Pegging to a currency basket

The technical issues behind the choice, composition, and operation of a basket peg under a system of floating exchange rates

Shinji Takagi

Following the generalized floating of the world's major currencies in 1973, a number of smaller countries began pegging the value of their currencies to an average value, or basket, of selected foreign currencies. At the end of 1985, 43 member countries of the Fund maintained such basket peg arrangements. Taking into account countries that adopted and then abandoned a basket peg, the total number of countries with such arrangements during 1973–85 was 63.

Why a basket peg

While the ability to maintain a market-determined exchange rate is a benefit of free floating shared by all countries, it can be a relatively costly arrangement for small countries, with their smaller volume of foreign exchange transactions, relatively inelastic trade flows, and less developed financial markets. These countries, therefore, have a greater incentive to choose a fixed over a freely floating exchange rate. In the current environment, however, when most major currencies are floating independently, no small country can maintain a strictly fixed exchange rate system: a decision to peg the currency to any major currency inevitably leads it to float against all other floating currencies. Under these conditions, when a country decides not to float independently, it must also choose the appropriate standard to which it wishes to peg its currency.

When the world's major currencies began to float in early 1973, most small countries initially continued to peg their currencies to the single currency that they had previously used to intervene in the market to support the fixed value of their currencies (mainly, the US dollar, French franc, and pound sterling). Some of these countries soon began to recognize, however, that the benefit of maintaining exchange stability against the intervention currency was, to varying degrees, offset by the cost of greater fluctuation vis-à-vis other major currencies. As a result, several countries began to manage systematically the movements of the home currency against currencies that were thought important, so that the home currency would neither float independently nor be pegged to any single currency. In practice, this was done by pegging the home currency to the so-called effective exchange rate index (i.e., a weighted average of bilateral exchange rates), or to a basket of currencies. The currency baskets included both country-specific baskets (e.g., based on bilateral trade flows) and ready-made baskets, such as the special drawing right (SDR) and, later, the European Currency Unit (ECU).

Although at least one country adopted an exchange rate system similar to a basket peg in the interwar years of floating exchange rates, the basket peg is a relatively new mechanism that came into being in the wake of generalized floating after 1973. The extensive use of the basket peg in recent years can be explained by the greater diversification in international trade that has increased the cost of a single currency peg, as well as by the availability of a well-defined concept of an effective exchange rate—allowing them to measure the "average" exchange rate when currencies are floating against each other—that has helped in measuring the benefit of a basket peg to policy makers.

Choosing a basket

The choice of a basket depends upon the exchange rate policy objective of the authorities. This objective may be defined in terms of a readily identifiable relative price variable, such as the terms of trade or the real exchange rate, or in terms of a macroeconomic variable such as the balance of trade or, more important, the balance of payments. Once the objective is defined, the choice of currencies and the weights to be assigned to them in

the basket can be made on the basis of the relative importance the authorities attach to exchange rate stability against various currencies in the light of the chosen policy objective. The greater the need for stability vis-à-vis a particular currency, the greater its relative weight in the basket. Determining the exact weights is a complex exercise.

Some countries have used an econometric model, such as the Fund's Multilateral Exchange Rate Model (MERM) to assign appropriate weights to individual currencies in their baskets. (The MERM is a general equilibrium model that is designed to assess the trade effects of exchange rate changes in the world economy. It is disaggregated into 18 countries or groups of countries and six classes of goods.) The use of this method has the advantage that it takes account both of the direct effect on a country's trade and payments of exchange rate fluctuations against the currencies of bilateral trading partners and of the indirect effect of movements in the currencies of other countries that are competing in the same markets. This method also allows the authorities to distinguish among different classes of commodities that have different price elasticities of supply and demand. Of course, a question remains as to the feasibility of constructing such a general equilibrium model that is capable of replicating reality accurately. In practice, most countries have decided not to use this method on the grounds that it is either not feasible or credible and have decided instead to use simple bilateral trade shares to weight their baskets. Many suggestions have been made to give greater economic validity to the use of such bilateral shares. For example, it has been pointed out that the share of trade in homogeneous goods (such as agricultural products and minerals) should be excluded from the calculation, because the existence of a well integrated world market for these commodities tends to make the direction of trade irrelevant in the determination of their prices in any one currency.

