

SPECULATION IN A FLEXIBLE EXCHANGE RATE SYSTEM

by

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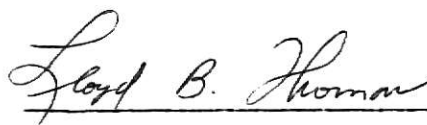
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A handwritten signature in cursive script, reading "Lloyd B. Thomas", written over a horizontal line.

Major Professor

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I. Introduction

The collapse of the Bretton-Woods System in the early 1970's gave rise to the revival of an old dispute concerning the advantages of alternative exchange rate systems. The proponents of flexible exchange rates held the view that a system of floating rates would eliminate the prevailing substantial balance of payments disequilibriums in the world market and provide an automatic adjustment mechanism which relieves national authorities from external stability targets. In addition to this independence of national policies from balance of payments problems, the flexible exchange rate system was expected to increase the efficiency of monetary policies with respect to internal stability goals such as full employment or price stability. Finally, it was argued that the floating would insulate national economies from external shocks. In particular, it was expected to hinder the international transmission of inflation rates.

In contrast to this position, the proponents of the fixed rate system held the view that flexibility creates exchange rate fluctuations and hence uncertainty among exporters and importers. This was expected to reduce the volume of international trade and thus hinder the optimal allocation of world-wide resources.

The experience of the 1970's seems to confirm the latter position. The transition from fixed to flexible exchange rates created an unacceptable exchange rate volatility and led to the introduction of the so-called "managed floating" in almost every industrialized country. The large fluctuations of the floating exchange rates were explained by the appearance of destabilising exchange rate expectations and speculative capital flows.

This paper examines the impact of exchange rate expectations on the external and internal stability of an economy, with special emphasis on external stability and thus exchange rate volatility. The first section (Chapter II) gives an outline of the early literature on exchange rate expectations. These studies focused mainly on an investigation of flexible exchange rates during the post-world war I period. Chapter III describes the theoretical framework of the current developments in the theory of exchange rate expectations. It outlines a model of international capital flows that incorporates speculative exchange premiums and introduces the most commonly used hypotheses on the formation of expectations.

Chapter IV deals with the three major approaches on exchange rate expectations. The traditional approach is based on the Mundell/Fleming model and shows that the stabilising effect of expectations depends on the underlying formations hypothesis. The J-curve approach emphasizes the failure of the traditional exchange rate mechanism in the short run and turns expectation into the central stabilising force of the system. The asset market approach, although based on a different theoretical concept, confirms the results of the latter approach.

Finally, Chapter V reconsiders the above described positive effects of flexible rates on internal stability with respect to speculative capital flows and destabilising trade balance reactions.

II. Early studies on exchange rate expectations and external stability.

Empirical studies of the effects of expectations and speculation on exchange rate stability have to face two basic problems. First, they have to separate speculative from non-speculative capital flows. The traditional theory distinguishes three different motives for foreign exchange market operations: goods arbitrage, interest rate arbitrage, and foreign exchange speculation. However, these three sources of international capital flows do not occur merely in their pure form. The overlapping of speculative and non-speculative motivations makes it difficult to study the impact of purely speculative capital flows on the exchange rate.¹ Secondly, all these studies face the problem of correctly defining the term "destabilising" speculation. Theoretically, speculation has to be called destabilising, if it causes the exchange rate to diverge from some equilibrium rate that would assure balance of payments equilibrium in the absence of speculation. However, there is no method to determine this equilibrium rate by means of empirical observations.² Subsequently, other, more practicable definitions have to be employed.

The major portion of the literature on exchange rate expectations uses the following definition: Exchange speculation is considered destabilising if it causes exchange rates to be more volatile than in the absence of speculation. This requires that a certain change in the exchange rate creates anticipations of future changes into the same

¹Kohlhagen, S. W.: "The Identification of Destabilising Foreign Exchange Speculation." Journal of International Economics, 9, 1979, p. 323.

²Thomas, L. B.: "Speculation in the Flexible Exchange Revisited--Another View." Kyklos, Vol 26, 1973, p. 144.

direction. This spreading out of the amplitudes of exchange rate movements is called "overshooting."

One of the first important issues on exchange rate expectations has been written by Ragnar Nurkse in 1944.³ He focused on the post-world war I period of flexible exchange rates with special emphasis on the fluctuations of the French franc between 1922 and 1926. He pointed out that the depreciations of many European currencies at that time was reinforced by destabilising exchange rate expectations. The initial increase in the exchange rates (depreciation) was due to the post war shortage of working capital that initiated a high import demand and thereby trade deficits. At first, the non-European investors believed that the depreciations were only temporary in nature. The confidence in the strength of European currencies provided the speculative capital inflows which were necessary to finance the current deficit. But when it was realized that the predictions of future appreciations turned out to be wrong, people adjusted their expectations and anticipated further depreciations. The subsequent capital outflows reinforced the actual depreciations and lead to "overshootings" of the exchange rates. Hence, speculation turned into a destabilising force.⁴

Nurkse's results remained unquestioned until Milton Friedman published his "Essays in Positive Economics." In a special comment on Nurkse's article, he pointed out that this study did not allow for general conclusions

³Nurkse, Ragnar: International Currency Experience, League of Nations, 1944.

⁴Nurkse, R., pp. 118, 210-211.

on the stabilising nature of speculation since the sample of countries used for the study was too selective. In fact it dealt almost exclusively with the case of the French franc and the results, obtained for this case, were assumed to be valid for all the other observed currencies too.⁵

In contrast to Nurkse, Friedman holds the position that speculation cannot be destabilising since this implies that speculators, in the aggregate, would lose money by speculative transactions. Destabilising behavior implies that speculators sell currencies when they are low in price and buy them when they are high in price. This is very unlikely to happen.⁶

A study by W. Baumol, however, reveals that destabilising speculation may be profitable. Since speculators cannot foresee the peaks and troughs in foreign currency prices, they react after the turning points have been passed. Particularly, they sell a currency when it passed its peak value and buy it when it is on its upturn. These speculations reinforce the current trend behavior of the exchange rate and may lead to destabilising overshootings.⁷

Apart from profit and market efficiency considerations, there have been some other studies that confirm Friedman's criticism of Nurkse's analysis. The studies of J. F. Hodgson and L. B. Thomas examined the impact of the so-called "fundamental factors" on the exchange rate

⁵Friedman, M.: "The Case for Flexible Exchange Rates" in Essays in Positive Economics, Chicago: The University of Chicago Press, 1953, p. 176, footnote 9.

⁶Ibid, p. 175.

⁷Baumol, W.: "Speculation, Profitability and Stability." Review of Economics and Statistics, Vol 39, 1952, pp. 263-271.

behavior of several countries in the early 1920's.⁸ It has been argued that, according to traditional theory, the exchange rate should reveal a considerable sensitivity with respect to changes in relative prices, interest rate differentials between the home country and abroad, and the relative income levels. This has been confirmed by a regression analysis, using the following equation:

$$(2.1) \quad e = b_0 + b_1 P_r + b_2 \cdot r_r + b_3 y_r + \epsilon$$

The exchange rate (e) reflects the price of foreign currency in terms of domestic price level, (r_r) is the ratio of the foreign to the domestic interest rate, (y_r) is the ratio of foreign to domestic income level, and (P_r) is the ratio of the foreign to the domestic price level. The analysis was conducted with data collected from five European countries (including France) and Canada and revealed a strong relationship between the exchange rate and the fundamental factors. The coefficients had the predicted signs in almost all cases. The coefficient b_1 turned out to be negative, as proposed by the purchasing power parity doctrine. The coefficient b_2 of the interest rate differential was positive as assumed according to the theory of interest rate arbitrage. Finally, in consistency with the key version import multiplier theory, b_3 turned out to be negative.⁹

These results proved the considerable significance of the fundamental factors for the exchange rate determination, but they did not yet prove

⁸Hodgson, J. F.: "An Analysis of Floating Exchange Rates: The Dollar-Sterling Rate 1919-1925." Southern Economic Journal, Vol 39, 1972, pp. 249-257.

Thomas, L. B.: "Behavior of Flexible Exchange Rates: Additional Tests from the Post-World War I Episode." The Southern Economic Journal, Vol 40, No 2, 1973, pp. 167-182.

⁹See the data tables in Thomas, L. B.: "Behavior of Flexible Exchange Rates . . .," pp. 171, 173; A modification of equation 2.1 included quarterly dummy variables to reflect seasonal patterns and a time trend variable.

the hypothesis that speculations are insignificant or stabilising. To study the latter hypothesis, additional tests were accomplished. According to the Purchasing Power Parity Doctrine (PPP), changes in the exchange rate are assumed to reflect the changes in the relative prices of domestic and foreign goods. Hence, the logarithms of the above determinants were employed to test the response of the exchange rate on relative price changes:

$$(2.2) \quad \log e = \alpha_1 + \beta_p \cdot \log P_r + \beta_r \cdot \log r_r + \beta_y \cdot \log y_r$$

According to the PPP Doctrine, the coefficient β_p is required to be unity. The existence of psychological forces, however, was assumed to modify the value of β_p . Stabilising speculation was expected to diminish the coefficient to a value short of unity. An increase of the foreign price level usually leads to an appreciation of the domestic currency. If this appreciation initiates anticipations of future depreciation, the actual percentage change in exchange rates will fall short of the percentage change in relative prices, β_p will be smaller than unity. In contrast, destabilising expectations will lead to an over-reaction of the exchange rate on changes in P_r . This would make β_p exceed unity. A sample of eleven currencies revealed a coefficient β_p of less than unity in ten cases. Only the French franc reacted with "overshootings" on relative price changes. This result strengthened the position that speculations are basically stabilising in nature and confirmed Friedman's criticism of Nurkse's study.¹⁰

¹⁰Thomas, L. B.: "Behavior of . . .," p. 179.

An additional test employed a different technique. It was assumed that the exchange rate is a function of the current relative price ratio (P_t) as well as the future expected price ratio (P_t^E), or the ratio of expected future inflation rates, respectively.

$$(2.3) \quad e_t = \alpha P_t + \gamma P_t^E$$

The revision of the expected price ratio is assumed to be a function of the deviation between the current observed price ratio and the previous expected ratio of the current period.

$$(2.4) \quad P_t^E - P_{t-1}^E = \beta(P_t - P_{t-1}^E)$$

The coefficient β is the coefficient of expectations. The greater β , the stronger the response of speculators to given changes in relative prices, assuming further changes in the same direction of the price ratio and thereby the exchange rate. Thus, a coefficient that is significantly greater than zero serves as an indicator for destabilising expectations and speculations.

The transformation and substitutions of (2.4) into (2.3) leads to:

$$(2.5) \quad e_t = (1 - \beta) e_{t-1} + (\alpha + \gamma\beta) P_t - (1 - \beta)\alpha P_{t-1}^{11}$$

In six out of eleven cases, the β -coefficient turned out to be not significantly different from zero. Only two countries showed high

¹¹ In order to eliminate statistical bias, caused by the correlation of the two variables e_{t-1} and P_{t-1} in equation (2.5) an additional equation was employed:

$$e_t = (1 - \beta) e_{t-1} + \delta(P_t - P_{t-1}).$$

See Thomas, L. B.: "Behavior of," p. 181.

