

The Monetary Model of Exchange Rates in the History of Economic Thought

Imad A. Moosa* and George Towadros

This paper traces the origin of the monetary model of exchange rate determination to three controversies surrounding three events in the European economic history. These events are the 1745 shift by Sweden to currency inconvertibility, the suspension of the convertibility of the pound during the Napoleonic wars, and the German hyperinflation of the 20th century. While the first controversy gave rise to the linkage between some forms of the quantity theory of money and purchasing power parity, the second controversy led to the refinement and development of these concepts. The third controversy introduced the role of expectations in the monetary model.

Introduction

John Hicks (1967) has put forward the argument that advances in monetary theory are stimulated by particular historical events involving severe monetary upheavals. This argument seems to be valid for the monetary model of exchange rate determination which is normally attributed to some Chicago economists, such as Frenkel (1976), Mussa (1976) and Bilson (1978). However, the origin and evolution of the monetary model can be traced back to a succession of policy debates initiated by episodes of currency depreciation and price instability following the suspension of the convertibility of paper currencies into gold. The central issue in these debates was (and still is) the alleged causes of exchange rate movements: two opposing schools of thought (the monetary school and the non-monetary balance of payments school) envisaged different exchange rate determination mechanisms and different causal scenarios.

Generally speaking, the monetary school attributes exchange rate movements solely to the actual and anticipated changes in the relative money supply. This school stresses a channel of causation running from the money supply to domestic prices to the exchange rate. In contrast, the balance of payments school attributes movements in the exchange rate solely to autonomous non-monetary (or real) disturbances to particular components of the balance of payments. It envisages a causal effect running from real factors through the balance of payments to the exchange rate to domestic prices, and sometimes even to the money supply. Although the differences between these two rival schools of thought are well understood, it is not fully appreciated that the current debate between them is largely a repetition of earlier debates emerging more than 200 years ago.

The emergence and evolution of the monetary model of exchange rate determination can be traced back to three early controversies: (i) the Swedish bullionist controversy of the 1750s; (ii) the English bullionist controversy of the early nineteenth century; and (iii) the German inflation controversy during and immediately following World War I (Myhrman, 1976). These debates contributed greatly to the evolution of the monetary model of exchange rate determination. Each successive debate added a new dimension to that

evolutionary process of the model, consolidating and building upon the developments of earlier stages which laid the foundations for subsequent developments. This paper traces the historical evolution of the monetary model of exchange rate determination through the Swedish, English and German debates, and outlines the contributions of each debate to the development of the model.

The Swedish Bullionist Controversy (1755-65)

It is arguable that the earliest debate contributing to the development of the monetary model of exchange rates was the Swedish bullionist controversy of the mid-1700s. In 1745, Sweden shifted from a metallic monetary system with fixed exchange rates to an inconvertible paper system with flexible exchange rates. The suspension of convertibility was followed by sharp increases in the price of commodities and foreign exchange more than ten years later. A debate arose between the two main political parties of the time, the so-called Hats and Caps, about the cause of these price increases.

The Hats advocated the balance of payments view, blaming both the external and internal depreciation of the Swedish mark on Sweden's adverse trade balance. Specifically, they held the view that the adverse trade balance had produced a depreciating currency, that this depreciation had rendered imported goods more expensive, and that the rise in import prices had spread to the rest of the economy, thereby leading to a rising general price level. This line of reasoning clearly shows that the balance of payments view attributes both domestic inflation and currency depreciation to external real disturbances. This view postulates a process of causation running from the exchange rate to prices, rather than from money to prices to the exchange rate, as in the monetary view. The Hats did not say anything about a monetary cure; instead they advocated export promotion and import restriction policies as remedies for inflation and currency depreciation. The opposition Caps party categorically denied the Hats' balance of payments view. Instead, they highlighted the importance of the monetary factor. They blamed both the domestic inflation and external depreciation of the currency on the central bank's (Riksbank's) excessive issuance of banknotes following the suspension of convertibility. Hence, they advocated a policy of monetary contraction to force prices and the exchange rate back to pre-inflation levels.

