Intervention arrangements in the European Monetary System

At their meeting in Brussels last December, the heads of government or state of EEC member countries agreed to establish a new European Monetary System (EMS). The entry into force of the system was delayed, however, until 13th March because the French Government were not willing to allow it to come into operation until certain questions affecting agricultural prices in the Community had been resolved.

One of the main elements of the EMS is an exchange rate and foreign exchange market intervention mechanism between the currencies of EEC countries. The United Kingdom, whilst participating in the EMS viewed as a whole, decided not to take part in these exchange arrangements at their outset. Nevertheless, the arrangements have been the subject of considerable public interest, and this article therefore sets out to provide a technical explanation of them and more particularly of the rules for determining when central banks should intervene to defend their exchange rates.

There are two separate but overlapping components which make up the exchange rate and foreign exchange market intervention mechanism. One, which has been called the 'parity grid', is essentially the system which was operated from 1972 by the countries participating in the European 'snake'. The other mechanism is new, and aims to assist greater convergence of members' economies by identifying when one participating currency is beginning to diverge from the average performance of all member countries' currencies, so that early action can be taken. For this purpose a 'divergence indicator' has been instituted.

The European currency unit

An important feature of the monetary system is a new European currency unit—the ECU. This is a basket of fixed amounts of EEC currencies—for example, it contains 8.85 pence sterling—and at end-March was worth about 65 pence sterling. Sterling thus accounts at present for some 13% of the basket (see Table A). Its initial composition is the same as that of the European unit of account (EUA) already in use within the Community; but the amounts of each currency in the basket may be changed in future by agreement of the Council of Ministers if, for instance, the percentage weight of a currency in the basket comes to diverge too far from that country's relative importance in the Community (as measured, *inter alia,* by gross domestic product).

Table A
Initial composition of the European currency unit[a]

	Amount of currency in basket	Approximate weight of currency at end-March 1979
		Per cent
Currency		
Deutschemark	0.828	*33*
French franc	1.15	*20*
Pound sterling	0.0885	*13*
Dutch guilder	0.286	*10*
Italian lira	109	*10*
Belgian franc	3.66 }	*10*
Luxembourg franc	0.14 }	
Danish krone	0.217	*3*
Irish pound	0.00759	*1*

[a] The amount of each currency in the basket is fixed until such time as it may be revised by the Council of Ministers. The exact weight of each currency depends on its current exchange rate, and changes continually.

The US dollar value of the ECU is calculated by taking the dollar rate for each Community currency and applying those rates to the amounts of currency in the basket.[1] Thus, if sterling is at £1 = $2, the sterling component of 8.85 pence is equivalent to $0.177. When the dollar equivalents of all the components of the basket have been calculated, they are added to give the dollar value of the ECU. Once this dollar/ECU rate has been calculated, the ECU value of any other currency can be derived through the dollar rate for that currency.

The ECU serves two main functions within the intervention system. One of these functions is specific to the divergence indicator, and will be described later. The other is to provide a unit (or numéraire) in terms of which member countries' parities can be declared.

For illustrative purposes in the description below, notional parities for various currencies are used. To aid the clarity of the description, these have been taken to be 'round numbers' fairly close to the current ECU value of each currency.

The parity grid

The obligations and constraints implied by the parity grid are described first. The extent to which these are modified by the divergence indicator is considered later.

Suppose that the following parities[2] had been declared: ECU 1 = DM 2.5; ECU 1 = FF6; and ECU 1 = BF 40. Then by division the cross-parity between the deutschemark and the Belgian franc, for example, can be derived as: DM 1 = BF 16 or BF 1 = DM 0.0625 (the former calculation would be used in Brussels, the latter in Frankfurt). Cross-parities can be calculated for each pair of currencies, and set out in a matrix, or parity grid, as shown in Table B.

[1] The base value of the ECU can, of course, be calculated in terms of any currency. In practice, the US dollar is used because it is the most commonly traded currency in all markets.