β -coefficients, France and Italy.¹²

The French case of destabilising expectations might be explained by the unstable financial policies of the French monetary authorities. The French economy of the early 1920's was characterised by an extremely high inflation rate and a substantial increase in the money supply. This might have caused this speculation.¹³ Basically, all these tests revealed the same results: In the case that expectations and speculation played a significant role in determining the exchange rates during the post world war I period, they were stabilising rather than destabilising. However, it has to be pointed out that these tests depend critically on the underlying definition of the term "destabilising." Studies that employ the criterion of "volatility" or "overshooting" can be successful only if the "true model" of exchange rate determination is known. This model must include all existing significant variables. Models that use an incomplete set of independent variables cannot identify the nature of speculation. The variance and thus the volatility of observed exchange rates may in these models fall short of the variability that would occur in the absence of speculation, even in the case of overshooting and thus "destabilising" exchange rates.¹⁴

Additionally, the results of tests on post World War I exchange rate experiences are only of limited value for the recent period of the 1970's. In the 1920's, the flexibility of the exchange rates was considered to be only temporary in nature. Speculators might have been influenced by the

¹²Ibid, p. 181.

¹³Ibid, p. 182, Aliber, R. Z.: "Speculation in the Flexible Exchange Revisited." *Kyklos*, Vol 23, No 2, 1970, pp. 303-314.

¹⁴Kohlhagen, S.: The Identification . . . , pp. 324-329.

belief that, in the near future, the authorities would peg the rates at the old pre-war level again. This expectation might have created relatively inelastic exchange rate anticipations. In the last decade, however, governments announced officially the departure from par values.¹⁵ The extremely high volatility of the floating exchange rates at that time gave rise to new reflections over the phenomenon of speculation in foreign exchange. The following section of the paper attempts to give a systematic survey of recent literature on exchange rate expectations. The three most important approaches to exchange rate theory will be discussed and further examined with respect to their implications for monetary and fiscal policies.

III. Expectations and the theory of international capital flows.

The effects of expectations on exchange rate determination depend on their impacts on international capital flows. Those capital flows depend, according to the traditional interest parity theory, on the degree of international capital mobility and the differential between domestic and foreign net yields on capital assets. In case of a fixed exchange rate system, the equilibrium condition on the capital market equals:

$$(3.1) \quad r = r^*$$

with r^* denoting the foreign interest rate level. This formulation abstracts from speculations of future exchange rate adjustments by official authorities. In a flexible exchange rate system, capital gains and

¹⁵Thomas, L. B.: "Behavior of . . . ," p. 182.

losses due to changes in the value of a currency have to be taken into consideration. An appreciation of the domestic currency reduces the value of foreign capital assets in terms of domestic currency. One possibility of hedging the risk of exchange discounts on domestic or foreign assets is the covering of these assets on the forward exchange market. This led to the interest parity condition

$$(3.2) \quad r - r^* = \frac{e_f - e}{e}$$

where e_f denotes the forward exchange rate and e is the spot rate. The term on the right hand side of equation (3.2) reflects the foreign exchange component of an asset's net yield. In equilibrium, an exchange premium ($e_f > e$) on foreign assets is equaled out by a corresponding interest rate differential ($r > r^*$). However, the explicit consideration of exchange rate speculation requires a somewhat different form of equation.

Speculators may operate on the forward exchange market, if they expect the future spot rate to diverge from the current forward rate. Or they may operate on the spot or asset market without hedging their invested capital. In the recent literature, the equilibrium condition on the capital market under explicit consideration of exchange rate speculation has generally been expressed in the following form:¹⁶

$$(3.3) \quad r = r^* + \lambda$$

where λ is the expected rate of depreciation or appreciation and,

¹⁶ Dornbusch, R. and Krugman, P.: "Flexible Exchange Rates in the Short Run." Brookings Papers on Economic Activity, 1976, p. 548. Witte, W. E.: "Dynamic adjustment in an Open Economy." Southern Economic Journal, 1979, p. 1073.

thereby, denotes the expected exchange discount or premium on foreign capital assets.¹⁷

The expectation of a future depreciation initiates a switch of the speculators demand towards foreign assets and hence a capital outflow, unless the domestic interest rate exceeds the foreign rate by exactly the rate of the expected depreciation. An alternative formulation of this condition, similar to equation (3.2), gives a more detailed specification of the term λ :¹⁸

$$(3.3) \quad r = r^* + \frac{E(e) - e}{e}$$

$$\text{with (3.3a)} \quad \lambda = \frac{E(e) - e}{e}$$

If the expected future exchange rate $E(e)$ equals the current spot rate, the speculative premium equals zero ($\lambda = 0$) and all existing capital flows are determined by interest rate differentials. If, however, the expectation of a future change in exchange rates arises, capital flows will occur even with a zero interest rate differential. The direction of the capital flow depends on the process of expectations formation.

The literature on exchange speculation distinguishes between the following basic hypothesis of expectations formation.¹⁹

¹⁷In the case of foreign currency speculation, the equilibrium condition is reduced to $\lambda = 0$, since currencies do not bear interest yields.

¹⁸Dornbusch, R.: "Exchange Rate Expectations and Monetary Policy." Journal of International Economics, Vol 6, 1976, p. 234.

¹⁹See: Williamson, J.: "Exchange Rate Flexibility and Reserve Use, Scandinavian Journal of Economics, 1976.
Dornbusch, R. and Krugman, P., p. 548; Bilson, J. F.: "Rational Expectations and the Exchange Rate," in: Frenkel and Johnson, (ed.), Readings, Mass., 1978.
Kouri, Pentti, J. K.: "The Exchange Rate and the Balance of Payments in the Short Run and in the Long Run: A Monetary Approach." Scandinavian Journal of Economics, 1976, pp. 281-304.

a) static expectations:

$$(3.4) \quad E(e_{t+1}) = e_t$$

where $E(e_{t+1})$ denotes the speculator's expectation in period t towards the future exchange rate in $(t+1)$. According to (3.4), the exchange rate $(t+1)$ is assumed to stay the same as the current rate in t . The expected exchange premium λ equals zero. There are no speculative capital flows and hence no destabilising speculation on the asset market. However, this hypothesis is not likely to be consistent with real market conditions.

b)

$$(3.5) \quad E(e_{t+1}) = \bar{e}$$

This hypothesis states that investors believe in the existence of a long run equilibrium exchange rate \bar{e} . Deviations from this rate are considered to be temporary in nature. Any divergence of the current rate from its "normal" value creates expectations of a future adjustment of (e) back to its equilibrium level (\bar{e}) . An alternative formulation of the regressive expectations hypothesis assumes that the restoration of the "normal" rate is expected to follow a certain time path.²⁰

$$(3.6) \quad E(e_{t+1}) = e_t + \rho(\bar{e} - e_t)$$

Regressive expectations are stabilising in the sense of Nurkse's definition. A depreciation causes the expectation of a future appreciation

²⁰ Dornbusch, R.: "Expectations and Exchange Rate Dynamics." Journal of Political Economy, 1976, Vol 84, p. 1163.

and vice versa. Hence, a depreciation creates expectations of a premium on domestic assets ($\lambda < 0$) and a capital inflow that initiates a future appreciation.

c) extrapolative expectations:

$$(3.7) \quad E(E_{t+1}) = f(e_t, e_{t-1}, e_{t-2}, \dots, e_{t-n})$$

This hypothesis is based on the idea that the expected future exchange rate is a function of past observed rates. If the exchange rate has steadily depreciated in the past, it is expected to further depreciate in the future. The observations, used for expectations formation, may reach far into the past. However, since investors place more emphasis upon the most recent exchange rates, their observations usually enter the expectations function with a weighting factor.

Extrapolative expectations are destabilising in the sense of Nurkse. A current depreciation leads to anticipations of further depreciations and vice versa. Hence, a depreciation of the domestic currency creates an expected exchange discount on domestic assets and a premium on foreign assets ($\lambda > 0$). Thereby, it initiates capital outflows that reinforce the actual depreciation.

d) adaptive expectations:

$$(3.8) \quad E(e_{t+1}) = E(e_t) + n[e_t - E(e_t)] \mid 0 \leq n \leq 1$$

or

$$(3.9) \quad E(e_{t+1}) = n e_t + (1 - n) \cdot E(e_t)$$

Adaptive expectations are based on extrapolation. However, they include an error learning process. Speculators adjust their expectations toward

the future rate $E(e_{t+1})$ with respect to the current rate e_t and its past expectational error $[e_t - E(e_t)]$. Nonetheless, with $\eta < 1$, the expected future change in $t+1$ falls short of the actual, experienced change in period t . Since the anticipated rate changes by less than the current rate, a sudden depreciation of the current rate will lead to a decrease of the premium λ on foreign assets. This is reflected in equation (3.3). A depreciation reduces the numerator of λ , because $E(e)$ increases less than e . Subsequently, a depreciation causes a capital inflow and future appreciation.²¹ Hence, given $\eta < 1$, adaptive expectations impact in a stabilising way on the exchange rate.

e) rational expectations:

$$E(e_{t+1}) = E(e_{t+1} | I_t)$$

The rational expectations hypothesis states that speculators know the "true model" of exchange rate determination. All information, available in period t (I_t), is used to form anticipations of the future exchange rate (e_{t+1}) in consistency with the underlying model.²² Since this model is considered to be the best model available, wrong expectations of future exchange rates are due to insufficient information rather than simple errors in the model. Rational expectations are often defined as "stabilising" in the fundamental sense that they are the best possible

²¹ Aliber, R.: "Monetary Independence under Floating Exchange Rates." Journal of Finance, 1975, p. 371.

²² The rational expectations analysis has been developed for the theory of price level changes, see: Muth, J. F.: "Rational Expectations and The Theory of Price Movements." Econometrica, 1961, pp. 315-335.

prediction of future exchange rates, given . . . the information, available to asset holders."²³

Generally, exchange rate expectations lead to capital flows that influence the future actual rate. This influence takes place via the exchange premium λ . Expectations are defined as stabilising if they dampen the actual change in the current rate, or, in other words, if they cause capital flows that change the direction of exchange rate movements. For instance, a depreciation that initiates the anticipation of a future appreciation creates a negative premium on foreign assets (λ) and thereby a capital inflow. The capital account surplus provides the dampening effect on the depreciation and hence a stabilization. This is the case, if speculators operate on the base of regressive expectations.

Adaptive expectations do not necessarily create the expectation of a future change in the direction of exchange rate movements. Nonetheless, they react sluggishly to changes in the current rate. This creates a reduction in the exchange premium λ in case of a depreciation and thus a capital inflow that stabilises the exchange rate. Vice versa, an appreciation creates a dampening capital outflow.

Static expectations have no effect on capital flows at all, whereas extrapolative expectations create destabilising capital flows since they increase the expected premium on foreign assets in case of a depreciation and reduce it in case of an appreciation. Both reinforce current exchange rate fluctuations.

Rational expectations often resemble those of the regressive

²³Mussa, M.: The Exchange Rate, the Balance of Payments and Monetary and Fiscal Policy under a Regime of Controlled Floating," Scandinavian Journal of Economics, 1976, p. 247.

expectations hypothesis. It is assumed that speculators know the true equilibrium exchange rate. In a purchasing power parity model, this would be the rate that levels out the domestic and foreign price level or, in a less extreme version, the rates of price level changes.²⁴ In the framework of a Keynesian model, the rate would be determined by the income level and the interest rate. Finally, in a monetary model, the equilibrium exchange rate is determined by money market conditions. In all these cases, the asset holder knows the relevant independent variables of the model and anticipates their values with respect to all available information. Additionally, the literature often employs models of "perfect foresight." This hypothesis is based on the rational expectations model, assuming that speculators know the correct adjustment path that leads to the equilibrium rate.²⁵ This form of expectations implies that any deviation of the current rate leads to expectations of a future change of the direction of exchange rate movements. Thus a depreciation creates capital inflows, whereas an appreciation initiates outflows. Both flows tend to stabilise the exchange rate.

