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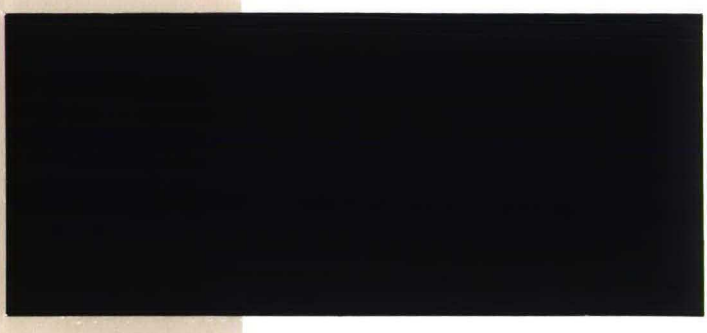

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REAL EXCHANGE RATE MISALIGNMENT AND REDISTRIBUTION

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REAL EXCHANGE RATE MISALIGNMENT AND REDISTRIBUTION

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Abstract:

Developing countries frequently maintain an overvalued nominal exchanges rate, resulting in real exchange rate misalignment. To finance import demand at the overvalued exchange rate, countries have to raise the level of income taxation or they have to resort to monetary finance. This paper explains nominal and implicitly real exchange rate misalignment as the outcome of the political process. More specifically, the paper explains the misalignment of an import exchange rate relative to a market exchange rate used for exports. Voters differ in their ownership of a single factor of production. Real exchange rate overvaluation results if the median voter spends a relatively larger share of his income on the importable good. For a given income distribution, the rate of overvaluation in political equilibrium declines with the overall level of income. In the case of monetary finance, the real exchange rate may be appreciating over the political cycle.

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1. *Introduction*

Real exchange rates in developing countries appear to be quite volatile. To some extent, real exchange rate adjustments no doubt reflect changes in underlying exchange rate fundamentals. Real exchange rate movements, however, appear to be too sizeable and too often reversed to be mere reflections of underlying fundamentals. Instead, exchange rate policy per se appears to be an important destabilizing influence. Given the importance of the real exchange rate, the welfare costs of the policy-induced variability of the real exchange rate may be considerable for some countries.

This paper examines the political economy of exchange rate policy. Exchange rate adjustments, in particular, are assumed to be determined by popular vote. Voters differ in their ownership shares of the economy's single factor of production called land. In this setting, exchange rate policy cannot affect relative incomes. In this respect, the present paper differs from contributions on the political economy of tariff policy by, for instance, Brock and Magee (1978) and Mayer (1984). Exchange rate policy still affects agents differently to the extent that they have different expenditure shares on tradeables and nontradebles. Exchange rate adjustments that imply a lower relative price of tradeables, in particular, benefit agents that spend a relatively large share of their income on nontradeables. Survey data gathered by Hazell and Roell (1983) suggests that an agent's expenditure share on tradeables falls with his income. This suggests that an exchange rate policy that reduces the relative price of tradeables benefits the poor relative to the rich. The relative price of tradeables is reduced if the exchange rate is overvalued. This paper shows that a median voter that is relatively poor will be in favor of such an overvalued exchange rate. The rate of overvaluation preferred by a poor median voter is shown to decline with the general level of income for a given relative distribution of income. This result can explain why real exchange rate misalignment appears to be a relatively serious problem in developing economies.

Agents are assumed to consume importables and nontradeables. A lower relative price of importables facing consumers, if desired by the median voter, can be brought about in a variety of

ways. One way is to institute a separate, relatively appreciated exchange rate for import purposes. Alternatively, the relative price of importables can be reduced by a straightforward import subsidy. In either case, the government needs to raise revenues to cover the budgetary expense of cheapening imports. In this paper, we assume that the government can institute a flat tax on all factor income or alternatively apply monetary finance. In practice, many countries use exchange rate policy to affect relative prices in combination with monetary finance to balance the budget. In this instance, an expansion of the money supply against a backdrop of a constant nominal import exchange rate leads to a further real appreciation of the exchange rate. An ongoing real exchange rate appreciation, in turn, increases the need for monetary finance. The process of exchange rate overvaluation and money printing continues until the nominal import exchange rate is adjusted by the political process. The adjustment takes the form of a devaluation of the nominal import exchange rate. If the government has limited taxing powers, however, then the devaluation preferred by the median voter may be insufficient to prevent a renewed overvaluation-cum-money printing cycle. The model thus can explain recurrent periods of real exchange rate misalignment.

The present paper extends the two-good model in Huizinga (forthcoming) on price ceilings for necessities to a three-good model of exchange rate management in an open economy. The present paper, in addition, starts from more general preferences and government finance options. Several previous contributions have examined reasons for policy makers to bring about deviations of real exchange rates from apparent equilibrium values. Rodrik (1988), for instance, argues that policy-induced real exchange rate devaluations that strengthen the demand for tradeables at present improve welfare, if the production of tradeables is characterized by learning-by-doing. Van der Ploeg (1989) further examines political exchange rate cycles, where the government effects an appreciation of the real exchange rate prior to elections to facilitate reelection. The slow response of the trade balance to real exchange rate movements, embodied in the J-curve, implies that an exchange rate appreciation leads to an improved short-run inflation performance without an immediate worsening of the trade balance. The political effectiveness of exchange rate cycles of

this type, however, rests of the assumption that voters are myopic. The real exchange rate cycles examined in this paper, instead, are consistent with full voter rationality.