Regardless of the method by which the weights are derived, the basket composed from trade weights can never be perfect, because the impact of an exchange rate change on the policy objective cannot be precisely predicted. In recognition of this, some countries have used the SDR as an accessible and practicable proxy for the theoretically perfect basket. The SDR is particularly attractive when the shares of the currencies that constitute it reflect fairly closely a country's pattern of trade and payments (the SDR currently comprises the US dollar, deutsche mark, Japanese yen, French franc, and pound sterling). Moreover, because the Fund quotes the value of the SDR in terms of most major currencies on a daily basis, the SDR peg offers a simple means of determining the value of a home currency against those major currencies. Several studies conducted in the Fund have indicated that, in practice, pegging to the SDR is more effective than pegging to a single currency in stabilizing a reasonably defined effective exchange rate in most developing countries.

Valuation of basket

The choice of currency weights in a basket does not in itself determine the value of the home currency. The same set of weights can give different values depending on which of two methods is used to weight changes in the component currencies. Under one method (the *arithmetic average* method), the currency weights are variable and, more important, the way the exchange rate index is defined determines how those weights change: if an increase in the exchange rate index is defined as a depreciation in terms of the intervention currency (first arithmetic average method), increasing weight is given to a depreciating currency; if an increase is defined to be an appreciation (second arithmetic average method), increasing weight is given to an appreciating currency (see box for an explanation of these methods). Under another method (the *geometric average* method), the initial currency weights can be maintained indefinitely and the value of the basket is independent of the way the exchange rate index is defined.

Given the same movements in the exchange rates of the component currencies, the first arithmetic average method results in the most depreciated value, the second method in the least depreciated value, and the geometric average method in an intermediate value. In the light of these different implications of valuation methods, the choice among them should be made according to the authorities' policy objective. If the primary concern is with price stability, the second arithmetic average method, in which there is a bias toward appreciation, should be adopted. If their primary concern is with maintaining the real (price level adjusted) effective exchange rate in the face of rising prices, they may prefer the first arithmetic average method, in which there is a bias toward (nominal) depreciation. Finally, if the primary concern is with the maintenance of the pre-determined currency weights, the geometric average method may be preferred. The choice of a valuation method makes a large difference in the value of the pegged currency over a period of years. (This was reflected in the July 1984 decision by Norway to switch to the geometric average method from the second arithmetic average method, under which the weight of the then-appreciating US dollar was rapidly increasing in Norway's basket.)

Basket as an exchange rule

Regardless of the choice of a valuation method, the effect of a basket peg is to minimize the extent of exchange rate fluctuation against all currencies. For example, in a basket containing the dollar, the deutsche mark, and the yen, when the yen appreciates against the dollar and the deutsche mark, the home currency that is pegged to this basket will also appreciate against both these currencies, though the extent of appreciation of the home currency will be less than that of the yen. In this respect, a basket peg resembles a managed float. The crucial difference between these two exchange rate regimes, however, is that under a basket peg the value of the currency is automatically determined by the rules governing the operation of the basket, while under a managed float the authorities have to take discretionary action to adjust the value.

Under a rule-governed exchange rate regime, such as a basket or a fixed peg, the authorities give up control over the money supply in order to retain control over the exchange rate. (In fact, the same kind of trade-off exists under free floating, where the authorities give up control over the exchange rate in order to retain control over the money supply.) A rule-determined exchange rate will largely determine the domestic price of traded goods and the nominal quantity of money that is consistent with that price level. If domestic credit expands too rapidly, for example, there will be an offsetting outflow of reserves. This is a binding constraint on monetary policy under a pegged exchange rate regime, be it a single currency peg or a basket peg. The only difference is that, under a basket peg, the authorities can choose their own desired long-run rate of inflation by the choice of a basket. Under a single currency peg, the inflation rate is determined by the country of the currency peg. The pursuit of high-inflation monetary policy in a pegged exchange rate regime has often resulted in frequent devaluations or even complete abandonment of such a regime. (For such high-inflation countries, the benefit of free floating becomes correspondingly greater).

