



## The Deceptive Resilience of Fixed Exchange Rates

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**The Deceptive Resilience of Fixed Exchange Rates**

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**Abstract**

This paper is an examination of the experience of exchange-rate systems since 1978. Despite the accelerating trend in favour of floating exchange rates, a substantial minority of IMF members have continued to fix the value of their currencies. The recent incidence of each of the principal types of exchange-rate peg is described.

***Journal of Economic Literature* classification**

F33

**Key words**

fixed exchange rates, floating exchange rates

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## **1. Introduction**

In a recent article in this journal, Kaneko (2003) discussed the choice of exchange-rate régime, and its interaction with domestic macroeconomic policy, by developing countries. Consistent conclusions were reached by a different route by Mushin (2002a). It is useful to consider recent experience in the context of these theoretical arguments for and against each type of exchange-rate policy.

In the early 1970s, the Bretton Woods system of fixed exchange rates collapsed. The combined effects of increased international mobility of capital and inadequate reserves meant that the system could not be sustained. With the sole important exception of Canada, whose exchange rate was allowed to float from 1950 to 1962, fixed exchange rates were almost universal during the quarter century following the end of the Second World War. They have now become exceptional in an international monetary system that is dominated by floating exchange rates. The major economies led the change to floating rates and smaller economies followed. Independently floating exchange rates were, for example, adopted by the UK in 1972, by Australia in 1983, and by New Zealand in 1985. These changes were encouraged by widespread developments in political and economic ideology that favoured economic deregulation and the use of monetary policy as an anti-inflation instrument. The maintenance of fixed exchange rates necessitates the buying and selling of their own currencies by monetary authorities and so precludes the operation of independent monetary policy. In addition, the original justifications for fixed rates have been weakened by the increased geographical and commodity diversification of trade in many countries and by the development, in the private sector, of other devices, including forward markets and insurance, that reduce risk.

It is now usual to include the diminished importance of fixed exchange rates, and the causes and consequences of this, in undergraduate courses in

macroeconomics. Dornbusch *et al.* (1998) and Mushin (2002b) are among the authors that explain this material. This emphasis is reasonable since the majority of countries, including all major countries, now have floating exchange rates. Fixed exchange rates have not, however, disappeared, and it is of interest to assess the importance of those that remain and to consider the nature of the countries that have retained them. Despite their reduced importance, there remains academic interest in the nature and significance of fixed exchange rates. For example, Schuler (1999) considered why some fixed exchange rates have survived very much longer than have others and discussed the relationship between inflation rates and exchange-rate stability. Kopcke (1999) analysed the importance of rigidly fixed exchange rates for developing and newly independent countries.

*International Financial Statistics* [IFS] is probably the best source of exchange-rate data. Analysed in this article is the information that is included in IFS on exchange-rate systems operated by each of the members of the International Monetary Fund [IMF] from 1978 to 1998. The published data that relate to earlier and later years are not in a format that is consistent with this.

Between 1978 and 1998, the number of IMF members increased from 135 to 182. Some of this net increase is due to changes in national boundaries. The dismantling of Czechoslovakia and of Yugoslavia, and the separation of Eritrea from Ethiopia, led to the creation of additional nations that became members of the IMF. Similarly, the number of IMF members was reduced by the merger of the former People's Democratic Republic of Yemen (Aden) and the former Arab Republic of Yemen. In addition, without any change in the number of IMF members, the People's Republic of China replaced the Republic of China (Taiwan), and the German Federal Republic expanded to incorporate the former German Democratic Republic. Also during this period, a large number of additional countries, including Czechoslovakia (1990), Hungary (1982), Poland (1986), and Switzerland (1992), joined or re-joined the IMF. The Union of Soviet Socialist Republics was never an IMF member, but each of its constituent parts, including Russia, became one after its dissolution. Almost all countries are now IMF members; notable exceptions are Cuba, People's Democratic Republic of Korea (North Korea), and (since 1981) Taiwan.

## 2. Analysis of exchange-rate systems using non-weighted IFS data

Figure 1 shows the proportion of IMF members using each of seven types of exchange-rate system. The data refer to the end of each year from 1978 to 1998.

The classification is:

