



Psychological and Institutional Forces and the Determination of Exchange Rates¹

by

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Neoclassical economists, by their own admission, have had a terrible time explaining foreign-currency prices (Taylor 1995b). In large part, this is due to the fact that they assume "economic" behavior to be independent of social and cultural influences. But markets are social institutions. They "organize and guide human social behavior through sanctions (formal and informal, negative and positive), mores, norms, status, and shared worldviews" (Harvey 1993a, p.679). Consequently, explaining economic exchange requires an understanding of the behavior associated with the subculture of those in question.

The purpose of this paper is to build a model of exchange rates that is based on the assumption that Homo sapien behavior can only be understood in terms of its social context. This will be accomplished in four steps. First, the participants in the market will be identified. Second, their relative significance in the determination of prices will be discussed. Third and most important, the psychological and institutional forces molding the behavior of the most influential actors will be explained. Finally, the implications for foreign exchange prices are outlined.

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1. Structure of the Market

1.1 The Participants

There are three basic groups of exchange-market participants: primary price makers, secondary price makers, and price takers (Bishop and Dixon 1992, pp.125-133). Those in the first are distinguished by the fact that they are willing to make two-way offers on a continuous basis, meaning that they stand ready to buy **and** sell the currencies in which they are considered primary price makers. Banks and other large financial institutions capable of maintaining currency trading rooms are typically the only ones willing to offer this dealership service. In contrast, secondary price makers' offers are one way. They are willing only to buy **or** sell a particular money, and consequently they do not need to maintain a staff of active currency dealers. They purchase their funds from a primary price maker and sell them, at a markup, to their customers. Small banks, restaurants, and hotels are especially likely to perform this service.²

Price takers are, roughly speaking, the final customers of the price-making entities. Those entering the market at this level fall into three categories: importers, direct investors, and portfolio-capital investors. Importers buy foreign currency in anticipation of purchasing foreign goods or services.³ Direct investors wish to undertake long-term capital investments (often in the form of multinational subsidiaries) abroad. Portfolio-capital investors enter the foreign-exchange

²Companies specializing in selling currency to the public may appear, on the surface, to be offering two-way reciprocity (as they are willing to both buy from and sell to their customers), but their selected geographical location will create far more activity on one side of the market than the other. Furthermore, they operate with bid-offer spreads far wider than the more competitive conditions of the interbank market would allow and that spread does not move in response to differential volumes of trading activity. They are simply marking up over the cost of transacting with a primary price maker.

³Of course, it may be the exporter who bears the burden of exchanging money.

market to purchase the currencies that will allow them to acquire international assets, including deposits of the money itself.⁴

It is possible, even likely, that one entity may play all three roles in the market. This could be because it is a primary price maker in one currency, a secondary price maker in another, and a price taker in a third, or its role may change over time and from one transaction to the next.

1.2 The Participants' Roles

In a market like that for foreign exchange, prices are determined by the continuous interaction and negotiation among the market participants. Excess supplies or demands can be quickly translated into price movements. Very few rigidities or externalities (as the terms are used in traditional microeconomics) exist. The question of what determines prices, then, becomes what determines the relative demands for currencies? That question will be answered here by looking more closely at the primary price makers, secondary price makers, and price takers and then specifying their behavior in the market.

Note first that the definitions of market participants employed here are by function rather than by example. In other words, players are classified by *what they do* rather than *who they are*. As suggested in the previous section, this means that a particular institution may be a primary price maker, secondary price maker, and price taker all at the same time. Using such a method will hopefully avoid some of the confusion often encountered in this literature.

Beginning with secondary price makers, their influence on exchange rates is minimal. Agents performing this function (often restaurants, hotels, currency kiosks, shops, and branch

⁴For simplicity, central banks are ignored here.

banks) play only a passive role, intermediating between price takers and primary price makers and charging a mark up in the process. Though clearly important to the effective functioning of the market, they create no demand for currency independent of that derived from their customers'. Short of the burden of managing an inventory (which should be fairly simple under the circumstances faced by most entities acting in this role), secondary price making is fairly straightforward.

Those acting as primary price makers face a more complex world. As defined here, they earn their income on the narrow spread between bid and ask prices (which widens a bit when selling to secondary price makers). Since they have no desire to take a position in the market (as this would be an activity classified under price taking), it is their goal to quote currency prices *that generate an equal volume of business on both sides of the market*. In this way, they have no vested interest in the future movements of currency prices and earn risk-free profits by "jobbing."

This is no easy task. The primary price maker cannot simply react to every order placed by changing the bid and offer rates (Suvanto 1993, pp.1-22). For example, while at the end of the day it is clear that an excess demand for pounds sterling over U.S. dollars required a reduction in the pound price of the dollar, at what point does the currency desk manager decide to take this step? Surely not at 9:00am, when the only order received on the day is to buy pounds with dollars, and maybe not at 10:00am, when pound orders continue to outnumber dollar ones. The primary price maker must determine whether or not they believe that the timing of orders is coincidental or indicative of an unexpected trend. If it is the former, then no bid or offer change is necessary and one can expect the volume on each side of the market to roughly equal by day's end; if it is the latter, then steps must be taken to compensate, or else unwanted inventories will accumulate and the primary price maker will find itself with an exposed position. In any event, it is clear that

primary price makers must take pains to make careful forecasts of customer demands in a way that is not required secondary price makers. This makes the former a much more complicated undertaking than the latter. For that reason, large banks and investment firms are usually the only economic agents in a position to offer primary price making services. Note that despite the greater level of complexity involved, primary, like secondary, price makers still play a largely passive role in the market.

