Orthodox approaches to exchange rate determination: a survey

The single most important development in international economic relations since World War II has been the exponential growth of international capital flows. By any standard, such transactions are now, far and away, the most numerous of all those that take place across national boundaries. As a consequence, they are also the dominant force in determining the demand for foreign currency (Harvey, 1991, 1993a, 1993b; Krause, 1991; Schulmeister, 1987; Shelton, 1994, p. 88).

Over the same period, neoclassical economists have expressed increasing frustration over their failure to explain exchange rate movements (Dornbusch, 1987; MacDonald and Taylor, 1992, 1989; Pentecost, 1993; Visser, 1989). Despite the fact that this is one of the most well-researched fields in the discipline, not a single model or theory has tested well. The results have been so dismal that mainstream economists readily admit their failure.

It is the premise of this paper that these two developments, the growth of the international capital market and the inability of the orthodox school to explain exchange rates, are related. The former has led to a situation in which the market for foreign currency, like Keynes’ stock market, has become dominated by speculative activities (Keynes, 1964, pp. 147–164; Harvey, 1993a, 1993b, 1991; Krause, 1991; Schulmeister, 1987). Because neoclassical models have been slow to take this development into account, relying instead on the notion that some set of “fundamental factors” determines rates, the empirical performance of their models has been extremely poor.

The paper proceeds as follows: First, there is a brief description of the growth of capital flows in international transactions. Next, the two most
popular mainstream exchange rate models, the monetary and portfolio-balance approaches, plus several related theories and methods are surveyed. Finally, conclusions and generalizations are drawn.

The growth of capital flows

Since the end of World War II, the role of capital in international transactions has increased dramatically. Despite attempts to control such flows in the Bretton Woods system, the Eurodollar market was born in the late 1950s (Harvey, 1995, pp. 5–6). By the early 1970s, Eurocurrency markets were a large enough factor in the determination of exchange rates to play a major role in the collapse of Bretton Woods (Bell, 1973, pp. 91–92). Since 1973, various factors have played a role in continuing and accelerating the growth of capital markets until they have become the dominant force in exchange rate determination. Andrew Walter gives a striking description of the state of the international economy today:

The value of world trade in 1988 amounted to more than $3 trillion, compared with US GDP in that year of $4.8 trillion. Though accurate figures are difficult to obtain, in 1986 the London Eurodollar market, virtually unregulated by public authorities, was reckoned to turn over the equivalent of $300 billion per day, or about $75 trillion per year. . . .

Another indication of the extent to which capital flows have come to dominate and become increasingly separated from trade-related payments is the size of foreign exchange market transactions. An April 1989 study estimated that daily turnover in London, New York and Tokyo was $187 billion, $129 billion, and $115 billion respectively. The great majority of these transactions, perhaps 90 percent or more, are unrelated to current account flows. . . .

Since the total foreign exchange reserves of central banks were almost $800 billion by mid-1990, it is clear that the international interbank market easily dominates the official sector. Central bank reserves are less than the equivalent of two days’ turnover in the world’s foreign exchange market. [Walter, 1991, pp. 196–198]

In the light of this dramatic evidence, it is not surprising that exchange rate research has led economists further and further toward explanations of exchange rates that focus on the capital account. The progress, however, has been neither straight nor swift.
Popular approaches to exchange rate determination

The two most popular approaches to exchange rate determination are the monetary approach and the portfolio balance model. Elements of the currency substitution model are sometimes included in the portfolio balance approach, so that they share many of the same problems.

The monetary approach

The monetary approach to exchange rate determination evolved directly from the monetary approach to the balance of payments. It has at its core three simple assumptions:

1. Wages and prices are perfectly flexible.
2. The demand for money is stable.
3. Purchasing power parity always holds.

While the first two are important, the third is crucial. For all intents and purposes the monetary approach to exchange rate determination is little more than purchasing power parity.