[2] Technically these are known as central rates, but, for the sake of simplicity, the more common word 'parity' is used throughout this article.

Table B
Illustrative grid of cross-parities

	Belgian franc	Deutschemark	French franc
Belgian franc	1	16	6.66667
Deutschemark	0.0625	1	0.416667
French franc	0.15	2.4	1

Each participating central bank is required to intervene to keep the market rate for its own currency against each other participating currency within 2¼% of its cross-parity. Thus, in this example, the Bundesbank would be obliged to keep the deutschemark price for the Belgian franc within 2¼% (above or below) of 0.0625. It would do this by declaring selling and buying rates for each participating currency—2¼%[1] above and below the cross-parity—at which it was prepared to deal in unlimited amounts with banks in Western Germany. The matrix of cross-parities can now be amplified into a matrix of limiting intervention rates (Table C).

Table C
Illustrative grid of parities and intervention rates

		Belgian franc	Deutschemark	French franc
Banque Nationale de Belgique	buying parity selling	1	15.6440 16 16.3640	6.5184 6.66667 6.8184
Deutsche Bundesbank	buying parity selling	0.06111 0.0625 0.06392	1	0.4074 0.416667 0.4261
Banque de France	buying parity selling	0.1467 0.15 0.1534	2.3466 2.4 2.4546	1

From this table, it can be seen, for example, that if the Belgian franc strengthened sufficiently against the deutschemark, the Banque Nationale de Belgique would find itself having to buy deutschemarks at 15.6440, and the Bundesbank would be selling Belgian francs at 0.06392.

In the course of time, this arrangement would in theory permit the rate between each pair of currencies to move through a maximum range of 4½% (e.g. if the deutschemark started at BF 15.6440 it could move to BF 16.3640). However, there is very little chance that in practice any country could make full use of this 4½% range in a short period of time. If the deutschemark were at its lower intervention point of BF 15.6440 and then started to strengthen, it would be likely to reach its upper intervention point against some other currency before it had risen 4½% to BF 16.3640. Assuming that the strengthening of the deutschemark left the cross-rates between other currencies unchanged, the deutschemark would be able to rise the full 4½% only if all the other currencies were at their cross-parities. Thus, in the three-currency grid shown in Table B, the French franc would have to be at BF 6.66667; if instead the French franc was worth only BF 6.60, the deutschemark could rise only to BF 16.20 before reaching its upper limit against the French franc of 2.4546 (for 6.60 × 2.4546 = 16.20).

An expanded form of such a parity grid can be drawn up to include all the participating countries. With seven participants, each of the seven central banks has buying and selling rates for each of the six other currencies. These are designed to ensure that the market rate between each pair of currencies stays within 2¼% of the cross-parity. The full matrix of actual cross-parities and bilateral intervention rates is set out in Table D.

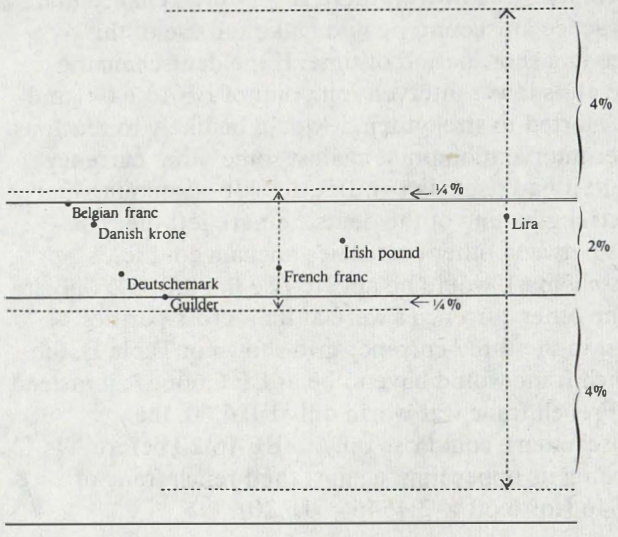
Typically, the market values of the seven participating currencies might be ranged as in Chart A. Since the currencies in the system are floating as a block against third currencies, there is, of course, no absolute measure of external value against which the relative appreciation or depreciation of each currency's market rate can be calculated. It is, however, quite easy to determine the relative depreciation of the market rate of each currency in the system against its cross-parity with the strongest currency at the time (or each currency's appreciation against the weakest). For the reasons explained in the footnote below, these two alternative methods of calculation will produce marginally different percentage results. For simplicity's

