Government Intervention  
in a Dual Exchange Rate Mechanism  

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The dual exchange rate mechanism (DERM) has recently received increased attention in the literature (1). A DERM is characterized by the coexistence of a floating (2) «financial» exchange rate (3) and an «official» exchange rate which is normally considered to be fixed (4). The current account transactions are channeled through the official market, and the capital transactions are channeled through the financial market. In this paper we want to concentrate on the possibilities for government intervention in such a system. We will analyze two specific intervention strategies; a compensatory intervention strategy and its impact on some policy problems (in section I) and a strategy to reduce the differential between the two spot rates (in section II).

I. COMPENSATORY INTERVENTION

(1) The compensatory intervention strategy (5) consists of an (automatic) compensation of the current account disequilibrium (in case of a fixed official spot rate) or, more generally, of the amount of official spot market intervention (in case of limited flexibility of

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(2) It is a fallacy to believe that this has to be a free float. In fact fuller exploitation of the possibilities of the system requires government intervention in the financial market.  
(3) All exchange rates are here defined as the number of domestic currency units (we assume this to be francs) that exchange for one unit of foreign currency.  
(4) This is explained by the fact that the DERM was originally conceived as a variant on the then existing unified fixed exchange rate system. The official spot rate can however be allowed to have whatever level of flexibility that is desired.  
(5) This idea has also been discussed in V. Barattieri and G. Ragazzi [1].
the official spot rate). The monetary authorities sell or acquire in the financial spot market an amount of foreign exchange to compensate (fully or partially) their net purchases or sales in the official spot market, in order to avoid any variation (\(^6\)) (in case of full compensation) or to limit the variation (in case of partial compensation) of the level of reserves.

The impact of this strategy on the monetary base of the domestic country can be formalized in the following way. The monetary base \(M\) consists of the sum of the foreign component \(F\) (i.e., foreign reserves of the central bank) and the domestic component \(D\) (i.e., the credit to the domestic sector by the central bank). When no compensatory intervention occurs, the situation is:

\[
(1) \quad M = D + F.
\]

and hence

\[
(2) \quad \Delta M = \Delta D + \Delta F.
\]

(3) \(\Delta F = B + \Delta K\) : the change in reserves is equal to the current account balance \(B\).

(4) \(\Delta K = 0\) : the financial spot rate will adjust so as to make the net flow of capital \((\Delta K)\) zero.

In case of full (or partial) compensatory intervention, this becomes \(^7\):

\[
(1'') \quad \Delta M = \Delta D + [(\Delta F')_b \cdot \text{OSR} - (\Delta F')_s \cdot \text{FSR}],
\]

where \((\Delta F')_b\) is the quantity of reserves bought at the official spot rate by the authorities, and \((\Delta F')_s\) is the quantity of reserves sold at the financial rate by the authorities. (A prime indicates that a variable is expressed in foreign currency terms.)

\[
(2'') \quad B' = (\Delta F')_b.
\]

(3'') \(\Delta K' + (\Delta F')_s = O\) :

The financial spot rate will adjust so as to make this equality hold. The difference between \((\Delta F')_b\) and \((\Delta F')_s\) indicates the extent to which the current account influence has not been neutralized.

\(^6\) It is clear that although this strategy is suggested here as a way to limit the variation in the level of reserves, it can equally well be applied to achieve the desired rate of growth of the reserves.

\(^7\) We consider here the case of a surplus on the current account balance. The situation with a deficit could of course be dealt with in a completely analogous way.
In case of full compensation the DERM has an important point in common with a unified completely flexible exchange rate system; there is no problem of balance of payments equilibrium for the domestic country. The difference lies of course in the way this is brought about. A unified flexible exchange rate system causes a continuous adjustment in both the current and the capital account, while the DERM shifts the brunt of the adjustment to the capital account. In following this strategy (8) the authorities can hence achieve (automatic) external balance, while having the option to choose the degree of flexibility they desire for the official spot rate.

(2) The DERM will only be fully efficient if the separation between the two markets is complete. One possible leak consists of illegal arbitrage by private participants. This possibility is in general mentioned briefly in the literature (9) and then assumed away. We will focus on the consequences of illegal arbitrage (and illustrate them by means of an example) and show how a compensatory intervention by the authorities can influence this.