The simple version of the monetary approach model yields:

\[ S = \frac{M/M^*}{(ky/k^*y^*)}, \]

where \( S \) is the exchange rate (domestic currency units per foreign currency unit), \( M \) is the supply of money, \( y \) is real income, \( k \) is the ratio of desired nominal money balances to nominal income, and asterisks denote foreign variables. In practice, equation (1) is often estimated as:

\[ s = (m-m^*) + \eta(y^*-y) + (k^*-k) + \varphi(i-i^*). \]

In equation (2), \( s \) is the exchange rate, \( m \) is the supply of money, \( y \) is real income, \( k \) is the ratio of desired nominal money balances to nominal income, \( \eta \) is the income elasticity of demand for real money balances, \( \varphi \) is the interest-rate elasticity of the demand for money, and asterisks serve the same purpose as above. The variables \( s, m, y, k, \) and \( i \) are in log form (Levich, 1985, pp. 1008–1009). The primary difference between the simple theoretical version and the empirical version (other than the functional form) is that the latter includes a provision for interest rate differentials.

In either case, the key to understanding how the exchange rate is

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1 I omit the Mundell-Fleming, Dornbusch, and currency substitution models on the grounds that they are infrequently used (especially the first) (Pentecost, 1993).
determined is purchasing power parity. While it appears that equation (1) explains the price of foreign currency in terms of the supply of and demand for money and the level of real income, in fact, the monetary approach defines the exchange rate as equal to the ratio of the domestic and foreign price levels. Equation (1) results from solving the Cambridge equation for the price level in each economy and then substituting that into the purchasing power parity equation. The variables M, k, and y appear because they are used to determine the price levels in the respective domestic macroeconomies. Then these price levels are used to determine the exchange rate. The monetary approach to exchange rate determination is, therefore, the monetarists’ domestic macro model with purchasing power parity added.

This fact helps explain the poor empirical performance of this monetary model (MacDonald and Taylor, 1992, 1989; Visser, 1989; Levich, 1985). Even without raising questions regarding the domestic portion of their model, history has not shown that exchange rates typically reflect purchasing power parity (Giovannetti, 1992). Moreover, the addition of purchasing power parity to the monetary model does not take the most important international transaction, capital flows, into account. The prices used for the calculation of purchasing power parity are those set in the markets for goods and services, not financial assets. The model implicitly assumes that the price of foreign currency is somehow derived from the international market for goods and services under the assumed “law of one price.” Given the empirical evidence, it cannot be said that this is a reasonable abstraction.

The monetary model actually tested usually bears more resemblance to equation (2), which includes measures of the domestic and foreign rates of interest. These rates are set in financial markets, and accordingly appear to make some concession to the fact that capital flows are important in the determination of rates. But interest rates are used to account for the possibility of an asset demand for cash; thus, their only direct effect is on the ratio of the demand for nominal money balances to nominal income (and, through that, price levels and then the exchange rate).

In the international capital market, rising domestic interest rates (ceteris paribus) make domestic interest-denominated assets more attractive to domestic and foreign investors. This causes a domestic currency appreciation as investors adjust their portfolios. A rise in U.S. interest rates therefore “causes” a dollar appreciation. In the monetary model, however, this would not be the outcome. Instead, a rise in the
U.S. rate of interest would lower the asset demand for cash, creating an excess supply of money. That in turn causes a rise in prices, followed by a depreciation of the dollar. Hence, the monetary model predicts that the effect of movements in interest rates should be precisely the opposite of what is observed and expected in the real world.

In sum, the monetary model is a derivative of purchasing power parity. It makes no provision for the role of the capital market in determining exchange rates. Even when a financial variable, the rate of interest, is included, its role is limited to how it might affect the prices of goods and services (through the demand for money).

The model has not performed well empirically. It has been described as “explain[ing] the facts only very weakly” (Copeland, 1989, p. 174), “mixed” (Akhing, 1989, p. 924), “fail[ing] to match the out-of-sample forecasting performance of a simple random-walk model” (Schinasi and Swamy, 1989, p. 376), and “dismal” (Baillie and Seloever, 1987, p. 49). Despite this, it remains very popular. This is no doubt because of its simplicity and intuitive appeal, plus the fact that it confirms the free-market bias held by many of its proponents.

