Exchange rate policy and income distribution in an open developing economy

Tropeano, Domenica and Michetti, Elisabetta

University of Macerata

January 2008

Exchange rate policy and income distribution in an open developing economy.

Elisabetta Michetti, Domenica Tropeano[1]
Dipartimento di Istituzioni Economiche e Finanziarie,
Università di Macerata, Italy.

Abstract

In this work we are going to deal with the issue of the distribution of income in an open economy within a simplified macroeconomic model with constant prices. This type of model could apply to middle-income developing countries, which have succeeded in fighting inflation through a policy of high interest rates. It will be assumed that the implicit target of monetary policy now becomes the exchange rate and interest rates are set at a high level to lower the exchange rate (defined as the price of the foreign currency in terms of the domestic one). Even if this strategy may work it may produce negative effects on output growth and the distribution of income. The lowering of the exchange rate target would have the following effects on distribution. It would cause a reduction in the growth of output, it would lower the wage rate. Domestically-produced income distributed abroad should increase instead. The domestic interest rate would rise only for suitable small values of the parameter, which links imports to income. The effect on the profit share is indeed uncertain.

[1]Corresponding author: Domenica Tropeano, Dipartimento di Istituzioni Economiche e Finanziarie, Università di Macerata, via Crescimbeni 20, 62100 Macerata (Italy). Phone number (+39)0733-2583248, fax number (+39)0733-2583205, e-mail: tropeano@unimc.it.

1. Introduction

Exchange rate targeting has become an important issue since in many developing middle-income countries governments have often chosen, while implementing anti-inflationary policies, to maintain a low level of the exchange rate, defined as the price of the foreign currency in terms of the domestic one. This policy aims at attracting capital flows into the country and requires high interest rates for foreign investors. In these countries, while the debt to GDP ratio was declining and inflation was falling very rapidly, interest rates, particularly short term ones, were kept very high in both nominal and real terms. Some have even argued, by discussing the case of Brazil, that higher interest rates in that country were not determined by an increase in the country risk premium; on the contrary investors thought that country risk was rising because interest rates were so high (see Bresser-Pereira and Nakano 2002).

In this paper we examine the distributional consequences of exchange rate targeting in open economy models within the Kaleckian tradition while the link between monetary policy, inflation and distribution, which has been widely studied, has been ignored. In fact we consider a perspective in which monetary policy may affect distribution and output growth (see Atesoglu and Smithin 2006, Smithin 2004 and Kam and Smithin 2004); however we do not take into account the distributional consequences of inflation since we use a constant price model. This choice enables us to focus on the particular case in which anti-inflationary policy has succeeded.

On the advice of international monetary institutions, governments still engage in a policy of high interest rates to attract foreign capital and to keep the price of the foreign currency low. In other words, interest rates are first used as an anti-inflationary tool, but if they stay high for longer periods this means they are used to hit other targets too. We show that, even if inflation is neglected, this policy has important consequences for output growth and distribution.

Furthermore, in this paper we focus on the growing weight of capital inflows. These inflows, however, in turn generate outflows and the balance, the net capital transfers, is often negative for developing countries. We can see the data for Latin America in Table 1 below.

Table 1. Latin America as a capital exporter (in billion dollars). Source: Correa and Vidal (2006).

Year	Net capital inflows	Debt interest and FDi returns net outflows	Net capital transfers
1980	30.9	18.9	12.0
1990	16.1	34.2	-18.1
1995	61.1	40.8	20.2
2000	53.6	53.6	0.0
2001	51.8	54.7	-2.9
2002	10.3	51.2	-41.0
2003	21.4	55.8	-34.4
2004	-12.5	65.3	-77.8

In Latin America, investments by multinationals have largely been made in non-manufacturing sectors enjoying high rents such as banks, telephone companies and so on. Of course, we cannot

capture this evidence in our framework, since we use a simple one-good/one-sector model. This notwithstanding, the effects of an increase in this type of investment and in net capital transfers abroad may be modelled.
In the next section we discuss the main approach to this topic in the context of open economy models in the Kaleckian tradition. Those models consider both the distribution of income between workers and capitalists in the home country and that between domestic and foreign capitalists. The distribution between domestic and foreign capitalists would be determined by the real exchange rate through the trade balance. Their concern is mainly with the balance of trade and the opening of trade flows while monetary and balance of payments factors are consciously ignored.