IV. Expectations and external stability.

The following section focuses more closely on the impacts that expectations and speculative capital flows have on the process of exchange rate determination and balance of payments adjustment. To study the effects of expectations on external stability, three basic approaches

²⁴The PPP theory is explained in detail by Dornbusch, R. and Krugman, P., pp. 540-542.

²⁵Dornbusch, R.: "Expectations and Exchange Rate Dynamics," p. 1167.

to exchange rate determination will be employed: the traditional approach as described by R. Mundell and M. Fleming,²⁶ the theory of the J-Curve, and the asset market approach.

IV. 1. The traditional approach

The Mundell-Fleming approach of exchange rate determination emphasizes two main influences on the balance of payments: the ratio of domestic and foreign interest rates and the ratio of domestic and foreign prices (terms of trade). Changes in the home or foreign interest rate influence the domestic capital account, whereas change in relative prices effect the trade account. The adjustment of the balance of payments is provided by the exchange rate mechanism. Given an equilibrium rate of interest, an increase in the relative price of domestic goods creates a current account deficit and hence a balance of payments deficit. The subsequent outflow of domestic currency creates a depreciation that restores the equilibrium level of the relative price ratio.

Given an equilibrium ratio of domestic and foreign prices, an increase in the domestic interest rate causes a capital inflow and thereby a capital account surplus that creates an appreciation of the exchange rate. This appreciation equilibrates the balance of payments, since it increases the relative price of domestic goods and thus initiates a current account deficit that offsets the capital account surplus.²⁷ This adjustment mechanism depends critically on the price elasticities of import demand

²⁶Mundell, R.: "International Economics," New York, London, 1968, Ch. 11, 17, 18.

Fleming, M.: "Domestic Financial Policies under Fixed and under Floating Exchange Rates." JMF Staff Papers, 1962, pp. 369-380.

²⁷Mundell, R., Ch. 11.

and hence a "normal" trade balance reaction in the case of exchange rate changes. However, the traditional approach is generally based on the assumption that the Marshall-Lerner condition is satisfied.²⁸

In order to introduce exchange rate expectations within this framework, we employ equation (3.3) that reflects the equilibrium condition on the capital market under explicit consideration of exchange rate speculation.

$$(3.3) \quad r = r^* + \lambda$$

Additionally, we need to employ an expectation formation hypothesis, since the foreign exchange premium (λ) is a function of the expected future exchange rate. We assume that the expected future exchange rate is some function of past observed exchange rates, either in adaptive or in straight extrapolative form, so that the expected premium is determined by equation

$$(4.1) \quad \lambda = \lambda(e, e_{-1}, \dots, u)$$

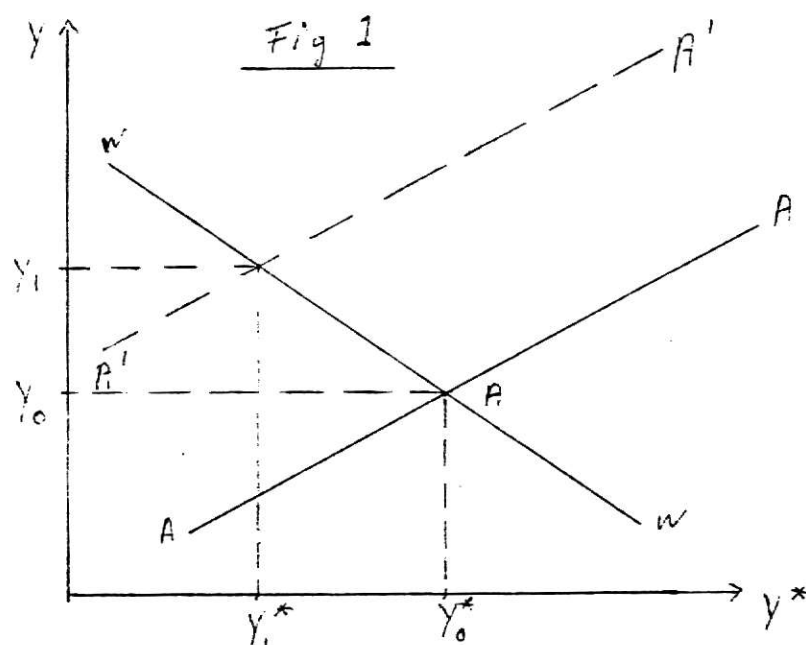
where (u) denotes an exogenous disturbance term.²⁹ Let us first consider an initial equilibrium situation that is disturbed by a sudden, exogenously determined change in the asset holders' expectations of the future exchange rate, as reflected by a change in the term u . Such a change in anticipations creates a change in the speculative premium λ (from zero to a positive or negative value) and hence a speculative

²⁸Lerner, A. P.: The Economics of Control, New York, 1962, p. 377.

The trade balance is defined to react "normally," if a depreciation causes a current account surplus whereas an appreciation initiates a deficit. The Marshall-Lerner condition states that this reaction occurs if the sum of the price elasticities of the domestic and foreign import demand is greater than unity.

²⁹Dornbusch, R. and Krugman, P., p. 548.

capital flow that causes fluctuations in the exchange rate. Figure 1 describes the effects of such a disturbance on external and internal stability by means of a two-country model.³⁰ The vertical axis measures the domestic income (y), the horizontal axis the foreign income (y^*).



The AA schedule reflects all combinations of domestic and foreign income levels that yield monetary equilibrium in both countries and capital yield parity ($r = r^* + \lambda$). The AA schedule is positively sloped because, in case of a constant money supply, each increase in domestic income raises the domestic interest rate. In order to catch up with this new interest rate level, the foreign income has to rise too.

The WW schedule indicates equilibrium in both countries' money and goods markets, given the money supply and fiscal policy. The different points on the schedule reflect alternative income combinations due to

³⁰ Ibid, p. 549.

alternative exchange rates. The schedule is negatively sloped since a depreciation of the spot rate shifts the world demand for goods towards domestic output, thus reducing the foreign income in favor of the domestic income level.

Assume now a speculative disturbance that is not caused by changes in monetary or fiscal policy, say, a sudden expectation of a depreciation. The anticipation of a depreciation of the home currency gives rise to expectations of a premium on foreign assets ($\lambda > 0$). The subsequent capital outflow causes a capital market disequilibrium. To restore equilibrium, the domestic interest rate has to rise until the interest rate differential offsets the expected capital gain on foreign assets. This requires the domestic income level to rise, as reflected by a shift of the AA schedule to A'A'. The new equilibrium point B is characterised by an increased domestic and reduced foreign income level. This change is brought about by exchange rate adjustments. The speculative capital outflow induces a depreciation that shifts world demand toward domestic output. At home, income and interest rates rise whereas the foreign income and interest rate level declines. The actual depreciation creates a current account surplus at home and a deficit abroad. This is financed by the capital outflow at home. Point B reflects a new market equilibrium. However, this equilibrium is only a temporary one, since the actual depreciation eliminates the initial expectations. The remaining interest rate differential now creates a capital inflow and hence an appreciation that leads back to the original equilibrium situation at point A. This model shows that speculative disturbances lead to short run fluctuations of exchange rates and real economic variables around the long run

equilibrium levels. Hence, they have to be considered destabilising in nature. To eliminate the effects of those disturbances, monetary or fiscal policies are necessary to stop speculative capital flows and thus exchange rate changes. Anticipations of, say, a depreciation call for restrictive monetary or expansive fiscal policies to raise the domestic interest rate, thus pegging the exchange rate in face of an incipient speculative capital outflow.³¹

Let us now consider the case of a regular balance of payments disturbance, say, an increase in foreign prices, wages and the money supply. According to the Mundell/Fleming approach, this increase in the relative price of foreign goods leads to an appreciation of the domestic exchange rate that offsets the relative price change and keeps the real magnitudes unchanged.³² This result, however, has to be modified, if exchange rate expectations are included in the model. The incipient depreciation may be reinforced or dampened by the anticipations of future exchange rate changes. Expectations of further depreciation will lead to overshootings whereas expectations of a change in the direction of the exchange rate adjustment will dampen the exchange rate movement. To describe this important feature of exchange rate expectations, the term "elasticity of expectations" has been employed in recent literature. This elasticity reflects the degree of response of the expected future exchange rate to current changes in the actual rate. It may be expressed in the form:

³¹ Ibid, p. 550.

³² Ibid, p. 550, It has been assumed that foreign prices, wages, and money supply increase proportionally so that the interest rate remains constant.

$$(4.2) \quad \frac{d E(e)}{d e} \underset{\leq}{\geq} 1 \quad ^{33}$$

Expectations are called inelastic, if the derivative of $E(e)$ with respect to (e) falls short of unity. In this case, expectations respond sluggishly to changes in current exchange rates. In contrast, if $d E(e)/de > 1$, then the expected exchange rate overreacts in response to changes in the current rate. The impact of this elasticity on speculative capital flows and exchange rate movements shall be explained for the case of a depreciation.

If expectations are inelastic, a depreciation causes the expected future exchange rate to rise by less than the current actual rate. According to equation (3.3a)

$$\lambda = \frac{E(e) - e}{e},$$

this reduces the premium on foreign assets and induces a capital inflow. This capital inflow raises the value of domestic currency and dampens the depreciation.

In contrast, elastic expectations [$d E(e)/de > 1$] lead to expectations of future depreciations [$d E(e)$] that exceed the current depreciation. Subsequently, the premium λ on foreign assets increases, thus initiating

³³Niehans, J : "Some Doubts about the Efficiency of Monetary Policy under Flexible Exchange Rates." Journal of International Economics, 1975, p. 277.

Another elasticity concept has been developed by V. Argy and M. G. Porter. They used the equation:

$$E(e_{t+1}) = e_t + \delta (e_t - e_{t-1})$$

The elasticity coefficient δ ranges from perfectly inelastic (-1) to perfectly elastic (+1). See Argy, V. and Porter, M. G.: "The Forward Exchange Market and the Effects of Domestic and External Disturbances under Alternative Exchange Rate Systems." IMF Staff Papers, 1972, p. 508.

a capital outflow that reinforces the current depreciation.

We might come to the conclusion that inelastic expectations are generally stabilising, since they diminish expected exchange rate movements whereas elastic expectations impact basically destabilising. Furthermore, the elasticity concept is consistent with our above described set of expectation formations. Regressive and adaptive expectations are inelastic and stabilising, static expectations are neutral since they always expect the exchange rate to stay constant [$\lambda = 0$; $d E(e)/de = 1$, since $E(e) \equiv e$], and extrapolative expectations are inelastic and destabilising.

However, this result oversimplifies the problem of exchange rate expectations since it neglects the impact of speculation on the internal stability. Let us go back to our initial example of an increase in foreign prices, wages and money supply. Without exchange speculation, the exchange rate adjusts instantly to changes in relative prices. It restores purchasing power parity and current account equilibrium. All real magnitudes stay constant. The introduction of inelastic expectations modifies their result. The dampening of the exchange rate adjustment leads to an improvement of the foreign terms of trade and a current account deficit that reduces the foreign income level in favor of the domestic income. Only as expectations adjust over time, the domestic and foreign income levels go back to their original income level at the original relative price ratio. In contrast, elastic expectations lead to temporary overshootings of the exchange rate, which actually deteriorates the foreign terms of trade and reduces the domestic income in favor of the foreign income. These effects are similar to those

described in figure 1.³⁴ Hence, inelastic expectations lead to a stabilisation of exchange rate movements, but create fluctuations in real economic variables. Elastic expectations impact destabilising on both sectors.