The remainder of the paper is organized as follows. Section 2 outlines the basic model. Section 3 examines voting on exchange rate adjustments and their implications for the real exchange rate over the political cycle. Section 4 examines the broader applicability of the model to the case of two separate import goods: an import good that is imported at a single official exchange rate, and an import good that is imported at the (black) market exchange rate. In this instance, the model has immediate implications for the premium of the (black) market exchange rate over the official exchange rate. The section also considers how exchange rate management can be used in combination with various non-exchange rate policy instruments to bring about the relative goods prices desired by the political process. Section 5 concludes.

2. *The model*

Let there be a single factor of production, L, which we will call land. The economy is populated by a range of agents indexed by i, with $i \in [0,1]$, that are infinitely lived. The agents only differ in their individual land ownership shares. Let agent i's land ownership share be denoted $\lambda(i)$ so that this agent's absolute land ownership is given by $\lambda(i)L$. Agents are ordered by their land ownership share so that $\lambda(i)$ increases with the index i. Clearly, we have $\int_0^1 \lambda(i)di = 1$.

There are three goods: a nontradeable, N, an importable, Y, and an exportable, X, all of which are perishable. The economy only produces the nontradeable and exportable goods. Technology is assumed to be linear. Units are chosen, in particular, such that a unit of either the nontradeable, N, or the exportable, X, can be produced with a single unit of land. The economy is assumed to be small in international markets. As a result, the country faces a constant world price of the importable, Y, in terms of the exportable, X, denoted β.

Agents consume only the nontradeable good, N, and the importable good, Y.[1] The lifetime utility of agent i from time t onwards, denoted $U_t(i)$, can be expressed as follows,

$$U_t(i)=\int_t^{\infty}[\alpha \log (N_s(i) - \hat{N}) + (1 - \alpha)(Y_s(i) - \hat{Y})]e^{-\delta t}ds \qquad 0 < \alpha < 1, \delta < 0 \qquad (1)$$

where $N_s(i)$ and $Y_s(i)$ are individual i's consumption of the nontradeable and the importable goods at time s, respectively. In (1), $\hat{N}$ and $\hat{Y}$ are constants representing the minimum consumption levels of the two goods, while δ is the subjective discount rate.

Let P_{nt}, P_{yt} and P_{xt} be the three goods prices in terms of the economy's money at time t. Money, denoted M, is the only financial asset available to the economy's residents. Agent i's money holdings, $M(i)$, increase with his land rental income equal to $\lambda(i)LR_t$, where R_t is the land rental rate at time t. At the same time, money holdings decline with the agent's consumption expenditure $P_{nt}N_t(i) + P_{yt}Y_t(i)$ at time t. Formally, the change in agent i's money holdings, $dM_t(i)$, at time t is given by,

$$dM_t(i) = \lambda(i) L R_t - [P_{nt} N_t(i) + P_{yt} Y_t(i)] \qquad (2)$$

Money is necessary to conduct transactions. Reflecting the primary role of money in financing consumption expenditures, we will assume that agent i's demand for money, $M_t(i)$, at time t is subject to the following cash-in-advance constraint,

$$M_t(i) \geq P_{nt} N_t(i) + P_{yt} Y_t(i) \qquad (3)$$

In what follows, we will assume that the subjective discount rate, δ, is so large that the cash-in-advance constraint in (3) is always binding. In the language of Feenstra (1985), this means that all agents are illiquid at all times. As a result, the agents' land rental incomes, money holdings and total consumption expenditures are all proportional to the land ownership share, $\lambda(i)$.

The logarithmic utility specification in (1) along with the money demand relationship in (3)

implies that the consumption levels $N(i)$ and $Y(i)$ of the two goods for individual i are as follows,

$$N(i) = \alpha \left[\frac{M(i) - C}{P_n} \right] + \hat{N} \tag{4}$$

$$Y(i) = (1 - \alpha) \left[\frac{M(i) - C}{P_y} \right] + \hat{Y} \tag{5}$$

where $C = P_n \hat{N} + P_y \hat{Y}$ and where time subscripts are deleted.

In deriving (4) and (5), we assume that all individuals can afford to purchase the minimum consumption basket consisting of quantities $\hat{N}$ and $\hat{Y}$ of the nontradeable and importable goods, or equivalently that $M(i) \geq C$ for all i. Aggregate consumption levels of the nontradeable and importable goods are found by aggregating the invididual consumption levels in (4) and (5) for all individuals. The resulting expressions are as in (4) and (5), without the agent index i. The variables N and Y then stand for aggregate consumption levels of the nontradeable and the importable goods, while M stands for aggregate money holdings.

Below, we will consider policy interventions that affect the price of good Y, P_y, facing consumers. More specifically, we consider policy interventions that leave all relative prices not involving the importable good unchanged. In this instance, the simple production technology immediately implies that we have $P_n = P_x = R$ throughout. Let us define the internal (external) real exchange rate as the price of the importable good in terms of the nontradeable (exportable) good, i.e. as P_y/P_n (P_y/P_x). As we have $P_n = P_x$, the two real exchange rates will always be equal. Let us use θ to denote either real exchange rate. The real exchange rate variable, θ, clearly equals the world price of the importable in terms of the exportable, $\hat{\theta}$, in the absence of any policy intervention.