2. Distribution of profits and international competition

The main determinant of the wage share in Kaleckian closed economy models is the mark-up that firms impose on wage and material costs. The same model can be applied to an open economy. The main issue in Kaleckian open economy models is how international competition may affect the distribution of income within a country. Given that the latter depends mainly on the mark-up, the question is how a change in the degree of competition in the international economy will affect the distribution of income and the rate of accumulation in a small open economy.
International competition may affect distribution in as far as it changes the profit margin required by firms, their target mark-up (see Blecker 1999). Monetary policy changes at the international level may do so as well (see Tropeano 2005 and Tropeano 2006).
An increase in the desired mark-up motivated by exogenous changes in international conditions may lead however to a fall in the rate of growth of the economy. In fact, if labor productivity and nominal wages do not change, this amounts to a loss of competitiveness for domestic products and then to a reduction in exports, which in turn makes output decline (see Blecker 1999). A way out would be to allow nominal or real wages to fall to increase a country's competitiveness (see Blecker 1996). A possible cause of changes in international conditions and in the desired profit margin is a financial rule that is imposed by financial markets upon managers of firms (see Boyer 2000). This could be labelled as a change in the international corporate governance regime.
Kaleckian models of the open economy so far have used only real variables to affect income distribution, as has been stressed by Blecker himself (Blecker 1999). An extension to monetary factors and policy would thus be useful.
On the other hand, at least for semi-industrialized economies, the changes in the wage share in the manufacturing sector cannot be considered as a reliable indicator of changes in the overall distribution of income (see Lopez 2005). This happens for reasons which have to do with the evolution of the economic system. In part, there is the heritage of the past with a large part of the population still employed in agriculture; in part, there is the growing share of informal work because of outsourcing and other very recent tendencies. As a consequence, when the real wage rate increases and the profit rate decreases, there is an increase in the concentration of income since the other wages in the informal sector fall as unemployment increases.
An appreciation of the currency may, as is supposed in Kaleckian models, increase the wage share in the manufacturing sectors because at constant prices the fall in intermediate inputs costs, because of the paradox of costs, lets the profit share fall. At the same time, however, it decreases the weight of the manufacturing sector due to the increased competition from imports and, through the decreased demand for inputs to other sectors, it will make the demand for labor fall and thus the average level of remunerations fall as well. The opposite happens in the case of a depreciation. Recent studies on employment have found that the main determinant of effective employment, in both the formal and informal sectors, is the exchange rate. Appreciation is very bad for employment (see Frenkel and Taylor 2006). Furthermore in many empirical studies it has been found that capital account opening seems one of the few variables to affect the wage differential in a significant way (see Behrman et al 2000). The opening of the capital account is generally followed by an increase in the wage differential.

Thus, it seems that to model the effects of changes in monetary and exchange rate policy on income distribution only through the pricing equation, under the assumption that other conditions are unchanged, may not fit well in the current world economy. Multinational corporations may increase their share of world profits by producing directly abroad instead of fighting for trade shares. The increasing weight of financial flows over trade flows may affect the distribution of income through the factor income payments and transfers items of the current account rather than simply the trade balance. Nominal rather than real wages may become flexible.

In Blecker (1999), the distribution of profits between domestic and foreign capitalists depends on the share of exports of domestic goods, which are of course imports for the foreign country. The distribution of profits then depends on the trade balance surplus or deficit. Anything that improves the trade balance understood as the sum of exports minus imports would increase domestic capitalists' profits and the opposite. The effects on capital accumulation then depend on the usual distinction between stagnationist and exhilarationist and so on. However, the exchange of goods is the basis for generating profits and then trade wars are a way of distributing them.

Thus the distribution of profits between domestic and foreign capitalists would pass only through trade between countries. Now even foreign capitalists may produce in the domestic country using a different organization of labor and different inputs, and have different objectives from those of domestic ones. Secondly, there is growing tendency to falling both nominal and real wages under the monetary and exchange rate policies that are carried out to fight inflation and ensure the financing of external debt.

3. Monetary and exchange rate policies in semi-industrialized economies

Most countries with a history of high inflation have macroeconomic policies, which aim at maintaining a low or falling rate of inflation. The most used instrument is inflation-targeting. This requires high interest rates. The problem is that even after the inflation rate has reached a low level, interest rates are left at their high levels on the advice of international institutions. In Turkey, after the 2001 crisis, the main content of the adjustment programme was to offer high real interest rates, accompanied by falling inflation and a primary surplus in the state budget, to foreign investors. The government objectives as to inflation, budget deficits, Gdp growth, real interest rates were equal to those, set in the IMF Turkey country study published in 2001 (see Yeldan 2007). The rationale for this is that high interest rates are good at fighting inflation but only under a stable and often overvalued currency. In the case of Mexico, it has been shown that monetary authorities react asymmetrically to exchange rate depreciations and appreciations. They raise interest rates after a depreciation but they do not lower them after an appreciation (see Galindo and Ros 2006, Levy-Orlik 2007). This amounts to adhering to an implicit rule of maintaining exchange rates at a low level.

A strong currency is used to restore trust in the performance of the domestic economy, to tame inflationary expectations and to attract foreign capital inflows. The problem is that once this fabulous world has been reached it must be kept alive. The opening of the capital account under stable monetary conditions paves the way to the entry of foreign capitals but the net resource transfers to developing countries are always negative (see Kregel 2004, Correa and Vidal 2006). This happens mainly because foreign earnings in the domestic countries are repatriated and, since foreign direct investment is usually directed towards sectors where the rate of profit is very high, those high profits weigh heavily on the balance of payments.

Foreign direct investments often come from countries where investors require high dividends to continue to invest and thus those dividends must be distributed to the foreign shareholders. Thus, though capitals come in, they soon go out too, to avoid a big external imbalance interest rates must be raised, and the exchange rate overvalued. We are speaking about nominal overvaluation.