Because there are many reasons to demand foreign currency, price takers are a heterogeneous group. As suggested in the previous section, these can be reduced to importers, direct investors, and portfolio investors. Unlike the activities of price makers, each of these has a direct impact on currency prices. For example, *ceteris paribus*, as the exports of a nation increase or direct or portfolio investment into that economy rise, so should be value of its currency. The job of primary price makers is to anticipate such changes, while secondary price makers directly supply currency (note that is not always the case, since in the event that a primary or secondary price maker decided in some instance to use rather than resell foreign exchange, the currency would actually have been directly supplied by the primary price maker). Price making is derivative of price taking.

While the ultimate determinants of foreign currency prices are imports, direct foreign investment, and portfolio capital flows, one of the three is far more important than the other two. Most foreign currency studies assume that trade flows drive this triumvirate.⁵ But this is not true, and it is this error that is **the** major flaw in existing studies (see Harvey 1996b; more on this in the next section). Portfolio investment dominates world business (Krause 1991, Schulmeister 1987,

⁵A common approach is to take the portfolio capital as arising passively in response to “real” economic activity. In this way, financial variables play no actual role.

Shelton 1994, and Walter 1991), and in particular flows in search of short-term capital gain.⁶

Price takers dominate exchange rate determination, and portfolio capital dominates price taking.

1.3 Some Related Issues

Before moving on to descriptions of the institution of foreign exchange trading, it would be useful at this point to quickly address two issues. First, there exists some controversy over whether or not currency dealers act solely as price makers or if they enter the market as price takers, as well. Specifically, some economists have argued that since the total quantity of currency demanded by customers is only a fraction (about 1/10th) of the volume of world currency trade, currency dealers must be taking an active role, entering the market on their own behalf (presumably in search of speculative profits; see for example Schulmeister 1987 and 1988). Others have countered that such a relationship between actual and customer orders is not inconsistent with a market dominated by non-dealer entities, since price makers may undertake a number of covering transactions for each order placed. The data do not exist to settle this argument.

On one level, it is not entirely clear that it matters, however. In either event, it is easily shown that the single most important daily impact on exchange rates is derived from short-term investment. The precise identity of the investors does not change that part of the story. So, though it will be suggested below that it is very likely that currency dealers *do* engage in at least some

⁶The latter deduction is based on the massive turnover that takes place annually in the world market. My calculations of international portfolio capital turnover, using Bank for International Settlements (BIS) data, give me a figure around 100. This is not out of line with other BIS estimates (see, for example, figures for the ratio of portfolio capital flows to total transactions in selected countries, BIS 1994, p.175; or cross border transactions in bonds and equities, BIS 1996, p.98).

speculation (if not a great deal), it is not immediately apparent that searching for an unequivocal answer to this dilemma is worthwhile.

Second, though all economists are well aware of the fact that portfolio transactions dominate daily volume, exchange rate models typically assume the primary causal role is played by trade flows. The reason for this is that neoclassicism expects the financial or monetary side of the economy to serve as a passive engine of growth for the real side. Financial flows arise only in accommodation of the demands of the real side of the economy, and are not of themselves important. Hence, though it may appear that portfolio capital is driving the market, the real, underlying determinant of currency prices are trade flows.

2. Institutions and the Foreign Exchange Market

This section consists of a broad discussion of the forces molding the behavior of foreign portfolio capital investors and currency dealers. The reason for investigating the former should be obvious (in particular it will be shown that the single most significant factor setting currency prices is the expectation of future rate movements on the part of market participants); the latter are studied both because of the interesting nature of their occupation and due to the controversy surrounding their role in the market. In general, even where the two groups do not overlap, they share a great deal in common.

2.1 The Setting: Capitalism

The groups discussed here have evolved and currently exist in a free-market or capitalist

system. Under capitalism, the means of production in a society are privately owned and each individual is encouraged to use the resources at her disposal to pursue her own self interests (where "self interests" are generally defined as material and financial wealth). She accomplishes this by using her available resources to create goods, services, or assets that can be sold in a market.⁷ The proceeds from the sale are then used to purchase other goods, services, or assets, which may be 1) used up, or "consumed," 2) held in anticipation of future sale (which would facilitate yet another purchase of a good, service, or asset), or 3) used as resources in a new cycle of production. Note that although it appears on the surface that consumption is the eventual terminus of any of the three routes, those socialized under capitalism are also encouraged to believe that the process itself is enjoyable.

Simply participating is not enough, however; each individual feels pressure to ensure that the process of selling and buying leaves them with a stock or flow of goods, services, and assets whose "value" outweighs that of the goods, services, and assets sold. With consumption, value is a function of individual taste, which is in turn shaped by social forces. Consumptive activities that fall short of the goal of excess-value may leave the individual with a feeling of inadequacy (perhaps leading to other psychological problems), but no more material consequences necessarily result. In the case of holding goods, services, or assets in anticipation of future sale or using them as resources in a new cycle of production, however, the value in question is decidedly monetary, and consistent failure to realize a sale price higher than the purchase price, i.e., to "earn a profit," may lead to formal sanctions.⁸

⁷Whether or not these activities tend to be welfare enhancing is a separate issue.

⁸This is especially true of assets, since they have no end use in and of themselves. Their usefulness in a capitalist system comes only from the financial wealth they can create.

Since the right to use the goods, services, and assets produced is determined by relative financial wealth, persistent losses could leave the individual stripped of property and dependent upon the charity of others.⁹ Not only does capitalism not provide a role for charitable acts (though it does not prohibit them), the worldview associated with free-market economics suggests that accepting aid is a sign of failure. Hence, there is a strong material and status-oriented incentive to earn a profit. Since they have no other use than profit making, this is especially true in the case of assets.

There also exists in the worldview of those socialized under capitalism a sense that the system is morally just and distributionally and allocatively optimal. As with most other aspects of popular culture, the ways of the free market system are understood as natural and the outcomes created by it as fair. Even when a consensus exists that a particular issue in society is not best addressed by market solutions, this is referred to as a "market failure," a terms that implies that markets are the default solution.

