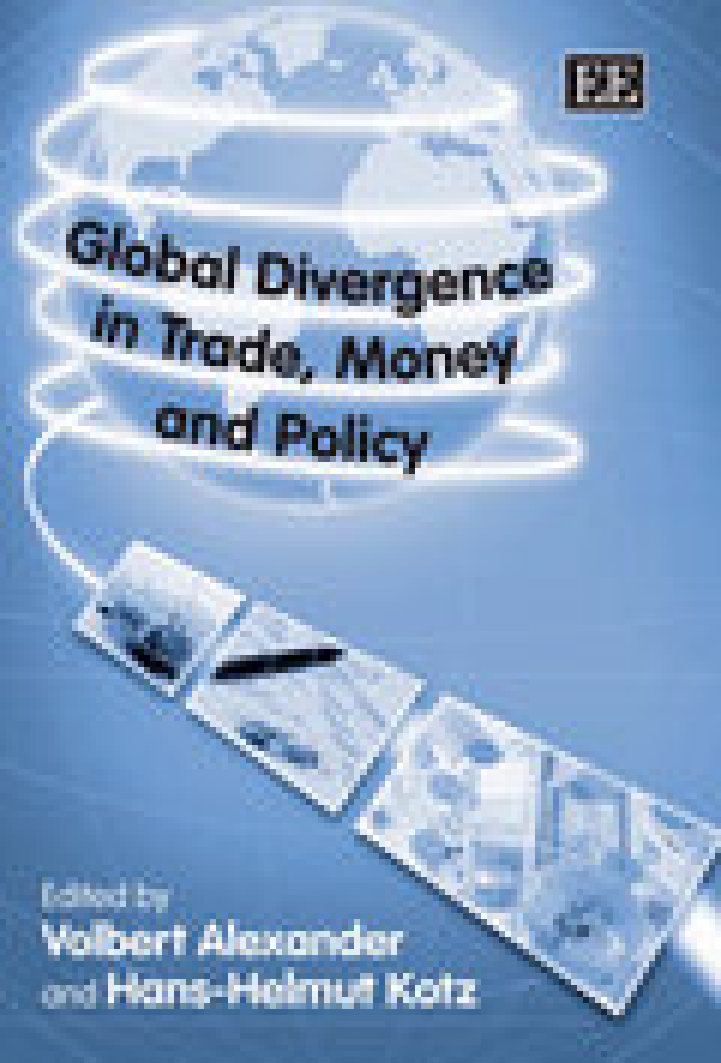
Global Divergence in Trade, Money and Policy



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1 INTRODUCTION

During the past twenty years underdeveloped economies have enforced their export leading activities, but in terms of product per capita and income distribution the results of these efforts were in contrast to the positive effects expected by the neoclassical tradition. For underdeveloped countries free trade and free capital mobility did not produce the theoretically expected results. The increase in poverty and inequality clearly showed that free trade is not the royal avenue to well-being. On the contrary, free trade seems to be the reason for a significant increase in poverty and inequality.

To show and analyze some basic features of underdeveloped countries visa-á-vis the rest of the world, we construct a model of a small, technologically weak and open economy. This economy is able to fix by itself the following three exogenous variables: the nominal wage, the nominal exchange rate and the money supply. A specific aim of the model is the explanation of mechanisms of how the exchange rate determines production, employment and prices levels, as well as distribution and poverty phenomena. The specific analytic environment corresponds to an export-oriented economy.

The model contains the following basic features of underdeveloped economies: Against the rest of the world they are considered to be small and price takers due to their production size. Their production is irrelevant for the formation prices in international markets. Their imports mainly consist of inputs and capital goods necessary for their production. This is a necessary implication of their technological weakness and their dependence on industrialized countries. Because they need inputs and capital goods produced by the rest of the world for their internal economic activity, their production is highly inelastic to exchange rate fluctuations. In contrast, their imports of consumption goods are highly elastic.

In order to find an alternative explanation for the observed results mentioned above, the model is based on the following assumptions:

1. Labor mobility between the domestic economy and the rest of the world is zero.[1]
2. The domestic economy is represented by two agents: a consumer and a producer; further by two non-durable products: the internal one and the imported one, and by two production factors necessary for any production: domestic labor force and import product.
3. In order to meet her needs any consumer demands both the domestic product and the import good. The same consumer is labor supplier in the domestic production process. There is a positive gross substitutability between the national and the imported product for consumption.
4. The producer demands the imported product as the only physical input that he transforms into the final domestic product. He also demands the labor supplied by the consumers, in order to organize the production process and to accomplish production itself. The producer supplies the final domestic product, not only for domestic consumption, but also for exports to the rest or the world.
5. The producer does not use its own product as an input.
6. There are no durable goods in the world economy, so that the domestic and the external economic processes take place in only one period.

2 THE MODEL

2.1 Accounting Features

Let the consumer behavior in the domestic economy be given by:

$$\max U = f(Q_c, Q_m, S) \quad \text{s.t.} \tag{2.1}$$

$$\Pi + WL_s = PQ_c + \varphi P_m Q_m \tag{2.2}$$

Here the preferences are represented by a well-behaved utility function *f(•)*, and Q_m refers to the product imported for internal consumption from the rest of the world; P_m represents the price of the imported product, and φ the nominal exchange rate expressed in terms of a number of domestic monetary units per monetary unit of the rest of the world. The other variables are: Q_c is the domestic consumption of domestic product, S = (τ - T_o) is the demanded time for leisure, *P* is the price of the domestic product, *W* is the nominal wage, L_s is the supplied time for labor, and $\prod$ are the profits perceived by the consumers who own the domestic firms.

