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Money and the European Union

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Interest in a common money for western Europe has waxed and waned for the past quarter century. Deadlines have been set -- but not met -- most recently the 1997 deadline. To an outside observer, the discussion and actions during the past quarter century suggest that the idea of a monetary union and common currency has great appeal until it is examined closely. Then, problems begin to mount.

The current deadline for European monetary union, 1999, is likely to be another missed deadline. In September, Germany's finance minister, Theo Waigel, told a committee of the Bundestag that Germany would insist that countries must meet the Maastricht treaty's requirements for public debt and budget deficits. No one in authority expected Greece to be a member of the monetary union, but Minister Waigel's statement warned that the current German government would oppose membership for Italy, Sweden and Belgium if their ratio of debt to GDP exceeds 60% or their budget deficit exceeds 3% of GDP. In October, the European Union accepted the German position but continued to act as if a union would occur. They agreed to use actual data for calendar year 1997 as a basis for decisions about eligibility and to allow up to 3-1/2 years to phase-in the new coins and notes.

Currently, many countries -- including such prominent members of the D-mark bloc as France, Austria and the Netherlands -- do not meet the Maastricht criteria. A European monetary union without these countries would be a narrower system than the current fixed exchange rate system. Since each of these countries has for some time been a member of the D-mark bloc, along with Belgium and Denmark, the proposed system seems unlikely to amount to much. Who would benefit from a monetary union that has fewer members than the current D-mark bloc? What net benefits accrue to the members that could not be attained in a fixed exchange rate system with the mark as the reserve currency? If a main purpose of the union is to bind France and Germany to common policies, a union without France is pointless; the
current D-mark bloc would be preferable for the small group of members.

Section 1 discusses some pros and cons of monetary union. Section 2 looks more closely at the role of trade as a factor affecting a country's desire for membership. Section 3 discusses price stability as a criteria for monetary control, and Section 4 offers an alternative proposal with, I suggest, better economic welfare implications for the world economy and the members of European Union.

1. Some Pros and Cons of Monetary Union

Most proponents of monetary union take as given that the benefits from a single currency for Europe outweigh the costs. The principal sources of this claimed advantage are the elimination of costs arising from the variability of exchange rates, generation of a common (or similar) inflation rate, and the use of a common standard of value and a common medium of exchange. The last benefit includes the reduction in transaction costs from elimination of currency exchanges within Europe and the release of resources engaged in making such exchanges.

Critics of a common currency question whether these benefits outweigh the costs. The critics do not dispute that there are benefits to a monetary union and a single currency, but they claim that the net benefits may be small or negative. The principal costs arise from the destruction of information about existing monetary units, the cost of learning about and adjusting to the properties of a new monetary system, the elimination of changes in nominal exchange rates as an important mechanism for adjusting to country-specific shocks, and the impetus given to an internal welfare state protected by tariffs and trade restrictions against outsiders.

These differences have been discussed not only in what is now a vast literature in books, economics journals and journals of opinion, but also in many forums and private discussions. My conclusion from much of this literature and the discussions in which I have participated is that the proponents of union have not convinced the critics and vice versa. One reason, perhaps a main reason, is that, particularly in France and Germany, political arguments are often more important for both critics and proponents
than strictly economic costs and benefits of the union. Both the history and costs of European wars in the 19th and 20th centuries and the gains during the relatively peaceful fifty years following the Second World War suggest that the proponents of union are right to keep these costs in mind. They err, however, in not making them explicit.

Despite many statements about common purposes, France and Germany also have some different objectives for the European Union. Germany seems more interested than France in expanding the Union to the east, while France is more concerned about relations with its former colonies in North Africa. Expansion to the east raises issues about the Common Agricultural Policy (CAP) and the restoration of prewar German ties to Central Europe. Restricting the CAP would reduce transfers to French farmers, lower the Union's spending, and reduce its appeal to France. Satisfying French concerns in North Africa would increase spending and budget transfers. Hence, there is uncertainty about how policies will change and how policy will affect the value of the new monetary unit. These uncertainties create some unavoidable costs of information that are likely to persist. The May 1995 Green Paper on the arrangements for introduction of a single currency does not clarify issues about monetary control. That report, like much other official discussion, presumes that the new system will produce low inflation, small deficits, and a strong currency.

In addition to these political issues and differences in objectives, there are issues about trade wars, "beggar thy neighbor" policies, and about how a European monetary system would be controlled. Monetary union is neither necessary nor sufficient for avoiding efforts to gain trading advantages. To an outsider, there appear to be some sharp differences of opinion about monetary control or control of the central bank that are often suppressed by diplomatic language. Included here are such basic issues as the stability of the future value of the proposed money and the responsiveness of the central bank to some political authority. French and German authorities differ on these issues, and the difference will not be resolved until after a European Central Bank has established a record of performance.

The social welfare programs protected by the Social Charter impose relatively
heavy costs on European producers. These costs affect the use of resources within the Union and the level of reported unemployment. To maintain the welfare state, Europe may choose to keep high trade barriers against non-members or allow the new currency to devalue against North American and Asian currencies. Here, too, there is uncertainty about how the new unit will perform.