It is within this capitalist context of social pressure to undertake economic activity and earn profit that the foreign exchange market exists. *This pressure acts both a constraint on all those involved and a motivation for those most fully acculturated.*

2.2 Investment Fund Managers and Foreign Exchange Dealers

In a capitalist economy, most individuals must sell their labor services in order to earn the income necessary to live in the socially accepted manner. This means that they must find another

⁹This includes an inability to find a buyer for the labor services owned by the individual, leading to involuntary unemployment.

entity willing to hire them. While the specific conditions vary, working means submitting to the guidelines of behavior specified by the employer and implied by the institutional setting. This manifests itself in two ways: in the personality traits attracted and encouraged by the employer and in the tasks the laborer performs on the job.

The two foci of this section, currency dealers and investment fund managers (the bulk of international portfolio capital is moved by fund managers), have a great deal in common in terms of personality and job requirements. Beginning with dealers, they have sold their labor services to a financial institution, most often a bank. The financial institution then uses these labor services (plus various other goods, services, and assets) to pursue profit-making activities. Because employment is not guaranteed, the individual dealers must endeavor to please their supervisors. Since the firm, as an economic entity, must earn sufficient profit to ensure command over resources and thereby guarantee its survival, "pleasing" must include helping (or at least appearing to help!) the employer earn profits. However, firms also constitute a subculture of their own, and continued employment also depends on the individual's conformity with their norms of behavior.

For foreign exchange traders, this goes beyond what one would normally expect of the employee of a financial institution (at least according to the dealers), and dealers appear to be both well aware and quite proud of this fact. They view their jobs as unusually exciting and even dangerous, since the assets held by the foreign exchange department will tend to have much more volatile prices than any other branch of the financial institution. Descriptions of dealers by dealers are particularly revealing of their self image and worldview:

The apparently ideal raw material would be a quick-witted person with about two years' banking experience and hopefully some A levels, numeracy, a good IQ, common sense in abundance, and a sense of balance and proportion. A well-developed sense of humour seems to abound in successful dealers, and is often needed. Above all the person must want to be a dealer. It is not enough

merely to find the ambiance of the dealing room interesting, or to feel involved by answering the telephone calls from distant places, or feel fulfilled by the successes engineered by colleagues. He must want to be in the market, to be a hammer and not an anvil, and this desire will be the motivating force that triggers his development.

The learning process for a dealer is so lengthy because dealing is largely the exercise of judgement, and this cannot be taught...The judgement or instinct that is the hallmark of a dealer stems from experience [Feeny and Brooks 1991, p.28].

He (the new dealer) will learn the forward market, how to calculate swaps and outright, and their relation to interest rates. He should try to digest what he can from the financial columns of the press. Ideally, he will have a consuming passion for everything germane. He will ask questions. He will ask more questions. He will ask questions when you are very busy. He will ask you why you quoted the rate at which you just dealt and lost money. He should then come to recognize the warning signs and learn when to say something amusing to defuse a fraught situation--and when not to. He will discuss "the market" with his colleagues constantly. He will seek out the company of other dealers in alehouses. He will be assiduously single-minded. From his colleagues in the dealing room and from the contacts he develops outside it he will absorb the ethos of the market. As he grows in experience and understanding so he will become more tightly bound to this international community of exchange dealers, and will develop a fierce pride in being counted among their number. He will learn the famous motto of dealers everywhere: "Once a dealer, always a dealer." He will see himself as a dealer first and foremost and as a bank clerk only some time in a previous incarnation. He will probably find conversations with erstwhile close colleagues from that previous experience quite boring and will wonder what they used to talk about. They will feel rather the same, but conclude that he has become a gibbering idiot. The process will be complete: he will have become a dealer [Feeny and Brooks 1991, p.29; parenthetical reference added]!

The pretension and narcissism of these descriptions is thinly veiled. It suggests a subculture within which members may be fiercely competitive, yet very desirous of comradery, friendship, admiration, and respect. It is not surprising that the head dealer often has to act as a mediator between the employees of the trading room and higher management. It is also not surprising that, given the social pressures in the rest of our society, dealers tend to be young, unmarried, and male.

As one might imagine given the above profile, foreign-currency dealers do not find the

simple process of covering customer transactions and earning profit off the spread very satisfying.¹⁰ All other things being equal, the sort of character the subculture of dealing attracts and molds will likely cause currency transactions to be drawn toward speculative activity (i.e., away from simple price making and toward price taking). Individuals who feel like they have been "selected for...the tribal hunting party" [Feeny and Brooks 1991, p.27] or are "wrestling with alligators" [Rosenberg 1987, p.33] are in search of exploitative activity, not enterprise.

Personalities aside, retaining employment involves earning the income the firm needs to survive. There are three sources of profit to the foreign exchange dealing room: the bid-offer spread, advantageous price changes of owned currencies,¹¹ and interest income. The first would be the primary source of income in a world wherein currency dealers were engaging simply in price making. It is a manifestation of the fact that price makers buy and sell currency at different exchange rates. Their "bid" to buy is always at a lower price than their "offer" to sell, hence a profit is made if they can generate two offsetting deals (of equal amounts) at the same rate.

If the transaction is between two primary price makers, the spread generates only moderate income. This is because, though in competition with their rivals at other financial institutions, currency dealers need each other if they are going to trade. Reputation is terribly important in maintaining contacts, and two-way reciprocity, the distinguishing characteristic of primary price making, is a privilege offered only to those willing to do the same in return [Bishop and Dixon 1992, p.266]. Furthermore, the spreads reflected in the bids and offers made must be at the

¹⁰In fact, Andrew Cornford (Senior Economics Affairs Officer at UNCTAD, Geneva) has informed me that one of the perks used to attract top dealers is the promise of more liberal "trading limits."