The firm´s economic behavior is defined by the maximization of its profit rate, subject to a strictly concave production function (diminishing returns to scale) regarding ($L_d - L^*$), so that:

$$\max(1+\pi) = \frac{PQ_0}{(WL_d + \varphi P_m Q_{\min t})} \quad \text{s.t.} \tag{2.3}$$

$$Q_0 = g[(L_d - L*), Q_{\min t}]; g' > 0, g'' < 0 \tag{2.4}$$

In (2.3) and (2.4) $Q_{\min t}$ is the quantity of external products internally used as an input for production. The term *L** represents the quantity of labor employed by the firm in order to organize all its processes. The bigger the number of contracts realized by the firm in order to employ labor and to sell the products, the higher *L** will be. In other words, the size of *L** always corresponds directly to the size of the internal product market.

It is necessary to state that *L** neither will imply increasing return effects nor indivisibilities, since in the macroeconomic equilibrium of the model *L** will be shown to be completely flexible. *L** makes possible the profit rate maximization, ensuring economic meaningful results.

Once defined $Q_x = Q_x - Q_c$, being Q_x the exported quantity of domestic products, and Q_c the locally consumed domestic products, the balance of the internal economy is given by:

$$W\left(L_d - L_S\right) = PQ_x - \varphi P_m\left[Q_m + Q_{\min t}\right] \tag{2.5}$$

Equation (2.5) shows that the trade deficit has the same size like unemployment. The rest of the world then will have a surplus and a positive excess demand for labor. If there was limited labor mobility between the two economies, the economy with surplus would be confronted with immigration, and the deficit economy with emigration. However, following assumption (1), the deficit in (2.5) would not be solved completely by labor mobility. In this context it is nearly impossible for a small, open economy to solve its unemployment only by allowing the exchange rate to fluctuate freely until its international trade is balanced. As will be shown, the free flotation of the exchange rate would only influence the balance and employment in a transitory way, that is to say in the short period, because the deficit condition is a problem of structural transformation of its productive apparatus. The trade deficit is only the countable expression of the technological weakness of the local economy against the rest of the world. It is a problem that cannot be solved exclusively by the exchange rate.

Since the analyzed economy does not correspond to a general equilibrium system, P_m is given by the rest of the world. The right expression of (2.5) is not a demand surplus in a Walrasian sense, derived from the difference between the demand and supply of the same product or service; it is the difference in value between exports and imports. The equality in (2.5) will depend on the magnitude of φ. It will be shown that the domestic economy consists of a domestic product market, a labor sector, a demand for the foreign product, and a monetary sector. As a consequence it will be possible to determine production, employment, distribution and prices, if the nominal wage *W*, nominal exchange rate φ or money supply are predetermined by exogenous criteria. If money supply M^s is fixed, *W* and φ are subject to the degrees of freedom.

2.2 Supply and Demand Functions

In our model we only need to know the fractions of income assigned to each of the two existing products because the consumer´s maximization behavior

consists in distributing his income between goods in an optimal way. So let γ and ζ be two positive parameters representing the consumer´s preferences, such that 1> ($\gamma + \zeta$)>0. Considering that S = (τ - L_s) the optimum fractions of income the consumer assigns to Q_c, Q_m and *S*, respectively, is given by:

$$(\Pi + W\tau) = \gamma(\Pi + W\tau) + \zeta(\Pi + W\tau) + (1 - \gamma - \zeta)(\Pi + W\tau) \tag{2.6}$$

We obtain the following expressions, which correspond exactly with the results of a standard maximization exercise:

domestic demand for the internal product:

$$Q_c = \gamma\left(\frac{\Pi + W\tau}{P}\right) \tag{2.7}$$

domestic demand for the external product:

$$Q_{cm} = \zeta\left(\frac{\Pi + W\tau}{\varphi P_m}\right) \tag{2.8}$$

leisure demand:

$$S = (1 - \gamma - \zeta)\left(\frac{\Pi + W\tau}{W}\right) \tag{2.9}$$

labor supply:

$$L_s = (\gamma + \zeta)\tau - (1 - \gamma - \zeta)\left(\frac{\Pi}{W}\right) \tag{2.10}$$

Due to the differences between the traditional maximization problem and the one proposed her, the modeling of the firm´s behavior requires a detailed procedure. Our maximization problem is defined as follows:

$$\max(1+\pi) = \frac{PQ_0}{(WL_d + \varphi P_m Q_{\min l})} \quad \text{s.t.} \tag{2.3}$$

$$Q_s = \left(L_d - L^*\right)^{\alpha} Q_{\min t}^{\beta}; 1 > \alpha + \beta > 0; \alpha, \beta \in \Re^+ \tag{2.11}$$

defined for every $(L_d - L^*) \geq 0$.

Considering the first order conditions, we obtain the marginal relationship of technical substitution (2.12), the sum of factors elasticities equal to one (2.13), and using the production function (2.14):

$$\frac{\alpha Q_{\min t}}{\beta(L_d - L^*)} = \frac{W}{\varphi P_m} \tag{2.12}$$

$$\alpha \frac{T_d}{(L_d - L^*)} + \beta = 1 \tag{2.13}$$

$$Q_s = \left(L_d - L^*\right)^{\alpha} Q_{\min t}^{\beta} \tag{2.14}$$

After solving this system, we obtain:

labor demand:

$$L_d = \left(\frac{1-\beta}{1-\alpha-\beta}\right) L^* \tag{2.15}$$

internal demand for the external product that will be used as input:

$$Q_{\min t} = \left(\frac{\beta}{1-\alpha-\beta}\right)\left(\frac{W}{\varphi P_m}\right) L^* \tag{2.16}$$

domestic product supply:

$$Q_s = \frac{\alpha^{\alpha}\beta^{\beta}}{(1-\alpha-\beta)^{\alpha+\beta}}\left(\frac{W}{\varphi P_m}\right)^{\beta}(L*)^{\alpha+\beta} \tag{2.17}$$

As can be shown in (2.15), the demand for labor by the firm is independent of the real wage and of any price. It is, therefore, demonstrated that firms do not demand labor as a function of real wages, but as a result of the size of its output market. This size is represented by L*, which has to be solved by the macroeconomic solution of the model. It is also apparent that the demand of imported input as well as the product supply of domestic products depend on prices, although important differences exist regarding the traditional theory. This is also true for (2.16): Though there is an inverse relationship with the price, a price increase or a rise of the exchange rate will not necessarily bring down the quantity of the goods sold. It can be the case that the growth in the market of the domestic product (reflected in L*) will increase the demand for the imported input though its price has risen.