These results again call for stabilising policies that offset speculative capital flows and assume an undisturbed exchange rate mechanism. However, if the initial disturbance is caused not by a change in relative prices, but by a change in the ratio of domestic to foreign interest rates, than inelastic expectations may turn into a stabilising force with regard to the internal equilibrium. The interest rate differential causes capital flows and thereby exchange rate adjustments which influence the trade balance and hence real magnitudes. Inelastic expectations dampen the capital flow, exchange rate changes and hence fluctuations in output and income.

IV. 2. The J-curve effect

The previous model was based on the assumption that the Marshall-Lerner condition is satisfied so that the trade balance reacts "normally" on exchange rate changes. Recent studies on trade balance behavior, however, stress the point that the Marshall-Lerner condition holds true only in the long run. In the short run, the current account reacts rather sluggishly or even perversely upon exchange rate adjustments.³⁵ This

³⁴Dornbusch, R. and Krugman, P., p. 550.

³⁵Britton, A. J. C.: "The Dynamic Stability of the Foreign Exchange Market." The Economic Journal, 1970, pp. 91-96; Niehans, J.: "Some Doubts" Katz, Eliakim: "Interest Rate Policies, Expectations and Exchange Rate Stability." The Economic Journal, 1975, pp. 338-354.

position has been confirmed by empirical studies that revealed a considerable time lag between exchange rate changes and physical trade adjustments.³⁶ The short run terms of trade effect of, say, a depreciation is to deteriorate the trade balance in terms of exchange flows. After a mean time lag of about four to six quarters the current account finally improves. The corresponding j-shaped reaction schedule gave rise to the name J-curve effect. Since exchange rate fluctuations and expectations are basically short term phenomena, it seems reasonable to focus on the short term behavior of the current account. The assumption of perverse trade balance reactions, however, leads to fundamental modifications of our previous results. Within the Mundell/Fleming framework, exchange rate adjustments provide a sufficient mechanism for balance of payments adjustment and external equilibrium. Speculation affects this mechanism in an either stabilising or destabilising manner, dependent on the elasticity of expectations.

We introduce now the assumption of a short run perverse trade balance reaction into the model. We again assume an increase in foreign prices, wages and money supply. The rise in the foreign relative price level initiates a shift of world demand towards domestic products that creates an appreciation of the domestic currency. However, this appreciation does not restore trade balance equilibrium since the physical demand for imports reacts sluggishly on exchange rate changes. The terms of trade effect of the appreciation reinforces the domestic current account surplus and leads to further appreciations. The restoration of the external

³⁶Dornbusch and Krugman, pp. 562-565.

equilibrium is possible only in the long run, when physical trade flows adjust over time. In this situation of short run instability, expectations and speculative capital flows turn out to be the fundamentally stabilising force of the system. Inelastic expectations initiate the anticipation of a future depreciation until the subsequent capital outflow offsets the current account surplus and stops the appreciation. The more inelastic the expectations, the larger the capital outflows and the faster the restoration of balance of payments equilibrium. Elastic expectations might at first reinforce the destabilising appreciation. However, it has been argued that there is always an exchange rate low enough to create expectations of a depreciation, so that, at a certain point, elastic expectations become inelastic.³⁷

In this model of short term J-curve effects, the overshooting of exchange rates is due to perverse trade balance reactions rather than destabilising speculations. Instead, speculative capital flows turn out to be a stabilising factor that dampens the exchange rate volatility. The less elastic expectations are, the stronger is their stabilising effect. The following mathematical model provides a formal analysis of the impacts of expectations under the alternative assumptions of "normal" and "perverse" trade balance reactions.³⁸

³⁷Niehans, J., p. 277. Niehans employs a "permanent rate" concept. However, this rate is considered to be the expected future rate. His expectations model is consistent with a regressive expectations hypothesis.

³⁸This model has been developed by John Williamson. However, the equations used by Williamson differ from those employed here with regard to the signs of some coefficients. This difference is due to the fact that Williamson employs the British definition of the exchange rate, expressing the price of domestic currency in terms of foreign currencies. Furthermore, this paper uses some additional expectations formations hypothesis with respect to previous sections of this study. For the basic model see: Williamson, J.: "Exchange Rate Flexibility"

The linear model of a normal current account-exchange rate relationship, the Marshall-Lerner condition being satisfied, is reflected in equation

$$(4.3) \quad c_t = a_1 + a_2 \cdot e_t + u_t ; \quad a_1, a_2 > 0$$

where (c_t) denotes the current account in period t as a linear function of the current exchange rate (e_t) . The disturbance term (u_t) is normally distributed around zero mean $[N(0, \sigma_u^2)]$.

In case of short run perverse current account reactions, equation (4.3) changes to

$$(4.4) \quad c_t = a_1 - a_3 \cdot e_t + a_4 e_{t-1} + u_t ; \quad a_1 > 0, \quad a_3 - a_4 < 0$$

The capital account (k_t) is assumed to be a constant fraction of the difference between desired (K_t^d) and actual (K_t) stock of net foreign investment:

$$(4.5) \quad k_t = h_1 (K_t^d - K_t)$$

(K_t^d) is a positive function of the expected rate of appreciation of the exchange rate:

$$(4.6) \quad K_t^d = h_2 - h_3 [E(e_{t+1}) - e_t]$$

Substituting (K_t^d) in (4.5) leads to

$$(4.7) \quad k_t = h_1 [h_2 - h_3 E(e_{t+1}) + h_3 \cdot e_t - K_t]$$

Adding an error term (V_t) and simplifying the equation leads to

$$(4.8) \quad k_t = h_5 - h_6 E(e_{t+1}) + h_6 \cdot e_t - h_7 \cdot K_t + V_t$$

with $h_5 = h_1 \cdot h_2$, $h_6 = h_1 \cdot h_3$ and $h_7 = h_1$. The error term (V_t) is assumed to be normally distributed around zero mean [$N(0, \sigma_k^2)$]. Finally, the capital account (k_t) is defined by equation:

$$(4.9) \quad K_{t+1} = K_t + k_t$$

Williamson employs three basic models of expectations formation that are consistent with those described in Chapter III:

$$(3.4) \quad E(e_{t+1}) = e_t \quad \text{static expectations}$$

$$(3.5) \quad E(e_{t+1}) = \bar{e} \quad \text{regressive expectations}$$

$$(3.6) \quad E(e_{t+1}) = \eta e_t + (1 - \eta) E(e_t) ; 0 \leq \eta \leq 1$$

adaptive expectations.

Additionally, he uses two forms of dual mechanistic expectations models, combining (3.4) and (3.5) on one hand and (3.5) and (3.6) on the other hand.³⁹ However, these models will not be employed here. Instead, the analysis will be extended with respect to extrapolative expectations and a dual mechanistic model, which combines extrapolative and regressive expectations. A simple model of extrapolative expectations will be employed in which expectations are formed with respect to the current rate (e_t) and the change from the past (e_{t-1}) to the current rate:

$$(4.10) \quad E(e_{t+1}) = e_t + \rho (e_t - e_{t-1}) ; \rho > 0$$

³⁹Ibid, p. 333.

The dual mechanistic expectations are formed in the following way:

$$(4.11) \quad E(e_{t+1}) = \gamma_1 [e_t + \rho(e_t - e_{t-1})] + \gamma_2 \cdot \bar{e} ; \quad \gamma_1 + \gamma_2 = 1$$

Short term stability of a freely floating exchange rate requires that the following condition is satisfied:

$$(4.12) \quad \frac{db_t}{de_t} > 0$$

where (b_t) denotes the balance of payments at time (t) as a sum of current account and capital account. Assuming "normal" current account reactions and static expectations, the balance of payments equation can be obtained by combining (4.3), (4.8) and (3.4) to

$$(4.13) \quad b_t = a_1 + a_2 e_t + h_5 - h_6 e_t + h_6 \cdot e_t - h_7 K_t + u_t + V_t$$

where

$$\frac{db_t}{de_t} = a_2 > 0.$$

which indicates stability of the floating exchange rate system.

In the presence of a J-curve-effect, the model becomes unstable [equations (4.4), (4.8) and (3.4)]

$$(4.14) \quad b_t = a_1 - a_3 e_t + a_4 e_{t-1} + h_5 - h_6 e_t + h_6 \cdot e_t - h_7 K_t + u_t + V_t$$

where

$$\frac{db_t}{de_t} = -a_3 < 0$$

A plausible explanation for this instability is the fact that the "perverse" trade balance effect is not offset by speculative capital flows. Static expectations do not dampen the destabilising impact of the current account

on the exchange rate. A depreciation causes merely a current account deficit and hence a balance of payments deficit that provokes further depreciation and thus overshooting.

Next, the case of "normal" trade reactions and regressive expectations shall be considered [equations (4.3), (4.8) and (3.5)]:

$$(4.15) \quad b_t = a_1 + a_2 \cdot e_t + h_5 - h_6 \cdot \bar{e} + h_6 \cdot e_t - h_7 \cdot K_t + u_t + v_t$$

$$\frac{d b_t}{d e_t} = a_2 + h_6 > 0$$

Regressive expectations, apparently, increase the stability of the exchange rate. The greater the value of the expectations parameter (h_6), the stronger the markets expectations of a reversion to an assumed long term equilibrium rate (\bar{e}), and the larger the balance of payments reaction on a given change in (e_t). However, the sensitivity of the capital account with respect to exchange rate changes has important impacts on the relative price adjustment path. The large value of h_6 implies that a given change in relative prices needs only a small adjustment of the current exchange rate to restore balance of payments equilibrium. This small adjustment is not sufficient to restore the original relative price ratio. Instead it allows for a foreign current account deficit that is offset by the capital account surplus. This leads to the short term fluctuations of domestic and foreign real economic variables, as described in Chapter IV, 1 above. Regressive expectations increase the exchange rate stability but reduce the internal stability.

This result has to be modified in case of a J-curve effect [equations (4.4), (4.8) and (3.5)]:

$$(4.16) \quad b_t = a_1 - a_3 \cdot e_t + a_4 \cdot e_{t-1} + h_5 - h_6 \cdot \bar{e} + h_6 \cdot e_t - h_7 K_t + u_t + V_t$$

$$\frac{db_t}{de_t} = -a_3 + h_6 \geq 0$$

The stability of the model depends on the strength of market expectations. The current account parameter is negative and thus destabilising. In this case, the restoration of the relative price ratio via exchange rate adjustment even destabilises the trade balance and real variables. Hence, the speculative factor is a stabilising force for external and internal equilibrium.

Next, we consider adaptive expectations and normal trade reactions [equation (4.3), (4.8) and (3.6)]:

$$(4.17) \quad b_t = a_1 + a_2 e_t + h_5 - h_6 \cdot \eta \cdot e_t - h_6 \cdot (1 - \eta) E(e_t) \\ + h_6 \cdot e_t - h_7 \cdot K_t + u_y + V_t$$

$$\frac{db_t}{de_t} = a_2 - h_6 \cdot \eta + h_6 = a_2 + (1 - \eta) h_6 > 0$$

This model reveals basically the same stability conclusions as the regressive expectations model. However, since $(1 - \eta) \cdot h_6 < h_6$ for $\eta > 0$, it implies relatively larger exchange rate fluctuations and smaller income fluctuations. This is due to the fact that regressive expectations are less elastic than adaptive expectations, thus leading to larger capital flows. The higher sensitivity of the balance of payments in case of regressive expectations gives rise to smaller exchange rate fluctuations.