Pehr Niclas Christiernin, a participant in the Swedish debate, articulated the monetary view by advancing a quantity theory explanation of the transmission mechanism linking money to exchange rates.¹ Christiernin (1761) maintained that the primary cause of currency depreciation was an excessive issuance of banknotes by the Riksbank, and that causation ran from money (via spending) to all prices, including the prices of commodities and foreign exchange, the latter being the exchange rate. He put forward the view that monetary expansion stimulated demand, exerting upward pressure on prices in domestic commodity markets. Moreover, the effect of the monetary expansion was reflected on the current account of the balance of payments through increased demand for imports. The resulting deficit, hence, led to a depreciating currency. Clearly, money-induced changes in total spending constitute the driving force in Christiernin's version of the transmission mechanism, linking the money supply and the exchange rate in a causal relationship running from the former to the latter. This feature has been a component of the monetary model of exchange rate determination ever since.

The only aspect missing from Christiernin's analysis is the unambiguous treatment of the real balance effect, whereby the exchange rate equates money demand and supply by deflating the latter to the level that people wish to hold. Except for this, his analysis comprises all of the standard components of the monetary model. He postulated that an

excess supply of money must be matched by an excess demand for goods, an incipient current account deficit, and a corresponding excess demand for foreign exchange, all of which exert an upward pressure on the exchange rate (measured as the domestic currency price of one unit of the foreign currency). Furthermore, he argued that the resulting rise in the exchange rate would simultaneously clear the foreign exchange market, eliminate the incipient current account deficit, and raise the domestic price level, the latter being linked to the given world price level via the exchange rate. Finally, he realised that the exchange rate tended to its equilibrium level when the real value or purchasing power of either currency was the same, whether spent at home or converted into foreign exchange at the equilibrium rate and spent abroad. As such, he articulated some form of the purchasing power parity doctrine.

What he did not make explicit, however, was that the exchange rate restores equilibrium by deflating the real value of the actual money supply to the level that people desire to hold. In so doing, it eliminates the excess money supply that is the sole cause of excessive spending and the resulting current account deficit that puts upward pressure on the exchange rate. It should be noted, however, that his exposition of the transmission mechanism linking money with the exchange rate implicitly embodies the operation of a real balance effect. Thus, while not stated explicitly, a real balance effect is implicit in Christiernin's work.

To stabilise the exchange rate, Christiernin was opposed to the Caps' plan of restoring the exchange rate to its pre-inflation level through monetary contraction. His opposition stemmed from his belief that prices adjusted sluggishly downwards in response to deflationary pressures, so that the monetary contraction required to restore the exchange rate to parity would result in a decline in output and employment rather than the desired price reductions. As a result of this line of reasoning, he advocated a policy of stabilising the exchange rate at a level established during the inflationary period. Unfortunately, his advice was ignored, and the Caps implemented a deflationary policy that resulted in the very reduction in output and employment that he had anticipated (Eagly, 1971).

The English Bullionist Controversy (1797-1819)

The monetary and balance of payments theorists clashed again in the famous controversy over the cause of the depreciation of the pound following the Bank of England's suspension of the convertibility of banknotes into gold during the Napoleonic wars.² One side blamed currency depreciation on the central bank's excessive issuance of notes, while the other blamed it on a deteriorating balance of payments. This time, however, the proponents of the monetary view were known as the bullionists, while the advocates of the balance of payments view were known as the antibullionists.

... The bullionists did more than any group to develop and refine the monetary model of exchange rate determination. Their position, however, was not as homogenous as some interpretations would imply. In particular, they can be divided into two distinct groups known as the strict and moderate bullionists. The strict bullionists developed the monetary model of exchange rate determination in its most rigorous form, while the moderate bullionists refined the model and extended it. The strict bullionists included Walter Boyd, David Ricardo and John Wheatley, while the moderate bullionists included William Blake, William Huskisson, Thomas Malthus and Henry Thornton. These writers contributed heavily to the development of the monetary model, adding new components to the foundations that had been laid before them.

The Strict Bullionists: Ricardo and Wheatley

The strict bullionists were the first economists writing in the English language to specify both the quantity theory and purchasing power parity links in the transmission mechanism relating the supply of money to the exchange rate. Their brilliant exposition far surpassed Christiernin's (1761) work which was unknown to them. Furthermore, they stated the monetary model in its most unyielding form, postulating that, under conditions of inconvertibility when demand cannot drain out into foreign trade, the exchange rate varies in exact proportion with changes in the money supply.