A principal benefit from use of a common medium of exchange is the reduction in costs of information and transactions. Money is used, and therefore held, to reduce these costs. Brunner and Meltzer (1971). The introduction of a new money imposes costs of learning about the properties of the new money. These costs include, but are not limited to, costs of learning about the conditions of supply, particularly how well the (internal and external) value of money will be maintained. As the discussion above suggests, some of the concerns about the European Central Bank reflect concerns about these costs.

Economists do not have good measures of information and transaction costs. Two types of observation suggest that the magnitude of these costs is not small. First, estimated holdings of U.S. currency abroad find that from 50% to 70% of the outstanding stock of dollars is held outside the U.S. Porter and Judson (1995). The U.S. dollar is not the currency with the lowest average rate of inflation, so holding costs are higher than for the Swiss franc or Japanese yen. The additional cost is, apparently, more than offset by the benefit of using a currency that is well-known by members of the group within which exchanges occur. A small number of other currencies are used abroad also, but their service areas are more limited. Seitz (1995) estimates that as much as 40% of German currency is held abroad, mainly in Europe where the currency is best known.

Second, countries with a history of high inflation adopt a foreign unit -- often the dollar -- as the unit of account particularly for relatively large transactions. It is common to find prices for houses, land, durables and other assets quoted in dollars long after high inflation has ended. The dollar may also continue to serve as medium

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1At the mid-point of the range, the value in 1995 is approximately $250 billion.
of exchange. This suggests that the costs of shifting to a new money are relatively large once a group has converged to a particular money. These costs are often subsumed in the phrase "general acceptability" without any analysis of the costs of achieving acceptability. The costs of shifting to a new money also include the one-time costs of adapting vending machines and ATM's, producing and distributing banknotes and coins, and adjusting prices, accounts, and computer programs discussed in Moore (1995).

Permanent reductions in costs of acquiring information and transacting are real changes that affect utility or productivity permanently. Other non-neutral economic costs of adopting a common money arise from the agreement limiting participation to those countries that meet the debt and deficit restrictions for admission. These rules seek to reduce uncertainty about the future quality of the new money, but they also reduce the proportion of any member's trade within the common currency area. Hence they reduce the benefits of the union to its members. And by forcing countries to make often sizeable fiscal adjustments, the rules impose one-time costs on prospective members.

The present value of the advantages of a common money must be large to offset the one-time costs of forming the union, the costs of acquiring information about the new money, and the continuing costs of forgoing use of the exchange rate to adjust to regional or country-specific shocks. With a common money, and a common monetary area without exchange controls or restrictions, adjustment to regional or country-specific shocks requires (1) resource mobility between regions, (2) adjustment of prices and wages, or (3) fiscal transfers.

As is well-known, labor mobility is relatively low within many European countries and even lower between countries. Many writers have pointed to the cultural barriers to mobility. These barriers may become smaller in the future, but rapid change is unlikely. Large-scale migration would be unwelcome in many parts of the Union. Welfare state policies reduce flexibility of money wages. Fiscal transfers to adjust for economic differences raise political issues no less difficult than migration.

Principally for these reasons, a common currency for Europe is costly. The
gains from use of a single currency must be large to compensate for the increased costs of information about the properties of the new money and the loss of a principal means of adjusting to regional disturbances. Many member countries of the Union are far from meeting the criteria set out in the Maastricht Treaty (as now interpreted). For these reasons a broad monetary union incorporating most of the countries in the European Union seems unlikely.

The foregoing does not rule out a common currency or a permanently fixed exchange rate for countries now in the mark bloc. Austria, Belgium-Luxembourg, Denmark, and the Netherlands have fixed their currencies to the mark. These countries may adopt a common currency at some point but, if they do, they would be wise to avoid delay between the announcement and the event. A common currency is not the limiting case of a fixed exchange rate system. It is a more binding commitment to a common monetary policy. Anticipations of parity changes differ under the two systems.2

A major, and probably the decisive, issue is what France decides to do. Political rather than economic considerations will be the principal determinant of that outcome. French concerns about so-called German hegemony and how best to accommodate to it or hinder it, the issues about North Africa, Eastern Europe and protectionist policies discussed above, and differences about control of monetary policy seem to dominate strictly economic issues. Without France, monetary union loses much of its political rationale. But a monetary union with France, Germany, and the countries currently in the mark bloc has smaller economic benefits to France and Germany than the larger currency area once considered. The following section develops this issue.

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2Administrative and production problems of a single currency could be handled after the event as is envisioned in the May 1995 Green Paper for phase C. The main event would be a closing of the monetary sections of all relevant central banks and the permanent fixing of exchange rates. This would be followed by the later replacement of individual currencies. The "main event" is similar to phase B of the Green Paper.
2. Inside and Outside Trade

One of the main economic arguments for a common currency is that countries gain from trading at fixed exchange rates. The gain results from the reduction in uncertainty about future exchange rates or prices at which payments are made. Since money is neutral, there is no long-run difference in prices arising from the choice of fixed or fluctuating rates. There are, however, net benefits since a common currency encourages investment diversification, specialization of production within the region, and reduces costs of information and transaction costs as discussed above.