¹¹Assuming the currency is then sold. Simply owning a money whose value has increased earns no income.

professional level (i.e., they must be very small) to avoid insulting and alienating fellow dealers. Transactions between primary price makers are not likely to cover much more than operating costs. Realistically, only the wider spreads associated with secondary price making can generate profit for the firm.¹²

When a trading room has inventories of foreign exchange on hand, these will invariably be held in some interest-bearing form, perhaps Eurocurrency deposits. Given this, there are two ways in which the financial institution's income can be affected: sale of the currency at a rate other than that at which it was purchased and earned interest.¹³ Currency dealers must try to anticipate both exchange rate movements (as this will allow them to purchase currencies expected to appreciate and sell those expected to depreciate) and interest rates. Note that buying a currency whose own interest rate is expected to soon increase does not earn the purchaser the higher interest rate. Rather, the anticipated benefit in this scenario is the appreciation of the currency as market participants rush to buy it when the rate does increase or when their expectations concur with the purchaser's.

Recall from the discussion above that currency dealers must already actively forecast exchange rates, even if they plan only to undertake price making activities. With the trading desk's resources already so invested, and combined with the personalities attracted./molded by dealing, it is a very short step to price taking.

The behavior of fund managers is very similar. They, too, have available to them both

¹²In some instances, financial institutions charge a fee for exchanging currency. Since, conceptually, this is no different from maintaining a wider spread for customer deals, this will not be explicitly taken into account here.

¹³The former can occur at the prices set between two price makers (either variety) or between a price maker and a price taker, since only the endpoints of the spread will be relevant.

low-risk options for earning income (interest and customer fees) and high risk ones (capital gain). And they, too, tend to attract risk-taking personalities.¹⁴ But there may be additional factors at work encouraging speculation in short-term investment, since most of these agents are going to be acting as fund managers of one description or another, and funds attract customers by advertising a winning record and because customer fees are generally enhanced when more trades are undertaken (Rosenberg 1996, p.380). Both aspects of the fund manager's job tend to encourage rapid turnover more than buy-and-hold.

The above discussion leads to the conclusion that currency dealers (at least to some extent) and investment fund managers are entering the foreign currency market as price takers, hoping to use the monies to pursue capital gain. This implies that market participants' expectations of worldwide asset price movements is what drives the foreign exchange market and currency prices. Though this certainly occurs, it is far from the whole story. Consider the following. First, because of the many thousands of assets available internationally, each requiring considerable investigation if intelligent decisions are to be made, investors are likely to limit their interest to a number of rather generic types. These may include stock indexes, low risk bonds (especially government), and other standard interest-bearing forms (Margolis 1990, pp.66-67). Second, market participants must take into account the fact that the value of their portfolio is affected not only by own-price changes of assets, but by movements in the value of the currency in which they are denominated. In fact, the latter often swamps the former. This reinforces the tendency to focus on generics, since exchange rate movements affect all assets equally.

¹⁴Interestingly, Jack D. Schwager, author of the "Market Wizards" series of books, argues that though this may describe the average trader, successful ones tend to be marked more by patience and a calm demeanor (Schwager 1992).

Note that these two points lead to an interesting conclusion. If asset value is so closely linked to exchange rate movements, then it must be the case that the latter is a, if not *the*, primary focus of price takers in the currency market. This does not mean that other, issuer-specific information will not be of interest; but by and large, forecasting asset value will entail forecasting exchange rates. Hence, actual exchange rates are driven by exchange rate expectations (see Harvey 1998-99 and Harvey and Quinn 1997 for empirical tests of this proposition). When currency dealers and portfolio investors, as a group, predict a yen appreciation, they shift into yen-denominated assets. Since buying yen-denominated assets requires the purchase of yen, speculators cause their prophecy to be fulfilled: the yen appreciates.

This is really no different from any other asset market, except, interestingly, that the currency itself need not be the direct object of speculation.¹⁵ Nevertheless, because the exchange rate is such an important part of the value of any international asset, the potential for fluctuations must be carefully considered. Speculators need never have foreign money as the object of their desire, and yet it will play a central role, both affecting and being affected by portfolio capital flows. And even if currency dealers are hoping to earn income only from the spread, they must still endeavor to set their bid and offer at the expected market rate.

2.3 Expectations and Foreign Exchange Rates

Since portfolio capital flows dominate price taking in the foreign exchange market it can be said that regardless of the specific role of currency dealers in this context, *it is expectations of the future, and especially of currency price movements, that determine the current foreign*

¹⁵Of course, many times it is, but this is obscured by the fact that what the speculator actually buys is a foreign asset.

exchange rate. If currency dealers are entering the market for speculative profit, then they must decide whether they believe that the value of the currency in question will rise or fall. Because they then buy those currencies expected to appreciate and sell those expected to depreciate, their average expectation added to that of fund managers (weighted for attitude toward risk and available liquidity) determines the actual rate.

In the event that dealers are passive, they must, first, try to set their median rate in anticipation of the one that would attract an equal volume of currency on both sides of the spread--in other words, guess what portfolio capital investors' average expectation is--and second, adjust that median in the event that they misjudged portfolio capital investors' expectation of future rates, causing unwanted currency inventory accumulations. Once they have accumulated an inventory of currency, which will almost certainly occur with regularity, they must then act as speculators themselves, quickly selling currencies they expect to depreciate, and vice versa. In any event, expectations are driving the price for foreign exchange, and whether the market is run by currency dealers in search of speculative profits or fund managers managing portfolios of short-term capital assets matters very little. The question of how foreign exchange rates are determined collapses to how are expectations formed.

3.0 Expectations Formation and the Decision Making Process

On the surface of it, neoclassical economists are not necessarily opposed to the idea that exchange rates are driven by expectations, especially in the short run. However, as argued above, they see the forecasts simply as the means by which more “fundamental” factors make their presence felt. Aggregate expectations determine exchange rates only in the same sense that a carpenter’s tools build a chair.