The portfolio balance approach

Another popular approach to exchange rate determination is the portfolio balance model. It recognizes that explaining exchange rates necessitates explaining international capital flows.

The portfolio balance approach assumes that investors have three choices of assets: domestic currency, domestic bonds, and foreign bonds. It further assumes that domestic bonds are imperfect substitutes for foreign bonds and that, therefore, the rate of interest each yields can differ. The simplest version of the model involves a small country where domestic residents may own foreign bonds, while foreigners do not hold domestic bonds.

Under these circumstances nominal wealth would consist of:

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W = M + B + SF
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where \(W\) is the net financial wealth of the private sector, \(M\) is the supply of money, \(B\) is the value of domestic bonds, \(F\) is the foreign-currency value of domestically held foreign bonds, and \(S\) is the exchange rate (domestic currency units per foreign currency unit) (MacDonald and Taylor, 1989). The demands for each component of domestic wealth are defined:
\[ M = m(r,r^*) \]
\[ B = b(r,r^*) \]
\[ F = f(r,r^*) \]

where \( r \) is the rate of return on domestic bonds and \( r^* \) is the return on foreign bonds. Signs under each determinant show the impact on the dependent variable.

In theory, this model is a great improvement over the monetary approach. Its primary emphasis is on the capital market, and in particular on the portfolio decisions of profit-maximizing investors. Another advantage is that, as in the real world, the line of causation from interest rates to exchange rates goes through the asset market rather than the market for goods and services. For instance, the effect of a stimulative monetary policy is a fall in the domestic rate of interest and, as investors shift into foreign bonds, a rise in the price of foreign currency.\(^2\) The model, however, still tests very poorly (MacDonald and Taylor, 1992, pp. 16–20; Levich, 1985, p. 1015). Although its treatment of capital flows is an improvement over that in the monetary approach, it still falls short. In spite of its apparent focus on financial markets, the portfolio balance model still makes the current account the primary driver of exchange rates.

In the model, changes in the desired composition of investors’ portfolios are caused either by government policy (as explained above) or by the existence of a current account imbalance. When the home country experiences a current account surplus (deficit), it accumulates (loses) foreign bonds. This creates an excess supply of foreign bonds, leading to a depreciation of the foreign currency. Eventually, the fall in the value of the foreign money eliminates the surplus. This process is taken to be evidence of overshotting by the exchange rate (caused by the slow adjustment of prices in the goods market), where, in response to some disturbance, the price of foreign currency becomes temporarily overval-

\(^2\) The results of fiscal policy are ambiguous (MacDonald and Taylor, 1992, p. 10).
ued. The model assumes that long-run equilibrium requires that the current account be balanced. When it is not, the imbalance places into motion forces that will return balance (in this case, unwanted portfolio adjustment). Therefore, the current account is still the driving force behind exchange rate movements. Capital market adjustments are only short term, and even then only in response to events in the current account.

There is no independent source of shifts in capital flows in the portfolio balance model. Decisions to alter portfolios result either from the impact of government policies or from current account imbalances. In the real world, the decision to alter the composition of a portfolio does not necessarily wait for a change in government policy or current account flows. If it did, the exchange rate would not exhibit the volatility it does.

In the real world, changes in the expectations of exchange market participants lead to sudden and frequent portfolio adjustments, which then lead to rate movements (even without policy or current account events). A proponent of the portfolio balance approach might argue that more sophisticated versions of the model explicitly include expected exchange rate movements as a determinant of the demand for foreign assets. This is true, but no specific theory of expectations is an integral part of the portfolio balance model. Such an important component of the explanation should not take the form of an ad hoc addition.

In sum, in spite of its claims to the contrary, the portfolio balance approach does not adequately take into account the features of today's international capital market. As with the monetary model, its empirical failure leaves it without a defense of its theoretical shortcomings. Unlike the monetary model, the portfolio balance approach allows for trade imbalances and overshooting of the exchange rate, and therefore at least some measure of volatility (even under a flexible exchange rate regime). It is an improvement, but still pays inadequate attention to modeling the capital account.