The real exchange rate, θ, can be affected by economic policy in several ways. The authorities can, for instance, implement a system of multiple exchange rates with separate exchange rates for

imports and exports. If the foreign currency price of the importable good, Y, is unity, then the domestic currency price of the importable, P_y, equals the nominal import exchange rate by the law of one price. We can thus refer to P_y as the nominal import exchange rate. If P_y is set below $P_x\hat{\theta}$, then the real exchange rate θ is reduced below $\hat{\theta}$, and vice versa. Many countries, indeed, maintain separate exchange rates for import and export transactions. In 1992, 33 countries in particular operated import exchange rates different from export exchange rates.[2] At the same time, 32 (31) countries maintained more than one exchange rate for imports (exports). As an alternative to multiple commercial exchange rates, the authorities can affect the real exchange rate, θ, by any combination of consumption or trade taxes, as is discussed further in section 4. For the remainder of this section, we assume that the primary policy instrument is the nominal import exchange rate, P_y.

With θ less than $\hat{\theta}$, the exchange authorities are incurring a budgetary loss on their foreign exchange operations equal to $(\hat{\theta}-\theta)Y$ in terms of the nontradeable good, N. Let government spending other than on foreign exchange operations in terms of the nontradeble good be equal to G. Government revenues consist of tax revenues from taxing all rental income at a rate τ. In addition, the government may print money in order to balance the budget. The required monetary finance in terms of the nontradeable good is given by,

$$\frac{dM}{P_n} + \tau L = (\hat{\theta} - \theta)Y + G \tag{6}$$

The economy also has to maintain external balance. This implies that the economy is subject to the following resource constraint,

$$L = N + \hat{\theta} Y + G \tag{7}$$

After substituting for N and Y using (4) and (5) into (7), we can obtain the following

expression for the real exchange rate θ,

$$\theta = \frac{L' - (1 - \alpha)\hat{\theta}\left[\frac{M}{P_y} - \frac{\hat{N}}{\hat{\theta}} - \hat{Y}\right]}{\alpha\left[\frac{M}{P_y} - \frac{\hat{N}}{\hat{\theta}} - \hat{Y}\right]} \tag{8}$$

where $L' = L - \hat{N} - \hat{\theta}\hat{Y} - G$.

Expression (8) implies that a devaluation of the nominal import exchange rate, P_y, also leads to a real exchange rate devaluation for a given money supply M, as totally differentiating (8) yields $d\theta/dP_y < 0$. At the same time, money creation leads to a real exchange rate appreciation for a given nominal exchange rate P_y, as $d\theta/dM < 0$. Equations (6) and (8) and the expression for aggregate importable demand, Y, together imply the following expression for real money creation in terms of the nontradeable,

$$\frac{dM}{P_n} = G - \tau L + \frac{(1 - \alpha)(\hat{\theta} - \theta)}{\alpha\theta + (1 - \alpha)\hat{\theta}} L' + (\hat{\theta} - \theta)\hat{Y} \tag{9}$$

Expression (9) confirms that an appreciation of the real exchange rate leads to a larger rate of real money creation, for given values of G and τ. Note that a higher government spending, G, or a lower tax rate, τ, also lead to a larger real money creation. At the same time, real money creation decreases with $\hat{N}$, and it increases with $\hat{Y}$ for a given value of θ less than $\hat{\theta}$.[3] If in fact $dM > 0$, then (8) implies that the real exchange rate, θ, falls over time, while equation (9) in turn implies that the rate of real money creation, dM/P_n, rises over time. As θ falls, the rate of money creation in terms of the importable good, dM/P_y, equally increases. Note that ongoing money creation against a background of a fixed nominal import exchange rate stimulates the consumption of the importable good, Y. To finance these additional imports, exports have to rise. This is accomplished by a shift in production from the nontradeable to the exportable sectors.

3. *Voting on exchange rate policy*

In this section, we consider the process of exchange rate adjustment by popular vote. In principle, the electorate can vote periodically on nominal exchange rate adjustments, giving rise to intervals of fixed nominal exchange rates between votes. Alternatively, voters can establish a prospective path of the nominal exchange rate until the next vote. In this instance, the electorate, in essence, establishes a tablita of preannounced nominal exchange rates for the entire political cycle. The tablita can be chosen so that the real exchange rate in fact is constant over the political cycle.[4] Before we can consider voting on exchange rate policy, we first have to consider how exchange rate policy affects individual welfare. We have to consider, in particular, how the impact of exchange rate policy on individual welfare depends on the individual's ranking in the overall income distribution.