Against the loss of discretionary monetary policy, a rule-governed regime has the compensating advantage that it frees the authorities from the need to make decisions on money supply and exchange rate constantly, thus freeing up resources, eliminating unnecessary uncertainty, and lessening the scope for costly policy errors. A rule-governed regime is also likely to result in greater monetary discipline and credibility. In any case the value of discretionary monetary policy may be limited in small, open economies that are typically subject to disturbances (e.g.,

crop failures or recession in the industrial countries) over which they have little control. This trade-off between rules and discretion becomes important in the resolution of operational issues arising out of the administration of a basket peg policy.

Operation of a basket peg

The operation of a basket peg involves several issues that do not arise in the operation of a single currency peg. They include the public disclosure of the basket, the frequency of quotations, and the width of margins around the parity value of the basket in terms of the intervention currency. These operational issues arise from the fact that the exchange rate of the home currency constantly changes in terms of the currency that is used to intervene in the market to maintain the value of the basket, but the rate is still dictated by a specific exchange rate rule.

If the authorities desire to adhere strictly to a basket peg rule under these conditions, they must continuously calculate and quote the exchange rate against the intervention currency and be ready to sell or buy whatever amount of the intervention currency is necessary to support that rate. Thus a strict basket peg policy is not practicable. But, if the exchange quotation is made less frequently (e.g., once a day), a minimum margin on either side of parity is needed to allow the official rate to deviate from the theoretical rate. If the quoted rate is allowed to deviate considerably from the theoretical rate, there is an incentive for foreign exchange dealers to make speculative profits by short selling or short buying. While speculation may not be harmful under all circumstances, the authorities may desire to prevent the dealers from knowing what the theoretical exchange rate is by not disclosing the composition of the currency basket. This is why most of the tailor-made baskets are not publicly disclosed. An additional complication arises from the fact that it is easy for dealers and other participants in the foreign exchange market to estimate the undisclosed currency shares in the basket by observing the movements of the exchange rate of the home currency against all others. The authorities need to vary margins from time to time, in an unpredictable fashion, if they also desire to eliminate this possibility.

Under a basket peg, as in a free floating regime, the authorities may need to provide forward facilities if there is no forward market for the home currency. This is not the case under a single currency peg, where forward transactions can, in principle, be conducted in terms of the intervention currency with which the home currency is convertible at a fixed parity. The guaranteed convertibility with the intervention currency at a fixed par rate allows the home currency to share the characteristics of the intervention currency. Under a basket peg, however, there is no link between the home currency and the currencies in the basket. The only way to establish this direct link and thus allow forward facilities under a basket peg arrangement is to peg the home currency to a basket that is composed of fixed units of currencies. Such a basket is known as the "standard" basket; the SDR and the ECU are two best known examples of this type of basket. Under the standard basket method, the home currency retains all the currency characteristics of the component currencies, thus forward transactions in the home currency can be made by forward sale or purchase of the component

Calculating the value of a currency basket

In the following example, it is assumed that the basket consists of the US dollar (with a share of 50 percent), the deutsche mark (35 percent), and the Japanese yen (15 percent) and that the exchange rates in the base period in terms of 1 US dollar are: 2 deutsche mark, 250 Japanese yen, and 10 units of the home currency.

Suppose that the deutsche mark depreciates to 2.5 and the Japanese yen appreciates to 200 per US dollar. In this case, defining an increase in the index as a depreciation against the dollar, the new exchange rates can be expressed in terms of index numbers as: 100 for the US dollar, 125 for the deutsche mark, and 80 for the Japanese yen. The new exchange rate index of the home currency can be found by taking (1) the geometric average, (2) the arithmetic average, or (3) the arithmetic average of the inverses, that is the dollar per unit of foreign currency, of the indices of the three currencies in the basket:

Geometric average: $(100^{0.5})(125^{0.35})(80^{0.15}) = 104.56$

Arithmetic average (I):

$$(100 \times 0.5) + (125 \times 0.35) + (80 \times 0.15) = 105.75$$

Arithmetic average (II):

$$\frac{1}{\left(\frac{1}{100} \times 0.5\right) + \left(\frac{1}{125} \times 0.35\right) + \left(\frac{1}{80} \times 0.15\right)} = 103.36$$

Thus the depreciation shown by the geometric average method is 4.56 percent, the arithmetic average method (I) 5.75 percent, and the arithmetic average method (II) 3.36.