Of course, if domestic wages and prices grow slowly, the nominal overvaluation also becomes a real overvaluation. The problem with this is its circularity. If this policy regime is stopped for some time the foreign investors will withdraw their capitals and a crisis will occur. In this case either the

country recovers after a while and starts again with the same policies (see Turkey) or, more rarely, succeeds in changing policy stance (Argentina).
In this paper, it will be assumed that the target of the monetary authorities is a certain presumably low price of the foreign currency in terms of the domestic currency. Thus the interest rule is written as regarding the deviation of the exchange rate from this target. To simplify things, prices are considered stable and exogenous while wages fluctuate with the level of economic activity. It supposed that they tend to rise in good times while they tend to fall in bad times. A certain degree of nominal wage flexibility is assumed which fits in well with the current situation of deregulated and informal labor markets. The behaviour of foreign investors is highly simplified too. The exchange rate depends on the balance of payments surplus or deficits. The balance of payments is made up of the current account, the trade balance and other items such as factor income payments and transfers, and the proper capital account. The capital account is made dependent on the interest rate differential while the current account depends on output and on the exchange rate itself due to the item factor income payments.

4. The model

Following Atesoglu and Smithin (2006) the linear equation describing the income distribution in an open economy can be expressed by

$$a = k + r + w + (kf + rf) = k + r + w + B(f),\ B(f) \geq 0 \qquad (1)$$

where a is the log of labour productivity, k is the profit share of the entrepreneur, w is the log of real wage rate, r the real interest rate. Equation (1) represents the logarithmic linearized version of the alternative income- based GDP breakdown, derived from the production function in the current period $Y = AN$ and the forward-looking GDP breakdown $P_{+1}Y = (1 + k)(1 + i)WN$, taking into account the interest charge on the costs of production and the expected profit share of output (see Atesoglu and Smithin 2007) . Here P is the price level, N is the level of employment, A is average labor productivity (the anti-log of a above), and W is the nominal wage bill.
Observe that in (1), differently from Atesoglu and Smithin (2006), profit and interest income which go abroad (given by $B(f)$) have been considered. These incomes, being the remunerations of foreign productive factors employed in the domestic economy, are part of the gross domestic product; instead national income, according to national accounts rules, includes only the sum of outgoing and incoming factor income payments (see Soci A. 1990).
In the open economy we consider that production or output (y) is described as the sum of autonomous expenditure, investment and the current account of the balance of payments by the following equation

$$y = x_0 + \varepsilon k + [E - M(y) - B(f)],\ \varepsilon > 1 \qquad (2)$$

where x_0 is the exogenous autonomous expenditure, εk are the investments (that are an increasing function of the profit share) while the current account of the balance of payments has been introduced. Equation (2) is basically an IS curve where, as in Atesoglu and Smithin (2006), the relative price term in the investment function is the profit share rather than the interest rate. Furthermore it is is made up of the balance of trade (i.e. $E - M(y)$) plus the balance of income factor payments coming from and going abroad (i.e. $B(f)$). If the country is a net receiver of investments from abroad it is supposed that this balance will be negative so that the quantity $B(f) > 0$ enters in equation (2) with negative sign. The idea behind this assumption is that foreign firms or multinational corporations are assumed to distribute more dividends and to earn higher profits than domestic ones.
Foreign direct investment may consist of either greenfield investment, which increases the

country's productive capacity, or mergers and acquisitions which is merely financial. While the former could increase output and employment in the host country, the latter does not. This happens in particular if the entry of foreign firms happens in sectors which have low labor intensity and high profitability, such as finance and utilities. This happens very often if external liberalization and privatization occur at the same time (see Mencinger 2003).
As usual, imports $M(y)$ are defined as a portion $\alpha > 0$ of income, that is:

$$M(y) = \alpha y \tag{3}$$

while exports $E > 0$ are assumed to be constant.
In order to describe the formation of the current account of the balance of payments we assume

$$B(f) = \gamma - \varphi e, \ \gamma > 0, \varphi \in (0,1) \tag{4}$$

where e is the exchange rate, so that $B(f)$ is decreasing with respect to e.
This last assumption is quite realistic according to the consideration that a higher exchange rate, and a policy of high interest rates to keep it high, can be considered as a sign of financial stability by foreign investors. This effect, of course, will be enhanced if all this happens in the framework of an *Imf* guided stabilization program.
Wages w, both real and nominal, are assumed to depend on the aggregate demand y as specified by

$$w = w_0 + \eta y, \ w_0, \eta > 0 \tag{5}$$

where w_0 is the exogenous component (it is due, for instance, to the bargaining power of labor not connected with demand conditions in the labor market) while η is a positive real constant so that the higher the level of demand, the higher the bargaining power of workers. In fact many empirical studies have shown that in period of slumps or recessions the wage share usually falls while the profit share rises (see Ortiz 2005). Of course, this implies that the increase in nominal wages will make real wages rise as well to the same extent and the opposite when wages fall. We are aware that this is an extreme assumption and that it could be released by introducing some type of Phillips curve as in Atesoglu and Smithin (2006).
We are assuming a certain degree of nominal wage flexibility, which in developing countries might be related to the size of informal markets, the labor market deregulation and the high labor mobility. There is an open discussion over the issue of whether there is nominal wage rigidity, especially downwards, even in developed countries (see Dickens et al. 2007, Smith 2000, Nickell and Quintini 2003 and Holden and Wulfsberg 2007). For developing countries, there are not so many studies available, with some valuable exceptions (see Onaran 2002 for the case of Turkey and Castellanos et al. 2004 for Mexico).
In order to consider the exchange rate (defined as the price of the foreign currency in terms of the domestic one) we simply assume that it appreciates if the balance of payments (BP) is in surplus and the opposite, that is