To this end, let agent i's instantaneous welfare at time t be denoted $V(\theta, i)$. Using (1), (4), (5) and (8), we can express $V(\theta, i)$ as follows,

$$V(\theta, i) = \log\left(\alpha^{\alpha}(1-\alpha)^{1-\alpha}\right) + \alpha \log \theta + \log\left(\frac{M(i) - C}{P_y}\right) \tag{10}$$

Expression (10) indicates that an appreciation of the real exchange rate, i.e. a lowering of θ, other things equal reduces instantaneous utility, as it entails a higher nontradeable price, P_n. An individual's welfare clearly increases with his own money holdings, $M(i)$. To see how exchange rate policy affects individual welfare, we can differentiate $V(\theta, i)$ with respect to P_y to yield,

$$\frac{dV(\theta, i)}{dP_y} = \alpha L' \frac{\left[\frac{M}{(P_y)^2} + \frac{d(1/\theta)}{dP_y}\hat{N}\right]}{\left[\frac{M-C}{P_y}\right]\left[L' - (1-\alpha)\hat{\theta}\left[\frac{M-C}{P_y}\right]\right]} - \frac{\left[\frac{M(i)}{(P_y)^2} + \frac{d(1/\theta)}{dP_y}\hat{N}\right]}{\left[\frac{M(i)-C}{P_y}\right]} \tag{11}$$

Equation (11) implies that the qualitative impact of changes in P_y on individual welfare depends on the size of individual money holdings, $M(i)$, relative to aggregate money holdings, M. To see this, let us first consider how exchange rate policy affects the mean voter, i.e. the voter i for whom $M(i) = M$. First note that if $\theta = \hat{\theta}$, then expression (8) implies that $P_n = M/(1 - G)$ and $P_y = M\hat{\theta}/(L - G)$. The expression for P_y and (11) together now imply that $dV(\theta, i)/dP_y = 0$ if $\theta = \hat{\theta}$ with $M(i) = M$. The mean voter thus cannot benefit from an exchange rate policy that causes θ to diverge from $\hat{\theta}$. The mean voter, in other words, cannot benefit from exchange rate misalignment. Next, let us consider a voter i, who is poorer than the mean voter, i.e. for whom $M(i) < M$. Again starting from $\theta = \hat{\theta}$, we see that such a relatively poor voter benefits from an a reduction in P_y, which implies a real exchange rate appreciation, if

$$\frac{\hat{\theta}\hat{Y}}{\hat{N}} > \frac{1 - \alpha}{\alpha} \tag{12}$$

For a proof, see the appendix. In condition (12), the marginal expenditure share on the importable good relative to the nontradeable good, i.e. $(1 - \alpha)/\alpha$, is less than the spending on minimum quantity of importables, $\hat{Y}$, relative to the minimum quantity of nontradeables, $\hat{N}$. As also shown in the appendix, condition (12) is equivalent to $\hat{Y}/Y > \hat{N}/N$. Finally, it can be shown that if (12) holds, then a reduction in P_y reduces the price of the minimum consumption bundle of the importable and nontradeable goods, i.e. $\hat{Y}dP_y + \hat{N}dP_n < 0$ if $dP_y < 0$. These results are summarized as follows,

Proposition 1: A voter poorer than the mean voter benefits from a reduction in the nominal import exchange rate, P_y, if spending on the importable in the minimum consumption bundle is relatively large so that $\hat{Y}/Y > \hat{N}/N$. If so, a reduction in P_y results in a reduction in the price of the minimum consumption bundle of the importable and nontradeable goods.

In developing countries, importables often include basic necessities such as staple foods, while nontradeables may include many services that relatively speaking are luxuries. Exportables are usually concentrated in one or a few sectors that differ from country to country. As a result, it is difficult to say in general whether exportables form an important component of the basic consumption bundle. Evidence on the budget shares spent on nontradeables, importables and exportables for Malaysian households in 1972 is provided by Hazel and Roell (1983).[5] Poorer households indeed are shown to spend relatively little on nontradeables. The marginal expenditure share on nontradeables of households in the first income decile, specifically, is estimated to be roughly 24 per cent, and it is 55 per cent for households in the tenth income decile.[6] The marginal spending shares on imports for the two income groups, in contrast, are both around 38 per cent. Within the imports category, marginal expenditure shifts from food to non-food items for wealthier households. Marginal expenditure shares on exportables for household in the first and tenth decile are estimated to be 38 and 7 per cent, respectively.

Overall, the evidence suggests that poorer households spend relatively little on nontradeables. In our model, we will capture this by assuming that $\hat{N} = 0$ and $\hat{Y} > 0$. Proposition 1 now implies that agents poorer than the mean benefit from an overvaluation of the real exchange rate. Let us consider that voters choose a (constant) real exchange rate equal to or below the equilibrium real exchange rate, θ.[7] Voters can institute a constant real exchange rate, if they choose a constant nominal import exchange rate, P_y, and at the same can freely choose the income tax rate, τ, consistent with a constant money supply, M, in (6). It can be shown that voter preferences over the possible values of the real exchange rate are single-peaked.[8] The outcome of the vote, therefore, is the real exchange rate preferred by the median voter. According to Proposition 1, only voters poorer than the mean can benefit from a real exchange rate appreciation. The outcome of the vote, thus, will be an overvalued real exchange rate, if and only if the median voter is poorer than the mean voter. For this case, the equilibrium real exchange rate is negatively related to the income of the median voter relative to the mean voter.[9] These result are summarized as

follows,

Proposition 2: The constant real exchange rate determined by popular vote is overvalued, if the median voter is poorer than the mean voter. For this case, the exchange rate is negatively related to the income of the median voter relative to mean income.