In (2.17), the quantity produced by the firm is positively related with the real wage. The growth of real wages will cause the expansion of the product supplied. In effect it is substantially different from the results of neoclassical theory. According to neoclassical theory the firm increases its production when a decrease in real wages is observed. It implies that whenever the market is confronted with a contraction in demand, the firms are encouraged to produce more goods. This is in contradiction to the logics of our model, which could be called a TNLM model (Theory of Nonexistence of Labor Market model).

In contrast to the fact labor supply depends on W (according to (2.14)) it is shown in (2.15) that labor demand is independent of this variable. This implies again that the labor sector is not a “market”, as it is treated in traditional theory. As a consequence, W (or ceteris paribus W/P) does not regulate the employment level, neither is it determined by the relationship between supply and demand of labor. The nominal wage W serves as a distributive variable that is exogenously determined by negotiations. Therefore, the “labor market” does

not exist and cannot be part of the analytical structure explaining the operation of a capitalist economy without raising serious conceptual errors.

2.3 Monetary Sector

Our economy is characterized by the existence of domestic money and foreign currency. They are introduced though two channels: First, by the money supply generated by the central bank in order to cover the domestic transactions in national output. Second, the foreign currencies enter the economy through the firm´s revenues for its exports. M^s is given to the firms as a special credit by the central bank; the firm then pays to the consumers the wages and profits not only with the domestic money but also with the foreign currency, and also pays the imported goods to the rest of the world. Whereas domestic transactions can be settled with both domestic money and foreign currencies, the rest of the world only accepts the foreign currency. There are no earnings for the intermediation in the monetary exchange transactions.

The equilibrium in the monetary sector is permanent and instantaneous, and represented by the following equation:

$$M^d = M^s \tag{2.18}$$

The money supply is identical to the value of the domestic transactions for the internal product:

$$M^s = PQ_c \tag{2.19}$$

The balance equation of the monetary system has on the left side as sources domestic currency (M^s) and of foreign currency $\left(D_{iv}\right)$, and on the right side the uses of theses sources:

$$M^s + D_{iv} = PQ_c + \varphi P_m \left(Q_{cm} + Q_{\min t}\right) \tag{2.20}$$

The exports are the only channel to get foreign currency:

$$M^s + PQ_x = PQ_s \tag{2.21}$$

2.4 Domestic Market of Internal Product

Starting from optimal plans and the conditions of the rest of the world economy we have to calculate the reduced forms of the functions above depending on the interaction between consumers and firms.

This market is determined by the domestic and foreign demand for and supply of the internal product. The demand surplus of this market is given by:

$$\left(Q_c + Q_x\right) - Q_s = 0 \tag{2.22}$$

The external demand for domestic product (exports function) is represented by the following expression:

$$Q_x = \psi\left(\frac{\varphi Y^*}{P}\right) \tag{2.23}$$

The term *Y** in (2.23) represents the level of nominal income of the rest of the world economy; the price *P* and the exchange rate are the same as in the previous functions. The parameter, ψ, $1>\psi>0$, is assumed to represent the preferences of the consumers of the rest of the world, and it allows to specify the fraction of income that consumers dedicate to the demand of the domestic product.

Replacing (2.7), (2.16), (2.17), (2.21) and (2.23) in (2.22), and solving for *L* *, we arrive at:

$$L^* = \left(1-\alpha-\beta\right)\left[\tau + \frac{\psi Y^* \varphi}{W} - \left(\frac{1-\gamma}{\gamma}\right)\frac{M^s}{W}\right] \tag{2.24}$$

This expression shows that L* is fully flexible and its magnitude is directly related to the domestic and external effective demand for the domestic product.

This guarantees the permanent equilibrium in the product market. When there is a higher demand for the domestic product, L* will be much higher. The function (2.24) will always satisfy the function (2.22). This means that the firm will not produce more nor less than the market demands. When they produce more than demanded, they will realize losses, the same is true for the opposite case. Therefore, the permanent equilibrium in the market for the domestic product makes clear real firms´ behavior. It must be said now that the permanent equilibrium in that market does not lead to full employment. As a matter of fact, the model is able to show a situation of positive unemployment and a simultaneous permanent equilibrium.

2.5 Price Level and Non-inflationary Character of Wages

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Equation (2.24) is fundamental for the solution of all endogenous variables in the system of structural parameters (preferences, technology and the endowment τ), and exogenous variables *W* and φ, and of the predetermined M^s. Replacing (2.24) in (2.7) and inserting the result in (2.19), we obtain the following expression for the domestic price level:

$$P = \frac{W^{\alpha}\left(M^{s} + \psi Y^{*}\varphi\right)\left(\varphi P_{m}\right)^{\beta}}{\left(\alpha^{\alpha}\beta^{\beta}\right)\left[W\tau + \psi Y^{*}\varphi - \frac{1-\gamma}{\gamma}M^{s}\right]^{\alpha+\beta}} \qquad (2.25)$$

This function corresponds to the reduced form of *P*. It shows that while the demand for the internal product is higher than its supply, *P* will be higher, too.

Concerning the relation between *P* and *W*, it is inspired by the traditional theory a common assumption, that an increase in nominal wages causes inflation; as a consequence it is assumed that to control inflation the growth of nominal wages has to be avoided or kept below the expected inflation rate.[2] However, in our model, the wage *W* is in general not inflationary. Only under very peculiar conditions a *W* growth causes inflation, which reduces the relevance of the neoclassical tradition dramatically.