For countries in the European Union, the size of any net benefits depends directly on the extent of the union as measured by the proportion of a country's trade conducted with other members of the union. Since there is uncertainty as to who would participate in the union, I have computed export shares for fourteen potential members of the union and for an inner bloc of countries. Table 1 shows these data and identifies the countries in the inner bloc. I have used a three year average of export shares to smooth fluctuations.

A problem with the data in the table is that they do not account for countries that are not members of the European Union (or the inner bloc) but formally or informally use an adjustable peg to fix their exchange rates to the D-mark or, in the future, to the common European currency. The column labelled "Other Europe" suggests the importance of this trade for each country. Other Europe also includes countries that do not peg to the D-mark, so the data are only suggestive.

Since gains from a common currency increase with trade volume, support for monetary union should be greatest in countries that do most of their trade within the bloc and weakest in countries that have most of their trade outside the bloc. Table 2 ranks trade shares within the European Union (from Table 1) and by the percentage of respondents in favor of a single currency. The rank correlation is +0.54 and is

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3Belgium and Luxembourg are treated as a unit. The use of import shares or an average of exports and imports would not change the implications drawn. For Table 2, I use the average percentage in Belgium and Luxembourg that favor a single currency.
Table 1

Three-Year Average Trade Within and Outside European Union
(1992-94 in percent)

<table>
<thead>
<tr>
<th>Country</th>
<th>EU</th>
<th>Inner Bloc</th>
<th>Western Hemisphere</th>
<th>Other Europe</th>
<th>Rest of World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>64.4</td>
<td>49.4</td>
<td>4.8</td>
<td>19.7</td>
<td>11.1</td>
</tr>
<tr>
<td>Belgium-Lux.</td>
<td>71.8</td>
<td>54.1</td>
<td>6.2</td>
<td>5.1</td>
<td>17.0</td>
</tr>
<tr>
<td>Denmark</td>
<td>52.0</td>
<td>36.0</td>
<td>8.2</td>
<td>13.2</td>
<td>26.5</td>
</tr>
<tr>
<td>Finland</td>
<td>48.2</td>
<td></td>
<td>9.2</td>
<td>14.9</td>
<td>27.6</td>
</tr>
<tr>
<td>France</td>
<td>60.4</td>
<td>32.5</td>
<td>11.6</td>
<td>7.5</td>
<td>20.4</td>
</tr>
<tr>
<td>Germany</td>
<td>50.6</td>
<td>34.8</td>
<td>10.4</td>
<td>14.7</td>
<td>24.3</td>
</tr>
<tr>
<td>Greece</td>
<td>59.8</td>
<td></td>
<td>6.5</td>
<td>17.4</td>
<td>16.3</td>
</tr>
<tr>
<td>Ireland</td>
<td>70.2</td>
<td></td>
<td>11.0</td>
<td>4.0</td>
<td>14.8</td>
</tr>
<tr>
<td>Italy</td>
<td>54.9</td>
<td></td>
<td>11.6</td>
<td>11.6</td>
<td>21.8</td>
</tr>
<tr>
<td>Netherlands</td>
<td>73.7</td>
<td>55.0</td>
<td>6.1</td>
<td>6.3</td>
<td>13.9</td>
</tr>
<tr>
<td>Portugal</td>
<td>74.7</td>
<td></td>
<td>6.0</td>
<td>4.2</td>
<td>15.0</td>
</tr>
<tr>
<td>Spain</td>
<td>69.4</td>
<td></td>
<td>10.6</td>
<td>4.9</td>
<td>15.0</td>
</tr>
<tr>
<td>Sweden</td>
<td>54.1</td>
<td></td>
<td>11.4</td>
<td>14.2</td>
<td>20.3</td>
</tr>
<tr>
<td>U.K.</td>
<td>51.0</td>
<td></td>
<td>15.8</td>
<td>6.3</td>
<td>27.0</td>
</tr>
</tbody>
</table>

Source: IMF: *Direction of Trade Statistics Yearbook*. 
significant at the 5% level. Other factors such as the Common Agricultural Policy or the size of prospective net transfers also affect the net benefit or cost of monetary union but have not been included in the analysis.

Table 2 here

By using the rank of EU trade share as a measure of perceived benefit I have assumed that the union would have fifteen members. This is very unlikely. Repeating the correlation based on Table 2 for the six members of the inner bloc reduces the correlation to insignificance. Limiting a common currency to the inner bloc reduces the share of within group trade substantially for several of the countries -- notably France and Germany -- and, correspondingly, reduces one of the main benefits of a common currency. This may explain some of the decline in support for a common currency. Moreover, several of the countries in the inner bloc have fixed their exchange rates to the mark for years and are likely to continue, so they have less to gain from a common currency limited to the inner bloc.

3. Controlling Inflation in the Union

What should a monetary union seek to achieve, and how should it operate? Despite my skepticism about a future union, I assume that a union is formed and discuss how the use of a rule for money can be implemented. Reliance on rule for money would reduce some information costs discussed previously.