It is interesting to examine how the outcome of the vote is affected by changes in the utility specification in (1) for a given income distribution. First, we will examine a change in the minimum consumption of the importable, $\hat{y}$. Not surprisingly, a relatively poor median voter wishes a further real exchange rate appreciation following a larger value of $\hat{y}$, as is shown in the appendix. At the same time, the individual goods prices P_y and P_n consistent with the more appreciated real exchange rate are both higher. As the relative price of imports is cheapened, the nominal prices of both goods thus have to increase to ensure that the economy maintains its external balance. This implies that the nominal import exchange rate, P_y, has to be devalued, even if the real exchange rate appreciates. Next, let us consider an increase in the marginal expenditure on the importable good, i.e. a reduction in α. A lower value of α again leads the median voter to desire a further appreciation of the real exchange rate, δ. Again, the real appreciation has to be accompanied by higher nominal goods prices P_n and P_y. Thus the shift in marginal expenditure towards importables again is accompanied by a devaluation of the nominal import exchange rate. These results are summarized as follows,

Proposition 3:

An increase in the minimum consumption of the importable, $\hat{y}$, or in the marginal expenditure share on importables, i.e. a reduction in α, both lead a median voter who is poorer than the mean voter to desire a further appreciation of the real exchange rate. In both instances, the importable and nontradeable goods price rise, which implies that the nominal import exchange rate is

devalued.

Next, let us consider how nominal and real goods prices in the economy are affected by economic growth, as indicated by an increase in the aggregate factor endownment, L. We will assume that relative incomes are unchanged so that in fact all agents' incomes increase proportionately. As shown in the appendix, an increase in aggregate factor resources, L, leads to a reduction in both goods prices P_n and P_y. Interestingly, the economic expansion leads to a devaluation of the real exchange rate, δ, which reflects that the expansion leads the median voter to prefer a smaller degree of real exchange rate overvaluation. The rationale is that average expenditures shares on nontradeables and importables become more alike, as society grows wealthier. As a result, the median voter has less to gain from relative price distortions implicit in exchange rate overvaluation. The role of exchange rate policy as a redistributive device indeed appears to be more important in developing countries than in the developed countries. As a result, persistent exchange rate disequilbrium appears to be a relatively common phenomenon in developing countries. These results are summarized as follows,

Proposition 4: Voters poorer than the median voter prefer a smaller overvaluation of the real exchange rate, as the overall level of income increases for a given relative distribution of income.

The proposition also applies to increases in national resources as a result of international borrowings or other capital inflows. A developing country that, for instance, receives a grant that is subsequently distributed among the population in proportion to individual land holdings will depreciate the real exchange rate in response to the enlarged national resources. The reduction of the incentive for the median voter to select disquilibrium exchange rates following international resource transfers can be seen as a benefit of such transfers.

So far, we have assumed that voters can select a value of the real exchange rate that is

constant over time. As indicated, this applies if voters can choose a constant nominal import exchange rate, P_y, and the income tax rate, τ, freely. If the taxing powers of the government, however, are limited, then a constant real exchange rate, equal to the median voter's preferred real exchange rate, may not be possible. To see this, consider that we have $\tau = 0$ and $G = 0$, while the nominal exchange rate, P_y, is adjusted at regular intervals by the electorate. If voters initially select P_y such that $\theta < \hat{\theta}$, then ongoing monetary finance leads to a gradual appreciation of the real exchange rate until the next adjustment of the nominal exchange rate, P_y. In essence, voters now have to decide between a stable real exchange rate, equal to $\hat{\theta}$, or a path of a continuously appreciating real exchange rate over the political cycle. A median voter richer than the mean voter, as before, cannot benefit from real exchange rate overvaluation and thus will prefer a constant real exchange rate equal to $\hat{\theta}$. A median voter poorer than the mean voter, however, can in principle benefit from a path of an increasingly overvalued real exchange rate.

At the beginning of the political cycle, voters determine the nominal exchange rate to be maintained throughout the cycle. This nominal exchange rate implies a real exchange rate, denoted θ_b, at the beginning of the political cycle. The dynamics of monetary finance and price adjustment and the length of the political cycle then together determine the real exchange rate at the end of the political cycle, denoted θ_e. Let the median voter be poorer than the mean voter. The voting outcome will now be such that the (constant) real exchange rate, θ^*, preferred by the median voter lies in between the beginning and ending real exchange rates, θ_b and θ_e, as follows,

$$\theta_e < \theta^* < \theta_b < \hat{\theta} \tag{14}$$

The voting outcome is as in (14), as any alternative characterised by either $\theta_b \leq \theta^*$ or by $\theta_e \geq \theta^*$ will be valued less than a range of paths characterised by (14) by at least half of the electorate. With $\theta_e > \theta^*$, for instance, the median voter as well as all poorer agents will have lower welfare than would be possible from a various paths characterized by (14), even if the

median voter and all poorer voters prefer such paths to a constant real exchange rate equal to $\hat{\theta}$. Note that the real exchange rate cycle, as characterized by (14), will be recurrent, as the nominal import exchange rate devaluation at the beginning of each political cycle will be too small to preclude a renewed real exchange rate cycle.[10] These result are summarized as follows,

Proposition 5: In the absence of sufficiently high income taxes, periodic voting on the level of the nominal import exchange rate can give rise to recurrent real exchange rate cycles, where the real exchange rate appreciates over the political cycle.

Note from (8) and (9) that the rate of real money creation increases over the electoral cycle, as the real exchange rate appreciates. At the same time, the consumption of importables rises over the period, while the consumption of nontradeables declines. To maintain external balance, the volume of exports has to increase. The instantaneous welfare of the median voter first rises over the electoral cycle until the real exchange rate reaches $\hat{\theta}$, and then falls. The welfare of voters richer (poorer) than the median voter peaks earlier (later) than the welfare of the median voter. Note that the median voter prefers a constant real exchange rate equal to θ^* to any real exchange rate cycle. Cycles, therefore, will cease to exist if the monetary finance can be replaced by a higher level of rental income taxation.