Table D
Actual cross-parities and intervention rates

	Brussels	Paris	Rome	Amsterdam	Frankfurt	Copenhagen	Dublin
100 Belgian francs		14.3680 14.6948 15.0290	2740.44 2909.79 3089.61	6.7420 6.89531 7.0520	6.221 6.36277 6.508	17.5585 17.9581 18.3665	1.64198 1.67934 1.71755
100 French francs	665.375 680.512 696.000		18649.0 19801.5 21025.2	45.88 46.9235 47.99	42.335 43.2995 44.285	119.490 122.207 124.985	11.1739 11.4281 11.6881
1000 Lire	32.365 34.3668 36.490	4.7560 5.05013 5.3620		2.23175 2.36970 2.516	2.059 2.18668 2.322	5.813 6.1716 6.553	0.543545 0.577135 0.612801
100 Guilders	1,418.00 1,450.26 1,483.25	208.38 213.113 217.96	39743.4 42199.5 44807.4		90.225 92.2767 94.375	254.645 260.439 266.365	23.8130 24.3548 24.9089
100 Deutschemarks	1,536.65 1,571.64 1,607.40	225.81 230.95 236.21	43069.8 45731.4 48557.6	105.960 108.370 110.835		275.960 282.237 288.660	25.8060 26.3932 26.9937
100 Danish kroner	544.45 556.852 569.50	80.01 81.8286 83.69	15260.5 16203.3 17204.5	37.5425 38.3967 39.27	34.645 35.4313 36.235		9.14343 9.35147 9.56424
1 Irish pound	58.2225 59.5471 60.9020	8.5555 8.75034 8.9495	1631.85 1732.70 1839.78	4.0145 4.10597 4.1995	3.705 3.78886 3.875	10.4555 10.6935 10.9365	

[1] The factors applied are not actually 1.0225 and 0.9775, as these would yield intervention rates for each pair of central banks which were not exact reciprocals of each other. The factors used are 1.022753 and 0.977753: these two numbers are reciprocals of each other, and differ by 0.045 (i.e. twice 2¼%).

Chart A



sake, the chart ignores these very small differences. In the constellation illustrated, the spread between the Belgian franc at the top and the Dutch guilder at the bottom is 2%. So long as these two currencies maintain this relative position, an individual intermediate currency, say the French franc could rise only until it was 2¼% above the Dutch guilder and fall only until it was 2¼% below the Belgian franc. Thus the range of movement available to the French franc, viewed in isolation, would be the theoretical maximum of 4½% less 2%, the spread of the remaining currencies, i.e. 2½%. The narrower the range between the weakest and strongest currencies (other than the currency being considered) the greater the range of movement available to that currency, so that at any one time the range available to a currency could be anything between 2¼% and 4½%; figures at the lower end of this range are, however, much more likely.

This is another way of saying that, in this type of multicurrency intervention system, the exchange rates for all the currencies are mutually constrained at all times within a band equal to the width of the bilateral margins used in the system, in this case 2¼%; if at any given time the band is not stretched to the full 2¼%, then changes in rates which result in its becoming stretched can evidently occur at either or both edges of the band.

The above argument has to be modified to take account of the fact that the Italian lira has margins against each other currency not of 2¼% either side of cross-parity but of 6%.[1] The lira itself can then rise as much as 6% above the weakest of the other currencies, and fall as much as 6% below the strongest. Thus, with the constellation of rates shown in Chart A, the lira could rise to 6% above the Dutch guilder but fall to only 4% below it, as by then it would be 6% below the Belgian franc. Thus the maximum possible range of 12% available to the lira would be reduced, by the 2% range existing between the other currencies, to 10%. The effective range available to the lira at any one time will lie between 9¾% and 12%, depending on the range between the remaining currencies; again, figures at the lower end of the range are more likely.