Assume that the financial spot rate is at a premium vis-à-vis the official spot rate. Illegal arbitrage will consist of buying foreign exchange in the financial market and selling it in the official market. It is clear that, for instance, a multinational corporation sending funds out of the country (i.e., buying foreign exchange) through the financial market and bringing them back (i.e., selling foreign exchange) through the official market disguised as additional "royalty" payments to the home country branch, will make a considerable profit.

Let us now point out some consequences of this illegal arbitrage in the absence of compensatory intervention:

(1) The very fact that operators can realize in this way a profit that is directly related to the size of the discrepancy between the official and the financial spot rate is an undesirable consequence. It also means that the larger the discrepancy becomes, the larger is the implicit premium the system puts on evasion of this kind.

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(8) Depending on the circumstances (for a summarizing table see V. Barattieri and G. Ragazzi [1], p. 361) the authorities will incur a profit or a loss. The total profit or loss is equal to the product of the amount of foreign exchange acquired or sold in the financial market and the premium or discount of the financial spot rate vis-à-vis the official spot rate.

(9) See e.g., V. Barattieri and G. Ragazzi [1], p. 359.
(2) The illegal arbitrage will have an influence on the level of official reserves, which normally would not have occurred. For instance, an operation as described in our example, will increase the level of reserves. This is a consequence that detracts from the ability of a DERM to protect that level of reserves.

(3) If this illegal arbitrage is done extensively, it will reduce and eventually eliminate the premium on the financial franc. To the extent that this happens, it undermines of course the impact of the DERM.

How does now a compensatory intervention by the authorities influence this situation? We will use our example to discuss this.

Because of the fictitious royalty payments there is an initial increase in the domestic country's foreign exchange reserves. When a full compensation strategy is followed however, this increase is then sold on the financial spot market.

With respect to the impact of such an operation on the financial spot rate, two cases have to be distinguished.

(1) If it is the purpose to realize a franc profit for the domestic branch, the amount of foreign exchange bought on the financial spot market is equal to that sold on the official market (and, ultimately, resold by the authorities on the financial market). Hence, the effects on the financial spot rate cancel out, and it remains after all at the same level.

(2) If however it is the foreign branch which is aiming at a foreign currency profit, then the situation is different. Now the amount of foreign currency sold on the official spot market will be smaller than the amount bought on the financial spot market. Consequently the premium on the financial franc will tend to be (slightly) reduced, since the government intervention does not succeed in restoring it at the original level.

We can hence conclude that if the government follows a strategy of full compensatory intervention, illegal arbitrage has no impact on the level of reserves nor on the premium on the financial franc, if it is done with the aim of realizing a franc profit. If the illegal arbitrage is aiming at a foreign currency profit for a foreigner, then full compensatory intervention cannot neutralize those effects. Notice that in both cases illegal arbitrage results in an increase of the volume of government intervention in the financial spot market.
II. INTERVENTION TO REDUCE THE SPOT RATE DIFFERENTIAL

A strategy for a combined intervention in the financial and the official spot market that has been applied frequently \(^{(10)}\) by countries having a DERM, consists of intervening in both spot markets to prevent the discrepancy \(^{(11)}\) between the official and the financial spot rate from becoming too large.

There are essentially two arguments for such intervention.

(1) First, the differential between the financial and the official spot rate is a clearly visible indication of the profitability of evasion at any given day. Consequently the authorities do not want this premium on evasion to become too large.

(2) Second, an increase in the spread between the two spot rates could be taken by the operators as a signal that the official spot rate will soon be changed in the same direction in which the financial spot rate has been moving. Such a change in expectations could then consequently lead to, for instance, an increase in leads and lags speculation, which the authorities might want to avoid.

This second argument relates to an important link between the official and the financial market, namely expectations. In a DERM the expectations about the future spot rate (i.e., \(E (OSR)_{t+n}\)) are not only a function of the current official spot rate (OSR\(_t\)) but also \(^{(12)}\) of the current financial spot rate (FSR\(_t\)). (The expectations about the future financial spot rate are formed in a similar way.) The argument for an intervention as indicated, is based on the fear of a switch of \(\frac{\partial E (OSR)_{t+n}}{\partial FSR_t}\) from negative (or zero) to positive. This allows us also to give a more precise interpretation of what constitutes a differential that is too large. It is precisely from the point on, at which this switch in expectations occurs, that the differential can be considered too large.