The Union has agreed to seek price stability on average. Differences remain about the extent to which other goals, such as employment, will be considered when setting interim inflation targets. This issue is often poorly posed. No central bank that I know is oblivious to the costs of achieving either low inflation or price stability. Unemployment and other real variables are inappropriate goals for monetary policy,

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4 Trade share with the Western Hemisphere plus the rest of the world is negatively rank correlated with the percentage favoring a single currency, but the correlation (-0.32) is not significant at the 5% level.

5 This section is a modified version of part of Meltzer (1995).
Table 2

Trade and Support for Monetary Union

<table>
<thead>
<tr>
<th></th>
<th>Rank&lt;br&gt;EU Trade</th>
<th>Rank&lt;br&gt;Favor Single Currency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Belgium-Lux.</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Denmark</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Finland</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>France</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Germany</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Greece</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Ireland</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Italy</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Portugal</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Spain</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Sweden</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>U.K.</td>
<td>12</td>
<td>10</td>
</tr>
</tbody>
</table>

aSource: Table 1 and The Economist September 16, 1995, p. 59.
but they may serve as short-run constraints on the rate of disinflation. Further, central banks in low inflation countries -- such as Switzerland, Germany, and Japan -- intervene on occasion to adjust exchange rates against other major currencies. Pressure for coordination and intervention to reduce fluctuations against non-members will arise for a future monetary union as they have for individual countries and groups of countries in the past.

Considerable skepticism is often voiced about the use of any monetary aggregate to control inflation. In the past, Nicholas Kaldor and others denied that inflation depends on the growth of monetary aggregates. Virtually all economists now accept long-run neutrality as a well-established principle, so skepticism about the use of money is less often a denial of the relation between money growth and inflation. Although not always stated explicitly, much current criticism or skepticism appears to focus on two problems: (1) the demand for money is unstable, so control of money has no predictable relation to inflation, or (2) control of money requires too much variation in interest rates or exchange rates.

To advance the discussion, it is helpful to put aside issues about the choice of control instrument. In principle, a monetary aggregate can be controlled using some short-term market rate as the control instrument. If the central bank is willing to raise or lower short-term rates as required to keep a monetary target within a quarterly or annual range, evidence suggests that they can do so. However, this requires more improvement in forecast accuracy than is likely to be achieved and may require the central bank to be willing at times to change the direction of interest rate changes more frequently than in the past.

Germany, Switzerland and Japan are three of the five countries with lowest average rates of inflation since the Bretton Woods System formally ended in 1973. Each of these countries used a monetary aggregate, and followed a quasi-monetary rule, during much of the period. A fourth country with low inflation, Holland, followed

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6Japan abandoned its quasi-monetary rule to control its exchange rate in 1986. Germany and Switzerland have also abandoned or missed their monetary targets at times, but they have continued to announce and respond to deviations of money from
a fixed exchange rate rule by pegging its currency to Germany's. Experience in these countries suggests that difficulties in controlling inflation by means of a monetary aggregate have been overstated.\textsuperscript{7}

The objective of an inflation target is, of course, to keep inflation within a band that is sufficiently narrow to be both credible and acceptable to the public. Bands widths of 2\% are commonly used. Let me therefore take as a goal keeping inflation within a 2\% band.

Currently, a policy of adjusting an interest rate or exchange rate based on the judgments of central bankers is the principal alternative to a monetary rule. We know that countries that used these instruments have not been as successful in controlling inflation as Switzerland, Japan and Germany, but they may have put less emphasis on control of inflation.

Uncertainty about the average length of lags and the variability of lags poses a greater problem for a policy of judgmental adaptation or discretion than for a rule-based policy. The reason is that the length of the lag depends on structural parameters of the system. The Lucas critique implies that these parameters are not invariant to changes in operating procedures. Discretionary changes in procedure may accelerate or decelerate responses. Variability of lags adds to the uncertainty about whether the target will be achieved and puts pressure on the central bank to respond to dominant market interpretations or misinterpretations. One of the advantages of a rule-based policy is that the rule gives a reason for rejecting political and other pressures on the central bank. This is likely to be of major importance in the early years of a European Central Bank.

Successful discretionary policy requires relatively accurate forecasts of inflation and other variables. The record of central bank and private forecasting of inflation targets. See Issing (1995) and Rich (1995) for discussion of these experiences by insiders and Neumann (1995) for evidence on German policy.

\textsuperscript{7}The Federal Reserve had a monetary target imposed by Congress against the wishes of Chairman Burns. The Federal Reserve failed to make adjustments in its procedures that would have improved control of an aggregate.
shows errors much larger than the bands used by central banks. Mean square errors of 60% to 100% of the average rate of inflation one quarter or one year ahead are common during the 1970s and 1980s. Meltzer (1987). McNees (1995) reports root mean square errors for U.S. inflation forecasts one year ahead of 1.2% for the years 1980 to 1994 and 0.9% for 1983 to 1994. This suggests the width of a 95% confidence interval band for the U.S. would be 4 to 5%; a target of zero expected inflation would produce inflation rates between minus and plus 2-1/2%.