For that reason, the orthodox approach to agents' forecasting and decision making has focused on rational expectations and expected utility theory. Rational expectations, which guarantees that forecasts will be correct on average, implicitly assumes that agents' predict, but do not cause, the objective variable (the actual causation is via the fundamentals; Davidson 1982-83 and Harvey 1998-99). Once armed with these unbiased forecasts of future outcomes and probabilities, expected utility theory predicts that agents will make the choices that maximize their return. In other words, rational expectations and expected utility theory provide an explanation of decision making that leads to the conclusion that the latter has no independent impact on market outcomes. Rather, expectations efficiently, but passively, translate the underlying determinants of exchange rates into reality.

This view of the role of forecasting in the determination of foreign exchange rates has come under increasing fire, even in the neoclassical camp. It is now almost universally accepted that short-term behavior in currency markets does not fit the traditional characterization. Rather than leading to a search for new theories, however, this has encouraged orthodox economists to believe that the short-run does not lend itself to an "economic" analysis.

Such a conclusion is not reached here. Rather, a new model of expectations and decision making, heuristic judgment theory (HJT), is offered below, one that argues that the decision-making process itself affects the realized pattern of exchange rates, and that it is the work of psychologists, not economists, that will be the most illuminating in this context.

3.1 Heuristic Judgment Theory¹⁶

¹⁶This section is based on Harvey 1998. Note that this model of decision making is intended as probabilistic and not deterministic.

The central theme of HJT is that Homo sapiens

rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations (Tversky and Kahneman 1974, p.1124).

This is true for a variety of reasons, including efficiency and habit.

HJT further assumes that the decision-making process can be broken into distinct stages (even if these do not correspond exactly with the steps taken by the agent). These are:

1. Eventuality Analysis;
2. Choice and Consequence Definition;
3. Decision Weight Assignment;
4. Choice;
5. Post-event Assessment.

In the first, the actor considers all the probable future states of the world. During the second, each possible future is compared with the alternatives at hand, and the consequences are considered.

Decision weight assignment arranges the alternatives in order of preference (based on the analyses performed in stage two), and stage four is the point at which the actor actually makes a choice. In many cases, Post-event Assessment may also occur, meaning that the decision maker reviews the choice and actual consequence in the light of what was expected.

The first two stages are very similar in character, as each requires the individual to establish probabilities and confidence levels regarding what they believe caused past events and what they think will happen in the future. In either stage, probability assessment involves the three main heuristics of human decision making. These are **availability**, **representativeness**, and **anchoring**. Availability is used to estimate frequency or likelihood. In general, the more available something is in memory (either through imagination or recalling past instances), the more frequent or likely that event is deemed. Representativeness is most useful when the decision

maker is concerned with the probability that object A belongs to class B (e.g., the likelihood that event A is the result of process B, or that process B will create event A). The simple rule of thumb is, the more A resembles B, the more likely that it belongs to class B. Anchoring occurs when the individual must make an estimate. Psychologists have discovered that regardless of the procedure used to arrive at an initial estimate, people tend to anchor any subsequent revisions to it.

All three of these are very useful under most circumstances, but they introduce bias. For example, an instance may be more available simply because it was dramatic, more recent, or falls into the decision maker's area of interest. The ease with which a scenario can be constructed or the search set used can also bias availability. Representativeness causes people to expect causation where chance may be at work, thus ignoring very simple and presumably intuitive rules of statistical inference. It works in reverse by convincing people that they can make predictions based on scanty information if that information *seems* consistent with one of their preconceptions. Anchoring puts undue weight on an individual's first estimate.

In addition to the importance of heuristics in probability assignment, research has shown that humans tend to believe that events that favor them are more likely to occur than those which do not. Finally, framing is a very important issue because

Peoples' probability judgments are not attached to events, but to descriptions of events (Tversky and Koehler 1994 and Tversky and Kahneman 1988). Events do not have likelihoods. A likelihood is an opinion, not an objective value. Opinion is based not only on the information available to the decision maker, but also on the framing of that information. Study after study has shown that the same question asked in different terms yields different answers, in stark contrast to the predictions of expected utility theory. Framing is an issue not only in the description of events, but also in the structure of the choice being made (Redelmeier and Tversky 1992). A change in either has the potential to change the decision that is made, and thus framing must be considered an important factor in the decision-making process and in probability assessment (Harvey 1998, p.54).

Once probabilities are established and it is necessary to evaluate confidence in stage one

or two, the first rule is that the more easily the decision maker was able to make a probability judgment based on the available information, the greater the confidence in that judgment. And since forecasts are usually based on the premise that the past is a reliable guide to the future, the belief on the part of decision makers that the world is nonergodic will lower the level of confidence in all forecasts. *Ceteris paribus*, however, people tend toward overconfidence.

Once possible futures and the impact of the choices available have been considered in stages one and two, the decision maker must assign decision weights to each alternative. As a first approximation, this can be viewed as equivalent to the expected values of rational choice theory. However, there are a number of important differences. For one, all other things being equal, the agent will choose the option in which she has more confidence. Also, psychologists have shown that people tend to underestimate the likelihood of high probabilities and overestimate low ones (which explains the popularity of lotteries and insurance), thus biasing decision weights in those directions. Decision makers are also more likely to prefer risky options when they feel that they are "losing" and safe ones when they are "winning." Finally, the agent will prefer to choose the option that lies is most likely to allow them to claim credit and avoid blame. For example, all other things being equal, they will prefer to operate in their perceived area of speciality. This is so because

There is little to be gained operating outside the area of expertise, regardless of the outcome: a decision that proved incorrect would likely be associated with ignorance, while a successful one with luck. Within the area of expertise, however, the decision maker has an excellent chance of avoiding blame while gaining credit. A good decision will probably be attributed to the skill of the decision maker, but a poor one might at least on occasion be chalked up to bad luck (Harvey 1998, p.56)!

The preference for following "conventional" wisdom also falls into this category.

Once decision weights are assigned, the choice stage is often simply a matter of picking the

alternative with the highest weight. One important exception occurs when agents feel they are so uncertain of the circumstances surrounding a decision that they endeavor to postpone it.