The following inequalities are the cornerstone of the main argument of the analysis:

$$\text{a) } \frac{\psi Y^{*}\varphi}{M^{s}} \leq \frac{1-\gamma}{\gamma} \quad \text{or} \quad \text{b) } \frac{\psi Y^{*}\varphi}{M^{s}} > \frac{1-\gamma}{\gamma} \tag{2.26}$$

The slope of equation (2.25) with *W*, φ or M^{s} as exogenous variables crucially depends on the expressions (2.26a) and (2.26b). Both expressions show on the left-hand side the proportion between the value of the foreign demand for the domestic product to the domestic demand for the domestic product. On the right-hand side the proportion between the fraction of consumers´ income stemming from transactions in exports divided by the fraction of income stemming from transactions in the domestic product is defined. In the case of dominating domestic markets we will have (2.26a); on the other hand, if the foreign market dominates domestic transactions we will have (2.26b). It becomes obvious that the equality condition possible in (2.26a) only represents a trivial case that is not durable and of very limited importance in the context of our analysis.

The shape of (2.25) for a situation where a dominance of the domestic market can be observed makes clear, ceteris paribus, that the growth of wages will in general be deflationary. Whenever *W* increases, keeping constant the nominal exchange rate and the money supply, *P* will decrease. This implies, as shown in Figure 2.1, that *W* is not inflationary if the wage growth is not financed by the money supply but is a consequence of a redistributive decision form the firm:

Such a decision of the firm alters the structure of the demand; the domestic market is strengthened and the level of employment goes up. Although we have a decrease in the profit rate, lots of benefits occur because the higher relative price of imports leads to more consumption of internal or domestic products.

Neoclassical theory tells us that whenever nominal wages grow with the same

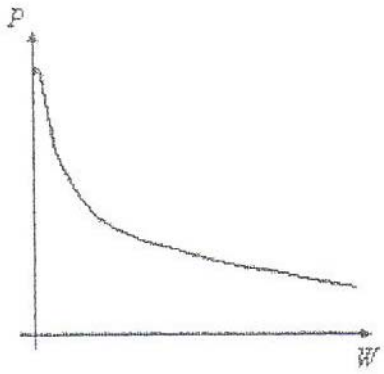

Figure 2.1 The relation between the price level and wages.

rate as the value of the marginal productivity of the labor, they will not cause inflation. Only when the growth rate of nominal wages is higher will inflation be caused.[3] This assumption may be misleading because in the TNLM model it is demonstrated that the relationship between wages and productivity in the neoclassical sense does not have any appropriate analytic foundation, since it is derived from a behavior of firms that does not represent rational behavior in a relevant way. In addition, *W* in the neoclassical theory is considered to be a price, not a distributive variable. Therefore, if wages grow positively or negatively as a result of an exogenous shock, the real conditions of the system are kept constant since all other prices are adjusted in the same proportion. This implies that after an inflationary process caused by *W*, no production and employment conditions are changed though the level of nominal prices has increased.

However, as shown in Figure 2.1, *P* reaches an absolute maximum in a point very near to the *W* axis. Between zero and the maximum, there are only very few values of *W* accompanied by an increase in *P*; this implies that a wage increase is only inflationary inside that range. The neoclassical postulate of a positive relationship between wages and prices is only relevant in a very limited way. In the more general case the relationship between *W* and *P* is always negative.

It is possible to conclude that the relationship between the domestic price level and the nominal wages in an open economy with fixed exchange rates and exogenous money supply is generally inverse provided that the domestic market dominates: a higher nominal wage leads to a lower price level.

A similar result is obtained when we analyze the case of an economy dominated by the exports of its own product supply; a system represented by (2.26b). The shape of the *P* function in this case is shown in Figure 2.2.
Geometrically, the function in this figure has the following characteristics:

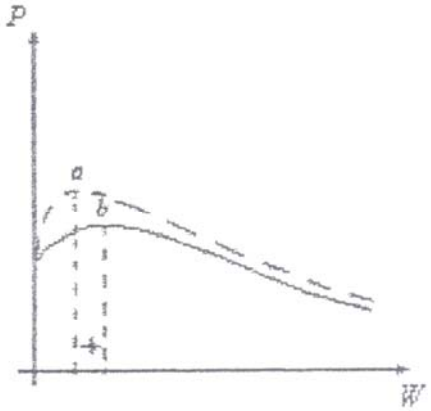

Figure 2.2 The relation between the price level and wages with domestically produced exports

in comparison to Figure 2.1 its maximum is located further to the right, the higher the dependence on exports. Figure 2.2 shows two curves. The dotted one has a maximum at *a*, the continuous one a maximum in point *b*. The higher the dependence of the economy on exports, the positive relation between *W* and *P* covers a wider range on the *W* axis. If wages in the dotted curve are between zero and *a*, they will cause inflation, even in the case when they are not financed with an additional money supply. Only if *W* is bigger its increase will have a deflationary effect on *P*. When the dependence on exports becomes higher, the range of inflationary effects of wage increases is higher, too. This is shown in Figure 2.2 by an arrow between the two maxima *a* and *b*.
This analytical conclusion is particularly important for those economies that have experienced growth rates of exports high above the growth rates of their domestic production and have not reached a very significant progress in bringing down production costs relative to the rest of the world. Since the underdeveloped world is generally characterized by rather low wages, it is very likely that inflationary effects of an increase in *W* become more and more important. As a consequence it is necessary to stabilize the domestic price level and exchange rates in order to implement growth. This implies that for growing purposes the substitution of the external market in favor of domestic production

will result in an increasing tendency to control wages in order to achieve inflation targets and exchange rate stability, except in the case when a dynamic technological progress takes place in a very short period of time.