If there were a second currency observing 6% margins, that second currency and the lira would exert a mutual constraint on each other of the kind described above for multicurrency intervention systems in general. Thus, in this situation, the range for the lira could fall as low as 6% if the other wider-margins currency was itself using its 6% margin to the full against a third currency. For example, if the second wider-margins currency were itself 6% above the guilder, then the lira would have to lie between these two; otherwise, it would be more than 6% above the guilder, or more than 6% below the other currency.

The fact that the lira has 6% margins makes little difference to the effective range likely to be available to the other currencies; this will still tend to be 2¼% or a little greater.

The above examples are not wholly realistic in that it has been assumed throughout that the cross-rates between the remaining currencies are unaffected by the changing value of the currency under consideration. Consider again the constellation shown in Chart A. If the French franc did weaken until it was 2¼% below the Belgian franc and intervention between these two currencies was triggered, then the effect of this intervention could be to pull down the value of the Belgian franc against the other member currencies. If the pressure on the French franc were sufficiently strong, the Belgian franc could be pulled down until it was level with the Danish krone, and intervention between the Danish krone and the French franc would then be triggered. With the French franc now being bought against two currencies, its fall might be arrested, but in principle it could go further. Similarly, if the French franc strengthened to 2¼% above the guilder, so that intervention between these two currencies was triggered, then the French franc could pull the guilder upwards to the point where it came level with the deutschemark. Overall, the range actually available to the French franc could thus be significantly greater than the 2½% mentioned earlier—possibly as much as 3½% in this example.

This effective widening of the available margin is greatest for heavily traded currencies such as the deutschemark. Currencies in which there are thinner markets would be less likely to pull other currencies up or down. For example, in Chart A, if the Irish pound moved up to its intervention point against the guilder, intervention between these two currencies would probably not have a significant effect on the value of the guilder against the other currencies, and the Irish pound could rise little or no further. The range actually available to the less heavily traded currencies may therefore be somewhat narrower than that available to the major currencies.

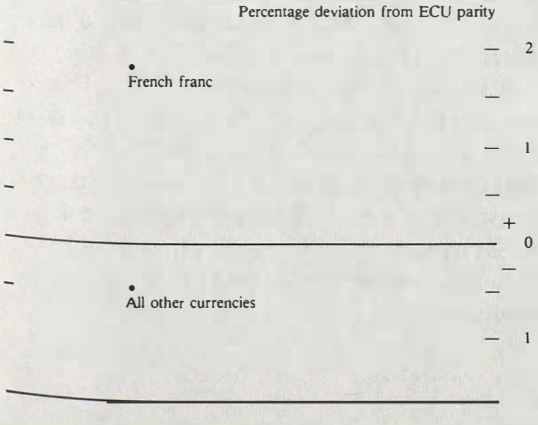
[1] On the principle cited in the footnote on the previous page, the factors which should be applied are actually 1.061798 and 0.941798.

The divergence indicator

Intervention arrangements on the lines of the above parity grid proved themselves to be technically robust in use in the European 'snake'. However, for reasons touched on later, the authorities of several member countries—the United Kingdom amongst them—felt that the new monetary system would be likely to prove more durable and effective if an additional mechanism for identifying the need for intervention were used. This second mechanism, involving a divergence indicator, which is based on the difference between the current ECU value of each currency and its ECU parity, has been superimposed on the parity grid. Any obligations to intervene when parity grid limits are reached are unaffected by the existence of the divergence indicator. But when a currency's divergence indicator passes a specified 'threshold', the issuing central bank is expected to intervene or take other action to counter the divergence. The divergence indicator will thereby sometimes lead to intervention or other action being taken before currencies reach their parity grid limits, so that the frequency with which these limits are reached should be reduced.