Once the choice is past, its success may be evaluated in order to refine the decision-making process. If undertaken with great care, this may prove successful. However, more often than not, the framing of decisions and data is not conducive to this process, and people tend to recall their past decisions as having been more successful than they actually were.

3.2 Decision Making in the Foreign Exchange Market

Expectations determine exchange rates.¹⁷ How they are formed, then, is the key to understanding foreign currency prices. The market participants whose expectations are most important are price makers and portfolio capital investors.

In both instances, their subculture is likely to attract aggressive individuals with a very strong desire to "win." They will be enticed by the more glamorous and exciting side of currency trading or portfolio capital investment: speculation. International portfolio fund managers will also be encouraged by their employers to take this route (within predefined limits) since it has greater potential for profit and it enhances the image of the firm (as explained above). Meanwhile, because spread profits represent a safe and steady source of income, the attitude of institutions employing currency price makers will vary with their philosophy and with industry sentiment. In

¹⁷See Harvey and Quinn (1997) for empirical evidence of this contention.

general, speculative activities tend to be permitted, but subject to scrutiny. As this runs counter to the desires of most dealers, resistance and occasional outright deception can be expected.

Both primary price makers and portfolio capital investors must actively forecast foreign exchange rates in order to earn profits for their firm. With respect to the HJT framework, their decision making efforts will really focus on the first stage: Eventuality Analysis. This is so because Choice and Consequence Definition, Decision Weight Assignment, and Choice will likely be very straightforward. Once dealers and investors decide which currencies they believe will appreciate, what to do next is not terribly complicated.

First of all, the object of their forecast is typically the *direction* of currency movement rather than the actual *level* to which the rate will move. This is a function of their low confidence and of the nature of profit from capital gain. Market participants know from experience that doing better than forecasting directions of movement on anything approaching a consistent basis is next to impossible (Schulmeister 1988). The nonergodicity of the system magnifies this insecurity. Furthermore, to make a profit from the resale of an asset, it is sufficient to know the direction of the movement of prices. Levels would be nice, but not necessary.

The reference for any such calculation will be the current foreign exchange rate. But the significance of the present price goes beyond this. It is the most "available," and because of the representativeness bias, market participants will believe that the current price is truly reflective of market conditions and is therefore the "right" price under the circumstances. They will also tend to anchor to the historical price, though as compared to other asset markets the consequent price fluctuations may still seem large.

While they may believe that the current price is "correct," they are nonetheless aware of the fact that exchange rates are rarely stable and they must therefore try to guess the market's next

move. As suggested above, agents' overall level of confidence in this matter is likely to be rather low (though this is somewhat offset by the general tendency to be overconfident), but they are driven by circumstances and their personality types to try. In this endeavor, most significant will be recent and dramatic information. This is a function of the availability heuristic and the fact that representativeness suggests that new circumstances must mean new prices. Because of the overabundance of information in the modern market, availability is likely to lead to considerable volatility as each piece of "news" becomes available. This is especially likely given

1. the lack of a clear anchor for foreign currency values, meaning that a wide variety of information might be deemed relevant by market participants, and that the perceived impact of that information could vary considerably from participant to participant and over time;
2. representativeness causes agents to believe that reliable forecasts can be created from what may be clearly insufficient information;
3. agents will tend to be overconfident given the basis of their analysis;
4. as explained above, agents in the foreign exchange market will generally hold their expectations with a low level of confidence.

The last two points appear to be contradictory, but their interaction, along with the insensitivity to predictability described in number two, is an important aspect of the volatility created. Because of them, the market may experience wild swings in confidence, adding to the instability. And even if dealers and investors soon realize that their earlier, volatility-creating forecasts were unrealistic, anchoring will prevent them making sufficient revision.

Attitudes toward risk suggest two other features of the foreign currency market: the cash-in effect and trading limits. Cash in, or profit taking, occurs because as a held currency appreciates, so the individual's anxiety regarding the likelihood of a sudden depreciation increases. Both

Schulmeister and Harvey have found evidence of this process in the foreign exchange market (Schulmeister 1987 and Harvey 1993b). On the other hand, as an owned currency depreciates, the individual can be expected to "let it ride" in an often forlorn hope to avoid the realization of losses. For this reason, every currency trading room sets loss limits on dealers' positions (Weisweiller 1991 and Hudson 1979).

Another characteristic of the market is the bandwagon effect, or the tendency of market participants to purchase an already appreciating currency (also due to Schulmeister). This can be explained by availability, anchoring, representativeness, the capitalist worldview, and the desire to claim credit and avoid blame. Especially if the upward movement has just begun (so that the cash-in effect is minimal and the trigger is fresh), the appreciation will be a salient event, causing market participants to focus on it as predicted by availability. And if they are focusing upon it, they will tend to anchor new forecasts to the *rise* in the price. Representativeness will lead agents to believe that the appreciation is occurring because circumstances warrant it. Unless there is a significant change in the circumstances, continued price increases may follow. This faith in the logic of the forces determining prices is increased by the belief of many participants that markets create only rational outcomes, i.e., that markets are always right (Bishop and Dixon 1992, p.303). Finally, those who did not purchase the asset at the beginning of its run will see the value of others' portfolios or holdings of foreign currency rising. They know that they are better off joining the herd. If the currency continues to appreciate, then they can earn a profit; if not, they cannot be blamed too much for following lead of so many other presumably knowledgeable market participants. By not joining in, they run the risk of foregoing an opportunity that was apparently obvious to so much of the rest of the market.