$$e = e_0 - \theta BP, \ e_0, \theta > 0 \tag{6}$$

where

$$BP = (E - M(y)) - B(f) + \pi r = E - \alpha y - (\gamma - \varphi e) + \pi r \tag{7}$$

and the term πr takes into account the capital account.
Now we introduce the exchange rate target rule. We assume that the government chooses a target level of the exchange rate, which should ensure enough capital inflows and monetary stability in general. If the existing level of the exchange rate is higher than the target, then interest rates should be raised and the opposite when the existing level of the exchange rate is lower than the target one. A higher exchange rate means that the domestic currency has depreciated with respect to the foreign one. We particularly consider the case in which the government revises the desired exchange rate target downwards; in this case, it wishes a lower level of the exchange rate that is an appreciation of the domestic currency as stated by the following equation:

$$r = r_0 + \beta(e - e^\star),\ \ r_0 > 0, \beta \geq 1 \tag{8}$$

where $e^\star$ is the exchange rate target level.

5. Equilibrium of the model: existence and positiveness

We first go back to the equilibrium in the goods market conditions in order to determine the output equilibrium value y as a function of the exchange rate e.

By considering imports as defined by (3) and the current account as a function of the exchange rate (4), we get the following new expression of production stated in equation (2), that is:

$$y = x_0 + \varepsilon k + (E - \alpha y - \gamma + \varphi e) \tag{9}$$

then we easily obtain the profit share

$$k = \frac{1+\alpha}{\varepsilon} y - \frac{\varphi}{\varepsilon} e + \frac{\gamma - E - x_0}{\varepsilon}. \tag{10}$$

According to equation (10), k is increasing with respect to y and decreasing with respect to e that is $\frac{\partial k}{\partial y} > 0$ and $\frac{\partial k}{\partial e} < 0$.

By following a similar procedure we replace in the equation describing income distribution (1), the terms $k, r, w, B(f)$ using equations (10), (8), (5) and (4) respectively. We then get:

$$a = \left(\frac{1+\alpha}{\varepsilon} + \eta\right) y + \left(\beta - \frac{\varphi}{\varepsilon} - \varphi\right) e - \beta e^\star + \left[\frac{\gamma - E - x_0}{\varepsilon} + r_0 + w_0 + \gamma\right]. \tag{11}$$

From equation (11) we finally obtain the following relation between the output and the exchange rate in the economy given by:

$$y = f(e) = \frac{\varphi + \varepsilon(\varphi - \beta)}{1 + \alpha + \varepsilon\eta} e + \frac{\beta\varepsilon}{1 + \alpha + \varepsilon\eta} e^\star + \frac{\varepsilon(a - r_0 - w_0 - \gamma) + (E + x_0 - \gamma)}{1 + \alpha + \varepsilon\eta}. \tag{12}$$

Now we consider the equations describing the balance of payments and the exchange rate target rule in order to obtain the relation between output equilibrium value y and the exchange rate e according to the institutional setting.

Consider equation (6) explaining the exchange rate, we replace term BP with equation (7) and r with equation (8). We then obtain the following equation:

$$e = \theta\alpha y - \theta(\varphi + \pi\beta)e + \theta\pi\beta e^\star + [e_0 + \theta(\gamma - \pi r_0 - E)]. \tag{13}$$

From equation (13) we easily we obtain the relation between output y and the exchange rate e representing the balance of payments with the exchange rate rule in our model, given by:

$$y = g(e) = \frac{1 + \theta(\varphi + \pi\beta)}{\theta\alpha} e - \frac{\pi\beta}{\alpha} e^\star + \frac{\theta(E + \pi r_0 - \gamma) - e_0}{\theta\alpha}. \tag{14}$$

The final model in the reduced form is described by two linear equations with two endogenous variables, output y and the exchange rate e, that is, taking into account equation (12) stating the equilibrium in goods market and equation (14) concerning the role of the balance of payments, we get the following system:

$$T := \begin{cases} y = f(e) = me + q(e^\star) \\ \\ y = g(e) = ne + p(e^\star) \end{cases} \tag{15}$$

where

$$m = \frac{\varphi + \varepsilon(\varphi - \beta)}{1 + \alpha + \varepsilon\eta} \text{ and } n = \frac{1 + \theta(\varphi + \pi\beta)}{\theta\alpha} > 0$$

while

$$q(e^\star) = \frac{\beta\varepsilon}{1+\alpha+\varepsilon\eta} e^\star + \frac{\varepsilon(a - r_0 - w_0 - \gamma) + (E + x_0 - \gamma)}{1+\alpha+\varepsilon\eta}$$

and

$$p(e^\star) = -\frac{\pi\beta}{\alpha} e^\star + \frac{\theta(E + \pi r_0 - \gamma) - e_0}{\theta\alpha}.$$

Observe that $q(e^\star)$ and $p(e^\star)$ only depend on the parameters and the exogenous variables of the model and that $q'(e^\star) > 0$ while $p'(e^\star) < 0$.