Ricardo and Wheatley, amongst others, arrived at their conclusion by putting forward a number of hypotheses. First, they assumed that under inconvertibility, domestic prices, P , varied in direct proportion with the quantity of money in circulation, M . Assuming that the neutrality of money holds, a crude version of the quantity theory of money can be written as

$$P = kM \quad (1)$$

where k is a constant equal to the ratio of the velocity of circulation to real output.³ The bullionists assumed that both of these variables are constant.

Second, they maintained that under inconvertibility, the exchange rate, S , moves in proportion to the ratio of domestic to foreign prices, P/P^* where P^* is the foreign price level. First enunciated by Wheatley (1803) and endorsed by Ricardo (1817), this proposition is the famous purchasing power parity doctrine, a term that was coined by Gustav Cassel (1918) who rediscovered it more than one hundred years later. The purchasing power parity condition is expressed as

$$S = P/P^* \quad (2)$$

implying that the purchasing power of money is the same when converted into a common unit at the exchange rate.

Third, they assumed that the foreign price component of the purchasing power parity ratio, P^* , was a constant equal to the given world bullion price of commodities. Given this assumption, the exchange rate is expressed as:

$$S = P \quad (3)$$

assuming that the foreign price level is set to be equal to unity. Due to the unavailability of general price indices, the classical economists used the paper money price of bullion as a proxy for the general commodity price level. They interpreted a rise in the market price of gold above its mint price as a measure of the fall of the internal purchasing power of money.

Finally, they substituted the exchange rate proxy for the price variable in the quantity theory relationship, obtaining the equation

$$S = kM \quad (4)$$

which states that the exchange rate varies in exact proportion with the money supply. On this basis, they were able to conclude that a rise in the exchange rate above its gold parity constituted the proof needed to show that the inconvertible currency was in excessive issuance. Thus, an exchange rate standing 10 per cent above its gold parity indicates that the issuance of notes was 10 per cent above what it would be under convertibility. As Ricardo (1817, p 151) stated:

"If a country used paper money not exchangeable for specie, and, therefore, not regulated by any fixed standard, the exchanges in that country might deviate from par in the same proportion as its money might be multiplied beyond that quantity which would have been allotted to it by general commerce, if...the precious metals had been used".

Wheatley extended the analysis to allow for the case where two countries are on an inconvertible paper standard. He simply substituted the quantity theory relationships for both the domestic and foreign prices in equation (2). This implies that the exchange rate varies in proportion with relative money supplies, that is

$$S = \frac{kM}{k^*M^*} \quad (5)$$

where $P = kM$ and $P^* = k^*M^*$.

A further contribution made by the strict bullionists was their assertion that movements in the exchange rate are a purely monetary phenomenon. They rejected the antibullionist claim that real disturbances to the balance of payments were responsible for the depreciation of the pound during the Napoleonic wars. The strict bullionists denied the proposition that such factors could influence the exchange rate, even in the short run. They postulated that the slightest upward pressure on the exchange rate would make British goods cheaper to foreigners, resulting in an instantaneous expansion of exports. In their view, an adverse exchange rate was caused solely by an excessive issue of currency. Ricardo (1817) went so far as to argue that even if real factors did affect the exchange rate by reducing real income and hence, the demand for money, the cause of the depreciation is still an excess supply of money, one arising from a reduction in money demand rather than an expansion in the money supply. Ricardo's proposition was simply that real factors could affect the exchange rate only through shifts in money demand not accompanied by corresponding shifts in the money supply. The notion that all factors affecting the exchange rate must do so through the demand and supply of money is central to the modern monetary model of exchange rate determination.

Finally, the strict bullionists advocated monetary restraint as the only policy for a depreciating currency. They put forward the view that a rise in the domestic price of foreign currency provided *prima facie* evidence for the existence of excess supply of the currency. An appropriate response would, therefore, be a monetary contraction.

The Moderate Bullionists: Blake and Thornton

The moderate bullionists refined the strict bullionists' analysis in three ways. They asserted that the analysis carried out by the strict bullionists was valid in the long run, but not necessarily in the short run. And while recognising that persistent domestic currency depreciation resulted solely from excessive note issuance, they were willing to admit that real shocks could affect the exchange rate in the short run. This is best illustrated with William Blake's (1810) distinction between the real and nominal exchange rates, or what modern economists refer to as the terms of trade and the purchasing power parity condition.