The existence of the bandwagon effect explains the popularity and success of technical

analysis (Taylor and Allen 1992). Rules like the moving average and momentum succeed when trends maintain themselves (Rosenberg 1996, p.324). These have, however, created some controversy. This is because their use is inconsistent with some aspects of the capitalist worldview. As suggested above, those socialized in the system come to believe that market solutions are optimal. It is further thought that one of the reasons for this optimality is the speed with which information is reflected in prices. However, charting makes use of old prices in the construction of forecasts, so that if it is successful this appears to be evidence that the market is not efficient.¹⁸ The pressure of earning profit combined with strong evidence that technical analysis did work led those directly involved in the market to either simply ignore the inconsistency or to invent explanations that apparently resolve the conflict.¹⁹ Only a few economists appear to cling tightly to the idea that technical analysis cannot work; meanwhile almost everyone in the foreign currency market relies on trading rules to at least some extent.²⁰

The above suggests some characteristics of dealers' and portfolio managers' decision making, but it does not specify the variables upon which they might focus in the formation of their expectations. Theoretically, this is a very difficult issue. If the market is dominated by the demands of either of these groups in search of speculative profit, then the appropriate factors to consider would simply be those that you expected all your colleagues throughout the world to

¹⁸I do not agree. See Harvey 1996b, pp.576-577.

¹⁹Ironically, most common is the contention that if prices contain all the relevant information, then they can be used to forecast!

²⁰The fact that this whole process of conversion to the idea that trading rules are effective means of forecasting took place against a backdrop of economists' increasing inability to explain rates by means of "fundamentals" certainly accelerated portfolio managers' and currency dealers' willingness to accept the idea (Rosenberg 1996, p.324).

scrutinize. It becomes Keynes' game of musical chairs. But this simple scenario is complicated by the worldview of markets as optimal allocators of resources. Though market participants know that in general their challenge is to outguess their contemporaries, there is still a strong sense that the variables upon which they should focus should reflect what mainstream economic theory suggests would indicate the fundamental strength of the economies in question. In reality, there is no such necessity, but the belief is so ingrained at many different levels of the capitalist worldview that econometric studies do tend to find a relationship between exchange rates and the fundamentals over the long run.²¹ Still, considerable variation is observed over the course of hours, days, weeks, and even months (Taylor 1995a and 1995b).

Trading rules are not consistent with fundamental analysis. The former is based on the psychology of the market, while the latter assumes that rates are really determined by a process driven by logical, economic principles (again, the logic assumed by neoclassical analyses). However, there has evolved among market participants a common perspective reconciling these divergent views. Dealers and portfolio managers believe that fundamental factors are most important for predicting long-term trends, while speculative forces, especially trading rules, are significant in the short run. These two sets of expectations are maintained simultaneously. When the short run view of the market is consistent with the long run, this raises agents' confidence in their forecast. When it is not, confidence falls.

Technical analysis and the cash-in and bandwagon effects, for the reasons described above, would be considered only in the formation of the short run forecast. Fundamental factors would be important in both the short and long run, but in different ways. Traditionally, those

²¹See Harvey 1996a for a discussion of "fundamentals."

variables that market participants believe to be indicative of the underlying strength of a currency include interest rates, inflation, economic growth, and current account balances, as well as other, less quantifiable, political factors. Of these, only data on interest rates would be available on a daily basis; indications of the state of all the others would depend upon official releases and other information of all sorts deemed relevant by the market participants. Even with respect to interest rates, the real object of interest would be *future* rates, so that even those depend upon subjective interpretations of events in the relevant economies.

Such events would occur piecemeal, so that one might reasonably expect that it would take an accumulation of news before long-term expectations would be adjusted. Meanwhile, each new piece of information affects the short-term expectation. Harvey (1993b) offers empirical evidence of this process.

The pattern of exchange rate movements created by the duality of expectations can be characterized as a series of fluctuations around the long run trend. The long run trend is every bit as much a function of the subjective expectations of the market participants as the short term fluctuations, but the worldview of the subculture of dealers and investors suggests that "fundamentals" are the most important over the longer time horizon. This explains both the tendency to find some explanatory power for fundamentals in limited contexts, and to find none at all in others (e.g. the U.S. dollar from 1982 to 1985).

4. Conclusions

Decades of research based on fundamentals, homo economus, "rationality," "efficiency," and related neoclassical concepts has yielded very little substantial progress in the area of exchange rate determination. My inclination is to, therefore, start over. Toss out the premises of

the failed models and tests of the past, and begin a new approach to exchange rates that starts from the specifics of the subculture in the foreign exchange market and works toward generalities that describe the participants' behavior. If some of the old premises survive, then perhaps some of the conclusions and methods of analysis associated with them can also be salvaged. But vested intellectual and political interests in keeping them must be suppressed. Too many years have been wasted to continue on that line.

The above describes exchange rate determination in terms of psychological and institutional forces. The major conclusions are that the market, as it is currently organized, is driven by agents' subjective expectations of future rate movements. The paper contends that this is the case regardless of whether foreign currency dealers are dominating the market, engaging in speculation on behalf of their employers, or in the event that they simply passively carry out the orders of their customers. Unlike neoclassical approaches, it is not assumed here that the "fundamentals" play any specific role in exchange rate determination other than that imagined by the market participants. But, as the role of the fundamentals is fairly well established in the worldview of those involved (even if their specific identities are not), it is not surprising that some studies have managed to find a correlation between them and rate movements.

Significantly, unlike many models of exchange rates, the analysis presented here does not imply that trade imbalances are self correcting or that purchasing power parity is likely to hold. Of all the possible candidates for fundamental variables in the minds of dealers and investors, these are only two, and neither is very closely related to factors that they would tend to find important.²² Only if their expectation was unequivocally that the currencies of economies with

²²In fact, trade imbalances were a center of attention in the early 1980's, only to be ignored by later in the decade.

current account deficits should depreciate, and vice versa, would self correction occur. But there is no reason to expect this, a priori, and the chronic payments imbalances that exist in the real world come as no surprise.