The equilibrium solutions for output and the nominal exchange rate must ensure that the supply of output is equal to the demand and that the desired exchange rate-targeting has been pursued through the interest rate targeting rule. Thus in steady state there is equilibrium in the goods market and the interest rate is at that level which ensures the desired exchange rate target.

On the existence of the equilibrium of system T given by (15) we prove the following proposition.

Proposition 1. Let $\varphi < \frac{\beta}{2}$, then function $f(e)$ in system T is strictly decreasing.

Proof. Function $f(e)$ in system (15) is strictly decreasing iff $m < 0$ that is

$$\varphi(1+\varepsilon) - \varepsilon\beta < 0 \Rightarrow \varphi < \frac{\varepsilon\beta}{1+\varepsilon}. \tag{16}$$

Observe that $\frac{\varepsilon}{1+\varepsilon} \in \left(\frac{1}{2}, 1\right)$ since $\varepsilon > 1$, and consequently $\frac{\varepsilon\beta}{1+\varepsilon} > \frac{\beta}{2}$. Trivially it follows that if $\varphi < \frac{\beta}{2}$ relation (16) holds. □

If the hypothesis of proposition 1 holds, $f(e)$ is strictly decreasing and consequently $g(e)$ and $f(e)$ intersect in a unique point namely $S = (\overline{e}, \overline{y})$. Observe that condition $\varphi < \frac{\beta}{2}$ holds if β is not too small (i.e. $\beta \geq 2$, for all $\varphi \in (0,1)$). We assume that the parameter φ describing the reaction of the current account (the item factor income payments) to a change in the exchange rate is small. The reason is that factor income payments outgoing depend on capital inflows and are made of interest and profits repatriated, which are a low share of them. The parameter φ should then be small. The parameter β describing the reaction of the interest rate to a revision in the desired exchange rate target must be strong to gain investors' confidence.

The previous proposition 1 gives a sufficient condition for the existence of an equilibrium solution $S = (\overline{e}, \overline{y})$ for our model, nevertheless we must state conditions on parameters such that $S \in R^2_+$ for the equilibrium point being economically interesting (both components, the exchange rate and the output equilibrium values, must be non-negative).

Assume $\varphi < \frac{\beta}{2}$ implies $m < 0$, so that the equilibrium point $S = (\overline{e}, \overline{y})$ of system T exists.

First we observe that $\overline{e}$ must solve equation $g(\overline{e}) = f(\overline{e})$ and consequently the exchange rate equilibrium value is given by:

$$\overline{e} = \frac{q(e^\star) - p(e^\star)}{n - m} \tag{17}$$

hence $\overline{e} > 0$ iff $q(e^\star) - p(e^\star) > 0$, being $n - m > 0$.

Define $h = 1 + \alpha + \eta\varepsilon > \alpha$, then the following relations hold:

$$q(e^\star) - p(e^\star) =$$

$$= \left(\frac{\beta\varepsilon}{h} + \frac{\pi\beta}{\alpha}\right) e^\star + \frac{\varepsilon(a - r_0 - w_0 - \gamma) + (E + x_0 - \gamma)}{h} - \frac{(E + \pi r_0 - \gamma)}{\alpha} + \frac{e_0}{\theta\alpha} \geq$$

$$\geq \frac{\varepsilon(a - r_0 - w_0 - \gamma) + (E + x_0 - \gamma)}{h} - \frac{(E + \pi r_0 - \gamma)}{\alpha} = H.$$

Obviously if $H > 0$ then $\overline{e} > 0$. This condition is verified for large values of the parameters of the model, for instance if x_0, a or γ are large enough. The parameter x_0 stands for the autonomous components of aggregate demand among which state expenditure is an important item. Given that the weight of the public sector is high in almost all economies, the assumption of a high value is easily justified.

Assume $q(e^\star) - p(e^\star) > 0$ so that the equilibrium exchange rate $\overline{e}$ of system T is positive. Then the correspondent output equilibrium value can be obtained from each of the equations of system T, for instance, $\overline{y} = m\overline{e} + q(e^\star)$ then, taking into account equation (17), trivially we obtain:

$$\overline{y} = \frac{nq(e^\star) - mp(e^\star)}{n - m}. \tag{18}$$

If $p(e^\star) > 0$, being $q(e^\star) > p(e^\star)$, then $\overline{y} > 0$. Observe that $p(e^\star) > 0$ iff

$$-\frac{\pi\beta}{\alpha}e^\star + \frac{\theta(E + \pi r_0 - \gamma) - e_0}{\theta\alpha} > 0.$$

The last relation is likely to hold for instance if E, θ or πr_0 are not too small. Exports E in small open economies are usually quite high. The parameter θ may be assumed to be high if it is supposed that the exchange rate is very sensitive to the position of the balance of payments. The initial level of the interest rate r_0 may be set at a high level given that the average level of interest rates in developing countries is very high and higher than in developed ones.

Taking into account the previous considerations, the following proposition easily holds.

Proposition 2. Assume $\varphi < \frac{\beta}{2}$ and $0 < p(e^\star) < q(e^\star)$, then our model admits a unique equilibrium point $S = (\overline{e}, \overline{y}) \in R^2_+$.