2.6 Labor Sector: Effective Demand and Employment Level

The TNLM model has shown clearly that the poor and inadequate concept of a neoclassical “labor market” has no relevance for an open economy. As a result of the reduced form of the model, the demand for labor depends on the effective demand for the domestic product, and therefore depends positively on *W*. When *W* does not function as a price, it is not able to serve as a mechanism for the regulation of the employment level. The wage *W* plays the role of distributive variable, confirming the classical and Marxian approach.

Labor demand can be derived from the substitution of (2.24) in (2.15), and has the following expression:

$$L_d = (1-\beta)\left[\tau + \frac{\psi Y^* \varphi}{W} - \left(\frac{1-\gamma}{\gamma}\right)\frac{M^s}{W}\right] \tag{2.27}$$

This equation shows that the employment level depends on the effective demand for the domestic product. From (2.27) we see that the weight of each of the two markets will be crucial for the influence exogenous variables exercise on L_d. It also possible to demonstrate by (2.27), that the influence of the exchange rate on the employment level will be positive. The money supply has a negative and *W* an ambiguous influence.

a. Employment level and wage

The inverse relation between *W* and Π implies that when *W* diminishes, income is shifted toward profits and therefore people who possess the property rights of firms become better off. On the other hand, increases in *W* will lead to a more progressive income distribution with an increase in the employment level.

At this point, it is crucial to answer the following question: What is the relation between *W* and L_d in all these cases, and under what circumstances can we make sure that employment grows together with consumption demand?
Figures (2.3a) and (2.3b) show the possible relevant cases:

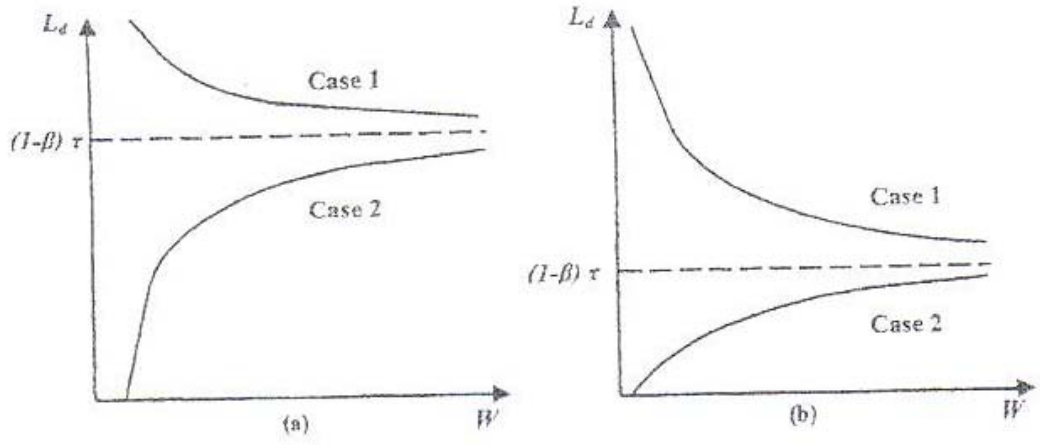

Figure 2.3 Labor supply and wages with small and large β

The difference between (a) and (b) is determined by the magnitude of the parameter β, which determines the degree of dependence of the domestic economy on imported input. This can be treated as a proxy of the technological dependence in the model.
Figure (2.3a) represented an economy with small β. Figure (2.3b) corresponds to a high β. Since the magnitude of this parameter reflects the degree of technological dependence from the rest of the world, (2.3b) corresponds to a much more dependent economy.

Case 1: An economy highly dependent on its exports

The two asymptotic curves in each quadrant represent the magnitude $(1 - \beta)\tau$, the maximum employment level that can be reached in the system. The ones market with “Case 1” characterize the situation of an economy whose main impulse for economic activity comes from its exports. The “Case 2” economies refer to a situation where economic activity is mainly based on its domestic market.

From Figure 2.3 it becomes obvious that in an economy characterized by Case 1 and (a) or (b), the firms hire more labor when the labor supply is cheaper. This is typical for the neoclassical situation. As a consequence a small and open economy depending more on exports than on domestic markets has to follow wage reduction policies in order to preserve or to expand its employment level. This is typical for those economies who have concentrated on the development of assembly plants as a central part of their productive activities during the last 30 or 40 years.[4] To maintain their competitiveness they have operated systematically with wage reductions. Since the inputs this type of economies have bought from other countries are determined by international prices and in order to keep profit rates on internationally attractive levels, they use the only available source in the domestic economy to knock down costs: the wages. These economies, instead of having reduced or even overcome their technological dependence, have increased it (in the context of the model β has grown). Like a vicious circle it then becomes more and more necessary to maintain low wages in order to preserve employment levels and their international competitiveness.

Case 2: An economy highly dependent on its domestic market

Now we analyze the case of those economies which produce the overwhelming part of their output in domestic markets depending on the purchasing power of domestic consumers, although these economies use foreign currencies in order to finance the purchases of their imported inputs. In this scenario labor demand will be defined as a positive function of the real wage, implying that ceteris paribus an increase in the employment level can be reached by an increase in *W*. This case shows a situation contrary to the one postulated by neoclassical theory. The higher *W*, the higher the employment level. In addition, if the same initial level of wages exists in two economies where the first one is technologically less dependent than the other one (as shown by (a) and (b)), the first one has a greater possibility of increasing its employment level by an increase in *W*. This is due to technological dependence.

The size of the domestic market in economies characterized by Case 2 strongly depends on the purchasing power of domestic consumers and its size is bigger the smaller the part of production necessary to finance the import. The positive

relationship between wages and employment means that the increase in *W* will initiate progressive developments in the distribution of the monetary income among consumers. Therefore, the growth in the employment level will be accompanied by a tendency toward a more equal income distribution.

