# STRUCTURAL CHANGE AND UNEVEN DEVELOPMENT*

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*"A process of nonproportional growth is what is most directly relevant to the uneven development of the world economy and to the situation of the underdeveloped economies or underdeveloped regions within national units. To the extent that it ignores this dimension of the growth problem, it is perhaps in this respect that the concept of steady-state growth does most violence our sense of historical reality. What is needed in this connection is a theory of uneven development." Harris, 1978.*

## 1. Introduction:

Despite the fact that Theory of Economic Development, hereafter TED, has already recognized the necessity of studying issues related to nonproportional growth, one of the most important consequences of economic growth has been neglected by this theory, namely the process of structural change. This mechanism refers to variations in sectoral composition of an economic system over time, due to the existence of different rates of change of productivity and demand for each sector.

Pasinetti (1981, 1993) shows that structural change is not only a final consequence of economic growth but a process responsible for the existence of structural unemployment, one of the most important world-wide problems nowadays. However, it is only possible to study this process in disaggregated models, since it requires the existence of different rates of change of productivity and demand. This may be one of the possible explanations to the fact that this mechanism has been somewhat neglected by TED, given that most of the economic growth models are built in aggregated terms.

North-South models are one of the best examples of the attention given to the study of uneven development by TED. The results obtained by this framework are basically concerned with the explanation of the rise of desiqualities between developed and underdeveloped regions, rarely making direct correspondence between regions and sectors within an economy. The explanation for this weakness is that these models are built in terms of stylized facts concerning poor and rich regions and many of the assumed hypothesis seems to be "unrealistic" when dealing with sectoral development through time of a given economy.

In this paper we intend to identify, in each of the cases considered by Dutt (1990)[2], mechanisms responsible for difficulties of poor regions to grow faster than rich ones. In this vein we will be able to extend, in a formal way, some results obtained by North-South trade models to the study of sectoral aspects of an economy. This will be done with the help of Feldman's model of investment allocation (1928)[3].

This paper is structured as follows: in section 2, we deal with the case where the preferences are homothetics and there is capital dependence, showing that these are the only required assumptions to explain the maintanance of desiqualities between regions or sectors. In section 3, we consider non-homothetic tastes and we show that introducing a welfare criterium, namely the full employment of labor force, Engel's law is enough to explain the rise of desiqualities. The section 4 concludes.

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[2] The North-South framework analysed by Dutt is also considered by Taylor (1991).

[3] An equivalent model was independently developed by Mahalanobis (1953). A discrete version of this model is presented by Simonsen (1983).

2. Capital Dependence and Homothetic Preferences:

As a first aproximation to the case in which North-South trade generates uneven development, due to the evolution of consumption patterns in both regions, Dutt considers that consumer's preferences do not change over time. The general framework proposed by him may be presented as follows.

There are two regions, a developed North and a poor South, with each producing a particular good - the N good and the S good - respectively. Each good is produced with Leontief Technology, using two homogeneous factors of production, capital and labour. The S good is only a consumption good, but the N good is a consumption as well as an investiment good (both in the North and the South). In this section it will be shown that these are the hypothesis necessary to prove that the long run equilibrium will be reached when the growth rates of both regions are equal. It means that independing on the assumptions related to the kind of the economy and to the behavior of the economic agents in both regions, there will be a convergence of the growth rates over time. Dutt considers many alternative closures to its basic model and makes some hypothesis about the way in which capitalists and workers behave in each of the regions, but it will be shown that the real mechanism responsible by the convergence of growth rates is the dependence on North's capital goods by South.

However, a different approach to the North-South trade will be adopted here - a modified version of Feldman's model of investment allocation, which considers the existence of three sectors: one of them is located in the South and it produces consumption goods with the same technology proposed by Dutt. The two others are located in North, one producing capital goods and the other consumption goods, both using Leontief technology. It is assumed that consumption goods sectors, located in both regions, need North's capital goods.

By using the following notation, it is possible to the derive the growth rate in both regions:

$Y_n$: production of the North's consumption goods.

$Y_k$: production of the North's capital goods.

$Y_s$: production of the South's consumption goods.