In what follows we consider parameter values such that the hypotheses of proposition 2 hold.

6. Effects on the equilibrium when varying the exchange rate target

We now want to study the effect of a change in the exchange rate target $e^\star$ on the exchange rate and output equilibrium values. To reach this goal we calculate the comparative static derivatives.

First we consider the effect of a change in $e^\star$ on $\overline{e}$. From equation (17), we easily calculate the following derivative:

$$\frac{\partial\overline{e}}{\partial e^\star} = \frac{q'(e^\star) - p'(e^\star)}{n - m} = \left(\frac{\beta\varepsilon}{1 + \alpha + \varepsilon\eta} + \frac{\pi\beta}{\alpha}\right)\frac{1}{n - m} > 0.$$

In this case an increase (or a decrease) in the exchange rate target will make increase (or decrease) the actual exchange rate. In our model we assumed that the governments' objective is often to get a lower value for the exchange rate. A lowering of the exchange rate target under the assumptions made above will make the actual exchange rate decrease as well.

To calculate the effect of a change in the exchange rate target on equilibrium output we use the same method.

In this case from equation (18), we have

$$\frac{\partial\overline{y}}{\partial e^\star} = \frac{nq'(e^\star) - mp'(e^\star)}{n - m} = \left(n\frac{\beta\varepsilon}{1 + \alpha + \varepsilon\eta} + m\frac{\pi\beta}{\alpha}\right)\frac{1}{n - m} > 0.$$

In fact, let $h = 1 + \alpha + \varepsilon\eta$ then

$$n\frac{\beta\varepsilon}{h} + m\frac{\pi\beta}{\alpha} = \frac{1 + \theta(\varphi + \pi\beta)}{\theta\alpha}\frac{\beta\varepsilon}{h} + \frac{\varphi + \varepsilon(\varphi - \beta)}{h}\frac{\pi\beta}{\alpha}.$$

After simple calculations we obtain that this last quantity is strictly positive and consequently $\frac{\partial\overline{y}}{\partial e^\star} > 0$. We have proved that an increase in the exchange rate target produces an increase in the

output equilibrium level $\overline{y}$.

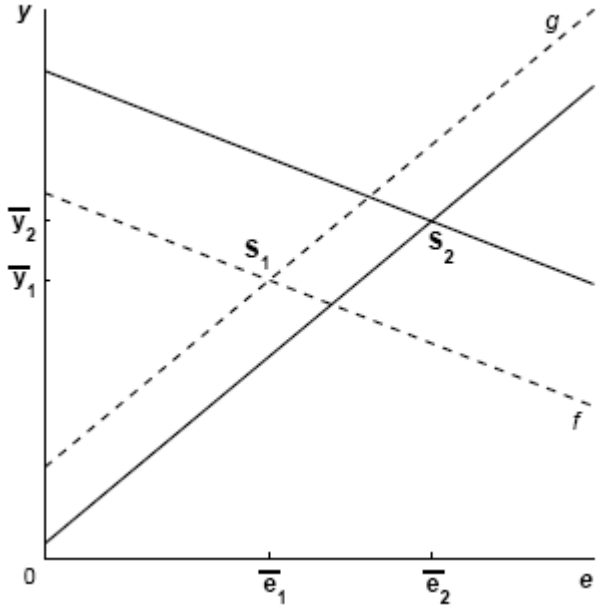

Figure 1. Equlibrium of the model after an increase in the exchange rate target: also the equilibrium exchange rate and output increase.

The effects of a change in the exchange rate target level on exchange rate and output is presented in figure 1. If $e^{\star}$ increases, also $q(e^{\star})$ increases (that is function $f(e)$ moves upward), while $p(e^{\star})$ decreases (function $g(e)$ moves downward). The new equilibrium point S_2 is characterized by a greater level of equilibrium output $\overline{y}$ and the exchange rate $\overline{e}$ being $\overline{y}_2 > \overline{y}_1$ and also $\overline{e}_2 > \overline{e}_1$.

As a consequence if the government chooses a lower exchange rate target, which means that it wishes a lower price of the foreign currency in terms of the domestic one, it will cause a decrease in output. The reverse of course applies too. If the exchange rate target is raised, if the government is happy with a higher price of the foreign currency in terms of the domestic one, then output should increase.

7. Effects on income distribution of a lowering of the exchange rate target.

We can also study the distributional consequences of a lower exchange rate target in our model for the wage rate w, the interest rate r and foreign distributed factor income payments $B(f)$.

Consider equation (5), then at the output equilibrium level of the model, we have that $w = w_0 + \eta\overline{y}$ hence the effects of a variation in $e^{\star}$ on wages can be deduced while considering that

$$\frac{\partial w}{\partial e^{\star}} = \eta \frac{\partial \overline{y}}{\partial e^{\star}} > 0.$$

Wages and the equilibrium output vary in the same direction (both increase or decrease). As a consequence a lower wage rate is reached with a lower exchange rate target. This possibility depends on the working of the labor market where nominal wages are flexible and may even be lowered. This is quite contrary to the usual assumption that nominal wages are rigid while real wages may fall or rise because of changes in inflation. This feature of the model has been introduced in order to mirror some recent institutional characteristics of labor markets in developing countries. In most middle-income countries, given the relatively successful fight against inflation, inflation has stopped being the main cause of changes in real wages. Instead, because informal labor markets have grown in weight with respect to formal ones the extent to which nominal wages are flexible has increased. Of course, nominal wages are not flexible in the manufacturing sector for

formal workers protected by contracts. Their number however has fallen greatly and the larger section of the labor market consists of low skill low protection and low paid workers. Their salaries may well fall if the economy undergoes a period of contraction. If this assumption holds then in our model the new equilibrium position for output, lower than the preceding one before the revision of the exchange rate target, implies a lower wage rate.

