

Exchange Rates

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An exchange rate is the relative price of two monies. Exactly what is being exchanged has of course varied with the assets that were used as money at any point in time. In ancient times and into the early part of the twentieth century, money generally consisted of a full-bodied metallic coinage of one sort or another. In the past two centuries, it has come increasingly to consist of currency notes and, more importantly, bank deposits. Exchange-rate arrangements have varied from systems in which exchange rates are rigidly fixed to ones in which they could vary freely with market forces.

In discussing exchange rates, it is useful to distinguish between nominal and real exchange rates. The nominal exchange rate is simply the actual rate in the foreign exchange market. The real exchange rate, in contrast, is the rate at which a market basket of goods in one country can be exchanged for a market basket of goods in the other. It is, therefore, a theoretical construct rather than something that is directly observable.

The discussion that follows provides a chronological survey of exchange-rate behavior, exchange market practices and exchange-rate regimes from the classical era forward. It concludes with an overview of the foreign exchange market currently.

The Greco-Roman Era

In ancient Greece and Rome, the analogue of the foreign exchange markets of today were the markets in which one type of coin was exchanged for another. The principals in these markets were the money changers. In the Athens of the fourth century B.C. these money changers were known as trapeziate, so named because of the bench-like tables (trapeza) that they used for their transactions. In Rome they were termed argentarii. The argentarii plied their trade throughout the Roman world, exchanging the foreign gold and silver coins that came to Roman

lands against the large Roman bronze coins, the aes grave, that made up the domestic Roman coinage during the Republican period.

The details of what went on in these early markets, including those surrounding the course that exchange rates actually followed, are rather murky. As in any monetary system in which a metallic coinage serves as money, prices of the various metals must have played a major role. Doubtless also of importance were changes in the metallic content of those coins. Such changes could come about as the normal result of wear and tear, because of clipping or as the result of policies of debasement that altered the fineness or weight of the coinage. The last was an occasional occurrence during the time of the Roman Republic and then became completely commonplace under the Later Empire.

Two additional items to note in connection with exchange-market practices during this period are what appears to be the beginnings of a market based on financial instruments rather than specie – in this instance, letters of transfer – and the issuance of what was perhaps the first truly international currency, the Roman gold aureus.

The Early Middle Ages

The Early Middle Ages suffers from an even greater dearth of information with regard to exchange rates and to monetary conditions than the classical era. Doubtless, a major reason was the breakdown of the money economy in Western Europe that occurred after the fall of the Western Roman Empire and the increased use of barter in place of money that followed. Very likely another was the diminished level of international trade that characterized the early centuries of that era.

There is, however, one set of developments during this period about which a good deal is known and that bears special mention. This is the introduction of a full-bodied, stable gold coinage for use in large transactions throughout the Mediterranean region. The earliest such

coin, known variously as the solidus, the bezant and the nomisma got its start early in the fourth century under the Emperor Constantine. It kept essentially the same gold content until well into the eleventh and continued to be coined in Byzantium until the thirteenth. This remarkable feat of stability has gone unmatched since. The nomisma was a true international currency – “the dollar of the Middle Ages,” as one scholar has put it. It did not, however, enjoy a monopoly. From the end of the seventh century, it shared its position with a similar coin introduced in the Moslem world, the dinar. Like the nomisma, the dinar kept a stable metallic content for centuries, not being debased until three hundred years later.

The Thirteenth Century Commercial Revolution

The thirteenth century was extraordinary in a number of ways. By all accounts it was a time of great learning and of considerable scholarly interchange. It was the start of a European commercial revolution, the chief manifestation of which was substantially increased trade, not only within Europe itself but between Europe and the rest of the world. It was, moreover, a time of considerable financial innovation, including the return to gold coinage in Western Europe.