Many forecasters use some type of Phillips curve relating inflation to the unemployment rate and other variables, including past inflation. A recent study by King, Stock and Watson (1995) found that this method produced root mean square forecast errors of approximately 1.6% for one-year ahead forecasts and 3.9% for two-year ahead forecasts during the period 1954-94. Moreover, the authors found considerable variance around the estimated value of the equilibrium level of unemployment, or NAIRU, at which inflation begins to rise. Their work suggests that a central bank that relies on the Phillips curve relation would be unlikely to remain consistently within a 2% band for inflation one or two years ahead.

Rasche (1995) reports similar results for several different sample periods. His lowest root mean square error is 1.1% for quarterly data from 1980 through 1993. Rasche shows that most of the forecasting power from his Phillips relation comes from the lagged values of inflation. The unemployment rate contributes to the forecast, but its contribution is small. A main problem with Phillips curve predictions of inflation may be that they neglect any direct role for money.

A necessary condition for inflation is a sustained growth rate of money in excess of the growth rate of output. A considerable body of evidence for many different countries and time periods supports this proposition. Evidence continues to accumulate. A recent study by McCandless and Weber summarizes evidence from other recent studies and adds additional evidence for 110 countries. In the authors' words (1995, p. 4):

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8For the more stable years 1954-73, the error is 1.1%.
In the long-run, there is a high (almost unity) correlation between the rate of growth of the money supply and the rate of inflation. This holds across three definitions of money and across the full sample of countries and two subsamples.\textsuperscript{9}

Further, the relation between inflation and commonly used measures of money growth is not nearly as weak as is often suggested. Cecchetti (1995) computed correlations of seventeen different possible indicators of inflation with the U.S. inflation rate at leads of three months to three or four years. Using monthly data for 1967 to 1994 the highest correlation at a three month or one-year lead was the growth rate of $M_1$ (0.72). The next highest correlations were for $M_2$ at three months and the monetary base at one to two years, but these correlations were lower, 0.43 and 0.66 respectively. In a shorter monthly sample, 1982 to 1994, the three highest correlations at a three month lead are the rate of change of the nominal exchange rate, average hourly earnings and the monetary base. The last of these has a correlation of 0.8 for a 3 month lead.

Contrary to the often repeated view that narrow monetary aggregates have little predictive power, Cecchetti's evidence suggests that growth of the monetary base has much more information about future inflation than most of the other sixteen variables he considered. At the two year frequency, relevant for inflation targeting, growth of the monetary base is correlated 0.66 in the full sample and 0.98 in the shorter sample. The Federal funds rate, which the Federal Reserve uses as its instrument, is uncorrelated with inflation at all frequencies in the full sample and, at all but the 1 to 2 year frequency in the shorter sample.\textsuperscript{10} Moreover, Cecchetti reports that the root mean square error for one year ahead rolling forecasts of inflation using only the growth of the monetary base is 1.6% in the longer sample and 1.1% in the shorter sample, 1982-

\textsuperscript{9}See also Capie (1995) who summarizes the history of inflation and concludes that the only periods when inflation occurred were times when money expanded persistently.

\textsuperscript{10}The correlation is 0.89, however, in the 1982-1994 sample at the 1 to 2 year frequency.
94. This compares well to Phillips curve estimates. Other commonly used measures such as the term structure spread or the spread between commercial paper and the Federal funds rate have zero or low correlations.

The monetary rule I have proposed requires the central bank to target the rate of growth of the monetary base to achieve zero expected inflation. The monetary base is the aggregate measure of money over which the central bank can exercise close control. The rule is adaptive; the current growth rate of the monetary base adjusts to past rates of growth of velocity and real output.

I have arbitrarily chosen a four quarter moving average of the growth rate of the base as the variable to be controlled (or monitored) by the central bank and a twelve quarter moving average of the growth rates of base velocity and real output to guide changes in the growth rate of the base. As in equation (1), expected inflation \( E(p) \) is zero when the four quarter growth rate of the base, \( b_4 \), is equal to the twelve quarter growth rate of the difference between growth of output and base velocity, \( y_{12} - V_{12} \).

\[
E(p) = 0 \quad \text{for} \quad b_4 = y_{12} - V_{12} \tag{1}
\]

By definition, \( V = y + p - b \); substituting, we get that for \( E(p) = 0 \)

\[
b_4 = b_{12} - p_{12} \tag{2}
\]

The expected rate of inflation for the next four quarters is

\[
E(p_4) = b_4 - (b_{12} - p_{12}) \tag{3}
\]

Equation (1) is an identity if \( b, y \) and \( V \) have the same time dimension, and the same is true of equation (3). The right side of (3) describes the permanent or expected

\[11\text{The complete statement of the rule also requires the central bank to post a penalty discount rate and provide the services of a lender of last resort through the discount window.} \]

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trend rate of inflation based on information currently available. It does not assure that all of the inflation will be realized in the next quarter. There are reasons for differences. First, given the uncertainty about the length of lags and the arbitrary choice of the period over which to average b and b-p, some of the expected inflation may have occurred; actual inflation can exceed or fall short of the trend rate shown on the right side of (3). As is well-known, inflation rates show considerable persistence. I use quarterly measured rates of inflation to adjust expected inflation for recent inflation. Second, as suggested by McCallum's version of a similar monetary rule (1988 and elsewhere), it may be useful to recognize that the inflation is affected systematically by fluctuations in output or employment such as occur during a business cycle. Third, changes in the terms of trade, excise taxes, oil shocks and other one-time price level changes introduce temporary changes to the rate of inflation. These changes will be left for the random term in a regression equation.