Consider now the effects on the interest rate. Taking into account equation (8) and the exchange rate equilibrium value $\bar{e}$ we have that

$$\frac{\partial r}{\partial e^{\star}} = \beta\left(\frac{\partial \bar{e}}{\partial e^{\star}} - 1\right).$$

The sign of this derivative may be uncertain however the following proposition can be proved.

Proposition 1. A $\bar{\alpha} > 0$ does exist such that $\frac{\partial r}{\partial e^{\star}} < 0$, $\forall\, \alpha \in (0, \bar{\alpha})$.

Proof. Consider quantity

$$\frac{\partial \bar{e}}{\partial e^{\star}} - 1 = \left(\frac{\beta\varepsilon}{h} + \frac{\pi\beta}{\alpha}\right)\frac{1}{n-m} - 1,\ h = 1 + \alpha + \varepsilon\eta$$

whose sign is the same as

$$\frac{\beta\varepsilon}{h} + \frac{\pi\beta}{\alpha} - n + m = -\frac{1}{\theta\alpha} - \frac{\varphi}{\alpha} + \frac{\varphi}{h} + \frac{\varepsilon\varphi}{h} = j(\alpha).$$

Since $\lim_{\alpha \to 0^{+}} j(\alpha) = -\infty$, then $\forall K > 0$, a $\bar{\alpha} > 0$ exists such that $j(\alpha) < -K$ if $0 < \alpha < \bar{\alpha}$. This proves our proposition. □

This last proposition states that r is decreasing with respect to the exchange rate target if α is small enough. Being α the propensity to import out of income, this is a reasonable assumption. Since the tool used to realize the new desired lower exchange rate level is the interest rate, obviously the interest rate has been raised and this appears in the national accounts too. The same result can be found also in closed economy models like the one by Atesoglu and Smithin (2006).

Finally we focus on the effects of a decrease in $e^{\star}$ on interest and profit distributed abroad. Consider equation (4) then

$$\frac{\partial B(f)}{\partial e^{\star}} = -\varphi\frac{\partial \bar{e}}{\partial e^{\star}} < 0.$$

As a consequence on a lowering in the exchange rate target $e^{\star}$, interest and profits distributed abroad should increase because it has been defined as a negative function of the nominal exchange rate. The desired exchange rate target causes an increase in both financial and foreign direct investment in the country. As we have already noticed, the balance between inflows and outflows is not favourable to developing countries, for, on average, net flows are always negative. As far as our model is concerned, this is reflected in the item factor income payments in the current account which rises in proportion to GDP as a consequence of the inflows and subsequent outflows. Of course we are considering only the part of these outflows which passes through the current account in the definition of gross national product.

What happens to profits, which are a residual in our income definition, is uncertain. In fact from equation (10) we can observe that

$$\frac{\partial k}{\partial e^{\star}} = \frac{1+\alpha}{\varepsilon}\frac{\partial \bar{y}}{\partial e^{\star}} - \frac{\varphi}{\varepsilon}\frac{\partial \bar{e}}{\partial e^{\star}}$$

and consequently we cannot conclude on its sign. In fact the sign of this quantity depends on the effects of two opposite forces. On one hand, if $e^{\star}$ decreases, also the equilibrium output decreases and hence the profit share, if the other components of production do not change. On the other hand, if $e^{\star}$ decreases, also the actual exchange rate decreases while the current account of the balance of payments increases. As a consequence, being the other components of production at the same levels, also the profit share must increase.

While in closed economy models the price level and the mark-up is the decisive variable in

assessing the changes in the distribution of profits between labor and capital, in this model instead international factors play the major role instead.
In an open economy in which the interest rate is used to achieve a lower exchange rate, the competition is no more limited to workers and capitalists to share among them the product of labor but also among workers, capitalists, rentiers and foreign investors; the latter may be either capitalists or rentiers.

8. Conclusions

In this work we discussed the distribution of income in an open economy within a simplified small macroeconomic model with constant prices. This simple model was used to show what happens in middle-income developing countries, which were successful on the inflation front and still practice a policy of high interest rates for various reasons. It has been assumed that such economies have an implicit exchange rate target and use the interest rates to hit this target. Even if this strategy may work, it may produce negative consequences for output growth and for the distribution of income. The lowering of the exchange rate target and the tightening of monetary policy would cause a reduction in the rate of growth of output and a change in the distribution of income that would presumably exacerbate inequality.
The lowering of the exchange rate target would have the following effects on distribution. It would cause a reduction in the growth of output, a lowering of the exchange rate, it would lower the wage rate. Domestically produced income distributed abroad through the current account of the balance of payments should increase. The domestic interest rate would rise only for suitable small values of the parameter, which links imports to income. The effect on the profit share is indeed uncertain.