International trade was centered around the fairs that were held regularly throughout Europe, the fairs of Champagne being the most important. These fairs naturally became centers of foreign exchange activity with money changers a regular fixture. Initially the money changers' role was confined mostly to the changing of one type of coin for another. Then as bills of exchange increasingly came into use, the money changers, and also certain of the merchants themselves, began to branch out and become intermediaries in this market. As time wore on some of these merchants actually began to specialize in this activity, whence the origin of the term “merchant banker.”

The purpose of these bills of exchanges was to eliminate the need for specie to be shipped each time goods were bought and sold. The mechanism was quite simple and evidently also

quite effective, since the bill of exchange remained the major form in which foreign exchange transactions were effected throughout most of the nineteenth century, and indeed survives today in modified form when coupled with letters of credit.

A typical scenario involving the use of a bill of exchange was something like the following. Taylor, a London merchant, wants to buy cloth from De Vries, a Bruges exporter. To pay for this transaction and to avoid having to ship specie, Taylor purchases a bill of exchange from Evans, an English merchant banker. The bill of exchange is then sent as payment to De Vries who ships the cloth and remits the bill to Koedijk, a Flemish merchant banker. Koedijk pays De Vries in groten and settles with Evans. This settlement might be simply a bookkeeping transaction, Koedijk canceling offsetting obligations to Evans, or it could involve a shipment of specie, to take place perhaps at a time in the future agreed upon by the two as the date for reconciling their books.

In the fifteenth century, the fairs became year-around ventures and the cities that housed them financial centers. In northern Europe first Bruges and later Antwerp occupied such positions. In southern Europe, the Tuscan cities of Florence, Lucca and Siena were the major centers initially, while Venice took over from all three later. Italians, moreover, became the banker class of Europe.

The reintroduction of a Western European gold coinage took place in 1252 with the striking of two full-bodied gold coins in Northern Italy – the genoin of Genoa and then a few months later the fiorina (or florin) of Florence. For the next century and a half these two coins, the florin particularly, were the world currencies. In the fifteenth century, however, their place was taken by the ducato of Venice. Not surprisingly, given the economic and financial changes that occurred during the thirteenth century, it is at that time that exchange rate data start to become available. Throughout Europe smaller denomination silver coins and coins of various baser metals were used in most internal transactions. A good overview of exchange rate

behavior, therefore, can be had by examining the rates of exchange between these coins and the gold coins used as the international money. Table 1 presents such data, using the Florentine florin as the numeraire. Listed in the table are indices of exchange rates for eight currencies relative to the florin at half-century intervals over the period 1252 to 1500.

What stands out is the upward trend in all of these exchange rates. In each instance the domestic currency depreciated in value relative to the international currency, the florin. A major factor engendering these movements was the series of debasements that took place in all of the European countries throughout this era. A second influence was the discovery and subsequent mining of silver in several countries of Europe during the fifteenth century. The modern notion of a metallic money being a stable money is clearly not borne out by these data.

A second point to notice is the difference across countries in the pace at which the exchange-rate depreciation occurred. The English pound sterling, for example, showed relatively little movement, a drop in value of 0.2 per cent per year over these two and a half centuries; the Castilian maravedi, in contrast, registered a decline of 2.0 per cent per year over the 200 years for which data on it are available.

The depreciation of these currencies does not seem to have been matched by increases in the various countries' price levels. The likely reason why is that increases in money supplies were themselves matched at least to some degree by increases in production and in desired quantities of money demanded.

The Sixteenth Century Price Revolution and Exchange-Rate Theory

In the sixteenth century, however, European price levels did increase, and although the magnitudes of those increases appear to have differed across countries, the overall trends in price levels appear to have been quite similar. A major factor underlying these increases was the increase in money supplies that took place as a result of inflows of specie – silver in particular –

from the Spanish colonies in America to Europe. These inflows quite naturally came first to Spain, causing Spanish prices to rise and Spanish exchange rates to depreciate to the limits set by the cost of transporting the specie abroad. From Spain the specie and associated inflation spread to the rest of Europe and eventually the rest of the world.