$\mu$: rate of investment allocation between the consumption good sectors and the capital good sector, where $0 \leq \mu \leq$ .

The total investment in both economies is given by the expression:

$$(2.1) \quad I = Y_k = \frac{K_k}{v_k}$$

where $K_k$ is the stock of capital good in the capital goods sector and $v_k$ is the capital-output ratio in this sector.

Therefore, the rate of change of total investment is given by:

$$(2.2) \quad \dot{K} = \frac{1}{v_k} \dot{K}_k$$

But $\dot{K}_k(t)$, or the rate of change of the capital stock in the sector of capital goods depends on the proportion of total production of this sector allocated to itself:

$$(2.3) \quad \dot{K}_k(t) = \mu Y_k(t)$$

By substituting (2.3) in (2.2), we obtain:

$$(2.4) \quad \dot{K}(t) = \frac{1}{v_k} \mu Y_k(t)$$

or

$$(2.5) \quad \frac{\dot{K}(t)}{Y_k(t)} = \frac{\mu}{v_k}$$

It is also possible to stablish the growth rate of the production of consumption goods in both regions. In relation to the South, the quantity of consumption good is given by:

$$(2.6) \quad Y_s = \frac{K_s}{v_s}$$

The rate of change of the South's production may be written as:

$$(2.7) \quad \dot{Y}_s(t) = \frac{1}{v_s} \dot{K}_s(t)$$

It is assumed that $(1-\mu)$ of total investment is allocated to the consumption goods sectors. As we have now two consumption goods sectors, it is necessary to introduce another rate, denoted by , where $0 \leq \theta \leq$ which represents the fraction of $(1-\mu)I$ that will be allocated to

the North's consumption goods sector. Therefore, the rate of change of capital stock in the South may be written as follows:

$$(2.8)\quad \dot{K}_s(t) = (1-\theta)(1-\mu)Y_k(t)$$

Substituting (2.8) in (2.7), we have:

$$(2.9)\quad \dot{K}_s(t) = \frac{(1-\theta)(1-\mu)}{v_s} Y_k(t)$$

Dividing this expression by $Y_s(t)$ we conclude that:

$$(2.10)\quad \frac{\dot{K}_s}{Y_s} = \frac{(1-\theta)(1-\mu)}{v_s} \frac{Y_k(t)}{Y_s(t)}$$

By adopting the same procedure to the North's consumption goods, we arrive to the following growth rate to this sector:

$$(2.11)\quad \frac{\dot{K}_n}{Y_n} = \frac{\theta(1-\mu)}{v_n} \frac{Y_k(t)}{Y_n(t)}$$

It is easy to prove that:

$$(2.12)\quad \lim_{t\to\infty} \frac{\dot{K}_s(t)}{Y_s(t)} = \lim_{t\to\infty} \frac{\dot{K}_n(t)}{Y_n(t)} = \frac{\dot{K}_k}{Y_k} = \frac{\mu}{v_k}$$

It means that the natural characterization of a long-run equilibrium in this framework is the state in which $g^n = g^s$. This result shows that the dependence on capital goods is the real mechanism responsible for the lack of the South grows, constantly, faster than North. Furthermore, the main decision variable of this model, the rate of investment allocation $\mu$ is completely controled by North and this means that global growth rates of the two economies are determined by the latter.

In terms of structural change, the case analysed so far is somewhat uninteresting, since, in the long run, all the sectors grow at the same rate and this means that the sectoral composition of the economy would not change over time.

3. Engel's Law and Uneven Development

Dealing with the case of non-homothetic tastes, Dutt considers that changes in demand composition are due to the low income elasticity of Southern goods in North and to the operation of the international demonstration effect. This means that South produces a relatively simple kind of commodity while North produces a sophisticated good, which has a higher income elasticity of demand.

By defining "uneven development" as a sustained increase in the ratio of capital stock in the North to that in the South, Dutt examined the possible role of the Prebisch-Singer effect and the international demonstration effect leading to uneven international development. The central results of his analysis may be summarized as follows:

1. Uneven development are due to the operation of the Prebisch-Singer effect and the international demanstration effect, though their existence does not necessarily imply it. The condition under which they can result in uneven development has been developed in terms of some elasticities which can, in principle, be measured empirically to answer the question whether they are strong enough to result in it.