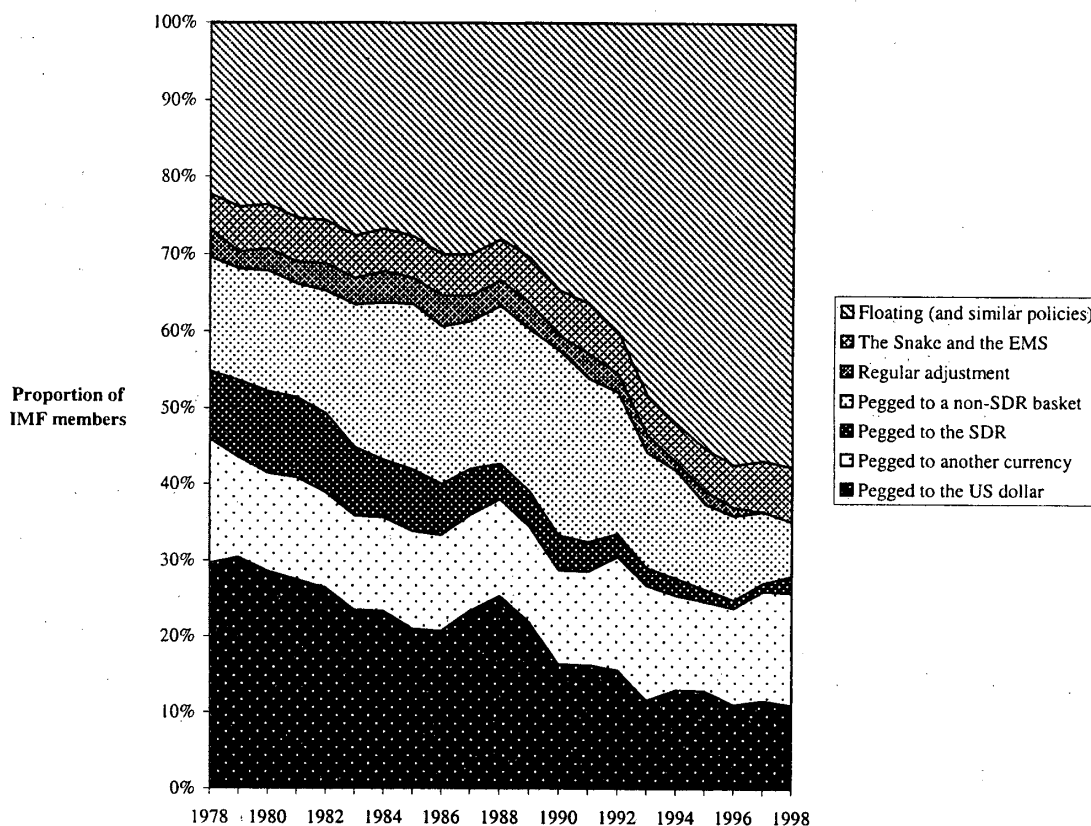
Pegged to the United States dollar

Pegged to the currency of another country

Pegged to the Special Drawing Right [SDR]

Pegged to another basket of currencies

Regular adjustment according to a set of indicators that is defined in advance



Source: "International Financial Statistics"

Figure 1. Exchange-rate systems, 1978-98

The Snake and the European Monetary System [EMS] [see Appendix 1]  
Floating (including managed floating and limited flexibility in terms of the  
US dollar)

Figure 1 confirms the recent dominance of floating exchange rates (and similar systems) and the declining importance of fixed exchange rates. In 1978, only 22% of IMF members had floating (and similar) exchange rates; in 1998, this proportion had increased to 58% [see Appendix 2]. The proportion of IMF members that pegged their exchange rates to the US dollar fell during this period from 30% to 11% [see Appendix 3], the proportion that pegged to the SDR fell from 9% to 2% [see Appendix 4], and the proportion that pegged to another currency composite fell from 15% to 7% [see Appendix 5]. In marked contrast with these figures, however, the proportion of IMF members that pegged their exchange rates to a currency other than the US dollar declined at a much lower rate; the proportion decreased from 16% in 1978 to 15% in 1998 [see Appendix 6]. The proportion of IMF members that adjusted their exchange rates frequently on the basis of pre-determined indicators decreased from 4% in 1978 to 0% in 1998 [see Appendix 7]. The proportion of IMF members that participated in the Snake and in the EMS increased from 4% in 1978 to 7% in 1998 [see Appendix 8].

These percentages should be treated with care because the membership of the IMF expanded significantly, and changed in nature, during the period of the data that has been analysed. New members are, at least in the short term, more likely than existing members to use fixed exchange-rate policies. The additional IMF members between 1978 and 1998 included newly independent countries, such as Azerbaijan, Belarus, Kazakhstan, and Moldova, for whom a pegged exchange-rate policy was often of short duration, and countries experiencing major political upheavals, such as Angola, Bulgaria, Mongolia, and Poland, for whom fixed exchange rates were also often short-lived. They also included small countries, including Antigua, Bhutan, Belize, Kiribati, San Marino, and St Vincent, each of which had a long history of a fixed exchange rate with respect to the currency of a large and dominant neighbour, and these fixed exchange-rate policies have endured.

Exchange-rate policy experience from 1978 to 1998 is summarised in a different way in Table 1. Using end-year data, this table shows the number

of IMF members that operated each type of policy for various amounts of time (which, in many cases, is not continuous). Pegs to the French franc are identified separately because the recent experience of this type of fixed exchange-rate policy differs from that of the other types of pegged exchange rate.

Although the rapid increase in the membership of the IMF makes Table 1 difficult to interpret, the conclusions are clear. Only 25% of the IMF members in 1998 had retained the same type of exchange-rate policy for the whole of the period of the data. The majority of IMF members made frequent changes to their exchange-rate policies between 1978 and 1998, although the countries that fixed their exchange rates with reference to the French franc, where there was generally a high degree of policy stability, have tended not to behave in this way. With the exception of the membership of the French-franc zone, each of the types of exchange-rate policy was used by a large number of countries for short periods only.

Table 1 *Duration of IMF members' exchange-rate policies, 1978-98*

	Years of policy duration (x):		
	$x=21$	$21 > x \geq 15$	$15 > x > 0$
	Number of IMF members:		
Pegged to the US dollar	7	12	46
Pegged to the French franc	13	0	3
Pegged to another currency	2	1	25
Pegged to the SDR	1	1	19
Pegged to a non-SDR basket	4	9	41
Regular adjustment	0	2	10
The Snake and the EMS	6	2	7
Floating (and similar policies)	13	19	91

Source: *International Financial Statistics*

The information used in the preparation of this table can be obtained from the author.

The Gross Domestic Product [GDP] per person of most of the IMF members that used floating exchange rates (or similar policies) for the whole of the data period is high [see Appendix 2]. This is also true of all the countries that remained members of the Snake and of the EMS throughout this twenty-one-year period [see Appendix 8]. In contrast, the majority of the IMF members that used one of the other types of fixed exchange rates continuously from 1978 to 1998, including all of those that used pegs to the French franc, are low-GDP countries [see Appendices 3, 4, 5, and 6]. There is, therefore, a relationship between a country's GDP per person and its exchange-rate policy. It is, however, a weak relationship. For example, members of the IMF that used floating exchange rates for all or most of the data period include Afghanistan, Congo (Democratic Republic) (formerly Zaire), Costa Rica, Ghana, Sri Lanka and other low-GDP countries. Similarly, countries that pegged their exchange rates to non-SDR baskets of currencies for at least fifteen years during the data period include Austria and Sweden, neither of which can be described as low-GDP countries.