The J-curve effect leads to:

$$(4.18) \quad b_t = a_1 - a_3 e_t + a_4 \cdot e_{t-1} + h_5 - h_6 \cdot \eta \cdot e_t - h_6 \cdot (1 - \eta) E(e_t) \\ + h_6 \cdot e_t - h_7 \cdot K_t + u_t + v_t$$

$$\frac{db_t}{de_t} = a_3 - h_6 \cdot \eta + h_6 = -a_3 + (1 - \eta) \cdot h_6 \geq 0$$

Again, the current account parameter impacts destabilising whereas the speculative capital flow parameter impacts stabilising. The total impact depends on the relative size of both parameters. However, the chance of a stabilising total effect is smaller than in the case of equation (4.16).

The "normal" reaction equation for the case of extrapolative expectations [(4.3), (4.8) and (4.10)] is:

$$(4.19) \quad b_t = a_1 + a_2 \cdot e_t + h_5 - h_6 e_t - h_6 \cdot \rho \cdot e_t + h_6 \cdot \rho \cdot e_{t-1} \\ + h_6 \cdot e_t - h_7 K_t + u_t + v_t$$

$$\frac{db_t}{de_t} = a_2 - h_6 - h_6 \cdot \rho + h_6 = a_2 - h_6 \cdot \rho \leq 0$$

As already supposed in Chapter IV, 1, extrapolative expectations appear to be destabilising. In order to obtain a stabilising exchange rate mechanism, the negative h_6 - parameter has to be over compensated by the stabilising current account parameter. The stronger the reliance of asset holders on observations of past spot rates (the greater ρ) the stronger the destabilising force of speculative capital flows.

In case of "perverse" current account reactions, equation (4.19) has to be modified to:

$$(4.20) \quad b_t = a_1 - a_3 \cdot e_t + a_4 \cdot e_{t-1} + h_5 - h_6 : e_t - h_6 \cdot \rho \cdot e_t \\ + h_6 \cdot \rho \cdot e_{t-1} + h_6 \cdot e_t - h_7 \cdot K_t + u_t + V_t$$

$$\frac{db_t}{de_t} = -a_3 - h_6 - h_6 \cdot \rho + h_6 = -a_3 - h_6 \cdot \rho < 0$$

As expected, both parameters reveal negative signs and hence instability. However, as mentioned in Chapter IV.1, it is most likely that extrapolative expectations turn into inelastic, say, regressive expectations, once a certain level of the exchange rate has been reached. To consider this change in our mathematical model, the dual mechanistic expectation hypothesis of equation (4.11) will be employed.

$$(4.11) \quad E(e_{t+1}) = \gamma_1 [e_t + \rho (e_t - e_{t-1})] + \gamma_2 \cdot \bar{e}$$

The parameter (γ_i) reflects the relative importance of the corresponding expectations formation process. In order to consider a slow adjustment in the speculator's expectation formation, the parameter γ_2 is assumed to be an increasing function of $[(\bar{e} - e_t)^2]$, with γ_1 as the residual magnitude, so that:

$$\gamma_2 = f [(\bar{e} - e_t)^2] \quad \text{for} \quad \gamma_1 + \gamma_2 = 1$$

Hence, \bar{e} has a non-linear influence on the expected future exchange rate, depending on the size of the deviation of the actual rate from this equilibrium rate (\bar{e})⁴⁰ Once a certain exchange rate has been reached, all asset holders will turn from elastic extrapolative expectations to

⁴⁰Williamson used this concept for his combination of regressive and adaptive expectations. See Williamson, J., p. 333.

inelastic regressive expectations, γ_2 takes the value of unity.

$$(4.21) \quad b_t = a_1 - a_3 \cdot e_t + a_4 \cdot e_{t-1} + h_5 - h_6 \cdot \gamma_1 \cdot e_t - h_6 \cdot \gamma_1 \cdot \rho \cdot e_t \\ + h_6 \cdot \gamma_1 \cdot \rho \cdot e_{t-1} - h_6 \cdot \gamma_2 \cdot \bar{e} + h_6 \cdot e_t - h_7 \cdot K_t + u_t + v_t$$

$$\frac{db_t}{de_t} = -a_3 - h_6 \cdot \gamma_1 - h_6 \cdot \gamma_1 \cdot \rho + h_6 \\ = -a_3 + (1 - \gamma_1 - \rho \cdot \gamma_1) \cdot h_6 \geq 0$$

In case of purely extrapolative expectations [$\gamma_1 = 1$; $\gamma_2 = f[(\bar{e} - e_t)^2] = 0$], speculative capital flows reinforce the destabilising current account effect. The larger the discrepancy between (e_t) and (\bar{e}), the smaller γ_1 and the larger γ_2 . At a certain (e_t), expectations become stabilising:

$$\gamma_1 + \rho \cdot \gamma_1 < 1 \text{ and } (1 - \gamma_1 - \rho \cdot \gamma_1) \cdot h_6 > 0$$

This is when the majority of asset holders have switched to regressive expectations so that the net capital flow changes direction and stops the overshooting of the exchange rate. In an extreme case, with $\gamma_2 = 1$, equation (4.21) turns into (4.16).

The effect of rational expectations depends on the underlying true model. In a Keynesian framework, rational exchange rate expectations might be consistent with the belief in a long term equilibrium exchange rate that adjusts only slowly with respect to permanent changes in real income levels and hence import demand. In this case, the rational expectations hypothesis resembles the regressive expectations model. Short term fluctuations of exchange rates, caused for instance by interest

rate changes, are dampened by the speculative component of capital flows.

To summarize the results of our preceding two approaches, it has to be pointed out that the impact of speculation on exchange rate volatility depends on the different assumptions employed for different models.

Exchange speculation, initiated by exogenous disturbances other than changes in the current exchange rate or monetary or fiscal policies have been found to create temporary fluctuations of exchange rates and income levels and are thus destabilising (figure 1). Expectations, based on observations of the current exchange rate may exert stabilising or destabilising features, dependent on their elasticity with respect to changes in the current rate (or the underlying expectations formation hypothesis, respectively), and on the direction of current account reactions on changes in the current spot rate (Marshall-Lerner-condition). Assuming "normal" trade balance reactions, inelastic expectations cause a reduction in short term exchange rate fluctuations. However, if the initiating disturbance has been a change in relative prices and the current account, the dampening effect on exchange rate adjustments hinders the relative price adjustment back to its equilibrium level. This induces undesired short term income fluctuations similar to those created by exogenous speculative disturbances. On the other hand, the destabilising effect of interest rate fluctuations which cause capital arbitrage, exchange rate changes and thereby trade adjustments and income fluctuations is dampened by inelastic expectations. In contrast, elastic expectations generally impact destabilising on exchange rates and income levels.

Assuming reverse trade balance reactions, expectations reveal a basically stabilising character. In fact, they become a necessary

condition for a stable exchange rate mechanism.

The question whether exchange rate expectations are stabilising or destabilising is closely related to the question which of the above conditions is most likely to occur in reality. In the recent literature, the existence of a J-curve-effect is hardly questioned anymore. The empirical observation of a short term inelastic import demand has been explained with the fact that changes in international trade flows in physical units require a change in production facilities as well as new distribution facilities and the development of new markets. Those changes are based on long term decisions of firms; they do not occur in the short run. Hence, there is general agreement among economists that the Marshall-Lerner-condition is satisfied only in the long run.⁴¹ Exchange rate expectations, however, are basically a short-run phenomenon. This implies that endogenous exchange rate speculation tends to be stabilising.

Nonetheless, there remain exogenous speculative disturbances which may impact destabilising. In order to eliminate such speculation, offsetting monetary or fiscal policies might be necessary that stop a speculative capital outflow by an increase in the interest rate and vice versa. These policy measures, however, face two basic problems:

Firstly, it is almost impossible to identify destabilising exogenous speculative disturbances from endogenous, stabilising speculation. Secondly, the call for stabilising exchange rate policies in a system of flexible exchange rates stands in vital contrast to the major argument in favor of flexible exchange rates. It turns away domestic policies from

⁴¹ Niehans, J., p. 276.

internal stability targets and brings the well-known policy dilemma of the fixed rate system back to life.

IV. 3. The asset market approach

The "monetary" or "asset market" approach to exchange rate determination has been derived from the so-called "monetary approach to the balance of payments." The latter concept was originally developed for a system of fixed exchange rates. It concentrates on the relationship between money-market conditions and the balance of payments, assuming full employment, perfect international arbitrage on goods and asset markets, and stable money demand and supply functions. International reserve flows (and hence balance of payments disequilibria) are explained with disequilibria on the domestic and/or foreign money market. For instance a money supply surplus at home increases domestic absorption. The subsequent excess demand on the goods market has to be satisfied by imports. This creates a current account deficit that causes an outflow of international reserves. This outflow continues until the money supply has adjusted to the money demand. The balance of payments provides the adjustment mechanism for the restoration of money market stock equilibrium.⁴²

In consistency with this theory, the monetary approach to exchange rate determination has been developed for a system of flexible exchange rates. The adjustment process is carried out by exchange rate adjustments instead of international reserve flows. A domestic money supply surplus

⁴²A survey over the literature on the monetary approach to the balance of payments has been published by Frenkel, J. and Johnson, H. G. (ed.): The Monetary Approach to the Balance of Payments, London 1977.

lowers the value of domestic currency and initiates a depreciation. In contrast, a money demand surplus creates an appreciation. These revaluations affect the variables that enter the domestic money demand function--as for instance the price level--and restore the markets stock equilibrium. Hence, the asset market approach reveals three features that are fundamentally different from the traditional approach:⁴³ Firstly, the exchange rate is considered to be the relative price of moneys rather than national outputs. Secondly, this rate is determined by a stock-adjustment process rather than the adjustment of flows due to import and export transactions. Finally, the approach assumes a world of perfect capital mobility and perfect substitutability of domestic and foreign capital assets. Hence, portfolio adjustments are conducted instantly with respect to any changes in money market conditions, exchange rates and interest rates. It is argued that the goods market adjusts sluggishly relative to the asset market so that the exchange rate is basically determined by asset market conditions. This phenomenon led to the name "asset market approach to exchange rate determination."

The asset market approach provoked a considerable amount of issues on exchange rate expectations. Most of the described models differ from each other with respect to their assumptions concerning expectations formation, the flexibility of real income or the degree of capital mobility or substitutability. For the reason of greater clearness, the

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Mussa, M., p. 231.

For a more detailed description of the asset market approach see also: Kouri, Pentti, J. K.: "The Exchange Rate and the Balance of Payments in the Short Run and in the Long Run: A Monetary Approach," Scandinavian Journal of Economics, 1976, pp. 280-304. Frenkel, J.: "A Monetary Approach to the Exchange Rate: Doctrinal Aspects and Empirical Evidence." Scandinavian Journal of Economics, 1976, pp. 200-224.

following section focuses on one particular model, developed by R. Dornbusch. It emphasizes the role of exchange speculation in a monetary macro-economic framework.⁴⁴ Dornbusch assumes a small home country, perfect capital mobility, full-employment and expectations which are consistent with perfect foresight.

The central determinant of his model is the interest rate. This variable exerts its influence on three different markets: The international asset market, the domestic money market, and the domestic goods market. The equilibrium condition on the asset market is represented by the already known equation

$$(3.3) \quad r = r^* + \lambda$$

The expectations formation hypothesis is characterised by the belief in a long run equilibrium exchange rate, to which the economy will ultimately converge. Using (e) and (\bar{e}) for the logarithms of the current and long run exchange rate, equation (4.31) indicates the expected rate of depreciation (λ) as a fixed proportion (θ) of the difference between these two rates:⁴⁵

$$(4.31) \quad \lambda = \theta (\bar{e} - e)$$

It will be shown later that this expectations hypothesis is consistent with perfect foresight.