\(^{(10)}\) On p. 182 of their study, the Talent Group [3] points out some cases where interventions of this kind have produced decreases in the discount on the Belgian financial franc.

\(^{(11)}\) This discrepancy can in some cases become larger as a result of a compensatory intervention. This will be the case if there is a current account surplus at the same time as the franc is appreciating in the financial spot market, or a current account deficit together with a depreciation of the financial spot rate.

\(^{(12)}\) The operators could for instance assume that there is one (hypothetical) exchange rate which corresponds to an overall equilibrium of the balance of payments. If they believe at any given moment that the financial spot rate is close to this equilibrium rate, and that the official spot rate is too far off, they will expect an adjustment of the official spot rate (and vice versa).
Changing the financial spot rate through direct intervention in the spot market involves however an asymmetry. If the financial rate is at a discount (premium) vis-à-vis the official rate, a change in the desired direction can be realized by buying (selling) francs, which of course involves a loss (gain) of reserves. This means that there is a limitation (namely, staying above the minimum acceptable level of reserves) on a policy involving the reduction of a discount, that does not exist when the policy consists of reducing a premium (although of course accumulation of reserves can create problems of its own).

The frequency with which an intervention by the authorities to reduce the discrepancy between the official and the financial spot rate is needed will for any level of the financial spot rate depend on the degree of flexibility of the official spot rate. This can be formalized in probabilistic terms.

The authorities are in the context of this intervention strategy concerned with the possibility that the absolute difference \( P \) between the official spot rate (OSR) and the financial spot rate (FSR) will exceed some positive number (i.e., the level of \( P \) that is considered too large).

(a) If both the official and the financial spot rates are flexible we can consider them as random variables; they have the same \(^{(13)}\) mean \( \mu \) but a different variance \( \sigma^2 \) and \( \sigma^2_1 \) respectively. If \( FSR \sim WS(\mu, \sigma^2) \) and \( OSR \sim WS(\mu, \sigma^2_1) \) then their difference \( X \) (= FSR-OSR) is also a random variable and
\[
X \sim WS(0, \sigma^2 + \sigma^2_1 - 2\sigma_{12})
\]
where \( \sigma_{12} \) is the covariance between FSR and OSR. The variance of this distribution can be used to set an upperbound on the probability of large deviations from the mean. Application of Chebyshev's inequality gives us
\[
\text{Prob} \left\{ \left| X - O \right| \geq P_M \right\} \leq \frac{\sigma^2 + \sigma^2_1 - 2\sigma_{12}}{P_M^2},
\]
where \( P_M \) is the level of \( P \) that is considered too large by the authorities.

(b) If the financial spot rate is flexible, but the official spot rate is fixed, we have the following \(^{(14)}\) situation: \( FSR \sim WS(\mu, \sigma^2_1) \)

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\(^{(13)}\) We assume that both the official spot rate and the financial spot rate have the same long-run value.

\(^{(14)}\) We are making two simplifying assumptions in this formalization:
1) the level of \( P_M \) is the same as in the first case, and
2) also \( \sigma^2 \) is the same as in the first case. The second assumption can be relaxed without any problems; the resulting changes in the formulae would however obscure the comparison of the two cases.
and OSR ∼ WS (µ, O). Consequently X (=FSR-OSR) is still a random variable but now X ∼ WS (O, σ₁²). Applying Chebyshev’s inequality leads to

\[ \text{Prob} \{ |X - O| \geq P_M \} \leq \frac{σ₁²}{P_M^2}. \]

The comparison of these two upperbounds allows us to conclude that the authorities will have to intervene more often to reduce the discrepancy between the two spot rates in the case when the two spot rates are flexible as compared to the case when the official spot rate is fixed, if

\[ σ₂³ > 2 σ₁², \]

i.e., when in the case with a flexible spot rate its variance exceeds twice the covariance between the two spot rates.

As a conclusion we should remind that the two intervention strategies we have discussed may be conflicting. The compensatory interventions will indeed also influence the spot rate differential, and the intervention to reduce the differential will as a by-product affect the levels of reserves. Neither of the two strategies should consequently be applied in an automatic fashion, and the authorities will have to evaluate the trade-off between the two targets before intervening.

**BIBLIOGRAPHY**