Whether or not the current organization of the market is instrumentally warranted is an issue outside the scope of the current paper, however I have dealt with it elsewhere (Harvey 1993a). It should be clear from the above, though, that currency prices are very likely to stray from the levels likely to encourage the growth of world trade and direct investment. The link between the financial activities of speculation (in currencies or assets) and what Keynes called enterprise is very tenuous, and it is unlikely that a market which serves the former will generate the latter (Keynes 1964, pp.147-174).

REFERENCES

- Bank for International Settlements. **64th Annual Report**, Basle, Switzerland: BIS, 1994.
- _____. **66th Annual Report**, Basle, Switzerland: BIS, 1996.
- Bishop, Paul and Don Dixon. *Foreign Exchange Handbook: Managing Risk and Opportunity in Global Currency Markets*. New York: McGraw-Hill, 1992.
- Davidson, Paul. "Rational Expectations: A Fallacious Foundation for Studying Crucial Decision-Making Processes." **Journal of Post Keynesian Economics**, vol.5, no.2 (Winter 1982-83), pp.182-198.
- Feeny, Michael and John Brooks. "The Dealing Room and the Dealer." In Rudi Weisweiller, editor, **Managing a Foreign Exchange Department: A Manual of Effective Practice**, New York: Quorum Books, second edition (1991), pp.17-33.
- Harvey, John T. "The Nature of Expectations in the Foreign Exchange Market: A Test of Competing Theories." **Journal of Post Keynesian Economics**, vol.21, no.2 (Winter 1998-99), pp.181-200.
- _____. "Heuristic Judgment Theory." **Journal of Economic Issues**, vol.32, no.1 (March 1998), pp.47-64.
- _____. "Long-term Exchange Rate Movements: The Role of the Fundamentals in Neoclassical Models of Exchange Rates," *Journal of Economic Issues* 30 (June 1996a): 509-516.
- _____. "Orthodox Approaches to Exchange Rate Determination: A Survey." *Journal of Post Keynesian Economics* 18 (1996b): 567-583.
- _____. "The Institution of Foreign Exchange Trading." **Journal of Economic Issues**, vol.27, no.3 (September 1993a), pp.679-698.
- _____. "Daily Exchange Rate Variance." **Journal of Post Keynesian Economics**, vol.15, no.4 (Summer 1993b), pp.515-540.
- Harvey, John T. and Stephen Quinn. "Expectations and Rational Expectations in the Foreign Exchange Market." **Journal of Economic Issues**, vol.31, no.2 (June 1997), pp.615-622.
- Hudson, Nigel R.L. **Money and Exchange Dealing in International Banking**, New York: John Wiley and Sons, 1979.
- Keynes, John Maynard. **The General Theory of Employment, Interest, and Money**, San Deigo:

- Harcourt Brace Jovanovich, 1964.
- Krause, L.A. **Speculation and the Dollar: The Political Economy of Exchange Rates**, Boulder, Colorado: Westview Press, 1991.
- Margolis, Louis. "Before and After October 19: Structural Changes in U.S. Financial Markets." In **Innovation and Technology in the Markets: A Reordering of the World's Capital Market Systems**, Daniel R. Siegle editor, Chicago: Probus Publishing Company (1990), pp.59-70.
- Redelmeier, Donald A. and Amos Tversky. "On the Framing of Multiple Prospects." **Psychological Science**, vol.3, no.3 (May 1992), pp.191-193.
- Rosenberg, Merri. "Traders Make Tradeoffs." **American Banker** (July 30, 1987), p.33.
- Rosenberg, Michael R. **Currency Forecasting: A Guide to Fundamental and Technical Models of Exchange Rate Determination**, Chicago: Irwin, 1996.
- Schulmeister, Stephan. "Currency Speculation and Dollar Fluctuations." **Banca Nazionale Del Lavoro Quarterly Review**, (December 1988), pp.343-365.
- _____. *An Essay on Exchange Rate Dynamics*. Research Unit Labour Market and Employment Discussion Paper 87-8, Berlin: Wissenschaftszentrum Berlin für Sozialforschung, 1987
- Schwager, Jack D. **The New Market Wizards: Conversations with America's Top Traders**, New York: Harper Collins, 1992.
- Schwartz, Hugh. **Rationality Gone Awry? Decision Making Inconsistent with Economic and Financial Theory**, Westport, Connecticut: Praeger, 1998.
- Shelton, J. **Money Meltdown: Restoring order to the Global Currency System**, New York: The Free Press, 1994 .
- Suvanto, Antti. *Foreign Exchange Dealing: Essays on the Microstructure of the Foreign Exchange Market*, Helsinki: The Research Institute of the Finnish Economy, 1993.
- Taylor, Mark P. "Exchange Rate Modelling and Macro Fundamentals: Failed Partnership or Open Marriage?" **British Review of Economic Issues** 17, #42 (June 1995a): 1-41.
- _____. "The Economics of Exchange Rates." *Journal of Economic Literature* 33 (March 1995b): 13-47.
- Taylor, Mark P. and Helen Allen. "The Use of Technical Analysis in the Foreign Exchange Market." **Journal of International Money and Finance**, vol.11 (1992), pp.304-314.

- Tversky, Amos and Daniel Kahneman. "Rational Choice and the Framing of Decisions." In **Decision Making: Descriptive, Normative, and Prescriptive Interactions**, David E. Bell, Howard Raiffa, and Amos Tversky, editors, Cambridge: Cambridge University Press (1988), pp.167-192.
- _____. "Judgment under Uncertainty: Heuristics and Biases." **Science**, vol.185 (27 September, 1974), pp.1124-1131.
- Tversky, Amos and Derek J. Koehler. "Support Theory: A Nonextensional Representation of Subjective Probability." **Psychological Review**, vol.101, no.4 (1994), pp.547-567.
- Walter, Andrew. **World Power and World Money: Restoring Order to the Global Currency System**. New York: St. Martin's Press, 1991.
- Weisweiller, Rudi, editor. **Managing a Foreign Exchange Department: A Manual of Effective Practice**, New York: Quorum Books, second edition, 1991.