To introduce these changes in (3), let the four quarter expected rate of inflation equal next quarter’s inflation rate plus actual inflation for the past three quarters plus an error term to allow for one-time changes in the price level.

\[ E(p_{t+1}) = E(p_{t+1}) - (p_t + p_{t-1} + p_{t-2}) \] (4)

where \[ E(p_{t+1}) - p_{t+1} = \epsilon_{t+1} \] (5)

Further, let \( U_t \) allow for business cycle fluctuations in the measured rate of inflation.

With these changes, the rule becomes part of a regression equation to forecast inflation as shown in (6). The equation has the monetary rule, an autoregressive equation and a type of Phillips curve. The rule implies that the coefficients on \( b_4 \) and \( (b_{12} - p_{12}) \) are equal. The statistical findings below do not reject this implication.

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12McCallum uses the difference between current output and its trend growth. I use lagged unemployment to compare to a Phillips curve.
\[ p_t = a_0 + a_1 b_{4,t-1} + a_2 (b_{12} - p_{12})_{t-1} + a_3 p_{t-1} + a_4 p_{t-2} + a_5 p_{t-3} + a_6 U_{t-1} + \varepsilon_t \quad (6) \]

Table 3 compares forecasting equations for the percentage rate of change of the GDP deflator using (separately) an autoregressive equation, a Phillips-type equation, and equation (6) with and without the lagged unemployment rate. All equations use quarterly data for the U.S. at annual rates for the period 1962:1 to 1995:1.

Column (1) shows the autoregressive forecast. Since U.S. inflation persists, the autoregressive equation captures much of the systematic variance in the measured inflation rate. Adding the lagged unemployment rate has a modest effect on the standard error of estimate (see). As Rasche (1995) suggests, the unemployment rate is statistically significant in the equation but contributes little explanatory power for the range of unemployment rates observed in postwar recessions. Column (3) uses the monetary rule with the lagged measured rates of inflation. Again, there is not much improvement over the autoregressive forecasts. Column (4), using equation (6), shows some improvement over the autoregressive equation. This version of the rule implies that, on average, a one percent change in the growth rate of the monetary base maintained for four quarters increases the quarterly rate of inflation by more than 0.3% at annual rates, other things equal. A 3 percentage point reduction in the growth rate of the base reduces inflation, directly, by 1 percentage point within a year and, indirectly, reduces inflation by as much as an additional 3/4 of 1% (depending on the distribution within the year) by changing the lagged inflation terms. Part of the reduction is, temporarily, offset by any increase in unemployment or change in real base growth that results.  

Insert Table 3 here

The last column of Table 3 reestimates for the period 1980 to 1995. Both the

\[ ^{13} \text{For Germany, Neumann (1995) shows that the lagged rate of growth of the Bundesbank's four quarter monetary target explains 50\% of the current four quarter rate of price change. The monetary target is growth of central bank money from 1979 to 1987 and growth of } M_3 \text{ from 1988 to 1994.} \]
Table 3

Forecasts of Measured Inflation (one quarter inflation rate at annual rates)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>p-1</td>
<td>.40</td>
<td>.38</td>
</tr>
<tr>
<td></td>
<td>4.85</td>
<td>4.41</td>
</tr>
<tr>
<td>p-2</td>
<td>.27</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td>3.05</td>
<td>3.29</td>
</tr>
<tr>
<td>p-3</td>
<td>.23</td>
<td>.25</td>
</tr>
<tr>
<td></td>
<td>2.74</td>
<td>2.89</td>
</tr>
<tr>
<td>b-1</td>
<td>1.10</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td>2.89</td>
<td>2.28</td>
</tr>
<tr>
<td>(B - p)_{-1}</td>
<td>0.33</td>
<td>2.18</td>
</tr>
<tr>
<td>U-1</td>
<td>-.18</td>
<td>-.39</td>
</tr>
<tr>
<td></td>
<td>2.18</td>
<td>3.73</td>
</tr>
<tr>
<td>see</td>
<td>1.47</td>
<td>1.43</td>
</tr>
</tbody>
</table>

_t_-statistics (absolute value) in parentheses

p = quarterly measured inflation rate at annual rates (deflator)
b = four quarter growth rate of monetary base
(B - p) = twelve quarter moving average of real base growth
U = unemployment rate
Subscripts denote lag length
monetary and unemployment variables are much weaker than in the full sample, but the standard error of estimate is lower. Forecast errors for four recent quarters, however, are not uniformly lower using the equation for the shorter sample. The monetary and unemployment terms contribute to forecast accuracy. Forecast errors are generally larger in this period using the autoregressive equation. Table 4 shows these within sample errors.

