_1}{X_2} + \beta_3 \frac{X_3}{X_2}\right) + \beta_1 \alpha_2}.$$

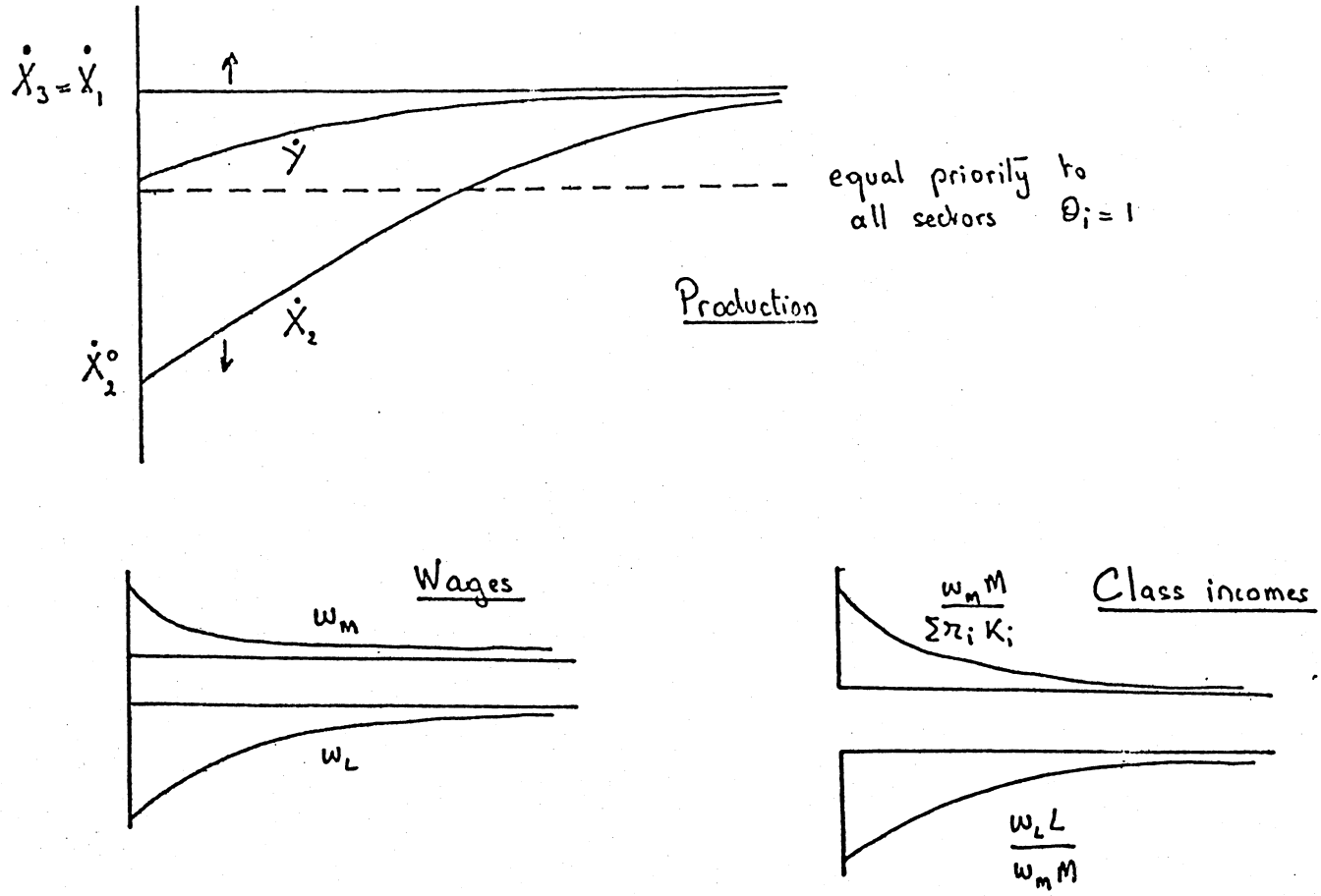
The skilled workers' wage w_M decrease over time and since, for realistic value of the parameters,

$$\bar{r}_3 \gamma_3 \beta_1 \alpha_2 - \bar{r}_2 \gamma_2 \beta_3 \alpha_1 > 0, \qquad (3.8)$$

the workers' wage w_L increases over time. This results in a narrowing of the individual wage spectrum.

The different ratios of class incomes can then be evaluated;

$$\frac{w_L L}{w_M M} = \frac{\alpha_3 w_L + \beta_3 w_M + \gamma_3 \bar{r}_3}{\alpha_2 w_L + \beta_2 w_M + \gamma_2 \bar{r}_2} \cdot \frac{X_3}{X_2}$$



↑ correspond to increase in θ

Fig. 2. Growth under social articulation in a closed economy.

is an increasing function of X_3/X_2--an increasing function of w_L under the most plausible assumption that

$$\frac{w_L L_3}{w_M M_3 + r_3 K_3} > \frac{w_L L_2}{w_M M_2 + r_2 K_2},$$

and a decreasing function of w_M under similar assumption. Also, under most plausible conditions similar to (3.8),

$$\frac{w_L L}{\sum_i r_i K_i} = \frac{\alpha_3 w_L + \beta_3 w_M + \gamma_3 \bar{r}_3}{\alpha_1 w_L + \beta_1 w_M + \gamma_1 \bar{r}_1} \cdot \frac{X_3}{X_1}$$

is an increasing function of w_L and a decreasing function of w_M. Finally,

$$\frac{w_M M}{\sum_i r_i K_i} = \frac{\alpha_2 w_L + \beta_2 w_M + \gamma_2 \bar{r}_2}{\alpha_1 w_L + \beta_1 w_M + \gamma_1 \bar{r}_1} \cdot \frac{X_2}{X_1}$$

decreases over time with X_2/X_1 if capital goods production and luxury goods production use similar techniques.

In conclusion, the model of growth under social articulation shows that:

1. Equal investment priority given to all three sectors leads to a steady state growth path with all growth rates equal and with constant wages and profit rates.

2. If, on the other hand, high priority is given only to sectors 1 and 3 and low priority is given to sector 2, then, in the short run, the growth rates of sectors 1 and 3 increase and, subsequently, remain constant. The

growth rate of sector 2 is initially reduced but starts rising with time. It will converge to the same level as that of X_1 and X_2, but both the rapidity of convergence and the level of the starting point depend on the extent of the relative neglect of sector 2 with regard to the other two sectors as expressed by the parameter θ_2.

3. Unless the luxury goods sector was a large sector and is less capital intensive than the combination of the two other sectors 1 and 3, the growth rate of GNP is not reduced even in the short run; and it will reach, in the long run, the higher level of sectors 1 and 3 growth rate. There is, consequently, no trade-off between articulation and growth if sector 1 keeps high priority. It is only in the case of priority to the wage goods sector, while neglecting both capital goods and luxury goods sectors, that the Manahalobis trade-off between short-term and long-term growth appears.

4. In terms of inequality, skilled workers' salaries decrease while workers' wages increase. The ratio of skilled workers' total income to either profit income or workers' income decreases, while the ratio of workers' income to profit income is fairly stable with most likely only a slight increase over time.

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