It is shown that an underdeveloped economy facing the situation to be strongly dependent on its exports in order to assure its output level, is condemned to decrease its consumption level and to concentrate its income in more and more. On the contrary, underdeveloped economies depending mainly on their domestic markets have real possibilities to increase their welfare and to improve their income distribution.

b. Employment level and money supply

The growth of money supply M^S, leaving unaffected all the other exogenous variables, has a negative effect on labor demand. The size of this effect, however, will depend on the parameter β and *W*. The lower is β, the flatter will be the slope of (2.27). Similar to the β effect the slope of the function will be flatter when *W* is bigger. Therefore, the negative effects of an increase in M^S on the employment will be less important.

It becomes obvious that an expansive monetary policy without an appropriate wage and exchange rate policy will have a negative effect on the employment level. The transmission mainly goes via the level of *P*. However, this does not imply that an expansive monetary policy has recessive effects, in general. We only can say that the effect of monetary policy on the employment level is negative.

c. Labor supply

The reduced form of the labor supply strictly depends on the domestic conditions of the economy. This implies that L_S positively depends on *W* and negatively depends on the money supply, as is shown in the following expression:

$$L_s = \tau - \left(\frac{1-\gamma-\zeta}{\gamma}\right)\frac{M^s}{W} \qquad (2.28)$$

It is important to stress the absence of the exchange rate and of the level of income of the rest of the world in (2.28). This means that the supply of labor in the domestic economy exclusively depends on domestic conditions. Variations in the level of the total exports or in exchange rates will not affect labor supply, except for the case that monetary authorities decide to adjust the level of M^S and *W* to impulses from the rest of the world. Without this policy labor supply stays independent from all variables characterizing the relationship between the domestic economy and the rest of the world.

d. Unemployment

The function for the excess demand for labor, a proxy for unemployment, is given by:

$$L_d - L_s \leq 0 \tag{2.29}$$

Substituting (2.27) and (2.28) in (2.29), we obtain the following weak inequality:

$$\left(\frac{1-\beta}{\beta}\right)\psi Y^* \varphi W^{-1} - \frac{\zeta - \beta(1-\gamma)}{\beta\gamma} M^s W^{-1} \leq \tau \tag{2.30}$$

(2.30) can be interpreted as follows: With a given wage the left-hand side of equation (2.30) shows that the employment level depends exclusively on the effective demand for domestic output. Whenever the expression of parameters multiplied with M^S is positive, the relation between M^S and the unemployment level will be inverse, which implies that a smaller money supply necessary for transactions in domestic consumption the higher unemployment will be. A positive sign of this quotient crucially depends on ζ representing the propensity to consume imported goods. If ζ < (1-β), the monetary supply is positively correlated with the employment level. If ζ > (1-β), the money supply has an inverse relationship to the employment level. On the contrary the wage rate *W* has a positive influence. This implies that a constant decrease in *W* leads to an increase in unemployment.

The link between *W* and the employment level can be positive, negative or zero. If *W* grows with a smaller rate than the money supply and at the same time the money supply is increased faster than the exchange rate, the employment level rises with a positive influence on the domestic market and without a regressive redistribution of income. If on the other hand the exchange rate goes up, leaving everything else constant, employment also grows because of an increase in the foreign demand for the domestic product, weakening the domestic market.

Another possible scenario is given by a situation of equal growth rates of exports, M^S and *W*, leaving the exchange rate constant: in this case the employment level remains constant, the income distribution changes in favor of people depending mainly on the salary revenues. The import of inputs then will grow more than the total demand for domestic goods, with a substitution effect in favor of labor.

This analysis makes clear that the relation between unemployment and the wage level and its flexibility is not only subject to the limit possibilities of the neoclassical theory; multiple employment levels can correspond to every level of real wages. This implies that every employment level is consistent with countless levels of real wages. In (2.30) the three degrees of freedom (neglecting *Y**) assure that independent of the adjustment rule assumed for *W* in a regime of full flexibility, the change of its magnitude is not able to guarantee that full employment will be reached. On the contrary, it is obvious that in starting from a hypothetical situation of equality in (2.30), that means starting from full employment, a decrease in any component of the effective demand will contract the employment level without any automatic mechanism to restore full employment. Involuntary unemployment then will emerge, even when the relative prices in the system have not changed.

2.7 Poverty Caused by Increases in Exports

We define poverty as the situation stemming from the decrease in per capita income available for final consumption. To analyze the role of the external sector we treat the export and import functions as one subsector of the economy similar to the labor market. It is clear that surpluses or deficits with the

rest of the economy can exist although some other markets are in a permanent equilibrium as has been shown above.

a. Exports

Substituting (2.25) in (2.23), we obtain the following equation for the reduced form of the export function:

$$Q_x = \left(\alpha^{\alpha}\beta^{\beta}\right)\left(1+\frac{M^s}{\psi Y^* \varphi}\right)^{-1}\left(\frac{W}{\varphi P_m}\right)^{\beta}\left[\tau+\frac{\psi Y^* \varphi}{W}-\left(\frac{1-\gamma}{\gamma}\right)\frac{M^s}{W}\right]^{\alpha+\beta} \qquad (2.31)$$

We can see that exports are not only a function of external variables and of the exchange rate, but also of domestic variables like the monetary supply and the wage level.

According to the standard theory, exports of internal products depend positively on the exchange rate, but the effect increases with an exchange rate increase. This indicates that economies whose competitiveness depends on devaluations have to devaluate more and more drastically to achieve the same impact on its exports.

b. Imported inputs

Our TNLM model has the ability to build up some extreme cases underdeveloped countries suffer from today because of the changes that drive the international division of labor. One of them is the increasing importance of the processing industry whose fundamental features consist of the transformation of imported goods with the help of domestic labor and in re-exporting theses goods with a very small value added generated domestically. It is possible to represent this case in our model in a perfect way, equalizing export and import values with the added value necessary for the transformation. However, despite of its increasing importance this case is not completely representative of the situation in underdeveloped countries mainly in underdeveloped Latin American countries. Although the processing industries have expanded quickly throughout the region, the Latin American underdevelopment is characterized basically by a production process that is not

able to produce the domestic output without the imported goods. This is the clearest expression of a technological dependence.