References

[1] Atesoglu H.S. and J. Smithin, 2006, Inflation targeting in a simple macroeconomic model, *Journal of Post-Keynesian Economics,*vol.28(4):673-89.
[2] Atesoglu H.S. and J. Smithin , 2007, Un modelo macroeconomico simple, *Economia informa* n.346 pp.105-119.
[3] Behrman, J. N.Birdsal and M.Szekely, 2000, Economic Reform and Wage Differentials in Latin America, Working paper Social sciences research network.
[4] Blecker R., 1996, Nafta, the peso crisis and the contradictions of the Mexican Economic Growth Strategy, *Center for Economic Policy Analysis Cepa Working paper n.3* New School for Social Research, New York.
[5] Blecker R., 1999, Kaleckian macromodels for open economies in J.Deprez and J.Harvey eds. *Foundations of international economics: Post-Keynesian perspectives* London and New York Routledge, p.116-149.
[6] Boyer R., 2000, Is a finance led growth regime a viable alternative to Fordism? A preliminary analysis, *Economy and Society*, 29(1):111-145.
[7] Bresser-Pereira L.C., Nakano Y., 2002, Una estrategia de desarrollo con estabilidad, *Instituciones y Desarrollo* 11.
[8] Castellanos S. G., Garcia-Verdu R., Kaplan D. S., 2004, Nominal Wage Rigidities in Mexico: Evidence from Social Security Records, *Journal of Development Economics*, 75, 2, pp. 507-33
[9] Correa E.and G.Vidal, 2006, Reform and Structural Change in Latin America.Financial Systems and Instability, in L-P. Rochon and S.Rossi eds. *Monetary and exchange rate systems. A Global View of Financial crises*, Edward Elgar Cheltenham pp.38-62.
[10] Dickens W.T., Goette L., Groshen E.L., Holden S., Messina J., Schweitzer M.E., Turunen J., and E. Ward M.E., 2007, How Wages Change: Micro Evidence from the International Wage Flexibility Project, *Federal Reserve Bank of New York Staff Reports* no. 275.
[11] Frenkel R. and L. Taylor, 2006, Real exchange rate, monetary policy and employment, *UN/DESA Working paper n.19*, United Nations New York.

[12] Galindo L.M. and Ros J., 2006, Alternatives to inflation targeting in Mexico, Political Economy Research Institute University of Massachusetts at Amherst Working Paper n. 7.
[13] Holden S. and F. Wulfsberg, 2007, Downward Nominal Wage Rigidity, *OECD, Cesifo Working Paper* no 2009.
[14] Levy Orlik Noemi, *The nature of interest rates and its impact on economic growth in developing economies: Can monetary policy instruments modify economic growth?* Paper presented at the conference Postkeynesian economic policies University of Dijon 29-30 november 2007.
[15] Kam E. and Smithin J., 2004, Monetary policy and demand management for the small open economy in contemporary conditions with (perfectly) mobile capital, *Journal of Post-Keynesian Economics* 26, 4, Summer pp. 679-94.
[16] Kregel J., 2004, Can we create a stable international financial environment that ensures net resource transfers to developing countries?, *Journal of Post Keynesian Economics* 26(4).573-90.
[17] Lopez J., 2005, Income Distribution in Latin America.Theoretical considerations and Mexico's experience, *Economie Appliquee*, LVIII(3):81-104.
[18] Mencinger, J., 2003, Does foreign direct investment always enhance economic growth? *Kyklos*, 56, pp. 491-508.
[19] Nickell S. J. and G. Quintini 2003. Nominal Wage Rigidity and the Rate of Inflation. *The Economic Journal* 113, 762-781.
[20] Onaran O., 2002, Measuring wage flexibility: the case of Turkey before and after structural adjustment, *Applied Economics* 34, 767-781.
[21] Ortiz E., 2005, Profitability Trends and Cycles. Structural Changes in the Mexican Economy, *Review of Radical Political Economics* 37(2):215-232.
[22] Tropeano D., 2005, Financial liberalization, growth and distribution in developing countries: some notes on a different approach, *Economia Politica* 22(3).439-456.
[23] Tropeano D., 2006, Does financial liberalization affect the distribution of income between wages and profits?, in L-P. Rochon and S.Rossi eds. *Monetary and exchange rate systems. A Global View of Financial crises*, Edward Elgar Cheltenham pp.83-105.
[24] Smith J. C., 2000, Nominal Wage Rigidity in the United Kingdom, *Economic Journal*, vol. 110 (462), pp C176-95.
[25] Smithin J., 2004 Interest rates operating procedures and income distribution, in Lavoie and Seccareccia eds. *Central Banking in the Modern World: Alternative Perspectives.* Cheltenham Edward Elgar pp.57-69.
[26] Soci Anna, 1990,*Contabilita' nazionale e saldi finanziari*, il Mulino Bologna.
[27] Yeldan E. 2007, *Patterns of adjustment under the age of finance: the case of Turkey as a peripheral agent of neoliberal globalization.* Political Economy Research Institute University of Massachusetts at Amherst Working Paper n.126 July 2007.