The money market equilibrium condition is assumed to have the traditional form, expressing the demand for real money balance as a function of domestic income and interest rate. Transformed into a log linear

⁴⁴Dornbusch, R.: "Expectations and Exchange Rate Dynamics."

⁴⁵Ibid, p. 1163.

form, this means

$$(4.32) \quad -\mu \cdot r + \phi \cdot y = m - p$$

where μ and ϕ reflect the elasticity of the money demand with respect to the interest rate and the income level.

The interest rate is the equilibrating force on two independent markets, the domestic money and the international asset market. This creates the basic stability problem of the model. The solution of this problem is provided by the asset holder's speculation. Equation (4.33) gives the combined equilibrium condition for both markets, substituting (3.3) and (4.31) for (r) in (4.32):

$$(4.33) \quad p - m = -\phi y + \mu r^* + \mu \cdot \theta (\bar{e} - e)$$

Given an initial equilibrium in both sections, an increase in the domestic money supply will tend to lower the domestic interest rate (r) in order to restore domestic money market equilibrium. The subsequent differential between domestic and foreign interest rates calls for anticipations of a future appreciation to restore asset market equilibrium. This expectations of a discount on foreign assets ($\lambda < 0$) is provided by an incipient capital outflow in response to the money supply expansion and the fall in interest rates. This outflow causes a depreciation that, according to traditional theory, would create an offsetting current account surplus. The asset market approach, however, considers the goods market to react sluggishly to exchange rate changes. Instead, the balance of payments equilibrium is brought about in the asset market itself, by expectations of a future appreciation.

Nonetheless, this process leads only to a short run equilibrium. The long run equilibrium requires the adjustment of the domestic to the

foreign interest rate so that short term expectations are eliminated. In order to keep this long term adjustment process in line with domestic money market equilibrium, the change in the interest rate has to be offset by adjustments of another money demand variable. Given constant full employment, this task has to be accomplished by the price level. An increase in domestic interest rates requires an increase in the price level and vice versa. The long run equilibrium price level \bar{p} can be derived from equation (4.33), assuming $\bar{e} = e$ and $r = r^*$:

$$(4.34) \quad \bar{p} = m + \mu \cdot r^* - \phi \cdot y$$

combining (4.33) and (4.34) leads to:

$$(4.35) \quad e = \bar{e} - \frac{1}{\mu\theta} (p - \bar{p})$$

This equation reflects the key relationship of the model. It determines the current exchange rate as a function of the current price level.⁴⁶ Prices change with respect to the demand for domestic output. A monetary expansion raises this demand by means of a fall in interest rates and a depreciation. Over time the adjustment of domestic prices to the increase in the money supply makes the interest rate rise again. This dampens the depreciation and allows for a fall in the expected discount on foreign assets (λ). The adjustment path of the price level and hence the exchange rate depends on the goods market conditions. The demand for domestic output, expressed in logarithmic form ($\ln D$) is assumed to be a function of the relative price of domestic goods ($e - p$), the interest rate, and the real income. The term (u) denotes a shift parameter.⁴⁷

⁴⁶Ibid, p. 1164.

⁴⁷Ibid, p. 1164.

$$(4.36) \quad \ln D = u + \delta(e - p) + \Omega \cdot y - \sigma \cdot r$$

The change in the price level \dot{p} is assumed to be proportional to an excess demand measure

$$(4.37) \quad \begin{aligned} \dot{p} &= \gamma \ln \left(\frac{D}{Y} \right) \\ &= \gamma [u + \delta(e - p) + (\Omega - 1)y - \sigma \cdot r] \end{aligned}$$

A transformation of equation (4.37) leads to⁴⁸

$$(4.38) \quad \dot{p} = -\gamma [(\delta + \sigma \cdot \theta) / \theta \cdot \mu + \delta] \cdot (p - \bar{p}) = -V \cdot (p - \bar{p})$$

with:

$$(4.39) \quad V = \gamma [(\delta + \sigma \cdot \theta) / \theta \cdot \mu + \delta]$$

Further transformation leads to the time path of the price level:

$$(4.40) \quad p(t) = \bar{p} + (p_0 - \bar{p}) \exp(-vt)$$

or the time path of the exchange rate [by substituting of (4.40) in (4.35):

$$e(t) = \bar{e} + (e_0 - \bar{e}) \exp(-vt)$$

Both time paths of convergency to the long run equilibrium level of (p) and (e) are determined by (v) , and hence by the response of domestic output demand to changes in relative prices (δ) , the response of prices to excess output demand (γ) , the response of output demand to changes in interest rates (σ) , the response of money demand to changes in the interest rate (μ) and the expectations coefficient (θ) .

Expectations of future exchange rates are identical with expectations

⁴⁸Ibid., p. 1165.

of the actual time path of exchange rates. Hence, the perfect foresight hypothesis simply requires that the parameter of the actual path equals the expectations coefficient θ . The solution of equation (4.39) is:

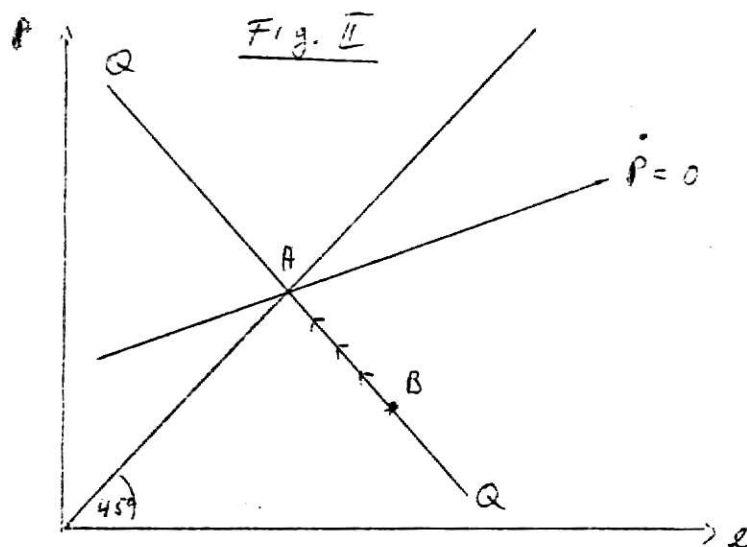
$$\theta = v = \gamma [(\delta + \delta \cdot \theta) \theta \cdot \mu + \delta] = \theta(\mu, \delta, \gamma, \tilde{\gamma})$$

indicates that perfect foresight is consistent with a rational expectations hypothesis, assuming the knowledge of the basic determinants of the "true model."⁴⁹

The asset market approach resembles the J-curve approach with regard to its explanation of exchange rate overshootings. In both cases, large exchange rate fluctuations are due to sluggish reactions of the real sector. Within the asset market model, the slow response of the demand for output to changes in relative prices (exchange rate changes) and interest rates as well as the slow response of prices to excess output demand hinder the price level adjustment to the initial change in the money supply. The adjustment has to take place via the interest rate and exchange rate expectations. The overshooting phenomenon shall be explained by means of a geometrical presentation of the model. Figure II reflects the equilibrium conditions on the goods, the money, and the asset market with respect to the domestic price level and the exchange rate.⁵⁰

⁴⁹Ibid, p. 1167.

⁵⁰Ibid, p. 1166.



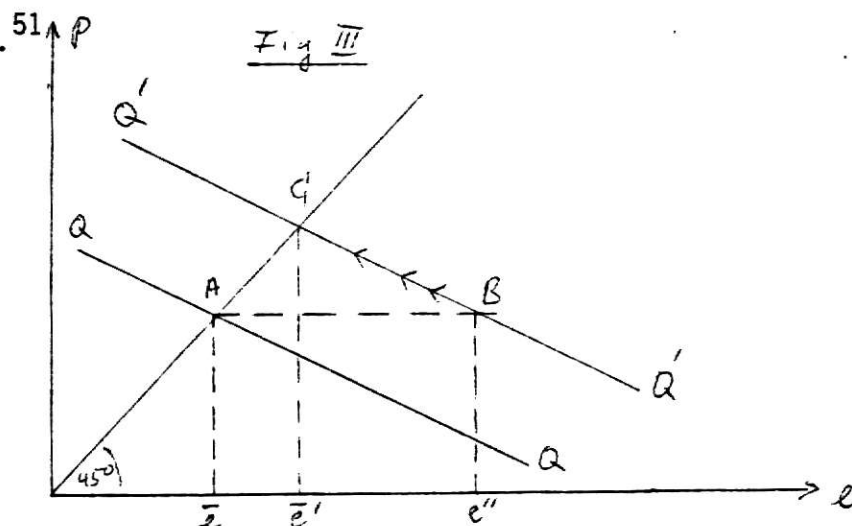
The QQ schedule represents equilibrium on the money and the asset market. An increase in the price level reduces the real money supply and increases interest rates. The subsequent capital inflow creates an appreciation that lasts until expectations of a future depreciation stop the capital flow. Hence, the QQ schedule is negatively sloped.

The positively sloped $\dot{P} = 0$ schedule reflects combined goods and money market equilibrium. An increase in the price level requires a deterioration of the exchange rate to keep the demand for domestic goods in equilibrium.

According to the assumption of perfect capital mobility, the asset market clears instantaneously by means of exchange rate adjustments and thus speculative capital flows. Hence, we are continuously on the QQ schedule, say, at point B. Since this point is situated to the left of the $\dot{P} = 0$ schedule, it represents an excess demand for goods. The price level will rise and so will the interest rate in order to keep the money market in equilibrium. This initiates an appreciation that creates expectations of a depreciation. The expected premium on foreign assets

offsets the interest rate differential on the asset market. Subsequently, the economy moves towards its long run equilibrium level A, where all three markets clear and (λ) equals zero.

Figure III indicates the adjustment path in the case of a monetary expansion.⁵¹



The increase in the money stock shifts the QQ schedule to $Q'Q'$, since the monetary expansion has to be offset either by an increase in prices or a reduction in interest rate, or both, in order to restore money market equilibrium. Since prices react sluggishly, the interest rate will fall. This calls for a depreciation to restore capital market equilibrium. This short run adjustment mechanism is represented by a movement from point A to point B. Over time, prices adjust to the increased money supply, interest rates rise and the exchange rate starts to appreciate again. Finally, the long-term equilibrium point C will be reached. Point C is situated on the 45°-schedule, since it is characterised by the condition:

$$(4.41) \quad de = dm = d\bar{p}$$

⁵¹ Ibid., p. 1169.

This means that, in the long run, relative prices and real magnitudes do not change. In consistency with the quantity theory of money, money supply and price level change by the same percentage. The speed of adjustment depends on the speed with which prices adjust as compared to exchange rate expectations. The difference between (e'') and (\bar{e}') reflects the amount of overshooting that is necessary to assure asset market equilibrium. It depends on the response of the money demand to changes in the interest rate (μ) and the expectations coefficient θ :⁵²

$$(4.42) \quad \frac{de}{dm} = 1 + \frac{1}{\mu \cdot \theta}$$

The overshooting effect may disappear, if we allow for short-term adjustments in the output level. Dornbusch points out that interest rates might actually increase in response to a monetary expansion. This occurs if the additional money supply increases output and prices to an extent that creates a money demand surplus. This would initiate an appreciation instead of a depreciation. At least, the short run output expansion may dampen the overshooting of the depreciation. However, Dornbusch considers a fixed output and overshootings to be the more likely characterization of the adjustment path in the very short run.⁵³

This simple asset market model allows for several extensions. A rational expectations model, developed by M. Mussa, focuses on the asset holder's judgement upon the character of current changes in the money supply.⁵⁴ If those changes are considered to be a temporary disturbance

⁵²Ibid, p. 1169.