According to Blake, the real exchange rate, R , is determined by non-monetary factors that affect the balance of payments. The nominal (unobserved) exchange rate, N , however, reflects the relative purchasing powers of different currencies as determined by the ratio of the money stocks, M/M^* .⁴ Blake's (1810) analysis can be summarised by the equation

$$S = NR \quad (6)$$

which expresses the observed exchange rate, S , as the product of its real and nominal components. As Blake (1810, p 86) states:

"...the real exchange depends on the proportion between the foreign payments which a country has to make, and the payments it has to receive. The nominal exchange depends on the comparative value of the currencies. The real exchange has an immediate effect on exports and imports. The nominal exchange, whether

favourable or unfavourable, has no effect whatever upon exports and imports. The real exchange cannot be permanently favourable or unfavourable, whatever be the state of the currency. The nominal exchange may continue for any length of time favourable or unfavourable provided the value of the currency continues to be depreciated. Now the computed exchange depends upon the combined operation of the real and nominal exchange".

On this basis, Blake assumed that the real and nominal exchange rates contributed to exchange rate movements in the short run. However, he postulated that in the long run, the real exchange rate returned to its equilibrium level, so that only the nominal exchange rate could remain permanently depressed. As such, persistent currency depreciation resulted solely from an excess issue of currency.

The contribution made by Henry Thornton was much more subtle and sophisticated than that of the strict bullionists (O'Brien, 1975). Specifically, he argued that interest rates and the velocity of money entered into the causal relationship, that the velocity of money was extremely volatile in the short run owing to shifts in business confidence, and that this volatility obscured the rigid money-price-exchange rate link postulated by the strict bullionists. In terms of equation (4), he claimed that k was a variable determined by the interest rate, i , and the state of business confidence, c , that is

$$k = k(i, c) \tag{7}$$

Since k varies in the short run, the exchange rate and money supply do not exhibit equal proportionate movements. A given change in the money supply affects k as well as the exchange rate. In the long run, however, k is a constant so that the neutrality postulate holds. Apart from an expectations element, the bullionists had assembled and integrated all the elements of the monetary model of exchange rate determination.

The Antibullionists

The antibullionists attributed currency depreciation and domestic inflation solely to real factors operating through the balance of payments. They asserted that the exchange rate was determined by the demand for and supply of foreign exchange, resulting from external transactions. However, they failed to see that a major factor affecting demand and supply could be relative price levels, as determined by the relative money supply. Moreover, they rejected all monetary explanations, claiming that monetary factors could not affect the exchange rate. They argued that the exchange rate could rise indefinitely without indicating an excessive money supply. Accordingly, they prescribed import reduction as a cure for the balance of payments problem.

The antibullionists employed the real bills doctrine in an unsuccessful attempt to disprove the proposition that the Bank of England had over-issued the pound. The real bills doctrine states that excess issue of money can never take place as long as the money supply is tied to bills of exchange arising from real transactions in goods and services. In other words, the doctrine postulates the impossibility of overissue, provided that the money supply is tied to loans made specifically for productive purposes.

The fallacy of this doctrine, however, was exposed when Henry Thornton argued that rising prices would require an increasing value of bills to finance the same level of real transactions. On this basis, inflation would justify the monetary expansion needed to sustain it, and the real bills doctrine would not effectively limit the quantity of money in existence. The invalidity of the real bills doctrine constituted a victory for the bullionists, and for the monetary model as a whole. The victory, however, was not decisive, for when the debate erupted again during World War I, the balance of payments view emerged as the

dominant paradigm in government circles, thus setting the stage for the third debate which we discuss next.

The German Inflation Controversy (1918-23)

The debate regarding the causes of exchange rate movements was reignited when Cassel (1918) used the purchasing power parity doctrine, along with the quantity theory of money, to challenge the balance of payments explanations of the wartime depreciation of the German mark. Whereas policy makers attributed currency depreciation to real disturbances emanating through the balance of payments, Cassel (1918) blamed it on excessive monetary expansion in Germany as compared to that of its trading partners.

Cassel's (1922) criticism of the balance of payments view was virtually the same as that of his British counterparts of more than one hundred years earlier. Like Wheatley and Ricardo, he argued that the exchange rate was automatically self-correcting in response to real shocks in the balance of payments. His view was that the exchange rate tended to return quickly to its equilibrium path as depicted by purchasing power parity. Since real disturbances have no lasting impact on the exchange rate, they cannot be the source of persistent exchange rate movements. Thus, the balance of payments view, which considers the impact of external real shocks, is incapable of accounting for sustained currency depreciation, such as that experienced by the German mark during World War I.