One of the difficulties of analysing the evolution of exchange-rate policy using data for the membership of the IMF is that there are many possible reasons for the adoption of each type of policy. For example, a country that, due some combination of its political, economic, and social conditions, is widely regarded as potentially (or actually) unreliable, might feel a pressing need to establish the credibility of its currency in world markets, and might decide that the operation of a fixed exchange rate is the optimal way to achieve this. This is likely to apply, to a variable extent, to, among others, Ethiopia, Hong Kong, Iraq, Oman, and Syria, each of which has pegged its exchange rate to the US dollar for many years, to Myanmar (formerly Burma), which fixed its exchange rate with respect to the SDR for the whole of the period of the data, and to Libya, whose exchange rate has been pegged either to the US dollar or to the SDR throughout the data period.

An entirely different causal sequence is that strong historical connections or dominant trade flows might encourage countries to fix their exchange rates with respect to a particular foreign currency. Examples are the long-term use of a US-dollar peg by Liberia, Marshall Islands, and by many countries in the Caribbean and in Latin America. The same applies to the use of a French-franc peg by most of France's former territories in Africa. A related scenario



is the adoption by small countries of a fixed exchange rate with the currency of the larger country with which they have a high degree of economic integration. In addition to encouraging exports and reducing the risk of imported inflation, this arrangement reduces transactions costs. Countries that have taken this approach include Bahamas, Bhutan, Lesotho, San Marino, and (until 1979) the Irish Republic.

### 3. Analysis of exchange-rate systems using GDP-weighted *IFS* data

Figure 1 is based on the number of IMF members using each type of exchange-rate policy. Since the definition of each country is derived from an arbitrary mix of historical, geographical, social, and political accidents, analysis based on this graph is deficient. A further complication is that some national

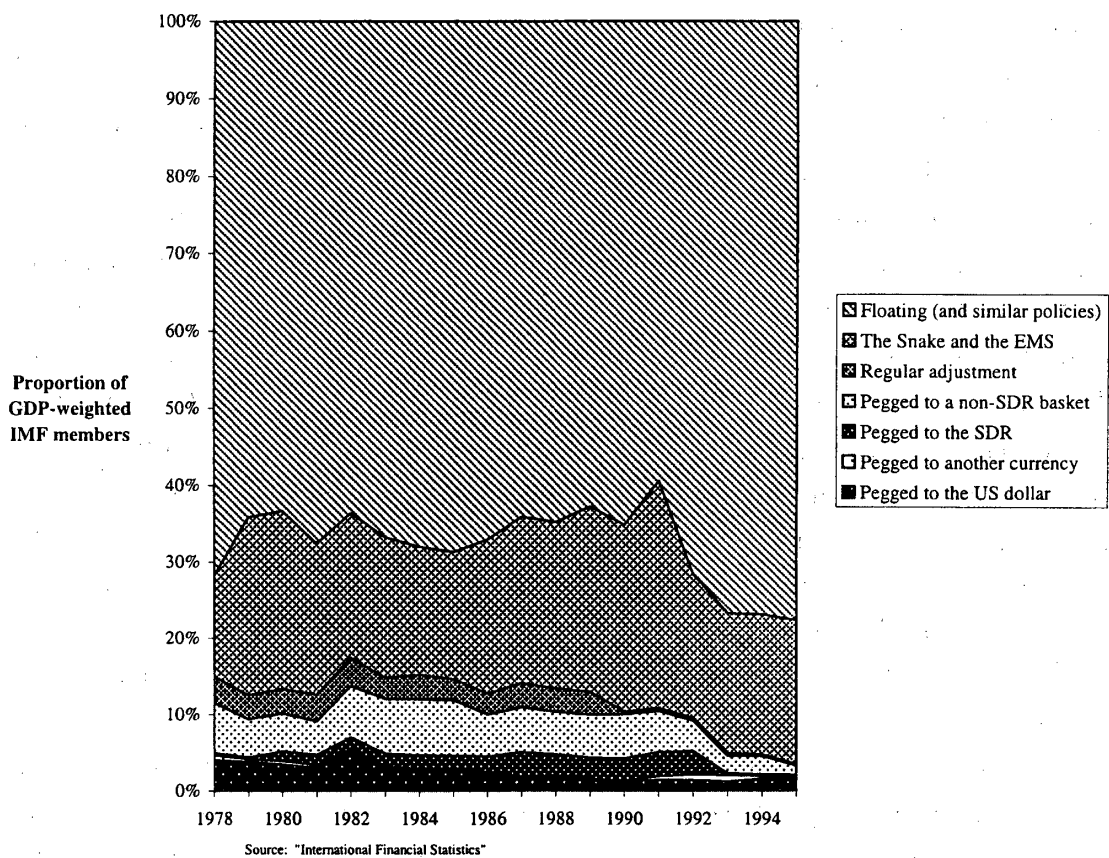


Figure 2. Exchange-rate systems, 1978-95

boundaries have changed during the period of the data. If the intention is to identify the relative importance of several exchange-rate systems, it is unsound to allocate the same weight to economies of different size, and it is unsound to use data that lead to different conclusions when countries divide or merge. Figure 2 is an attempt to deal with this weakness. In this case, each country has been weighted by the annual value, in millions of US dollars, of its GDP. Data have been taken from several issues of the *Statistical Yearbook*. The most recent such data that are available refer to 1995. The use of GDP data is, of course, an imperfect proxy for the importance of each exchange-rate policy, partly because international GDP data are likely, despite the diligence of United Nations statisticians, to be both inaccurate and inconsistent, and partly because the importance of international trade and payments varies substantially between individual countries and is most unlikely to be proportional to the value of the GDP of each country.