⁵³Ibid., pp. 1172-1173.

⁵⁴Mussa, M., pp. 241-247.

rather than a permanent change, the resulting changes of the actual exchange rate initiates regressive expectations. These anticipations of a future return to the original exchange rate level dampens fluctuations in the exchange rate and provides a stabilising equilibrium mechanism. If, however, the speculator expects the money expansion to persist, he will form more elastic expectations. The current rate will have to move further to restore equilibrium, since the incipient depreciation or appreciation is considered to be a permanent change due to the permanent change in the money supply.

Basically, the same results occur, if deviations from the long term rate of money growth are examined. If these disturbances are considered to be temporary, then the exchange rate adjustment will be relatively small. If investors, in contrast, believe that the change in the growth rate is permanent, the adjustment has to be larger to create the necessary speculative flows.

Other studies focus on the impact of expectations of future changes in the money supply and real income. C. A. Wilson points out that an anticipated monetary expansion may lead to expectations of future depreciations and thus capital outflows which cause the actual rate to depreciate even before the money supply is actually increased.⁵⁵ Subsequently, the price level and interest rate rise above the equilibrium level until the actual money expansion reduces the interest rate again. This leads to further adjustments according to the QQ schedule. This analysis shows that the simple announcement of monetary policies may have impacts

⁵⁵Wilson, C. A.: "Anticipated Shocks and Exchange Rate Dynamics." Journal of Political Economy, 1979, pp. 639-647.

on exchange rates and the capital account.

A study by J. F. Bilson deals with expected changes not only of the level and growth rate of money supply, but also with expected changes of the real income.⁵⁶ The expected future growth rate of the money supply is considered to be equal to the current growth rate. Any anticipated changes in the current growth rate may lead to weak or strong responses of the exchange rate. The effect depends on the common experience, whether disturbances are usually reversed in the future or not. In this sense, Bilson considers exchange rate instability to be a consequence of an unstable money supply process. If monetary disturbances are not assumed to be reversed in future, than they are expected to be a permanent change in the growth rate and lead to expectations of further changes in the exchange rate. This is called the magnification effect. So far, Bilson's conclusions are similar to those made by Wilson. However, the explicit consideration of changes in real income modifies these results to a certain extent. An unanticipated monetary expansion will increase the income level and tend to appreciate the exchange rate through its effect on the money demand. This will partly offset the depreciating money supply effect. However, the unanticipated increase in real income will create expectations of a future fall in the growth rate of income, because transitory changes in income are expected to fall back to zero again.⁵⁷ This creates the expectation that the exchange rate tends to depreciate again in future. Nonetheless, the total effect of a rising income is considered to be to

⁵⁶ Bilson, J. F.: "Rational expectations and the Exchange Rate," in: Frenkel, J. and Johnson, H. G. (ed.). Reading. Mass.: Addison-Wesley, 1978, p. 80.

⁵⁷ Ibid.

appreciate the exchange rate. It thereby dampens the effect of unanticipated money supply shocks, as already mentioned by Dornbusch.

Principally, the asset market approach confirms our results gained from the study of the previous two approaches. Similar to the assumption of "perverse" trade balance effects, the asset market model is based on the assumption of sluggish goods market reactions. In consequence, both approaches come to the conclusion that exchange rate expectations are a necessary component of the adjustment mechanism. Actually, the adjustment paths described by the last two models appear to be almost identical. Nonetheless, there is a considerable disagreement with respect to the definition as well as to the determinants of the exchange rate. According to the monetary approach, the exchange rate is determined by the money market conditions, and changes in the spot rate are due to stock disequilibria. The emphasis on capital mobility and asset market operations makes monetary disturbances and interest rate fluctuations become the predominant source of exchange rate fluctuations. Considering the higher speed of capital market operations compared to goods market transactions, this position seems reasonable even if one disagrees basically with the monetary approach. Transferred to the traditional approach, this means that the total effect of inelastic expectations is stabilising even under the assumption of normal trade balance reactions. If disturbances on the goods market, like changes in relative prices, play only a minor role in exchange rate determination, than the dampening impact of inelastic expectations on exchange rate adjustments is stabilising. It hinders the transmission of basically monetary disturbances on to the real sector of the economy via flexible exchange rates (see Chapter IV, 1.).

Another interesting feature of the asset market approach is the fact that most (not all) of its proponents employ the rational expectations hypothesis. This assumption gives rise to the question how to fit exogenous speculative disturbances, as those described in figure 1, Chapter IV. 1, into such a model. Apparently, a rational expectations model has no scope for exogenous shifts in expectations. All anticipations are based on all available information in connection with the application of the true model. Hence, they are endogenous. Within the framework of our traditional approach, speculative capital flows that are due to expectations of future changes in the money supply would be called exogenous. Within the asset market approach, they are endogenous. But does this affect the destabilising character of those expectations? According to the rational expectations analysis, all expectations are basically stabilising, since they are the best possible prediction of future events. Errors are due merely to a lack of information and are thereby unavoidable. However, this change in the perspective is hardly able to solve the problem of destabilising speculative disturbances. Of course, if those expectations turn out to be correct, than they are not destabilising. However, if they are incorrect, they reveal the same destabilising effects as exogenous speculative disturbances. The question how to identify exogenous destabilising expectations merely turns into the problem how to identify incorrect from correct anticipations. If such disturbances exist, it is no help to define them as "fundamentally stabilising in nature."⁵⁸

⁵⁸Mussa, M., p. 247.

V. Expectations and internal stability.

It is usually argued that flexible exchange rates improve the internal stability of an economy, since they a) allow policymakers to concentrate on internal economic targets, b) improve the efficiency of monetary policies, and c) insulate the economy from external disturbances. The following section focuses on all three arguments with special consideration of the impact of exchange rate expectations.

V. 1. Expectations and the efficiency of monetary policy.

Since R. Mundell's and M. Fleming's analysis of the impacts of monetary and fiscal policies in alternative exchange rate systems has been published, the efficiency of monetary policy has become a major argument for exchange rate flexibility. Mundell argued that, in a world of imperfect capital mobility, flexible exchange rates would provide more efficiency of monetary and fiscal policy with respect to income and employment targets. Assuming perfect capital mobility, however, monetary policy was considered to have no impact on employment in a fixed rate system, whereas fiscal policy has no impacts in a flexible rate system. More important, there is a magnification effect of flexible exchange rates on monetary policy impacts that is due to the effects of exchange rate changes on the current account.⁵⁹ The primary effect of a monetary expansion is a fall in the interest rate that increases domestic demand for output. In addition to this primary effect, the fall in interest rates initiates a capital outflow which induces a depreciation and hence a fall in the relative price level. This shifts the world demand towards

⁵⁹Mundell, R., Chapter 17 and 18.

domestic output and adds a secondary expansionary impact to the primary effect. If capital flows are infinitely elastic with respect to interest rate differentials, the depreciation persists until the initial world interest rate level is restored again (assuming a small home country). This requires that the domestic money income increases proportionally to the money supply.⁶⁰

These results have to be modified if expectations are incorporated into the model. Whether expectations exert a magnifying or dampening effect on the secondary impact of monetary policy depends on their elasticity. Let us begin with the assumption of inelastic expectations [$\frac{dE(e)}{d e} < 1$]. The incipient depreciation, due to the monetary expansion initiates expectations of a future appreciation. Hence, the actual depreciation falls short of the one that would take place in the absence of expectations. This reduces the efficiency of monetary policy.⁶¹ On the other hand, expansionary fiscal policies may become efficient since inelastic expectations dampen the offsetting effect of the increase in interest rates on the exchange rate and current account. In the absence of expectations, this interest rate effect of fiscal policies initiates an appreciation that fully offsets the effect of an increase in governmental expenditures. The appreciation switches private demand towards relatively cheaper foreign goods. A dampening of this appreciation by expectations of a future depreciation allows for a net increase in demand

⁶⁰Fleming, M. p. 374.

⁶¹Argy and Porter, p. 512; Dornbusch, R.: "Exchange Rate Expectations and Monetary Policy," p. 236. Dornbusch's argumentation differs slightly from the one described above. Dornbusch emphasizes the impact of expectations on the interest rate. Speculators allow for a lower domestic interest rate, thereby reducing the velocity of money. This dampens income expansion.

for domestic goods.⁶²

Assume now that expectations are elastic. The effect of monetary policy is reinforced by an overshooting of the exchange rate. The anticipation of a further depreciation leads to speculative capital outflows that actually enforce a further depreciation. This strengthens the shift of world demand towards domestic output. The monetary expansion will actually raise domestic interest rates to offset the expected capital loss on domestic assets.⁶³

The result of an expansionary fiscal policy will be an actual decline in income and employment. Elastic expectations induce the appreciation to overshoot the level, that neutralizes the expansionary effect of increased government expenditures. The domestic interest rate will actually decline to offset the anticipations of further appreciations.⁶⁴

The previous results were based on the assumption of a satisfied Marshall-Lerner Condition. The impact of expansionary monetary policy may, however, actually become contractive, if the current account reacts "perversely" in the short run. In Chapter IV. 2, we discussed the effects of this phenomenon on exchange rates and external stability. It has been argued that exchange rate expectations become the central force of short run exchange rate stabilisation. Nonetheless, the failure of trade balance adjustments gives rise to overshootings that might, in connection with an inelastic import demand, lead to reverse income reactions.⁶⁵ A

⁶²Argy and Porter, p. 516.

⁶³Ibid., p. 513.

⁶⁴Ibid., p. 517.

⁶⁵Niehans, J.: Some Doubts"

monetary expansion initiates a substantial exchange rate depreciation and hence a deterioration of the terms of trade. If the domestic demand for goods does not react to this increase in the foreign relative price level, the domestic expenditures on imports, in terms of domestic currency, will increase. However, the export revenues stay basically constant. This may lead to the actual deterioration of the current account. The partial derivatives of import volume $[M(y, e)]$ and export volume $[X(e)]$ with respect to (e) indicate the condition of a perverse current account reaction.

$$(4.11) \quad \frac{M}{e} - \frac{X}{e} > 0$$

In this case, flexible exchange rates carry no advantage for monetary policy. The deterioration in the terms of trade tends to reduce the domestic real income level. With the normal income still at its original level, individuals might wish to keep their normal aggregate expenditures at the same level too. Since the depreciation has increased the price of foreign goods, the demand for domestic goods has to decline to offset the increased nominal expenditures on imports. This dampens the short run effect of monetary policy. In its extreme, this secondary demand effect overcompensates the primary effect of the fall in interest rates on domestic demand. In this case, monetary policy impacts contractive.

It has been argued, however, that the terms of trade effect is unlikely to reduce only the demand for domestic goods. Instead, the

⁶⁶Ibid, p. 280.

decline in real income would affect import demand too. Since this is excluded by the assumption of inelastic import demand it is more appropriate to assume that the terms of trade effect on real income is compensated by a reduction in savings.⁶⁷ The volume of savings reductions depends on the interest elasticity of the money demand and the elasticity of expectations. The depreciation is larger, the higher the elasticity of expectations and the smaller the interest elasticity.⁶⁸ However, the smaller the interest elasticity, the larger the primary effect of a monetary expansion on domestic demand for domestic output.