The philosophers and moral theologians associated with the University of Salamanca displayed a particular interest in these developments. Indeed, the writings of this “Salamanca School” contain what are now regarded as the earliest statements of the quantity theory of money and of the purchasing power parity theorem, both major underpinnings of modern exchange-rate theory.

The first of these, the quantity theory, posits a relation between money supply and the price level of the following sort:

$$M = k P y,$$

where M is the money supply, k is the desired ratio of money to nominal income, a measure of the real quantity of money demanded, P is the price level and y is real income. Suppose, as was the case in sixteenth century Spain, that M increases as a result of specie discoveries. Suppose further that k is not affected and that the increase in M exceeds any increases in y due to the normal forces of economic growth. The result then will be an increase in P .

The second relation, purchasing power parity, can be seen by considering the following equation linking nominal and real exchange rates and the price levels of the two countries in question:

$$Q = E/(P/P^*),$$

where Q is the real exchange rate, the rate at which a domestic market basket of goods exchanges for a foreign market basket, E is the nominal exchange rate, the domestic currency price of the foreign currency, and P and P^* are the domestic and foreign price levels, respectively.

Suppose now that P increases and that Q is unaffected. The result will be an increase in either E or P^* and, in certain circumstances, both. If E is rigidly fixed, as it would be under a specie standard or if a currency union such as the one currently in existence between Panama and the United States prevailed, then the increase in P will be reflected in a corresponding increase in P^* . If, in contrast, E is floating, as has been the case in many countries over the past three decades, E will increase commensurately with the increase in P , and P^* will be unaffected.

This difference between systems of floating exchange rates and systems of fixed exchange rates has important implications with regard to the links among economies. It implies that under fixed rates monetary disturbances will be transmitted internationally, while under floating rates nominal exchange rates rather than variables like the balance of payments and price levels will adjust following a monetary disturbance.

In the sixteenth century Spanish case, as P increased due to the specie inflows, both E and P^* felt the impact. The increase in E , however, would have been limited to a rather narrow band set by the costs of transporting the specie abroad. Most of the increase in P would, therefore, have translated into an increase in P^* .

Martín de Azpilcueta, a professor and canon-lawyer, known also as Navarrus, was the first to write on the subject. In 1556, he wrote (Commentario resolutorio de usuris, as cited in Grice-Hutchison, 1978 p.104):

And even in Spain, in times when money was scarcer, saleable goods and labour were given for very much less than after the discovery of the Indies, which flooded the country with gold and silver. The reason for this is that money is worth more where and when it is scarce than where and when it is abundant.

In 1601, the philosopher and theologian Luís de Molina, summarized the developments during the course of the previous century in similar terms. In his Disputationes de Contractibus

(as cited in Grice-Hutchison, 1993, p. 165) he wrote:

Other things being equal, whenever money is most abundant, there it will be least valuable for the purpose of buying goods and comparing things other than money. ... Thus we see that in Spain the purchasing power of money is far lower on account of its abundance than it was 80 years ago. ... We likewise see that money is far less valuable in the New World (especially in Peru, where it is most plentiful) than it is in Spain.

The Seventeenth through Early Nineteenth Centuries

The distinguishing feature of the seventeenth and the eighteenth centuries from the standpoint of exchange rate history, was the institutional development that took place during the period. During the seventeenth century Amsterdam became the world's principal financial center and market for foreign exchange. A century later London began its ascent, and by the early nineteenth century it had completely eclipsed Amsterdam in both regards. The other important financial innovations during this period included development of an active secondary market for bills of exchange, development of a financial press providing regular quotes for foreign exchange rates and prices of financial assets, and the founding of the Bank of Amsterdam, an institution that had as one of its major functions facilitating the settlement of foreign exchange transactions.