Related theories and methods

There are several theories and methods in neoclassical economics that, while not exchange rate models in themselves, have become very

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3 It is referred to as "overshooting" because the exchange rate adjustment to a position consistent with a current account imbalance is only temporary, related to the slow adjustment of the goods market. The current account imbalance itself sets into motion forces that will redress the imbalance by moving the exchange rate back to a position consistent with balance.
popular in explaining rate movements. These include rational expectations, tests employing survey data, studies of charting, market efficiency, "news," speculative bubbles, and chaos. Since each of these is a response to the failure of the full-fledged neoclassical models to explain rate movements, they are examined here.

Rational expectations, efficient markets, charting, and survey data

As mainstream economists came to the realization that the market for foreign currency is an asset market, they made numerous ad hoc changes to their approach. The adoption of rational expectations and market efficiency, used extensively in studies of domestic capital markets, is the foremost example. A market is efficient if prices reflect all available information. Rational expectations is closely related, requiring that economic agents, first, use all available information in their forecast of future asset prices, and second, that their subsequent forecasts contain no persistent errors. These seem rather harmless and intuitively appealing at first glance. But testing has led to dismal results. Orthodox economists model exchange market participants' expectations as if they had no effect on currency prices. Instead, they assume that the prices are determined by some other, more objective process, and that the job of speculators is to guess the outcome of that process. More specifically, the "fundamentals" are assumed to determine rates, while market participants second-guess the fundamentals. Exchange rate forecasting is then analogous to guessing a dice roll or predicting the weather; the expectations have no effect on the actual outcome (Davidson, 1982–83; Fazzari, 1985).

But orthodox economists know as well as anyone else that in asset markets it is the aggregate expectations of market participants that determine prices. The reason that they speak as if the fundamentals were an independent force is that they assume that those fundamentals are the

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4 Today, the most popular method of testing rational expectations is to use survey data (this avoids the problem of proxying agents' expectations). Rational expectations is rejected if either the forecast is a biased predictor of the future spot rate or if it is determined that agents have not used all the available information (the orthogonality condition: see Takagi, 1991, pp. 169–170, and MacDonald and Taylor, 1992, pp. 31–32) (Cavaglia, Verschoor, and Wolff, 1993; MacDonald and Taylor, 1992; Pentecost, 1993; and Takagi, 1991). Note that rejection of the orthogonality condition would constitute a rejection of both rational expectations and market efficiency. Studies showing the profitability of technical analysis and filter rules are often taken as indirect evidence that the market is inefficient (Taylor and Allen, 1992; Schulmeister, 1987). More is said on this subject later.
primary guide to market participants as they form their expectations. If so, then the simplification does no harm. But why should market participants rely so heavily on them (especially when the list of what constitutes fundamentals varies from source to source)? If rates are determined by the aggregate expectations of market participants, then one can make the argument that they should use the fundamentals only if most already are.

In Keynes-type asset markets, the participants' expectations are also the force determining asset prices. There is no a priori reason, however, to expect them to prefer any particular set of indicators over another (i.e., there is no presumption of the existence of endogenous expectations produced by ergodic fundamentals). Because the set of factors on which expectations are formed continually must be discovered in a non-ergodic system, careful examination of the expectation formation process is considered an important segment of such research, revealing many significant facts regarding the determination of exchange rates (Harvey, 1991; Schulmeister, 1987).

If foreign exchange markets were modeled after Keynes' stock market, then the concepts of rational expectations and market efficiency would not be so much wrong as irrelevant. If dealers' aggregate expectations determine the actual prices of currency, there is no point in asking if they were correct on average, or in determining how much of the available information they used. Even applying rational expectations to individual dealers (the only context in which it might still make some sense) is questionable because there would no longer be a stable ergodic system equilibrium relationship toward which a dealer's expectations could converge. If forecasting exchange rates really means forecasting the forecasting of everyone else in the market, the picture becomes very complicated. Careful examination of the process by which expectations are formed must be a major segment of any serious research program. The fact that real-world exchange market expectations show no strong correlation with a set of fundamental determinants should come as no surprise.