Table 4
Forecast Errors U.S. Inflation
1994:2 to 1995:1

<table>
<thead>
<tr>
<th></th>
<th>Full Sample (1962 - 95)</th>
<th>Shorter Sample (1980-95)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rule</td>
<td>Rule</td>
</tr>
<tr>
<td>1994:2</td>
<td>1.33</td>
<td>1.65</td>
</tr>
<tr>
<td>3</td>
<td>0.23</td>
<td>0.24</td>
</tr>
<tr>
<td>4</td>
<td>-0.66</td>
<td>-0.70</td>
</tr>
<tr>
<td>1995:1</td>
<td>0.29</td>
<td>0.18</td>
</tr>
</tbody>
</table>

A by-product of Table 3 is the evidence showing that, on average, the standard error of measured inflation is large relative to the bands within which many central banks now seek to hold the inflation rate. One reason is that inflation, as measured, includes one-time price level changes from oil shocks, changes in commodity taxes, the terms of trade, weather and other non-monetary events. A monetary target abstracts from all or most of these changes or, as in Table 3, includes them in the error term. A price level or measured inflation target makes the central bank appear responsible for all such changes. In practice, central banks that set inflation targets often exclude the most common types of one-time shocks by redefining the price level or rate of price change that they target. By excluding one-time price level changes, the central bank allows the price level to vary around the rate of inflation produced by monetary growth. It remains to be seen whether the public in countries that make
these adjustments will accept the exclusions or will try to force the central bank to control the price level instead of expected inflation.

The aim of this section has not been to develop the most efficient forecast for inflation or to claim that equation (6) is such an equation. The benefit of the rule lies less in its contribution to forecasts than its contribution to policymaking. The base can be controlled directly, so a central banker can use the base rule to adjust policy action. If nominal and real base growth have remained on paths consistent with zero expected inflation, the policymaker should not react to changes in lagged rates of price change that temporarily raise or lower the current measured rate of price change. The difference between recent nominal and lagged real base growth gives information about the expected rate of inflation. For example, if increased intermediation reduces desired real money balances and raises monetary velocity, the gap between nominal and real base growth in equation (3) will widen. This implies that expected inflation will be higher, so the rule requires growth of the monetary base to be reduced to keep expected inflation at zero. The proposed rule treats the initial change as transitory, hence make no immediate adjustment. Since ability to forecast changes in intermediation and maintained economic growth is limited, I see no reliable alternative, under rules or discretion, that would discriminate more successfully than gradual adjustment as learning occurs. The rule provides for such adjustment as $b_{12} \cdot p_{12} - b_4$ changes relative to $b_4$, although the speed of adjustment is arbitrary.

In the past I have suggested that the central bank should not choose either the price level or the measured rate of inflation as its target. The target I have proposed is the expected rate of inflation. Using this target, the objective of the central bank is to prevent the public from making decisions based on anticipations of inflation. A monetary rule helps to make this important distinction clear to the public. Prices and measured inflation would not be constant, but changes in the rate of price change would be one-time events. Some of the public would interpret the changes as inflation or deflation. Since many of these changes are distributed over-time, the ideal of no response would not be fully realized. Nevertheless, the proposal has an advantage that should not be neglected. The central bank would not be expected to roll back
increases or decreases in the price level, so the public would avoid the real costs of these adjustments.

This last discussion brings out a choice that governments and central banks must make in the world of zero (or low) inflation that is envisaged for the monetary union. Economic theory does not tell us whether it is better to keep the anticipated price level or the anticipated rate of inflation constant. One choice imposes costs of reversing price level changes; the other increases the variance of the long-run price level. One choice imposes costs of adjustment if there are lags, contracts or other impediments to price level adjustments; the other imposes long-term costs of uncertainty about the future price level. Research comparing or measuring these costs would be highly desirable.

4. Conclusion: What Would Be Better?

The paper is skeptical about the net benefits of a monetary union that produces a single currency for Europe and skeptical, also, about whether such a union will replace the quasi-fixed exchange rate, mark bloc now in place in part of Europe. The net economic benefits seem small at best. Relinquishing exchange rate adjustments to country specific shocks or making the countries adopt the Social Charter may make the net economic benefits negative. Too little is known to warrant a stronger statement. The remaining benefits, such as political benefits from a larger Europe to bargain with the United States and Japan, do not require monetary union.

The stated goal of the European monetary union is price stability or low inflation. It is important to be clear about which of the two is intended, since a stable price level and stable expected inflation have different short- and long-term properties. The paper argues that zero expected inflation will be achieved more readily if the European Central Bank follows a rule that controls the growth of money. A specific monetary rule is proposed to guide decisions. Evidence from the United States suggests that the proposed rule contributes to forecasts of inflation but the forecasts do not keep inflation within a band of ± 1%.