Over most of the period, exchange rates and price levels showed little or no long-term movement. That, however, changed abruptly in the late eighteenth century as first France and then England abandoned specie standards and adopted paper money. In the French episode, which lasted from 1789 through 1796, money supply grew at rapid and accelerating rates, inflation soared and the exchange rate depreciated dramatically. In the English episode, which began a year after the French one had ended but lasted much longer, money growth, inflation and exchange-rate depreciation were much more muted.

During this time, interest in exchange-rate theory increased. To explain the depreciated currency, Henry Thornton, John Wheatley a number of other "bullionist" writers used the

quantity theory coupled with the purchasing power parity theorem. In so doing, they echoed the Salamancan writers of two centuries earlier, although this apparently was unknown to them.

The Nineteenth Century Gold Standard

England returned to gold in 1821 and remained on the gold standard continuously until the outbreak of World War I. As the nineteenth century wore on, more and more countries joined England. Germany, the Netherlands and the Scandinavian countries switched to gold in the 1870s, while Belgium, France, and Switzerland, the former members of the Latin Monetary Union, switched in 1878. The United States, which prior to the Civil War had been on the gold standard de facto went on it de jure in 1879. Japan adopted gold in 1897.

Under the gold standard, bank notes and deposits increasingly were used as money but both were redeemable in gold. Gold, in turn, circulated domestically as money and also could be used in international transactions.

The late nineteenth century also was a period of considerable international economic and financial integration, and in the United States, in particular, a period of considerable economic growth. Some would argue that the degree of integration experienced during that period has only begun to be matched during the last decade.

In the mid-nineteenth century, the telegraph came into use and in 1867 the Atlantic cable was laid. The immediate result was an increased information flow in the foreign exchange market and in other financial markets. These improvements in communication also began the process of altering the very way in which the foreign exchange market operated. What had been a market centered around organized exchanges eventually became a strictly over-the-counter market. Transactions were conducted via telegraph and cable and then later over the telephone instead of on the trading floor of an exchange.

The Twentieth Century

The inter-war years saw an attempt to resurrect the gold standard, but that effort was both half-hearted and short-lived. Ultimately it floundered under pressures of the Great Depression. In place of gold, countries adopted various expedients, ranging from floating rates to the rigid foreign exchange controls instituted by National Socialist Germany.

During World War II such practices spread, and Allied governments too became highly interventionist, both domestically and internationally. In international finance, the devices used included capital controls, tariffs, quotas and other restrictions on trade, as well as multiple exchange rates. In a number of countries, such restrictions remained in place for well over a decade and a half after war had ended.

In 1944 in Bretton Woods, New Hampshire, the major Allied powers drew up plans for an international monetary system of fixed exchange rates in which the United States dollar would effectively be the reserve currency. As it turned out, the system was of short duration. It was 1959 before many industrial countries allowed their currencies to become fully convertible and the system became fully operable. Then in summer 1971 it started to break down and by early 1973 had done so completely. The reason for its demise, as with the gold standard four decades earlier, was the ease with which shocks got transmitted internationally under these two sets of exchange-rate arrangements. In the 1970s, the culprit was overly expansive U.S. monetary policy, which resulted in worldwide inflation; in the 1930s it had been the overly restrictive U.S. policy, which caused a cyclical contraction in the United States to take on a world-wide dimension.

The floating exchange rates that took the place of the Bretton Woods system were a device for insulating countries that wished to avoid importing the inflation then being generated by U.S. policy excesses. In this regard, they clearly have worked. Where problems have arisen, is in the area of exchange-rate behavior itself. For a decade and a half following the move to

floating rates, variability of nominal and real exchange rates ran exceedingly high, much more so than most observers had expected. Questions were raised about the applicability of existing exchange rate theory to this new world of floating exchange rates. Purchasing power parity, in particular, was quite widely viewed as having broken down.