Figure 2 confirms the prevalence of floating exchange rates (and similar policies). It also confirms that the importance of this type of policy is increasing. Comparison with Figure 1, however, shows that the use of GDP-weighted data increases the apparent importance of floating exchange rates (and similar policies) and reduces its apparent rate of growth. In 1978, the proportion of GDP-weighted IMF members with floating exchange rates (and similar policies) was 72%; in 1995, this proportion had increased to 78%. However, the proportion decreased during most of this period, reaching a minimum of 60% in 1991, and it did not exceed its 1978 value until 1993. Comparison of Figure 1 and Figure 2 indicates that small countries are less likely than large countries to use floating exchange rates, and that it is principally smaller countries that have changed from fixed to floating exchange rates since 1978. Some of the significant changes in the proportion of GDP-weighted IMF members using floating exchange rates (and similar policies) between 1978 and 1998 reflect changes in the proportion that participated in the Snake and the EMS [see below]. Most of the countries that joined or left the Snake or the EMS during the period of the data adopted or abandoned floating exchange-rate policies.

The use of GDP-weighted data reduces the apparent significance of fixed exchange rates, especially those are specified in terms of the US dollar and of other individual currencies. On Figure 2, the area of the graph that represents

pegs that are specified in terms of individual currencies other than the US dollar is so narrow as to be almost invisible, which is in marked contrast to its substantial width on Figure 1. The very modest recovery from 1991 to 1993 is due to the adoption of fixed exchange rates related to the Russian rouble and to the German mark, most of which did not last long [see below]. The proportion of GDP-weighted IMF members that pegged their exchange rates to the US dollar decreased from 4% in 1978 to 2% in 1995, the proportion that pegged their exchange rates to other currencies decreased from 0.7% in 1978 to 0.3% in 1995 (with a maximum of 0.8% in 1993), and the proportion that pegged their exchange rates to non-SDR currency composites decreased from 7% in 1978 to 1% in 1995. Fixed exchange rates that are specified in terms of the French franc have shown greater resilience than have other types of fixed exchange-rate policy. This is probably related to the fact that France has maintained greater economic and political links with its former territories in Africa than the other former colonial powers have retained with theirs.

Unadjusted data overstates the importance of fixed exchange rates, especially those that are pegged to the French franc. This indicates that low-GDP countries are more likely than high-GDP countries to use fixed exchange rates. An examination of the exchange-rate policies of the fifty IMF members with the smallest GDP confirms this. In 1978, 88% of the fifty smallest countries used fixed exchange rates (including pegs to the US dollar, to other currencies, to the SDR, and to other currency composites), compared with 70% of all IMF members. In 1998, the proportions were 66% of the fifty smallest IMF members and 35% of all IMF members.

Figure 1 indicates that the importance of SDR-pegs also declined during the period of the data. The GDP-weighted data used in Figure 2 lead to the different conclusion that the importance of exchange rates pegged to the SDR increased significantly in 1980 and decreased significantly in 1993. These are the years in which the use of this policy began and ended in Iran, whose GDP is much greater than that of the other countries that adopted or abandoned this system during the period of the data.

Non-weighted data shows a slow decline in the importance of exchange rates subject to regular adjustment by reference to pre-specified indicators. In contrast, Figure 2 shows that the proportion of GDP-weighted IMF members using this system fell sharply in 1990. This is because Brazil and

Portugal ceased to operate this type of policy in that year. GDP-weighted data shows no such change in 1994, although two IMF members abandoned regular adjustment of exchange rates in that year too. However, these two countries are Colombia and Madagascar, whose combined GDP is very much smaller than Brazil's.

The use of GDP-weighted data, as in Figure 2, also increases the apparent importance of the Snake and the EMS, of which all the members (and former members) are high-GDP countries. The proportion of GDP-weighted IMF members that participated in the Snake and in the EMS increased from 13% in 1978 to 19% in 1995. The peak in 1991, when the proportion reached 30%, indicates the short period of membership of the UK, which is not apparent in Figure 1.

The differences between non-weighted and GDP-weighted data arise because there is a great range of individual countries' GDP values. This is illustrated by the data that refer to exchange rates that are pegged to the US dollar. In 1982, the weighted data indicate an increase in importance of US-dollar pegs, but the non-weighted data show a decrease in their importance. The explanation is the adoption of this policy in 1982 by Mexico, whose GDP is much greater than the combined GDP of Chile, Costa Rica, Pakistan, and Somalia which ended their US-dollar peg in that year. Similarly, in 1987, there was a marked increase in the non-weighted data but a small decrease in the GDP-weighted data. The explanation is that the GDP of Egypt, which ended its US-dollar peg in 1987, is substantially greater than the combined GDP of Afghanistan, Guyana, Mozambique, Uganda, and Zambia, which began pegging their exchange rates to the US dollar in that year.

The principal advantage that is claimed for fixed exchange rates is that they encourage stability. It is perhaps curious, therefore, that fixed exchange rates frequently survive for short periods only. For example, thirty-two IMF members fixed their exchange rates to the US dollar for fewer than six years between 1978 and 1998. This might imply that economic conditions, including the level of reserves, meant that fixed rates could not be maintained, or it might mean that the conditions that had led to the establishment of fixed rates quickly ceased to exist. There will often also have been political determinants of economic policy.

The role of the US dollar as the numéraire in the exchange-rate policy of

individual countries has diminished rapidly [see Appendix 3]. This role of the British pound is now almost extinct [see Appendix 6]. There has not, however, been a corresponding growth in the importance of other currencies in this role. Both the number and the GDP of the countries that have adopted a French-franc peg since 1978 are very small. For varying periods between 1992 and 1994, each of nine components of the former USSR fixed their exchange rates with respect to the Russian rouble. Despite the dominance of Russia in the external trade of these countries, this was a temporary policy only, lasting less than three years in every case, probably because of the instability of the Russian currency. Pegs to the German mark, which were first used in 1991 and survive in three of the four countries in eastern Europe that adopted them, might be of greater long-term significance as this currency is generally perceived to be more stable than the Russian rouble. It is interesting that, despite the importance of the external trade of Japan, especially in the Asia-Pacific region, and the stability of its currency, the Japanese yen has not been chosen as its exchange-rate peg by any country.