Substituting function (2.24) in (2.16) the following expression is obtained:

$$Q_{\min t} = \beta\left[\frac{W\tau}{\varphi P_m} + \psi\frac{Y^*}{P_m} - \left(\frac{1-\gamma}{\gamma}\right)\frac{M^s}{\varphi P_m}\right] \tag{2.32}$$

It becomes apparent by simple inspection that the function is undoubtedly positively related to *W* and negatively related to M^S. On the other hand, the relationship of $Q_{\min t}$ with φ is not clear. The latter one depends on indirect relations between the exports and the domestic market influencing the activity level.

To sum up, it should be stressed here that in an economy whose activity level is basically determined by the domestic market, the exchange rate is positively related to imports used as input. Secondly, it can be observed that when an axis for the activity level is measured in export growth, the relation between the exchange rate and the import of inputs is negative. This is because devaluations enable the economy to substitute these inputs by labor and exports tend to grow less quickly in these economies than in those guided by the domestic market.

Once again the point should be stressed that the analyzed relationships reveal an enormous distance to those characterized by neoclassical theory.

c. Imports for consumption

The function of the imports for consumption is one of the simplest of the whole model. As a reduced form it depends exclusively on the money supply and on the exchange rate. Wages are eliminated.

Considering that the supply of the domestic product is given by the following function:

$$Q_s = \left(\alpha^\alpha\beta^\beta\right)\left(\frac{W}{\varphi P_m}\right)^\beta\left[\tau + \frac{\psi Y^*\varphi}{W} - \left(\frac{1-\gamma}{\gamma}\right)\frac{M^s}{W}\right]^{\alpha+\beta} \tag{2.33}$$

we can verify easily that the sum of Q_c and Q_x is always equal to (2.33). This means that the added demand for the domestic product is always equal to its supply.

When substituting (2.33), (2.32) and (2.24) in the definition of Π, we obtain:

$$\Pi = \frac{1}{\gamma} M^s - W\tau \tag{2.34}$$

Finally, by substituting (2.34) in (2.7) we arrive at the reduced form of the function of the demand for external products used for domestic consumption:

$$Q_{cm} = \frac{\zeta M^s}{\gamma\varphi P_m} \tag{2.35}$$

We can see that although the wage determines the individual consumers´ demand for imported product, the effect of *W* is indirect in the (2.35).

The relation between Q_{cm} and the exchange rate shows negative sign. It defines an equilateral hyperbola, similar to that of any habitual function known as a Marshall-type demand function.

d. Poverty grows as fast as exports

Let us now assume that the authorities responsible for managing the exchange rate development decide to manipulate the price of the foreign currency and to use it as a competitiveness target; or let us assume that an exchange rate flotation is put into existence in order to avoid a commercial deficit. As analyzed above this leads to a constant devaluation of the home currency depending on the technological gap. With this devaluation, the following phenomena will be produced:

1. The demand for exports grows less than proportional to the rise in the price of foreign currency.
2. Domestic consumption of the domestic product will decrease.
3. Domestic consumption of the imported product will decrease.

4. The imports of inputs will increase less than proportional to the devaluation rate.
5. The effective demand for the domestic product will increase, and with it the employment level.
6. There will the following inflationary impulse: The level of prices *P* will grow less than proportional to the devaluation.
7. Real wages have to go down in order to explain the contraction of domestic demand for domestic and imported products, thus reducing the per capita consumption and causing an increase in poverty.

The effect of the devaluation on the activity level will be positive: the production and employment levels will be increased, and the exports, in particular. On the other hand, there will be serious effects on social welfare: total domestic consumption will go down. As a consequence the domestic market will contract, and exports will expand more quickly than domestic products, partly due to this contraction. The real wage will decrease because of the inflationary effect of the devaluation, and in spite of the increase in employment, per capita consumption inevitably will fall. The main conclusion is that the export-favoring model for underdeveloped economies has the following characteristics: The increase in employment is accompanied by a decrease in the welfare of all consumers of the local economy. Figure 2.4 shows this effect graphically using all the above information.

3 CONCLUSIONS

First, it is an empirical fact that the structural reason for the current trade deficits in underdeveloped economies cannot be solved by a devaluation; sooner or later they will have to devalue again. In any case, the local economy re-appreciating its exchange rate suddenly is not able to overcome its technological deficiency.

Secondly, it is also known every effort to stimulate exports by a devaluation will lead to worse terms of trade which is accompanied by decreasing consumption levels. As a consequence the domestic social cost of obtaining any additional unit of foreign currency will constantly increase.

To sum up, the correction of the trade deficit or the again of international competitiveness through a devaluation will be socially very expensive and will be unable to solve the primary reasons for that deficit. The solution necessarily lies inside the domestic institutional structures.