As it turned out this assessment was much too pessimistic. The behavior of price levels, during both the floating-rate period and the decade or two leading up to it has, in fact, differed markedly from earlier historical experience, but the behavior of real exchange rates has been roughly the same, at least when viewed over the long term. This is clear from Figure 1, which plots annual data for the price levels of the United Kingdom and the United States and for the corresponding real exchange rate for the long period from 1791 to 1998. Prior to World War II, price levels and the real exchange rate appear trendless. After World War II, the picture changes dramatically for the price levels, both exhibiting substantial upward trends. For the real exchange rate, however, it does not alter at all.

Exchange Rates and the Foreign Exchange Market at the Start of the New Millennium

Today the traditional foreign exchange market is an almost totally over-the-counter market. It is dominated by commercial and investment banks and certain other financial and non-financial corporations. Trading takes place via telephone, and electronic communication.

The foreign exchange market is currently the largest financial market in the world. In April 1998, the latest date for which data are available, the estimated average daily turnover in the foreign exchange market was \$1.5 trillion dollars. This was one and one-half times the size of the next largest market, the U.S. government bond market, and two and one-half times the size of the foreign exchange market a scant decade earlier in 1989. Roughly 60 per cent of the turnover in 1998 involved forward transactions and only 40 percent spot, almost the exact opposite of the situation in relative shares of the two in 1989.

What has remained virtually the same over this period, however, are the dominant positions of the United Kingdom and the United States – in essence London and New York – in this market. The United Kingdom accounted for 26% of the turnover in 1989 and 32 per cent in 1998; the United States for 16 per cent and 18 percent, in the two years, respectively.

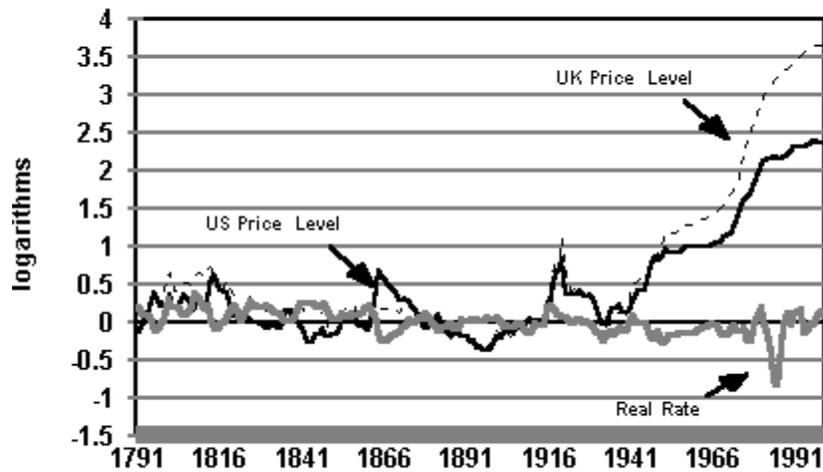
In addition to these traditional markets, moreover, markets now exist for over-the-counter and exchange-traded foreign-exchange derivative products. Measured in terms of average daily turnover neither is large relative to the traditional foreign-exchange market. Measured in terms of notional amounts outstanding, however, they are quite sizable – \$22.1 trillion.

Table 1. Indices of exchange rates relative to the Florentine florin.

	1252	1300	1350	1400	1450	1500
Austria	90	100	141	225	333	495
Castile		100	431	1137.9	2586.2	6465.5
Cologne	37.5	100	336.3	630	915	1680
England	80	100	100	96	121.3	146.7
Flanders		100	128.3	255.2	373.3	609.5
France	80	100	250	220	312.5	387.5
Rome	58.8	100	138.2	214.7	290.2	382.4
Venice	75	100	100	145.3	181.3	193.8

Source: Spufford, Money and its Use in Medieval Europe, 1988.

Figure 1. UK and US Real Exchange Rate and Price Levels



Source: Lothian and Taylor, 1996 and International Monetary Fund, International

Financial Statistics on CD ROM

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