Evidence of the existence of real exchange rate cycles can be found in Edwards (1988), who presents time series of the real exchange rates for 12 developing countries over the period 1964-1985. For many of these countries, the graphs are characterized by periodic large real devaluations, effected by nominal devaluations, followed by gradual real exchange rate appreciations. The real exchange rates of Brazil, Israel, India, and the Phillipines, for instance, display such patterns. Brazilian real exchange rate cycles appear to be relatively short at about three years. The length of the Isreali cycle is closer to four years, while the Indian and Phillipine cycles appear to last about a decade. In the second half of the 1980s, the pace of Brazilian real exchange rate-cum-inflation

cycles appears to have quickened. Brazil, in particular, experienced four consecutive real exchange rate-cum-inflation stabilization plans between January 1986 and April 1990. Over this almost five year period, Brazilian inflation displayed a regular, saw-like pattern.[11]

Edwards (1993, p. 35) further provides evidence on the political timing of exchange rate adjustments. The evidence confirms that major devaluations by democratic regimes in developing countries tend to take place relatively quickly after a transfer of power. For parliamentary democracies, 70 per cent of the devaluations considered, in particular, occurred within 2 years after the transfer of government, while only 20 percent of devaluations occurred 1 year or less time before the next government transfer. Devaluations may quickly follow the transfer of power, as democratic regimes are perceived to be strongest in the early years of their administrations. Early devaluations also have the advantage that their causes can more easily be blamed on the regime's predecessor.

4. *Alternative interpretations of the model*

So far, we have assumed that the main policy instrument is a fixed nominal import exchange rate. This nominal import exchange rate immediately determines the domestic currency price of imports transacted at the import exchange rate. In this setting, monetary finance is shown to increase the domestic currency prices of the nontradeable and exportable goods. Reflecting a higher domestic currency price of exportables, the nominal exchange rate applicable to exports depreciates. The model thus, in essence, is one of multiple exchange rates, with a relatively favored exchange rate for import purposes.

The model, however, also applies to countries that have a single fixed nominal official exchange rate, but limit the range of transactions that can be conducted at this exchange rate. The remainder of international transactions then are valued at the (black) market exchange rate. The government may, for instance, maintain lists of sanctioned and of proscribed imports. In some countries, the importation of various luxury items, for instance, is forbidden. In this setting,

prospective importers are able to obtain foreign exchange at the official exchange rate only for approved imports. The model of this paper applies immediately to this situation, if nontradeable consumption is replaced by the consumption of non-approved imports. As before, we can maintain that there is no domestic production of importable goods. The variable θ now is the ratio of the official import exchange rate to the (black) market exchange rate for non-approved imports. This market exchange rate also applies to exports, unless there are strictly enforced export surrender requirements that force exporters to surrender their export earnings at the more appreciated official exchange rate.[12] In this guise, the model predicts the path of the (black) market exchange rate premium over the political cycle. The model, specifically, indicates that the black market premium is smallest after a devaluation of the official exchange rate, while the premium gradually increases until the next official exchange rate devaluation.

It is well recognized that exchange rate management under a system of multiple exchange rates, be they official or unofficial, can be viewed as a tax policy. Huizinga (1991), for instance, examines the black market for foreign exchange that arises from the evasion of exchange regulations integral to a system of separate import and export exchange rates. At the same time, Frenkel and Razin (1989) examine the equivalence between a system of dual exchange rates, consisting of separate exchange rates for commercial and financial transactions, and tax policy.

The equivalence between exchange rate management with multiple exchange rates and tax policy implies that exchange rate policy can be used instead of or in combination with direct fiscal measures to effect the politically desired relative goods prices facing consumers. A relatively low price price of importables, for instance, can be achieved by an export tax, an import tariff, or by a relatively light consumption tax on importables. In these instances, income taxation or monetary finance, as before, can be used to balance the government budget. In practice, countries use a combination of exchange rate and tax policies to manipulate relative goods prices. Exchange rate policy perhaps has the advantage over tax policy that its redistributive implications are not as transparent.

In practice, developing countries in particular appear to use a mix of exchange rate, trade and tax policies to affect the relative prices of the various nontradeable and tradeable goods.[13] Krueger, Schiff and Valdés (1991) have compiled an exhaustive survey of the combined impact of exchange rate, trade and tax policies on the wedge between internal and external prices of various tradeable goods, particularly in the agricultural sector, for a large number of developing countries. These wedges, of course, have immediate implications for relative goods prices faced by consumers. The authors explain the various explicit and implicit price interventions on the basis of political economy rather than as consistent with some overall optimal tax structure. In each of the country studies, the implications of the overall scheme of price interventions for the distribution of income are drawn out.