Fixed exchange rate policies are not as homogeneous as might be inferred from *IFS* data. Schuler (1999) described the various forms that they can take. Honohan (1994) described the fixed exchange rate between the Irish Republic pound and the British pound (that ended in 1979) and compared this to other pegs. The legal basis of a fixed exchange rate might influence its durability.

#### **4. Developments in Europe**

In January 1999, eleven of the members of the European Union introduced a new currency called the euro [see Appendix 9]. A twelfth country joined the euro zone in January 2001. Each national currency in this group had a rigidly fixed exchange rate with the euro (and, hence, with each other). In January 2002, euro notes and coins replaced national currencies in the euro zone. The intention of the new currency arrangement is to reduce transactions costs and encourage economic integration. Mushin (1999) analysed some of the likely effects of this new arrangement.

The Snake and the EMS can perhaps be regarded as transitional structures leading to the introduction of the euro, which is the single currency (which has a floating exchange rate) of a single integrated economy. If this premise

is accepted, the IMF members whose currency is the euro (and those who participated in its precursors, the Snake and the EMS intervention arrangements) should be added to those whose currencies have floating exchange rates. In this case, floating exchange rates (and similar policies) amounted, in 1995, to 96.5% of the GDP-weighted total of IMF members. This proportion has almost certainly increased since then. Despite the superficial inferences that might be drawn from the non-weighted data that are published in *IFS*, fixed exchange rates are now of trivial importance in the international monetary system as a whole.

Exchange rates that, in 1998, were pegged to the French franc, to the German mark, and to the Italian lira have been pegged to the euro since its inception. This further increases its significance, although not by a large amount. Most of the countries whose currencies are currently pegged (via one of its constituent currencies) to the euro, including all of the countries that use the CFA franc, have a very low GDP per person [see Appendix 6]. Denmark, Cyprus, Lithuania, and Malta have linked their currencies to the euro since 1999 but this also has a small effect on its importance. Especially if the euro becomes an important currency, as predicted by Mundell (1998), the list of currencies that are pegged to the euro might expand. It is likely that the additional countries that choose to peg their exchange rates to the euro will also have a lower GDP per person than the European Union countries that introduced the euro in 1999. This possibility must have weakened the case for the exclusion of Greece from the euro zone. Greece was initially excluded on the grounds that it did not satisfy the Maastricht conditions [see Appendix 10] and that therefore its economy was not comparable to the economies of the other eleven euro countries. This initial exclusion was imposed on Greece although only one of the euro countries, Luxembourg, had satisfied all the conditions on the date of the introduction of the new currency. However, Greece, in 1999, was very much closer to satisfying the Maastricht conditions than are, for example, the members of the CFA franc zone.

The creation of the euro will have, and might already have had, macroeconomic consequences for the countries whose exchange rates were pegged to the French, German, and Italian currencies and are now pegged to the euro. The influences on the import prices and export prices of these

countries now include the effects of monetary policy run by the European Central Bank, a non-elected supra-national institution that is directly accountable neither to individual national governments nor to individual national parliaments, and developments, including capital flows, in world financial markets. Neither of these can be relied upon to ensure stable prices at an acceptable level in small price-taking economies. The consequences of the introduction of the euro might be severe in these (mostly low-GDP) economies, and might lead to a change in the nature of their currencies. It is perhaps ironic that the countries that are undergoing this experiment in exchange-rate policy have been selected largely by historical accident.

The introduction of the euro is a remarkable event whose economic effects, especially in the long term, are uncertain. This type of exercise, involving the rigid fixing of certain exchange rates, has not previously been attempted in the recent past. It is especially noteworthy at a time when the majority, and an increasing proportion, of countries have chosen floating exchange rates for their currencies. This includes all major economies.

Perhaps stimulated by the Treaty of Maastricht, which incorporates an agreement on the new European currency, there has recently been an increase in interest in monetary unions and their effects. Mushin (1995) and Hargreaves and McDermott (1999) analysed the desirability of the formation of a monetary union including New Zealand. The formation of other monetary unions that are comparable to the group of European countries that have introduced the euro would lead to the creation of additional strong currencies with floating exchange rates. This would be a continuation of the evolution of the international monetary system away from the dominance of fixed (but adjustable) exchange rates of individual national currencies that ended in 1972. An alternative view is that it could be the beginning of the revival of fixed exchange rates for high-GDP countries and their principal trading partners.

The euro might become a model for the establishment of other new currency blocs, but there is no evidence yet of any significant movements in this direction. The potential benefits of this kind of monetary union include reduced transactions costs and increased stability of import prices and export prices, and the likely effects include increased output and employment especially in the most efficient economies. The disadvantages include a partial loss of sovereignty, especially in relation to monetary policy, interest rates, and

capital flows, and the risk of imported inflation. Both of these also occur with other types of fixed exchange-rate régime.

## **5. Conclusions**

This article describes the recent experience of the exchange-rate policies of IMF members. GDP-weighted data have been used to identify trends since 1978 in the evolution of exchange-rate policy. Fixed exchange-rate policies have suffered a severe decline over many years and are now of very limited importance. However, the circumstances of individual countries vary so much that this aspect of economic policy is probably not amenable to mathematical modelling. Exchange-rate policy decisions have numerous determinants, not all of which are economic, and these vary significantly between countries and at different times. Recent experience is, however, consistent with the classification of the reasons for the adoption of fixed exchange rate systems described by Mushin (2001).