In the well-spread constellation of rates shown in Chart A, no currency is beyond its divergence threshold. The divergence threshold is intended to be triggered when one or two currencies are beginning to depart from the pack. Suppose that all currencies are at their ECU parities, and that the French franc then rises by 2¼%, i.e. to its parity grid margin against each of the other currencies (except the lira). Because the weight of the French franc in the ECU basket is currently about one fifth, the strengthening of the French franc would cause the ECU itself to appreciate against the other currencies by one fifth of 2¼%, or about 0.45%. The French franc would itself rise by 1.8% against the ECU. This extreme polarisation of the ECU is shown in Chart B.

Chart B



In such extreme circumstances, it would appear, *prima facie*, that the French authorities should be taking action to redress the situation. But the parity grid system would be requiring all participating countries (except Italy) to intervene—the Banque de France to buy the weaker currencies, the other central banks to sell French francs. If the pressure on the French franc were great, some of the other countries might face unacceptable losses of reserves. The aim of using the divergence indicator is to prevent such extreme circumstances occurring, and to create a presumption that a country whose currency is becoming divergent will take action at an earlier stage. To this end, a divergence threshold is set for each country at three quarters of the theoretical maximum divergence which would result from its being 2¼%[1] from all other currencies. Once the ECU value of the French franc was this far above or below its ECU parity, the French authorities would normally be expected to intervene and/or take other measures in the financial, and possibly fiscal, fields to prevent the divergence growing.

It has just been explained that the divergence threshold for any given currency is three quarters of the theoretical maximum divergence which would result from its being 2¼% from all other currencies. This might suggest at first sight that for each currency the divergence threshold was 1.69% (three quarters of 2¼%) of its ECU parity. In fact, this is not so: the figure will be different for each currency.

The need to set a different divergence threshold for each currency to secure the same result (that it would be triggered at three quarters of its maximum divergence) arises because each currency has a different weight in the ECU basket and therefore influences the value of the ECU itself to a different extent. Thus the deutschemark, with a weight of about one third, would be only 1½% above its ECU parity, and the other currencies would be ¾% below their ECU parities, were it in the position equivalent to that of the French franc in Chart B. The deutschemark's divergence threshold should therefore be three quarters of 1.5%, or 1⅛% approximately. By contrast, that for the Irish pound should be about 1⅜%.

In discussing the parity grid, it was shown that the range through which a currency could move at any one time would vary between 2¼% and 4½%, depending on the spread of the other currencies. The higher ranges could be achieved only if other currencies were within a narrow spread. But if some form of action is taken at the divergence threshold, the likelihood of the more extreme of such cases occurring should be further reduced; and, as long as all currencies remain within their thresholds, the maximum range will be limited to three quarters of 4½%, i.e. 3⅜%.[2]

Distinctions between the parity grid and the divergence indicator

In conclusion it may be useful to draw a few distinctions between the two parts of the intervention system.

An important one is the degree to which the parity grid limits will be observed in a much more automatic fashion than will the divergence thresholds. As has been

[1] 6% in the case of the lira.

[2] As the lira reaches its divergence threshold when it is 4½% (three quarters of 6%) from all other currencies, its maximum possible range will similarly be not 12%, but 9%.

described above, each participating central bank has published buying and selling rates for each other participating currency. During normal business hours[1] the willingness of the central bank to deal at these rates will ensure that market rates do not go beyond the limits, for no commercial bank is going to deal at a rate outside the limits with another bank when it could obtain a better rate from the central bank. The central bank has only to respond to requests to deal initiated by the commercial banks; it need take no initiative itself.

Of course, as happened in the 'snake', central banks may take a more active rôle in managing their exchange rates. By dealing, on their own initiative, within the margins, they may be able to prevent the market rates from reaching the limit rates. Such intervention is co-ordinated on a special telephone network linking the foreign exchange dealers in the various central banks.