One of the early problems with testing rational expectations was that the researcher had to find a proxy for expectations. It was therefore never clear whether a failed test meant that the theory or the proxy was wrong. But the recent proliferation of data sets containing observations of actual forecasts has eliminated this problem. Neoclassical economists have had ample opportunity to test expectations for persistent errors, regardless of which inputs were used in the expectation formation process. Almost without exception, the tests find that expectations are biased (indicating
persistent errors) and do not use all the available information, thus rejecting both rational expectations and market efficiency (see note 4). While these results seem to further indict the orthodox model, they also appear to cast doubt on the Keynesian view that asset prices are determined by market participants’ expectations. If expectations determine the asset prices, would it not be true that expectations would always be correct (and not just on average as implied by rational expectations)?

The solution to this mystery lies in the manner in which the theory of rational expectations is framed in empirical studies. The orthodox view of the currency market participant is that of an individual trying to guess the outcome of some objectively and externally determined ergodic process (like the roll of two dice). Since there is no link between the expectations so generated and the outcome being forecast, and since the outcome is decided by an objective process, comparing ex ante predictions with ex post results is a logical measure of forecasting accuracy. Following this logic, tests of rational expectations (and market efficiency, to the extent that they share characteristics) have consisted of comparing what an exchange dealer on Monday (for instance) thought Friday’s rate would be, with the actual rate on Friday. If the dealer’s forecasts are biased, then she or he is not rational.

But from the standpoint of a Keynes-style asset market, dealers’ expectations on Monday of Friday’s rate determine Monday’s rate, not Friday’s. They act on the expectation immediately. Who knows what other events will take place on Tuesday, Wednesday, and Thursday? By then, they have probably forgotten what they expected on Monday, and are busy working on their forecast for the next week. But that forecast of next week’s rate will have its effect in the here and now. Therefore, it is not at all surprising that rational expectations does not test well, despite the fact that expectations appear to determine exchange rates. It miscasts the relationship between expectations and the rates they determine. The assumption that market participants will use the fundamentals to form expectations leads neoclassicals to view the process incorrectly. Dealers are not guessing the outcome of some external operation—they are creating the outcome.\(^5\) Another riddle in this area has been the success of trading rules. It is now well accepted in mainstream research

\(^5\) While I have not tested this hypothesis, it may be that the biases that neoclassicals have found in these studies are related to exchange dealers’ bifurcation of expectations. Stephan Schulmeister suggests that dealers form two sets of expectations: short term and medium term. The former are used to forecast hourly to weekly movements, while the latter look for longer trends. If what dealers report in surveys is
that foreign currency dealers make extensive use, especially in forecasting short-term movements, of technical analysis (Pentecost, 1993, pp. 183–184). From the orthodox perspective, this must represent a short-lived fad since, first, the fundamentals are the primary determinants of rates, and, second, trading rules use old information (past time series of prices). Under market efficiency, old information, especially that which is publicly available, must be useless since it is already reflected in the current price. The shocking truth is that technical analysis appears to generate consistent profits (Levich and Thomas, 1993; Schulmeister, 1987).

Neoclassicals see this as a problem for market efficiency. There are more compelling reasons to reject that theory (see above). But the curiosity regarding why old information would still be useful remains. This seems odd from any perspective that believes the price of foreign currency is determined in an asset market. The inconsistency is only apparent, however, as technical analysis does not use past prices; it uses mathematical manipulations of series or combinations of past prices. The difference is significant. Signals generated by trading rules constitute new information that did not exist until the most recent (new) prices were added to the computation. An exchange dealer on June 4 does not use a set of prices exclusively from May to build his trading rule; depending on the particular rule being generated, he uses some from May, plus June 1, 2, 3, and 4. It is the most recent, brand-new prices that trigger buy and sell signals in technical analysis. The older prices are used to make the standard to which the new prices are compared.⁶

"News"

Frenkel (1981) suggested that in an efficient foreign exchange market characterized by rational expectations, only surprises or "news" should