The operation of a standard basket

Composing the standard basket

If we use the same currencies as in the above illustration, the standard basket can be composed in the following manner. First, the initial exchange rate of each currency is expressed in US dollars per unit of currency, that is, 1 for the US dollar, 0.5 for the deutsche mark, 0.004 for the Japanese yen, and 0.1 for the home currency. Second, the number of units of each currency in the basket is determined by finding the value of an unknown (d_i) such that the product of d_i and the dollar exchange rate constitutes the desired share. In this example, we have

$$(1 \times d_1) \div (0.1) = 0.5,$$
$$(0.5 \times d_2) \div (0.1) = 0.35,$$
$$\text{and} \quad (0.004 \times d_3) \div (0.1) = 0.15,$$

thus obtaining $d_1 = 0.05$, $d_2 = 0.07$, and $d_3 = 3.75$. The standard basket will then comprise 0.05 units of the US dollar, 0.07 units of the deutsche mark, and 3.75 units of the Japanese yen. This composition of the basket will remain the same regardless of subsequent exchange rate changes until the authorities decide to change it deliberately.

Calculating its value

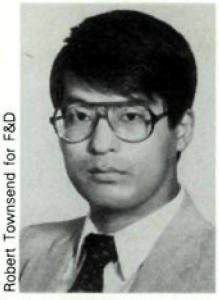
Once we know the currency units in the basket, the value of the home currency in terms of the US dollar at a subsequent date can be calculated as the sum of the values of the three currency components. In the example above, if the new exchange rates in terms of the US dollar are 1 for the US dollar, 0.4 for the deutsche mark, and 0.005 for the Japanese yen, the new exchange rate of the home currency would be calculated as follows:

$$(1 \times 0.05) + (0.4 \times 0.07) + (0.005 \times 3.75) = 0.09675$$

This represents a 3.36 percent depreciation, the same as the result under the second arithmetic average method. This follows from the fact that, since the currency units are fixed under the standard basket method, an increase in the value of a component currency in terms of the intervention currency means an increase in the share of that currency in the basket.

currencies in their exact composition in the basket, provided there is a well-functioning forward market for all of them. This composite currency or basket can be determined by finding the number of units of each currency that would give that currency the desired weight in the basket; the value of the basket in terms of the intervention currency, say the dollar, at a subsequent date can be given by the sum of the dollar values of the currency components at that date (see box).

In order to retain some degree of monetary discretion, the authorities may want to maintain a wide margin around the parity value. They may also want to make discrete adjustments in the value or the composition of the basket in order to offset a loss of competitiveness or to accommodate a change in the structure of the country's trade. Too wide a margin or too frequent an adjustment, however, will make a basket peg behave more like a managed float. Although a minimum margin and occasional adjustments are necessary for the smooth operation of a basket peg, their excessive use may lead to a loss of monetary discipline and credibility that are the key ingredients of an exchange rate regime governed by the rules of a basket peg. Similarly, keeping the basket undisclosed may signal a lack of commitment on the part of the authorities to pursue a rule-governed exchange rate policy and may even increase the temptation for overvaluation. On the other hand, a policy of pegging the home currency to a publicly disclosed basket with a narrow margin accompanied by little adjustment may impose on the authorities a firm commitment to abide by such a policy and reduces the temptation for overvaluation.


Robert Townsend for F&D

Shinji Takagi
a Japanese citizen, is an Economist in the Fund's Research Department. He holds a PhD in economics from the University of Rochester, and has published articles on macroeconomics and international finance.

Conclusion

The preceding discussion suggests that the operation of a basket peg can be quite flexible. At one extreme is a policy of pegging to a publicly disclosed basket with narrow margins and infrequent adjustments; on the other extreme is a policy of pegging to a publicly undisclosed basket with wide margins and frequent adjustments. Under such conditions, there is a fine line between a basket peg and a managed float. In the current system of floating exchange rates, both the basket peg and the managed float can help stabilize effective exchange rates. However, they differ in the extent to which they allow policy discretion. Our discussion suggests that the benefits of a basket peg are likely to be greater, if a country has a less diversified production, is well integrated with the global economy and thus more vulnerable to external disturbances, and lacks the manpower to properly manage a more discretionary exchange rate system. As long as the current global exchange rate system continues, a basket peg is likely to remain a viable and useful exchange rate regime for smaller economies. F&D