2. Abstracting from all other causes of uneven development, the operation of the Prebisch-Singer and international demonstration effects will usually imply a correspondence between terms of trade deterioration for the South and uneven development. But showing that such deterioration has not occured cannot rule out the possibility of uneven development.

3. The South can stem, to some extent, the forces of uneven development by restricting luxury imports, but this will not work if such imports are already at very low levels. In this case,

governenments may have little choice but to change the structure of the model, a crucial feature of which is the dependence of the South on Nothern investment goods. The importance of developing a domestic investment goods sector is then obvious.

Adopting almost the same procedure of the last section, it is possible to show that, when introduced a social criterium related to the full employment of labour force, the assumptions related to the non-homothetic tastes are the only requirements to the existence of uneven development. In this case, even the assumption of capital dependence may be relaxed.

Now, in relation to the model of last section, it will be made the following change: We consider that South does not depend anymore on North's capital goods, by admitting the existence of a capital good sector in the former, responsible by the total supply of capital goods to the South's consumption goods. Therefore, it is necessary to adopt a little different notation:

$Y_n^k$: production of North's capital good sector.

$Y_n^c$: production of the North's consumption good sector.

$Y_s^k$: production of the South's capital good sector.

$Y_s^k$: production of the South's consumption's good sector.

By adopting the same procedure of the last section, we obtain the following results to the growth rate of each of the economies in terms of the rates of investment allocation:

$$(3.1) \quad g^n = \frac{\dot{Y}_k^n}{Y_k^n} = \lim_{t\to\infty} \frac{\dot{Y}_k^n}{Y_k^n} = \frac{\mu^n}{v_k^n}$$

and

$$(3.2) \quad g^s = \frac{\dot{Y}_k^s}{Y_k^s} = \lim_{t\to\infty} \frac{\dot{Y}_c^s}{Y_c^s} = \frac{\mu^s}{v_k^n}$$

where $0 \leq \mu^n \leq 1$ and $0 \leq \mu^s \leq 1$ corresponds respectively to the rates of investment allocation in North and South regions.

It is considered that $r^n(t)$ and $r^s(t)$ represent the rates of change of demand of North and South consumption goods, respectively. In addition, it will be used the simplified assumption that the growth rate of population is equal to n in both regions. Now it is possible to stablish the growth rate of demand for the product of each region:

$$(3.3) \qquad \frac{\dot{Y}_c^n}{Y_c^n} = n + r^n(t)$$

and

$$(3.4) \qquad \frac{\dot{Y}_c^s}{Y_c^n} = n + r^s(t)$$

But we know that the growth rates of production are given by (3.1) and (3.2). By equalizing (3.1) to (3.3) and (3.2) to (3.4) we obtain the rates of investment allocation to each region that guarantees the full employment of the labour force:

$$(3.6) \qquad \mu^n(t) = (n + r^n(t))v_k^n$$

and

$$(3.7) \qquad \mu^s(t) = (n + r^s(t))v_k^s$$

Considering the stylized fact that $v_k^n \geq v_k^s$ and the assumption that $r^n(t) > r^s(t)$, we conclude that the rate of invesment allocation in the North will be higher than this rate in the South and it means that $g^n > g^s$. If, despite of the regions, we consider a disagregated economic system, it becomes clear that the sectorial composition will change over time, showing the rises of desigualties as a consequence of Engel's law.

4. Conclusion:

In this paper, we analized the possibilities of using North-South trade models to study the relationships among sectors of an economic system. It was shown that, by using a free institutional model, it is possible to isolate the real mechanisms responsible by the desigualties between poor and rich regions and, therefore, to extend the results obtained by North-South models to the study of structural change process.

In the case in which preferences are homothetics, it was proved that the real mechanism resposible by the equalties between the rates of growth of South and North regions is the South dependence on the North capital goods. No other assumption is necessary to prove this.

When we considered non-homothetic tastes, it was proved that the existence of a criterium of social welfare, namely the full employment of the labour force, is, besides assumpitons about low elaticity income of the South good and international demonstraction effect , the only required hypothesis to guarantee that North will grow faster than South.

5. References:

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