Fixed exchange rates have become concentrated among countries that are small, low-income, unstable, or newly independent, and are frequently used for short periods only. Exchange rates that are fixed with respect to the US dollar have remained more important than those that are fixed to other currencies, but have become unimportant in an absolute sense. Pegs to the French franc have shown greater tenacity than have other pegs, but even these are of trivial importance compared to other exchange-rate systems. At the other extreme, there are now no IMF members that peg their exchange rates to the British pound. Exchange rates that are fixed with respect to the SDR are now of very little importance, as are exchange rates that are fixed with respect to other currency composites. There are no longer any members of the IMF that adjust their exchange rates frequently in response to changes in pre-determined indicators. Countries that introduced the euro beside (and subsequently in place of) their national currencies have chosen a new type of fixed exchange-rate policy, and the Snake and the EMS can be regarded as transitional arrangements leading to this.

This paper has several weaknesses. The first is that it is purely descriptive and does not include an attempt to construct a formal model. Identification of recent trends in economic policy is, however, a useful exercise. The second



weakness is that it is based on the statements of their exchange-rate policies that have been notified by its members to the IMF and subsequently reported in *IFS*. As described by Calvo and Reinhart (2002), there is frequently a difference between a country's official position and the policy that it actually follows. In particular, countries that claim to operate a managed floating exchange rate frequently aim to stabilise their currencies with respect to the US dollar.

Further developments, including the consequences of the introduction of the euro, which can be regarded as a new type of fixed exchange rate policy structure, are not easy to predict.

#### **APPENDIX 1 The Snake and the European Monetary System**

Following the collapse of the Bretton Woods system of fixed exchange rates in terms of the US dollar, most countries in western Europe attempted to stabilise their currencies in relation to each other's currencies. The arrangements known as the Snake in the Tunnel (or, more frequently, as the Snake) lasted from 1972 to 1979. Each member agreed to limit, by market intervention, the fluctuations of its currency's exchange rate in terms of other members' currencies. The maximum divergence between the strongest and the weakest currencies was 2.25%.

The Snake is generally regarded as a failure. Membership was very unstable; the UK and the Irish Republic withdrew after less than one month, and only the German Federal Republic remained a member for the whole of its existence. Other members withdrew and rejoined, and some did this several times. In addition, the political context of the Snake was not clearly defined. Sweden and Norway participated in the Snake although neither of these countries was then a member of the European Economic Community [EEC], one of the forerunners of the European Union, and Sweden was not a candidate for EEC admission at that time.

The Snake was superseded by the exchange-rate mechanism of the EMS. Partly because it had different rules for different countries, the EMS had a more stable membership than had the Snake. The standard maximum exchange-rate fluctuation from its reference value that was permitted for each EMS currency was  $\pm 2.25\%$ . However, there were wider bands ( $\pm 6\%$ ) for weaker members (Italy from 1979, Spain from 1989, and the UK from 1990)

and the Netherlands observed a band of  $\pm 1\%$ . The system was also subject to frequent realignments of the parity grid. The Irish Republic joined the EMS in 1979 but the UK did not, thus ending the link between the British pound and the Irish Republic pound that had existed since the establishment of the Irish currency following the partition of Ireland, so that a step towards one monetary union destroyed another. The UK joined in 1990 but, as a result of substantial international capital flows, left in 1992. The bands were increased in width to  $\pm 15\%$  in 1992.

The details of the EMS arrangements have been explained by Adams (1990). The principal feature of the EMS can be summarised as the requirement that each member undertook to stabilise the value of its currency in terms of the European Currency Unit [ECU]. This new unit was a basket of EMS-currencies. Each nation's weight in the ECU was proportional to its importance in intra-EEC trade. A fluctuation, in terms of an external denominator (such as the US dollar), of the value of any EMS currency changed the external value of the ECU and therefore changed the ECU-denominated value of each of the currencies in the system. This imposed adjustment obligations on all members, each of whom had undertaken to keep the ECU-value of its currency within narrow limits. The magnitude of each of these obligations was related to the weight allocated to the currency experiencing the initial disturbance.

The effects of the EMS requirements on an individual member depended upon that country's weight in the ECU. The system ensured that major members delegated to their smaller partners a greater proportion of their exchange-rate adjustment responsibilities than the less important members imposed on the dominant countries. The explanation for this lack of symmetry depends on the fact that a particular percentage shift in the external value of the currency of a major member of the EMS (with a high weight in the ECU) had a greater effect on the external value of the ECU than had the same percentage disturbance to the external value of the currency of a less important member. It therefore imposed greater exchange-rate adjustment responsibilities on the remaining members than did the same percentage shift applied to the external value of the less important currency. While each of the major members of the EMS could delegate to the remaining members a high proportion of its adjustment obligations, the same is not true for the smaller

countries in the system. This burden was, however, seen by the smaller nations (including Denmark, Belgium, and Netherlands) as an acceptable price for exchange-rate stability with their main trading partners (including France and the German Federal Republic). These issues were analysed by Mushin (1986). The particular position of the Irish Republic, which joined the EMS in 1979 despite both the low weight of its currency in the ECU and the absence of the UK, its dominant trading partner, was discussed by Mushin (1980). Mushin (1991) analysed the effects of the introduction in Australasia of an exchange-rate structure comparable to the EMS.

#### **APPENDIX 2 Floating Exchange Rates (and similar policies)**

The number of IMF members operating floating exchange rates (including managed floating and limited flexibility in terms of the US dollar) increased from thirty in 1978 to 105 in 1998. There were increases in most years in this period (during which the total number of IMF members also increased in most years). For many countries, membership of this group has lasted only a few years.