Cassel (1922) noted that when a balance of payments disturbance pushes the domestic value of a currency above its foreign value, the currency becomes devalued, that is, its domestic purchasing power is greater than what is indicated by the exchange rate. Such a devaluation will invoke forces pulling the exchange rate back to equilibrium as foreigners find it profitable to purchase the currency to buy goods and services from that country. The resulting increased demand for the currency (and for the goods and services denominated in the same currency) will lead to a convergence of the exchange rate on the level consistent with purchasing power parity. In short, deviations of the exchange rate from its purchasing power parity generate corrective mechanisms that eliminate the deviations. As a result, both the balance of payments and the exchange rate return to equilibrium.

On the strength of this argument, Cassel (1922) asserted that any persistent devaluation must be due to an excessive monetary growth that raises domestic prices and thereby alters the purchasing power parity or equilibrium exchange rate itself. In this context, Cassel (1922) had simply repeated Ricardo's (1817) dictum, that an excess supply of money, whether stemming from a rise in the money supply or a fall in money demand, is always the cause of exchange rate movements. Moreover, Cassel criticised the proposition that currency depreciation causes domestic inflation rather than the inverse of this causal relationship. He acknowledged that currency depreciation relative to purchasing power parity results in increasing import prices. Yet, he refuted the notion that these import price increases could be transmitted to the general price level, provided that the supply of money (and hence total spending) were controlled. He maintained that, given monetary stability, the rise in import prices would be offset by compensating reductions in other prices, leaving the general price level unchanged. In short, he did not accept the hypothesis that causation ran from the exchange rate to domestic prices.

The German Hyperinflation and the Causality Debate

Despite Cassel's (1922) vigorous assault, the debate did not go into depth until the post-war hyperinflation period of the early 1920s. During this period, the mark price of

foreign exchange escalated to multiples of its pre-war level. Advocates of the monetary view emphasised the explosive growth of the money supply as the causal factor. Proponents of the non-monetary view, however, attributed currency depreciation to the adverse balance of payments arising from the burden of reparation payments combined with Germany's fixed need for imports and inability to export. In their view, money had nothing to do with the depreciation of the mark. They claimed that causation ran from a depreciating currency to rising import prices to rising domestic prices to increased demand for money that requires an accommodating increase in the money supply.

Regarding the increase in the money supply, they claimed that the exchange rate induced a rise in prices which created a need for money on the part of businesses, and that it was the Reichsbank's duty to meet this need. Far from viewing currency expansion as the source of inflation, they argued that it was the solution to the shortage of money caused by escalating prices. The German proponents of the balance of payments view, however, pushed this argument too far. In 1923, when the Reichsbank was already issuing currency in denominations of as high as 100 trillion marks, Rudolph Havenstein, the president of the Reichsbank, claimed that the installation of new high speed currency printing presses would help overcome the money shortage. Citing the real bills doctrine, he refused to believe that the Reichsbank had over issued the currency. He also unequivocally denied that the Reichsbank's discount rate of 90 per cent was too low, even though the market rate on short-term loans was 7,300 per cent per year.⁵

The German inflation controversy contributed the last of the three major elements of the monetary model. The English bullionists had already established the quantity theory of money and purchasing power parity components. All that remained was the inclusion of the expectations element, linking anticipations of future money supplies with the current exchange rate. This development was undertaken during the hyperinflation debate when the monetary school sought to explain why the dollar/mark exchange rate rose faster than the German money supply. According to the strict quantity theory and purchasing power parity doctrines, the two variables should rise at approximately the same rate. Their failure to do so was taken by the balance of payments school as constituting evidence for the failure of the monetary model.

Advocates of the monetary view, however, rescued the monetary model of exchange rate determination from this criticism by explaining the disparity between the rise in the exchange rate and the growth in the money supply using the phenomenon of market expectations. Their contention was that, in disequilibrium, the exchange rate is influenced by the expected future exchange rate (that is, the anticipated purchasing power parity), which depends on prospective price levels, the latter being determined by expected money supplies. To reach this conclusion, they argued that exchange rates are determined by relative money supplies and demands and that relative money demands depend upon the expected future rate of change of the exchange rate. The latter, according to the argument, depends upon expected future inflationary monetary growth which is based on predictions of future monetary policies. On the basis of these considerations, they concluded that an expected future depreciation of the domestic currency would shift demand from the domestic to the foreign currency, thereby causing the exchange rate to rise faster than the supply of money. In other words, assuming non-inflationary policies abroad, expectations of inflationary domestic monetary policies would induce a drop in the demand for domestic currency relative to foreign currency, giving rise to additional pressure on the exchange rate.