In the long run, the permanent rate will adjust to the depreciation and so will the trade balance. The world demand will shift towards domestic products and domestic income will increase.

These results stand in sharp contrast to those of the monetary approach. The full-employment assumption does not allow for long run expansionary effects of monetary policies. If changes in real income are examined at all, they are either transitory short term adjustments or regular growth rates.⁶⁹ In the long run, money supply changes are fully absorbed by proportionate price level changes. In consistency with the quantity theory of money, real magnitudes are considered to be constant.

V. 2. The international transmission of disturbances

This traditional argument for a flexible exchange rate system deals

⁶⁷Dornbusch, R.: "Exchange Rate Expectations and Monetary Policy," p. 239.

⁶⁸Ibid., p. 240.

⁶⁹Dornbusch, R.: "Expectations and Exchange Rate Dynamics," p. 1172, Bilson, J., pp. 80-82.

with its ability to insulate economies from external shocks. The experience of a world wide transmission of inflation rates in the past fixed exchange rate system made many economists call for more exchange rate flexibility. It was argued that a change in the foreign price level would be offset by instant exchange rate adjustments. This extreme version of the purchasing power parity doctrine has been modified in recent years. A more appropriate version of the PPP-doctrine considers the relative movement of domestic and foreign price levels. Exchange rate adjustments are supposed to level out internationally diverging inflation rates, as well as productivity growth rates and relative price structures. The term "relative price structure" here focuses on each economy's price ratio of traded to non-traded goods.⁷⁰

These results change if expectations are incorporated into the model. Assume an increase in the inflation rate of the foreign country. The domestic currency will tend to appreciate in order to level out the inflation rate differential (the relative price change, respectively). Inelastic expectations dampen this adjustment process. The anticipation of a future depreciation initiates a speculative capital outflow that stops the appreciation short of relative price adjustment. The impact of those expectations on domestic income and internal stability has already been discussed in chapter IV. 1. In the case of full employment at home, the subsequent current account surplus pushes up the domestic price level, thereby transmitting the foreign inflation rate into the home country. In contrast, elastic expectations are likely to impact deflationary in

⁷⁰Dornbusch and Krugman, p.

the case of foreign price increases. The overreaction of exchange rate adjustments might actually widen the inflation rate differential. Of course, these results depend critically on "normal" current account reactions. In the short run, given the J-curve effect, inelastic expectations impact deflationary whereas elastic expectations are inflationary. However, since changes in productivity rates or inflation rates tend to persist over longer time periods, long run effects appear to be more important.

Another kind of external shock is provided by fluctuations of the foreign interest rate. Given static expectations, an increase in the foreign interest rate exerts its influence on the home country by creating capital outflows, a depreciation and hence an increase in the domestic income or price level. The depreciation persists until interest parity is restored again. As already mentioned in earlier sections of this paper, these disturbances are dampened by inelastic and reinforced by elastic expectations.⁷¹ To the extent that inelastic expectations insulate the home country from shifts in foreign interest rates, they also hinder the transmission of foreign monetary and fiscal policy effects. Expansive fiscal policies abroad raise the foreign interest rate and create a domestic depreciation that impacts inflationary on the domestic economy. In contrast, expansionary monetary policy lowers the foreign interest rate and impacts deflationary on the home country.⁷² These effects are dampened by inelastic and reinforced by elastic expectations.

⁷¹Chapter IV, 1 & 2, Argy and Porter, p. 515.

⁷²Dornbusch and Krugman, p. 542-548.

V. 3. Independence from external stability targets.

The third traditional argument in favor of flexible exchange rates stresses the point that policy measures can be concentrated on internal stability targets, because external stability will be provided automatically by the exchange rate mechanism. This argument is of considerable importance, since the possibility of simultaneous achievement of internal and external stability is often blocked up by a trade off between both policy goals. However, in the face of past exchange rate experience, this argument loses much of its power. The last decade revealed exchange rate fluctuations that were large enough to make the majority of countries adopt a managed floating system. The new emphasis on external stability targets curtailed the monetary independence. Studies on the optimal stock of a country's international reserves led to the presumption that a system of managed floating might call for even a larger stock of international reserves than it is needed in a fixed rate system.⁷³ The most common explanation of this phenomenon focused on the destabilising impact of expectations. However, our preceding examinations do not approve this supposition. Instead, it seems most likely that the experienced exchange rate volatility is due to the failure of the traditional exchange rate mechanism in the short run. It is the insufficient demand elasticity for imports rather than the existence of speculation that creates exchange rate fluctuations. Nevertheless, it has been found that speculation may exert a destabilising impact, if they are based on exogenous disturbances or incorrect expectations, respectively. However.

⁷³Williamson: "Exchange Rate Expectations and Reserve Use."

monetary or fiscal policies (interest rate policies) that aim to offset these disturbances face the identification problem described in Chapter IV. 3

The asset market approach of exchange rate determination stresses the position that the appropriate monetary policy is one that stabilises monetary expansion. It is argued that the magnification effect of unanticipated monetary shocks provides . . . destabilising fluctuations. Thus, active intervention policy to counter speculative disturbances is considered to be destabilising.⁷⁴ Since this position is consistent with the monetarist proposition of a monetary rule policy to stabilise internal equilibrium, it offers a practicable solution for the circumvention of the trade-off dilemma. However, whether a monetary rule is an appropriate policy measure for the internal stability target shall not be discussed in the framework of this paper.

⁷⁴Bilson, J., p. 84.

VI. Conclusion

The impact of speculations on exchange rate volatility and, hence, external stability depends on a variety of determinants. To begin with, the source of exchange rate expectations is of considerable importance. Exogenous disturbances that lead to temporary shifts in anticipations operate destabilising on exchange rates and real economic variables. In a rational expectations model, such disturbances may appear as predictions that turn out to be incorrect due to insufficient information. Policy makers may try to eliminate those disturbances by interest rate policies that offset speculative premiums and stop destabilising capital flows. However, those intervention policies face the problem of identifying stabilising from destabilising expectations. Only few speculative capital flows can be definitely identified with respect to their theoretical base.⁷⁵ But even in the case of apparently destabilising speculation, it might be more reasonable to renounce on interventions. Frequent and unanticipated changes in the money supply tend to create a magnification effect of monetary policies on exchange rate adjustments. Hence an attempt to stabilise monetary expansion might be the more appropriate policy concept.

Exchange rate expectations that are based on observations of current exchange rate changes may be stabilising or destabilising, dependent on

⁷⁵The recent appreciation of the U.S. dollar in response to a change in the U.S. government may serve as an example for such a speculative disturbance. It has generally been argued that this appreciation was due to the expectations of more restrictive monetary and fiscal policies, as announced within the economic program of this party. However, whether those expectations are a destabilising disturbance or a correct prediction of future changes in the monetary conditions depends on the success of the program. In the latter case, they merely shift future appreciation into the presence (Wilson). Since authorities are not likely to believe in the failure of their policies, they will consider such speculation as correct and stabilising.

their elasticity. Generally, inelastic expectations tend to dampen exchange rate adjustments whereas elastic expectations reinforce fluctuations. However, if we take into consideration that the traditional balance of payments adjustment mechanism fails in the short run, both kinds of expectations turn into a basically stabilising force. This result is approved by the asset market approach. The proponents of this approach also emphasize the relative sluggish reaction of the goods sector with respect to exchange rate changes. Consequently, balance of payments adjustments take place predominantly on the asset market. The asset market approach is based on the relationship between money market conditions and balance of payments. This monetary concept leads to a new interpretation of the linkage between price level and exchange rate. Instead of purchasing power parity considerations, this relationship is the basis for the simultaneous achievement of asset market and money market equilibrium.

The last chapter of the paper dealt with the impacts of exchange rate expectations on internal stability. In particular, the three major arguments for a flexible exchange rate system were examined. The efficiency of monetary policy with respect to internal targets may be improved or deteriorated, dependent on the elasticity of expectations. Inelastic expectations dampen exchange rate adjustments and reduce the magnifying trade balance effect of a flexible exchange rate system. Elastic expectations improve this effect. Nonetheless, in the short run, the trade balance may react perversely so that the total effect of monetary policy will actually be reversed. This negative result, however, is due to an inelastic import demand rather than any kind of speculation.

From the point of view of the asset market approach, monetary policy is merely inflationary. In the long run, an expansionary monetary policy will induce a proportionate increase in prices, exchange rates and money supply. The effect of expectations on the international transmission of disturbances depends on the type of disturbance and the elasticity of expectations. Inelastic expectations reinforce the transmission of foreign price changes, but dampen the impact of foreign interest rate changes on the domestic economy. Elastic expectations operate in the opposite way.

Finally, the independency of monetary policies from external stability targets has been discussed. Our previous findings proved that only part of the observed volatility of exchange rates is due to expectations. Other sources of instability are the insufficient speed of trade balance adjustments as well as interest rate fluctuations. Since the observed volatility of flexible exchange rates is considered to hinder international trade, monetary authorities generally feel bound to pursue stabilising policies. Thus they give up part of their independency. However, this is not merely due to destabilising speculation.

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SPECULATION IN A FLEXIBLE EXCHANGE RATE SYSTEM

by

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Abstract:

This paper focuses on current developments of the theory of exchange rate determination with particular emphasis placed upon exchange rate expectations and speculative capital flows. Following the introduction, chapter two gives an outline of the earlier discussion on the stabilising or destabilising character of expectations with regard to the exchange rate fluctuations observed in the 1920's. It focuses on the fundamental problems of the studies on this subject and gives some basic definitions.

In Chapter III, the theoretical framework of the particular approaches employed in this paper will be developed. The introduction of speculative capital flows turns the traditional one-sided relationship between exchange rates and capital flows into a reciprocal causality. Traditionally, capital flows cause exchange rate adjustments, not vice versa. Now exchange rate changes create expectations of exchange premiums on capital assets which initiate speculative capital flows. The second part of this Chapter introduces alternative hypotheses concerning the formation of exchange rate expectations.

Chapter IV examines the effects of expectations on exchange rate determination in detail. Three different approaches have been chosen: the traditional Mundell/Fleming approach, the so-called J-curve approach that goes back to A. J. C. Britton and J. Niehans, and the "asset market" approach that has been derived from the monetary approach to the balance of payments.

These studies show that the stabilising character of expectations, with regard to exchange rate volatility, is mainly dependent upon the "elasticity" of expectations with respect to changes in the current

rate, and the satisfaction of the Marshall-Lerner condition. Whereas only elastic expectations impact destabilising in the case of normal trade balance reactions, all types of expectations turn into a basically stabilising force if the model allows for reverse current account reactions in the short run (J-curve-effect). Section IV, 2 ends with a complex mathematical model that deals with both alternative approaches and incorporates explicitly the previously described alternative expectation formation hypotheses.

The asset market approach, outlined in section IV. 3 is based on a different theoretical concept. However, since it adopts the assumption of a sluggish reaction of the goods market with respect to exchange rate changes, it comes to basically the same conclusion as the J-curve approach: expectations appear to be stabilising rather than destabilising.

Chapter V examines the impact of exchange rate expectations on internal stability. Three major arguments in favor of flexible exchange rates are examined with respect to our previous findings. It is shown that the independence of monetary policies from external stability targets is restricted by the failure of the exchange rate mechanism rather than by destabilising expectations. The same conclusion is derived for the efficiency of monetary policy with respect to internal targets. Finally, it is shown that the insulation of the domestic economy from external shocks depends upon the elasticity of expectations.