Only thirteen IMF members used floating exchange rates (and similar policies) for the whole of the period: Australia, Bahrain, Canada, Greece, Japan, Lebanon, Philippines, Qatar, Saudi Arabia, Sri Lanka, Turkey, United Arab Emirates, and United States. Nineteen other IMF members used this type of policy for at least fifteen of the twenty-one years: Afghanistan, Bolivia, Congo (Democratic Republic), Costa Rica, Ghana, India, Indonesia, Israel, Jamaica, Republic of Korea (South Korea), Maldives, Mexico, New Zealand, Nicaragua, Nigeria, Pakistan, South Africa, United Kingdom, and Uruguay. Listed in *IFS* are ninety-one other countries<sup>1</sup> that used floating exchange rates (and similar policies) between 1978 and 1998.

#### **APPENDIX 3 Exchange Rates Pegged to the US Dollar**

There was a fairly consistent decline in the number of IMF members that pegged their exchange rates to the US dollar from forty in 1978 to twenty in 1998, although there was a small resurgence in 1987 and 1988, when the number increased from thirty-one to thirty-eight. Membership of this group of countries was, however, unstable, and many countries remained members for a short time only.

Only seven IMF members retained a US-dollar peg for the whole of the period of the data: Bahamas, Barbados, Grenada, Iraq, Oman, Panama, and Syria. Other IMF members which retained a US-dollar peg for at least fifteen of the twenty-one years are Antigua, Belize, Djibouti, Dominica, Ethiopia, Liberia, St Kitts and Nevis, St Lucia, St Vincent, Suriname, Trinidad and Tobago, and Yemen (both of its parts and then the unified country). *IFS* lists forty-six other countries<sup>2</sup> that used a US-dollar peg for shorter periods between 1978 and 1998.

Not listed in *IFS* is the use of the US dollar in the overseas possessions of the United States (American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and the US Virgin Islands) and in the British Virgin Islands and the Turks and Caicos Islands. Also omitted from *IFS* is the fixed exchange rate with the US dollar that is operated by Bermuda. Hong Kong which, despite the constitutional change in 1997, has continued to peg its exchange rate to the US dollar, is not listed in *IFS* before 1999. Macao, which is not listed in *IFS* before 2002, operates a fixed exchange rate in terms of the Hong Kong dollar. Netherlands Antilles, which is not listed in *IFS* before 1999, also uses a US-dollar fixed exchange rate.

The widespread unofficial use of the US dollar in many countries is outside the scope of this paper.

#### **APPENDIX 4 Exchange Rates Pegged to the Special Drawing Right**

The number of IMF members that pegged their exchange rates to the SDR fell from twelve in 1978 to four in 1998. The membership of this group increased to fifteen in 1980 and then decreased in almost every year reaching a minimum of two in 1997.

Only Myanmar (formerly Burma) retained its SDR-peg for the whole of this period, and, of the remaining countries in the group, only Seychelles retained it for at least fifteen of the twenty-one years. Listed in *IFS* are nineteen other countries<sup>3</sup> that pegged their exchange rates to the SDR during this period.

#### **APPENDIX 5 Exchange Rates Pegged to Non-SDR Currency Composites**

The number of IMF members that pegged their exchange rates to non-SDR baskets of currencies fell from twenty in 1978 to thirteen in 1998. The membership of this group fluctuated and reached a maximum of thirty-seven

in 1990.

Only four IMF members retained non-SDR currency-composite pegs for the whole of the period of the data: Cyprus, Fiji, Kuwait, and Malta. Other countries which used this type of fixed exchange rate for at least fifteen of the twenty-one years are Algeria, Austria, Bangladesh, Botswana, Malaysia, Papua New Guinea, Solomon Islands, Sweden, and Thailand. Forty-one other IMF members<sup>4</sup> used non-SDR currency-composite fixed exchange rates during this period.

#### **APPENDIX 6 Exchange Rates Pegged to Currencies other than the US Dollar**

The number of IMF members that pegged their exchange rates to currencies other than the US dollar increased from twenty-two in 1978 to twenty-seven in 1998. In each of five years between 1992 and 1998, there was a net increase in the number of IMF members that fixed their exchange rates with respect to currencies other than the US dollar. Most of the additional countries were new members of the IMF. These included parts of the former USSR, of the former Yugoslavia, and of the former Czechoslovakia, and also several very small countries.

There is substantial variation in the experience of exchange rates that are fixed to individual currencies other than the US dollar.

IMF members that have pegged their exchange rates to the French franc have tended to change their exchange-rate policies less frequently than have other countries. There was a net increase in the number of countries in this group from fourteen in 1978 to fifteen in 1998. There were only three changes during this period of twenty-one years: Madagascar left in 1982, Equatorial Guinea joined in 1985, and Guinea-Bissau joined in 1997. Countries which pegged their exchange rates to the French franc for the whole of the period are Benin, Cameroon, Central African Republic, Burkina Faso (formerly Upper Volta), Chad, Comoros, Congo-Brazzaville, Côte d'Ivoire, Gabon, Mali, Niger, Sénégal, and Togo. With the exception of Comoros, all of these countries use the CFA-franc<sup>5</sup>. In addition, and not listed in IMF publications, the CFP franc<sup>6</sup> is used in the three French territories in the south Pacific: French Polynesia, New Caledonia, and Wallis and Futuna Islands. The euro has replaced the French franc as the currency of France's *départements d'outre-mer* (French

Guiana, Guadeloupe, Martinique, Mayotte, Réunion, and St Pierre-Miquelon).

The currency peg that has shown the most rapid and complete decline is the British pound. In one generation, it has evolved from its pivotal role at the centre of the Sterling Area [see Appendix 11] to its present minor role. In 1978, only four IMF members pegged their exchange rates to the British pound: Bangladesh, Gambia, Irish Republic, and Seychelles. From 1979 to 1985, only Gambia did so. *IFS* lists no countries that have used a British-pound peg in any year from 1986. Falkland Islands, St Helena, Gibraltar, Guernsey, Isle of Man, and Jersey, which, with the UK, comprise the remnant of the Sterling Area, are not IMF members. These six economies, which are very small, are unimportant in world currency markets (despite the expanding financial-centre activities in the last four of them). The few other remaining British dependencies, all of which are very small, use currencies that are not linked to the British pound.