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⁶ The reason Stephan Schulmeister (1987) gives for the success of these rules is, first, their ability to predict the characteristic upward and downward runs in the exchange market (caused by the bandwagon and cash-in effects), and the self-fulfilling prophecy that takes place when such rules are very popular.
move the exchange rate. Anticipated changes in fundamental variables have no effect. The basic structure of tests of the “news” hypothesis has been:

\[ s_t = a + b f_{t-1} + \text{“news”} + \epsilon_t \]

where \( s_t \) is the spot rate in time \( t \), \( f_{t-1} \) is the period \( t-1 \) expectation of the spot rate in period \( t \), “news” is unanticipated changes in fundamental variables, and \( \epsilon_t \) is random error (Levich, 1985, pp. 1019–1020). Expectations have been modeled using both the forward rate and survey data, while “news” has been created using univariate time series, multivariate time series and vector autoregression, and announcement/event studies (Copeland, 1989, pp. 311–313). The last variety appears to work best. The univariate and multivariate time series and vector autoregression versions of “news” tests depend significantly on (a) rational expectations holding in the real world, and (b) the market participants actually using in the formation of their expectations the sets of information and models specified in the test. The announcement/event studies use reports known to have been made available for the first time on the dates in question as the source for news (Copeland, 1989, p. 314). It is no doubt the latter’s independence of rational expectations and fundamental determination of rates that accounts for its success.\(^7\)

**Rational bubbles and nonfundamental movements**

Orthodox economic models assume that exchange rate movements can be explained in terms of ergodic fundamentals. Neoclassicals have thus been at a loss to explain the large and persistent swings of exchange rates away from what they perceived to be their underlying “intrinsic” values, such as the rise of the dollar from 1981 to 1985. This unavoidable empirical fact has led to two explanations: rational bubbles and nonfundamental movements.\(^8\)

\(^7\) What I present as a test of a Post Keynesian theory of exchange rate determination possesses many of the characteristics of an announcement-based “news” test (Harvey, 1993b).

\(^8\) The “peso problem” is related, but does not quite fit the situation discussed here. It refers to the situation that arises when forward and/or expected rates are substantially out of line with current known fundamentals because they take into account a potentially significant, if at present unlikely, change in the fundamentals (Visser, 1989, p. 24). This strict version cannot explain the deviation of the current spot rate from its fundamental value (however, some economists have used broader interpretation of the peso problem [Visser, 1989, p. 25]).
Rational bubbles are an attempt to explain such swings while maintaining the efficiency assumption. This is an impossibility, of course, without allowing some irrationality somewhere in the scenario. For instance, rational bubbles explain that, once the value of a currency is far from its fundamental level, perfectly rational agents may still go long in that currency if their estimate of the probability of a crash in the short run (a certainty in the long run) is less than the probability of a continued rise in the short run (MacDonald and Taylor, 1992, pp. 13–15; MacDonald and Taylor, 1989, pp. 87–93; Pentecost, 1993, pp. 80–87; Visser, 1989, pp. 24–25). The problem is, if this is still “rational,” then how did the currency price vary so far in the first place, and what basis would market participants have for expecting the deviation to continue (Copeland, 1989, pp. 318–325)? These apparent irrationalities are not explained; they are assumed to exist, and the question then is how rational agents will react to them (Glickman, 1994).

Despite the glaring inconsistencies of the rational bubbles approach, mainstream research continues in this area. Some neoclassicals, in response to these problems, have done what was once unthinkable: allowed for irrationality and nonfundamental movements in exchange rates (Frankel and Froot, 1990; MacDonald and Taylor, 1992, pp. 25–26; Taylor and Allen, 1992; Visser, 1989, pp. 24–25). These nonfundamental movements are related to charting and technical analysis, and it is always the case that their impact is seen as fleeting and superimposed on fundamental effects. There is a feeling of unease for some economists where this analysis is concerned, as evidenced by the following:

The rate of exchange may be determined by rational expectations of (other market participants’) whims, i.e., my expectation of what other people’s expectations will be. Those expectations may be governed by other factors than “fundamentals.” We are back to Keynes’s gloomy view of (in his case, stock) market valuation as a game of musical chairs. [Visser, 1989, p. 24; emphasis added]