In this way, currency depreciation stems not only from a rise in the money supply but also from an expectations-induced fall in money demand. This drop in money demand magnifies and reinforces the impact of current monetary growth in the exchange rate, in which case it would rise faster than the money supply. Ludwig von Mises (1923)

enunciated this view, claiming that inflationary monetary growth, by generating expectations of future inflation and future currency depreciation, would result in a flight from the mark to foreign currencies, thereby bidding up the exchange rate relative to the money supply. In stating this, he anticipated the rational expectations hypothesis, according to which exchange rate expectations are formed in such a way as to be consistent with the way whereby the exchange rates are actually determined in the economy, that is through money supply and demand.⁶

Similarly, other members of the German monetary school insisted that the exchange rate reflected not only current monetary conditions, but also expectations of future monetary conditions (Ellis, 1934). In essence, they claimed that people form their exchange rate expectations from predictions of future monetary conditions resulting from future monetary policies. These predictions, they asserted, are derived from all available information, including the observed behaviour of the policy-making authorities, particularly the responses in monetary and fiscal policies to large budgetary commitments, such as reparation payments. These observations yield information about the authorities' policy strategy, which people use in predicting future policy actions affecting the money supply and the exchange rate. As von Mises (1923, p. 25) states, the exchange rate "is affected only by changes in the relation between the demand for, and quantity of, money and the prevailing opinion with respect to expected changes in that relationship, including those produced by governmental monetary policies". In the case of Germany, the policy makers were already demonstrating a strong tendency to finance reparations with budget deficits and excessive monetary growth. People expected this policy to continue in the future, and these expectations were embodied in the exchange rate.

As a result of the German monetary school's definitive critique of the rival balance of payments assertions, the hyperinflation debate produced a monetarist rational expectations analysis of exchange rate determination. Hence, the last major element of the monetary model emerged.

Summary and Conclusion

The monetary model of exchange rate determination is normally attributed to contemporary Chicago economists such as Frenkel (1976), Mussa (1976) and Bilson (1978). This model has three constituent components: the quantity theory of money, purchasing power parity and expectations. This paper has demonstrated that these components have emerged as a result of controversies surrounding three major events. These events are the 1745 shift by Sweden from a metallic monetary system to an inconvertible paper money system; the Bank of England's suspension of the convertibility of banknotes into gold during the Napoleonic wars; and the German hyperinflation of World War I and later. These controversies typically involved the contrasting views of the monetary school of thought and the balance of payments school of thought. Who was right and who was wrong, however, is not a question that this paper meant to answer.

* The corresponding authors' Address: School of Business, La Trobe University, Bundoora, Victoria 3083, Australia. Fax: (3) 9479 1654. E-mail: i.moosa@latrobe.edu.au We would like to thank two anonymous referees for their encouraging response to and comments on the paper.

Notes

¹ On Christiernin, see Eagly (1971).

² On the English bullionist controversy, see O'Brien (1975) and Viner (1965).

³ Some economists believe that early versions of the quantity theory of money appeared in the 17th century (see, for example, Bordo, 1989). We must make it explicit here that we do not want to give the impression that the quantity theory is attributed exclusively to Christiernin or the bullionists. Rather, our emphasis is on the linkage between the quantity theory and purchasing power parity that has led to the emergence of the monetary model of exchange rates.

⁴ Blake's use of the word "nominal" is very unusual. In the contemporary literature, the "nominal" exchange rate is the same as what Blake calls the "observed" exchange rate. *S.* The "nominal" exchange rate, according to Blake, is actually equivalent to the equilibrium level indicated by purchasing power parity.

⁵ On the German hyperinflation and causality debate, see Ellis (1934) and Yeager (1976).

⁶ In this respect, von Mises argued that since actual exchange rates are determined by money stocks per unit of real money demands, it follows that expected future exchange rates are determined by the expected future values of those same monetary variables. These expectations, in turn, depend primarily on predictions of future monetary policies. This is essentially an early statement of the rational expectations hypothesis, according to which exchange rate expectations are consistent with the way whereby the exchange rate is determined in the monetary model.

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