Egypt has used the full range of exchange rate, trade and tax policies to depress the relative price of especially imported foods in the 1970s, as documented by Scobie (1983). In addition to outright subsidies for imported foods such as grains, butter, sugar and tea, Egypt maintained a multiple exchange rate system with a relatively appreciated exchange rate for food imports. In 1981, the official exchange rate for food imports, for instance, was 1.43 US$/LE, while it was 1.19 US$/LE for non-food imports. As a result of the various policies, the Egyptian market prices of imported foods, such as wheat and rice, were about half of world prices in the 1979-1980 period.[14] Consistent with the model, Egypt financed its food imports to a some extent with specific exports such as oil and cotton that by themselves do not represent a main part of the consumption bundle. These exports were taxed by the authorities. The authorities also used monetary finance to finance the food imports, resulting in an accelerating inflation in the late 1970s. In addition, the country incurred large foreign debts in maintaining its relatively appreciated exchange rate for food imports.

5. *Conclusion*

Developing countries frequently suffer from recurring episodes of real exchange rate overvaluation accompanied by monetary finance. Such episodes are puzzling, because it can hardly be the case that developing country policy makers do not know how to reverse overvaluations, or that they believe that real exchange overvaluation generally improves economic efficiency and welfare. This paper takes the view that apparent disequilibrium exchange rate policies are pursued, because those in the middle of the political spectrum benefit from such policies at the expense of others. Overvaluation in the present model implies that tradeables, and more specifically importables, are inexpensive relative to nontradeables. Such overvaluation benefits relatively poor agents, as the evidence suggests that poor agents spend relatively little on nontradeables. In the model, overvaluation benefits the median voter if he is poorer than the mean voter.

In an alternative interpretation of the model, there are two import goods and a single export good. One of the import goods can be imported at the fixed nominal exchange rate, while the other import good and the export good are transacted at a more depreciated (black) market exchange rate. In this interpretation, the model explains the overvaluation of the official exchange rate vis-à-vis the (black) market exchange rate. In particular, the model can explain cycles of increasing (black) market exchange rate premia after each politically determined devaluation of the official exchange rate. It would be interesting to see to what extent empirical evidence can confirm that the black market exchange rate premium rises over the political cycle.

This paper has assumed that there is no rationing of foreign exchange intended for purchases of importables at the stated nominal import exchange rate. Many countries, of course, ration foreign exchange for import purposes in a myriad of ways. Clearly, differential access to official foreign exchange can explain differences in people's enthusiasm for various exchange rate policies. It would be interesting to extend the present model to incorporate rationing of foreign exchange available at the overvalued official exchange rate. The relatively wealthy and powerful may stand a better chance of obtaining rationed foreign exchange than the poor and unpowerful. If

so, rationed foreign exchange is more likely to be used for the importation of luxury items than for the importation of basic necessities. In some countries, a relatively appreciated import exchange rate, therefore, may coexist with luxury imports. Empirical work perhaps can shed light on the extent to which this is the case.

Appendix

Proof of proposition 1:

As noted in the text, with $\theta = \hat{\theta}$ we have,

$$P_n = \frac{M}{L - G}, \qquad P_y = \frac{M\hat{\theta}}{L - G}$$

After totally differentiating (8) and noting the above expressions for P_n and P_y and also (4) and (5), we find that with $\theta = \hat{\theta}$,

$$\frac{dP_x}{dP_y} = -\frac{Y}{N}$$

After substituting for P_n and P_y into (11), we find after rearranging that $dV(\theta, i)/dP_y < 0$ is equivalent to,

$$\frac{\frac{M}{(P_y)^2} + \frac{d(1/\theta)}{dP_y}\hat{N}}{\frac{M}{P_y} - \frac{N}{\hat{\theta}} - \hat{Y}} < \frac{\frac{M(i)}{(P_y)^2} + \frac{d(1/\theta)}{dP_y}\hat{N}}{\frac{M(i)}{P_y} - \frac{N}{\hat{\theta}} - \hat{Y}}$$

After multiplying the above expression by the respective denominators, we get after simplifying,

$$M(i)\left[\frac{d(1/\theta)}{dP_y}\hat{N} + \frac{1}{P_y}\left[\frac{\hat{N}}{\hat{\theta}} + \hat{Y}\right]\right] < M\left[\frac{d(1/\theta)}{dP_y}\hat{N} + \frac{1}{P_y}\left[\frac{\hat{N}}{\hat{\theta}} + \hat{Y}\right]\right]$$

If we take $M(i) < M$, then the above is equivalent to,

$$\frac{d(1/\theta)}{dP_y}\hat{N} + \frac{1}{P_y}\left[\frac{\hat{N}}{\hat{\theta}} + \hat{Y}\right] > 0$$

Noting that $\theta = P_y/P_x$, the above is equivalent to,

$$\frac{\hat{Y}}{\hat{N}} > \frac{-dP_x}{dP_y} \left[= \frac{Y}{N} \right]$$

Finally noting (4) and (5), we get,

$$\frac{\hat{\theta}\hat{Y}}{\hat{N}} > \frac{1-\alpha}{\alpha}$$

Proof of propositions 3 and 4:

First from (11) we can check that with $dV/dP_y = 0$ we have,

$$\frac{d^2V}{dP_y^2} < 0$$

$$\frac{d^2V}{dP_y\, dL'} < 0 \qquad \text{by inspection}$$

$$\frac{d^2V}{dP_y\, d\alpha} = -\frac{ML'\left[\hat{\theta}\left[\frac{M}{P_y} - \hat{Y}\right] - L'\right]}{(P_y)^2\left[\frac{M}{P_y} - \hat{Y}\right]\left[L' - (1-\alpha)\hat{\theta}\left[\frac{M}{P_y} - \hat{Y}\right]\right]^2}$$

which is negative as,

$$\hat{\theta}\left[\frac{M}{P_y} - \hat{Y}\right] > L' \text{ for } \theta < \hat{\theta} \text{ from (8).}$$