Others seem to have no such qualms, but restrict the potential effects of irrationality to the short run:

The Taylor and Allen [1992] evidence on the prevalence of nonfundamentalist analysis in foreign exchange markets suggests that, as a guide to the short-run behavior of exchange rates, the fundamentals versus nonfundamentals approach seems promising. [MacDonald and Taylor, 1992, p. 27]
Still others appear to be relatively open:

In short, it may indeed be the case that shifts over time in the weight that is given to different forecasting techniques are a source of changes in the demand for dollars, and that large exchange rate movements may take place with little basis in macroeconomic fundamentals. [Frankel and Froot, 1990, pp. 184–185]

It remains to be seen how nonfundamental movements can be incorporated into their models, but this is truly an outstanding event in the neoclassical history of exchange rate theory (even if it is almost sixty years since Keynes said practically the same thing in the General Theory). Time will tell whether this is representative of a bona fide revolution in neoclassical thought or simply a bump in the road.

**Cointegration and chaos**

The last class of recent innovations in neoclassical approaches to exchange rate determination concerns mathematical and statistical techniques. Naturally, each of these shares the problems of the particular model employed. To neoclassicals, these represent the most sophisticated in a series of attempts to discover the true relationship between exchange rates and the fundamental forces that determine them; to nonbelievers, they appear to be a last-ditch effort to rescue a failed research program.

Tests of exchange rate theories using cointegration and unit root tests started in the mid- to late 1980s. These search for equilibrium relationships between economic variables (Griffiths, Hill, and Judge, 1993, pp. 696–702). So far, the results have been no more promising for the models' adherents. Hakkio and Rush (1989) find evidence inconsistent with market efficiency in their work; Baillie and Selover (1987, p. 49) conclude that their cointegration test "provide[s] more dismal evidence on the inappropriateness of the monetary model," and Giovannetti (1992, p. 95) reports that "the evidence provided so far, using the cointegration technique to test the validity of the PPP hypothesis, does not seem to support the view of long run proportionality between exchange rates and prices." These results are typical.

The tests and models employing nonlinear and chaotic structures have fared no better (Pentecost, 1993, pp. 184–189). It was hoped that these

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9 One attempt to build nonfundamental movements into a neoclassical model is Barnett (1992), whose approach is to look at foreign currency demand as an individual choice problem, with nontraded goods and imperfections in the currency markets.
might explain the often erratic behavior of currency markets, and although it may be that quantitative data limitations are to blame (Pentecost reports that natural scientists use 5,000 to 10,000 data points to detect chaotic systems), “the best evidence to date suggests that high-frequency exchange rate data do not exhibit chaotic behavior” (Pentecost, 1993, p. 189).

Conclusions

The literature on exchange rate determination is one of the largest in economics. Economists do not have the excuse that the price of foreign currency is determined in a market marked by institutional rigidities and government interference. The dominance of the capital market that has evolved since World War II has pushed the world economy in precisely the opposite direction. But by their own admission, orthodox economics has failed to explain exchange rates.

In response to this failure, research has taken off in two directions. Most new work assumes that the mistakes are in details rather than the core. Economists employ new tests, use more complex mathematical formulations, or add and subtract variables. This has met with little success.

Others have taken the truly revolutionary step of suggesting that exchange rates may not be governed by fundamental forces, or at least not entirely so.¹⁰ This is a huge step, for it is an admission that, since the fundamentals are assumed to move rates in the direction that is most beneficial for the world economy, a free market may not always be ideal.

Thus far, the effect of nonfundamentals has been relegated to the short run, and several economists have suggested that we should therefore concentrate on the long run (implying that nonfundamental movements are irrational and therefore not a suitable subject for economic analysis). At the very least, it is encouraging that neoclassical economists have, in their study of exchange rates anyway, taken note of the fact that their models do not explain (let alone predict) the real world.

¹⁰ The conclusion of Mark P. Taylor’s (1995) Journal of Economic Literature article is particularly interesting in this regard.

REFERENCES


--------- "Daily Exchange Rate Variance." *Journal of Post Keynesian Economics*,