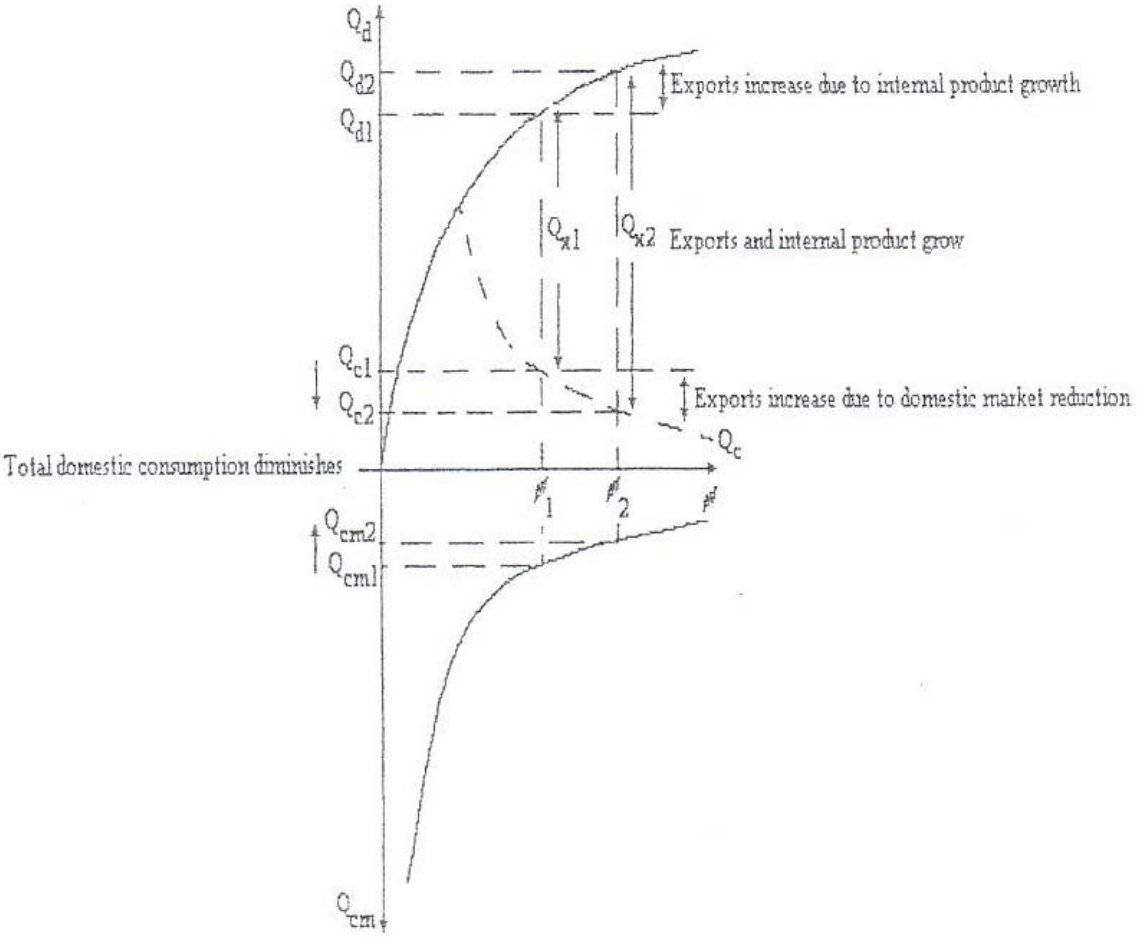

Figure 2.4 Employment and welfare effects of a devaluation.

In addition to the analytic possibilities of the model, we can conclude that the problem described above can only be solved by an endogenous technological transformation of the domestic production process. In this respect market forces are totally useless in solving this problem.

It is important to say here that the effects of decreases in P_m lead to similar phenomena as studied above. A sustained increase of exports under technological disadvantage unavoidably will lead to an increase in poverty.

To develop a small and open economy in a way that domestic markets are substituted by foreign markets and to use this as a decisive way to determine its

activity level implies that wages must be punished in order to achieve competitiveness and to control inflation. The consequences of this way are an increasing income concentration, a sustained increase in poverty and, in spite of the free flotation, a recurrent tendency to deficits with the external sector. Although the deficit is abolished immediately if a free float is put in validity without obstacles, it leads to a drop in the wages in order to avoid inflation and unemployment. This is a structural tendency that is increased systematically. Therefore, the best option for any small, open economy will be to strengthen its domestic market.

Any exchange rate policy cannot correct the technological gaps against the rest of the world. The only possibility to correct it consists of a policy of public intervention characterized by a support of investments in high-priority areas of the production process, and in strengthening the labor supply qualitatively. The free market does not have the capacity to renovate and to strengthen the technology of the production process of an economy like the one analyzed in the model.

The autonomy of the wage, exchange rate and monetary policies crucially depends on the degree of openess of an economy. Economies whose activity level basically depends on its domestic market show wide possibilities of implementing policies designed to correct structural problems like the technological one with a long-term perspective. In contrast, economies highly dependent on exports increase their dependence on wage and monetary policies very quickly in order to keep their international competitiveness by manipulating the exchange rate.

Exchange rate policies lead to redistribution effects and they are much more significant in economies highly dependent on their exports. Their deegres of freedom for other corrections are practically zero.

NOTES

[1] It is a fact that migration from poor countries toward the rich ones is much more significant. The flow of illegal immigrants into industrialized countries clearly show a characteristic feature of industrialized economies: they establish increasing obstacles to limit free labor mobility. Industrialized economies do not have a lot of interest in receiving something more than the goods they supply from the underdeveloped world, and their labor force is not willing to move to

the underdeveloped world because of lover wages. Therefore, the labor mobility between the industrialized and underdeveloped economies is not significant.

[2] In fact, differentiating the equation representing the equality between the marginal productivity of labor and the real wage, and dividing the original equation by the result, it can be shown that inflation emerges when the growth rate of money wages exceeds the rate of growth of labor productivity. This is shown in Blanchard and Fischer (1989), pp. 542-546.

[3] The model of supply dynamics, proposed by Tobin (1972) and included in Blanchard and Fisher (1989), pp. 542-546, clearly shows the neoclassical conception of this problem. There is no place in it for another argumentation but only for the one linking wages in a positive way to the marginal productivity of labor. These and other facets of the problem are extensively discussed in Jossa and Musella (1998), pp. 1-141.

[4] For example, the economies of Southeast Asia.

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