Following the dismemberment of the USSR and the establishment of separate currencies in each of its successors, several of these pegged their exchange rates to the Russian rouble: Armenia (1992-93), Azerbaijan (1993), Belarus (1992-93), Georgia (1992), Kazakhstan (1993), Kyrgyzstan (1992), Moldova (1992), Turkmenistan (1993), and Tajikistan (1994).

Other fixed exchange-rate policies used by IMF members are Bosnia-Herzegovina (from 1996), Bulgaria (from 1997), Estonia (from 1992), and Yugoslavia (1991) pegged to the German mark; Denmark, Cyprus, Lithuania, and Malta pegged to the euro; Solomon Islands (until 1978), Tonga (1985-90), and Kiribati pegged to the Australian dollar; Nepal (from 1997) and Bhutan pegged to the Indian rupee; Lesotho, Namibia (from 1992), and Swaziland pegged to the South African rand; Equatorial Guinea (until 1984) pegged to the Spanish peseta; San Marino pegged to the Italian lira; and Brunei-Darussalam pegged to the Singapore dollar. The Belgium-Luxembourg monetary union, which pre-dates the Snake and survived within the EMS, has been incorporated into the euro zone. Monetary unions (or rigidly fixed exchange rates) involving non-members of the IMF and currencies other than the US dollar include Cook Islands and Niue (New Zealand dollar), Liechtenstein (Swiss franc), Nauru and Tuvalu (Australian dollar), Vatican (Italian lira), and Monaco (French franc). The Australian dollar is used in Australia's overseas territories (Christmas Island, Cocos Islands, and Norfolk

Island).

The unofficial use of currencies outside the countries that issued them is not within the scope of this paper.

#### **APPENDIX 7 Regular Adjustment of Exchange Rates**

The number of IMF members that adjusted their exchange rates frequently on the basis of pre-determined indicators decreased from five in 1978 to zero from 1997. The number of such countries reached a maximum of six in 1984. Only Chile and Colombia operated this system of exchange-rate adjustment for at least fifteen years during the period of the data. Ten other IMF members<sup>7</sup> used this system between 1978 and 1998.

#### **APPENDIX 8 Membership of the Snake and of the European Monetary System**

In 1978, the members of the Snake [see Appendix 1] were Belgium, Denmark, German Federal Republic, Luxembourg, Netherlands, and Norway. With the exception of Norway, and with the addition of France, the Irish Republic, and Italy, these countries formed the EMS in 1979. Spain joined the EMS in 1989, and the UK joined in 1990. In 1992, Italy and the UK withdrew, and Portugal joined. Austria joined in 1995, Finland and Italy joined in 1997, and Greece joined in 1998.

#### **APPENDIX 9 The Euro**

Of the members of the European Union, to which participation in this innovation was restricted, Denmark, Sweden, and the UK chose not to introduce the euro in place of their existing currencies. The countries that adopted the euro in 1999 are Austria, Belgium, France, Finland, Germany, Irish Republic, Italy, Luxembourg, Netherlands, Portugal, and Spain. Greece, which followed in 2001, was initially excluded from the new currency arrangement as a result of having failed to satisfy the Maastricht conditions [see Appendix 10].

Fixed exchange rates, in national currency units per euro, are:

Austria	13.7603	Belgium	40.3399
Finland	5.94573	France	6.55957
Germany	1.95583	Greece	340.750

Irish Republic	0.787564	Italy	1936.27
Luxembourg	40.3399	Netherlands	2.20371
Portugal	200.482	Spain	166.386

Source: European Central Bank

### **APPENDIX 10 Conditions for the Adoption of the Euro by Individual Countries**

The Treaty of Maastricht (1991) identified the conditions for countries to adopt the euro as their currency. A maximum value for each of five variables for each country is specified:

inflation rate:	1.5 percentage points above the average of the three euro countries with the lowest rates
long-term interest rates:	2.0 percentage points above the average of the three euro countries with the lowest rates
exchange-rate stability:	fluctuations within the EMS band for at least two years
budget deficit/GDP ratio:	3%
government debt/GDP ratio:	60%

Source: *The Economist*, 31 May 1997.

### **APPENDIX 11 The Sterling Area**

Those countries that decided, following the end of the British gold standard in 1931, on a fixed exchange rate with the British pound became known as the Sterling Area. Membership was not constant, but by 1933 comprised the British Empire (including India and the independent Dominions except Canada), Denmark, Egypt, Estonia, Finland, Iran, Iraq, Latvia, Norway, Portugal, Siam, Sweden, and other countries. Contraction of the Sterling Area began in 1939, and most of its remaining members withdrew in 1972 when the fixed exchange rate for the British pound, with respect to the US dollar, was abandoned.

The Sterling Area was a zone of relative stability of exchange rates but not a monetary union. Distinct national currencies circulated within its boundaries, and their exchange rates, although fixed with respect to the British pound,



were occasionally changed. For example, the New Zealand currency was revalued in 1948 and devalued in 1967, both in terms of the British pound.

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#### FOOTNOTES

1. Details are available from the author.
2. Details are available from the author.
3. Details are available from the author.
4. Details are available from the author.
5. The *Communauté Financière Africaine* [CFA] franc is equal to 0.0015244 euros (or 0.01 French francs). The value of the CFA franc was 0.02 French francs until 1994.
6. The *Comptoirs Français du Pacifique* [CFP] franc is equal to 0.0083846 euros (or 0.055 French francs).
7. Details are available from the author.