To establish the sign of $d^2V/dP_y\, d\hat{Y}$, note that (11) is equivalent to,

$$g(P_y, \hat{Y}) = \frac{L'\left[\frac{M(i)}{P_y} - \hat{Y}\right]}{\left[\frac{M}{P_y} - \hat{Y}\right]\left[L' - (1-\alpha)\,\hat{\theta}\left[\frac{M}{P_y} - \hat{Y}\right]\right]} = \frac{M(i)}{M(1-\beta)}$$

Note that $dg/dP_y < 0$ if $M(i) < M$. Next, we can take the log of g, and differentiate with respect to $\hat{Y}$. The term $M(i)/P_y - \hat{Y}$ can be then substituted from (11). The result after collecting terms is,

$$\frac{d\ log(g)}{d\ \hat{Y}} = \frac{1}{\Delta}\left[\beta\left[\left[\frac{M}{P_y} - \hat{Y}\right] - L'\right]^2 + (1-\beta)\left[1 - \frac{M(i)}{M}\right](L')^2 + (1-\hat{\theta})(1+\beta)L'\left[\frac{M}{P_y} - \hat{Y}\right]\right]$$

with, $\Delta = L'\left[L' - (1-\alpha)\hat{\theta}\left[\frac{M}{P_y} - \hat{Y}\right]\right]\left[\frac{M}{P_y} - \hat{Y}\right]$.

Thus for $M(i) < M$ and $\hat{\theta} \leq 1$, we immediately see that $dg/d\hat{Y} > 0$. Note that the sign of this derivative is positive for any value of $\hat{\theta}$, however, as we can always choose units of the importable good so that $\hat{\theta} \leq 1$.

If the median voter is poorer than the average voter, we conclude that,

$$\frac{dP_y}{dL'} < 0, \quad \frac{dP_y}{d\alpha} < 0, \quad \frac{dP_y}{d\hat{Y}} > 0$$

Next note that (8) and (11) allow us to derive the following implicit expression for θ,

$$\frac{\theta}{\alpha\theta + (1-\alpha)\hat{\theta}} = \frac{\left[\frac{M}{P_y} - \frac{M}{M(i)}\hat{Y}\right]}{\left[\frac{M}{P_y} - \hat{Y}\right]}$$

Using this expression and the above derivatives, we obtain,

$$\frac{d\theta}{dL'} > 0, \quad \frac{d\theta}{d\alpha} > 0, \quad \frac{d\theta}{d\hat{Y}} < 0$$

Noting that $\theta = P_y/P_x$, we finally obtain,

$$\frac{dP_x}{dL'} < 0, \quad \frac{dP_x}{d\alpha} < 0, \quad \frac{dP_x}{d\hat{Y}} < 0.$$

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Endnotes

1. Little is gained if we assume that domestic agents also consume exportables.

2. See the IMF (1993), pp. 590-96.

3. Specifically, we can find from (3) that,

$$\frac{d(dM/P_n)}{d\hat{N}} = -\frac{(1-\alpha)(\hat{\theta}-\theta)}{\alpha\theta + (1-\alpha)\hat{\theta}} < 0$$

and,

$$\frac{d(dM/P_n)}{d\hat{Y}} = \frac{\alpha\theta(\hat{\theta}-\theta)}{\alpha\theta + (1-\alpha)\hat{\theta}} > 0$$

4. For the real exchange rate to be constant, the nominal import exchange rate, P_y, will have to be devalued continuously at a rate equal to the constant growth rate of the money supply.

5. Qualitatively similar expenditure patterns are found by the authors for Nigerian data.

6. See Hazell and Roell (1983), Table 12. Note that strictly speaking the utility specification in (1) implies that marginal expenditure shares of households on nontradeables and on importables are invariant with household income.

7. This restriction of the policy choice set results if the authorities lack the enforcement technology to force importers to buy foreign exchange at an unfavorable depreciated exchange rate from the authorities.

8. For a proof, see Huizinga (forthcoming).

9. This follows as $dP_y/dM(i) > 0$ with $M(i) < M$ for a given value of M and with $dV(\theta, i)/dP_y = 0$ in (11).

10. Alesina and Drazen (1991), instead, consider the political aspects of a once-and-for-all stabilization of an unsustainable economic policy.

11. See Mondino and Sturzenegger (1992), Figure 7. Inflation specifically fell after the Cruzado plan of January 1986, the Bresser plan of May 1987, the Summer plan of December 1988, and the Collor plan of April 1990.

12. In the presence of export earnings surrender requirements, only part of the export earnings may in fact go to the non-official exchange market. Similarly, part of the foreign exchange for non-approved imports may be obtained at the official exchange rate through overinvoicing of approved imports. These issues are not considered here.

13. The redistributive implications of exchange rate policy on account of income differences in the case of non-homothetic preferences have received little attention. The redistributive implications of tax policies that affect relative goods prices are, of course, central to the analysis of commodity taxation. See, for instance, Majumder (1988).

14. See Alderman, Von Braun and Sakr (1982), Table 30.

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