In principle, it would be possible to ensure that each currency's ECU value was kept within its divergence threshold by means of the central bank publishing buying and selling rates for ECU against its currency. However, this is not currently possible because only central banks may hold, buy, and sell ECUs; commercial banks are unable to deal in them. In any case, it is not intended that the divergence threshold should be a mandatory intervention level; it is rather a signal that some action is required: when a central bank observes that its currency is crossing its divergence threshold and if it decides that its appropriate response is to intervene, it then has to take the initiative and offer to buy or sell one or more other currencies against its own currency—in order to weaken or strengthen its own currency.[2]

This gives rise to another distinction between the two parts of the intervention system. When parity grid limit rates are activated, there is no question as to which partner currency will be used for intervention: that is decided by the commercial banks on the basis of which market cross-rates have reached their limits. But with intervention to maintain the divergence thresholds—as with intra-marginal intervention in the 'snake'—an appropriate intervention currency needs to be chosen. This might be the Community currency diverging from parity furthest in the opposite direction; it might be another Community currency or currencies; or it might be the US dollar (or some other third currency) if the cause of the divergence appeared to be large flows between the US dollar (or some other third currency) and the currency concerned. In view of the potential effects on other participating countries of such diversified interventions, the currency or currencies to be used would need to be discussed (on the telephone network) with the other EEC central bank or banks concerned.[3]

Lastly, the adoption of a divergence indicator based on ECU rates also has implications for the setting and changing of parities within the new system. Within the 'snake', parities were not declared in terms of a unit representing a basket of the participating currencies themselves but in terms of the European monetary unit of account, the value of which was unaffected by movements in the exchange rates of the currencies concerned, since it was defined as a fixed weight of gold. Consequently, if it was agreed to revalue the deutschemark, say, by 10%, all that was necessary was to change the deutschemark's parity by 10%. Alternatively, the parities of all other participants' currencies could have been devalued by 10%.[4] The choice was immaterial to the intervention system: the same parity grid would have resulted.

But with parities being declared in terms of ECU, and the ECU value of currencies being used as a divergence indicator, matters are no longer so simple. If the deutschemark were revalued by 10% and its market rate moved up by, say, 9% against other Community currencies, then it would pull up the value of the ECU against these other currencies by one third of 9%, i.e. 3%. The deutschemark itself would rise 6% against the ECU but, with its parity raised by 10%, would also be well below its new ECU parity. Thus all Community currencies would have fallen against their ECU parities, and all would probably now appear to be divergent on the weak side of parity.

To prevent this anomalous situation arising, it will be necessary in future to secure a balance of devaluations and revaluations, taking into account the relative weights of the currencies in the ECU. Thus to secure a 10% revaluation of the deutschemark against other Community currencies, the deutschemark would have to be revalued by 6⅔% against the ECU, and other currencies devalued by 3⅓% against the ECU. These complications are, however, only technical. They do not represent any new constraint on the ability of participating countries to achieve any desired change in cross-parities. For any such change there will be a unique set of changes of ECU parities that would enable all member currencies to be at their new ECU parities simultaneously.

[1] The official obligation to intervene in the EMS (as in the 'snake') only obtains between certain hours of the day.

[2] As mentioned earlier, the authorities concerned may take other measures (measures of domestic monetary policy, changes in central rates, or other measures of economic policy) to correct the situation. If, because of special circumstances, such measures are not taken, the reasons shall be given first to the other central banks, and, if necessary, discussed in the Council of Ministers.

[3] Note that, in the case of intervention at parity grid limits, no consultation is required. The two currencies which will be involved are, as has been explained, automatically specified, while the effects on exchange rates and money supplies do not depend on which central bank intervenes. For example, the effects on the Dutch and West German money supplies and exchange rates will be the same whether the Bundesbank buys guilders (against deutschemarks) or the Nederlandsche Bank sells deutschemarks (against guilders).

[4] In this and the following paragraphs, percentage revaluations and devaluations are treated as though they were additive—to simplify the illustration.