A monetary union will destroy information about monetary policy. The credibility
of the Bundesbank, acquired through many trials, will not fully transfer to the European Central Bank. To enhance initial credibility, the new European Central Bank should announce and follow a rule that is readily monitored. The proposed rule has this property.

Discussions of rules or discretion often arouse passions and responses that are not reflected in current practice. Central banks do not behave haphazardly. Many try hard to behave consistently so as to avoid misinterpretations. Governors and staff members speak and write frequently to inform market participants and the public about their procedures and their intentions. Market participants watch the same variables that central bankers watch, and they learn to anticipate policy actions. In short, central bankers typically follow rules of behavior, but they do not like to make precise statements about the rules. They want to adjust rules flexibly and preserve the right to depart from the rule temporarily or change the rule permanently. There are many examples of the latter. The Federal Reserve has changed its target from free reserves to the Federal funds rate, to some measure of reserve growth, and back to the Federal funds rate. The Bank of Japan shifted in the mid-1980s from principal reliance on a broad measure of money growth to a policy of targeting the exchange rate. The Bundesbank has deviated from its announced monetary targets at times and has changed the monetary aggregate that it targets. The Swiss National Bank has intervened to manage the exchange rate by allowing the monetary base to exceed its announced growth rate. Most of these changes by the central banks were accompanied by announcements, speeches and papers that informed interested parties about some of the new procedures. I use the term discretion to refer to these changes in process or procedures whether open or hidden in ambiguity. I know of no evidence that these changes have generally increased welfare. Some have clearly been costly.

Many central banks now express concern about the credibility of their policies for reducing and controlling inflation. Although major central banks continue to respond to rising unemployment rates, central bankers talk much less than in the past about a broad range of objectives and much more about the social cost of inflation and the social gain from price stability. It is difficult to conceive of credibility independently
of a rule or rule-like behavior at least as to the objective of policy. It is difficult also to conceive of a credible policy of inflation control achieved by frequent changes in process or procedure. Frequent discretionary changes increase costs of information and raise doubts about the commitment to the central bank's announced objective.

I believe that central banks in the industrial countries no longer choose between rules and discretion as these terms were used in the past. The choices that many central banks now make are (1) the degree of ambiguity they maintain in announcing their rule, (2) the consistency with which they maintain procedures, and (3) the extent to which the rule covers both procedures and objectives, not just objectives. Evidence suggests that central banks that give most weight to the growth of monetary aggregates in the implementation of policy have had the lowest average rates of inflation and less variable inflation. Most models of central banking do not reach this conclusion. The models typically assume that the central bank can achieve its objective and they do not distinguish between maintained inflation and one-time price level changes.

The normative implications of available evidence is much less than fully general. Central banks cannot control both the internal and external values of money unless they act cooperatively. Economic theory does not give clear guidance about the relative merits of internal and external price stability, but it does suggest how countries can gain from cooperation.

I wish to close by suggesting an alternative to European Monetary Union that has better welfare properties, not only for Europe, or parts of it, but for most of the world economy. My proposal builds on Keynes's (1923) recognition that there are gains to each country, and to all, if the variance of expected inflation and exchange rates can be reduced together. I suggest three types of institutional arrangements to internalize the gain from cooperation. The United States, Germany and Japan should each follow an adaptive monetary rule to achieve zero expected inflation. Coordination of outcome would be achieved by following a common rule that maintains the internal value of money in these countries. Bilateral exchange rates would be largely free of influence from differences in expected inflation but would adjust to real shocks and to
cyclical changes in the three countries. This part of the arrangement not only smooths cyclical fluctuations but provides a public good for third countries. Very small countries should eliminate the monetary operations of their central banks by establishing a currency board or a permanently fixed exchange rate and, to enforce their commitment, these countries should permit their citizens to use a non-inflating foreign currency as a medium of exchange or parallel currency. The central bank in a small economy can do much harm but has little prospect of improving on a fixed exchange rate, low inflation solution.

The remaining countries can choose between the advantages of a fixed exchange rate in a world of zero expected inflation or an independent monetary policy to prevent domestic inflation. Any other choice would fail to provide the benefits that countries can expect to gain from a stable world monetary order and more effective monetary policies. It is up to each country to decide whether it is small or medium-sized and whether it wishes to join the club of stability or undertake its own policy actions. Although others may choose to do so, only the three largest countries should be restricted by a common commitment to a rule that maintains zero expected inflation and provides public benefits for them and for any country that accepts the requisite monetary discipline.

The three large countries would gain from zero expected inflation and from the opportunity to trade at fixed exchange rates with countries that accept the rule-based arrangement. Coordination would not require international action. The proposed rule is easy to monitor by markets around the world. A large country with excessive base growth would be recognized promptly, so any advantage would be modest. No problem of hegemony arises. The rule binds the large country to a consistent policy that adapts to change. A fixed exchange rate policy binds other countries. Departures would be noted.

The rule creates public goods. It can be enforced by markets. It is easily monitored and welfare enhancing. It extends over a much wider area than any monetary union that is likely to emerge in Europe.
References


