Reflections on the Strategy of Monetary Policy

Remarks by Robert P. Black, President, Federal Reserve Bank of Richmond, before the Annual Convention of the Maryland Bankers Association, White Sulphur Springs, West Virginia, May 18, 1990.

Introduction

It's a particular pleasure to be with you this morning at your annual convention. I want to focus my comments today on monetary policy. This seems like a natural subject for a Federal Reserve Bank official to address. Some of you may be disappointed by my choice, however, since there are a number of other topics I could tackle that might strike you as more pressing such as the current concern about a possible credit crunch, progress toward the resolution of the problems in the thrift industry, deposit insurance, or prospective changes in our banking and financial structure. We at the Federal Reserve are naturally interested in all these matters. Our most important responsibility at the Fed, however, is to manage the nation's monetary system and, in particular, the rate of growth in the supply of money. Moreover, by discharging this fundamental responsibility effectively we may well be able to facilitate resolution of the seemingly more immediate issues I just mentioned as well as others. In fact, it can be argued that some of our more immediate problems, such as the thrift crisis, may have been brought on in part by past monetary policies that in retrospect were less than optimal.

A More Useful Conception of Monetary "Policy"

The first thing I want to stress is the time frame I have in mind when I talk about monetary "policy." When many, and perhaps most people, think of the Fed and monetary policy, they focus almost automatically on interest rates and where they are headed and how our actions may affect them in the near future. Since the day-to-day operating lever we use in conducting monetary policy is the federal funds rate, many people equate changes in the funds rate with changes in monetary policy. For example, the press typically refers to an increase in the rate as a "tightening" of monetary policy.

This is definitely not what I have in mind when I think of monetary policy, and I shall argue later in my remarks that equating changes in the funds rate and other money market indicators with changes in monetary policy has been a particularly misleading practice and has contributed to many of the problems we have experienced over the last 30 years. Instead, when I speak of monetary policy, I am talking about both the longer-run objective the Federal Reserve is trying to achieve in the economy through its monetary actions *and* the timetable and set of procedures for attaining that objective.

To understand the distinction I am making, consider the setting of the prime rate by your bank. Obviously, the "policy" of your bank is not simply to set the prime rate at a certain level. Your policy embraces your larger goal of achieving a certain rate of return on assets or equity over a particular time horizon. To help in reaching this goal, you maintain the prime rate at a certain spread above your cost of funds. Clearly, changes in the prime are just part of a larger set of procedures designed to achieve the ultimate goal of a target return on assets or equity. Similarly, changes in the funds rate have to be considered in the context of the larger strategy of monetary policy.

A Brief Historical Review

The principal questions I want to address this morning are (1) what is an appropriate monetary policy for the Federal Reserve and (2) how far have we come in developing such a policy? I shall begin with a brief review of the major monetary developments over the last 30 years and, on the basis of this review, make some general observations about how policy has worked over this period and how it has affected inflation and the economy. With these generalizations in mind, I shall then summarize my view of an appropriate monetary policy in the sense in which I have just defined the term and conclude with an assessment of the progress we have made in putting such a policy in place.

My historical review necessarily will be very brief and oversimplified, but even a quick review suggests some strong generalizations about an appropriate monetary policy. Think back if you will to the late 1960s when large increases in federal spending on social programs and defense put strong upward

pressure on interest rates. In this period the Fed was sometimes slow to let the funds rate and other short-term interest rates rise enough to reflect these pressures. Consequently, money growth accelerated, which resulted in a sharp increase in the rate of inflation. The System eventually responded to the higher inflation by pushing the funds rate up over three percentage points in 1969, and the recession of 1970 followed.

Roughly this same sequence was repeated two more times in the 1970s. In 1972, an expanding economy put upward pressure on interest rates. The Fed allowed the funds rate to adjust upward modestly before the end of the year, but in retrospect the increase was not enough to prevent money growth and inflation from rising strongly. The System responded to the accelerating rate of inflation by raising the funds rate five percentage points in 1973, and the economy again fell into a recession. Of course, the rise in oil prices during this period undoubtedly affected both the inflation rate and the general economy, but it seems clear with the benefit of hindsight that our failure to let short-term interest rates rise more freely in 1972 was also a factor since it made a much sharper increase unavoidable the following year.

The third episode, and one I'm sure you all remember quite well, occurred in the late 1970s. In this period rapid economic growth again put upward pressure on interest rates, yet the funds rate remained essentially constant from late 1975 through mid-1977. Throughout this period, of course, the System was justifiably concerned about the lingering effects of the huge increases in oil prices in 1973 and 1974, and we naturally wanted to do whatever we could with monetary policy to help minimize the damage these increases might inflict on the economy. Even so, looking back it seems evident that our reluctance to let the funds rate adjust upward for such an extended period helped set the stage for the sharp acceleration in both the rate of growth of the money supply and inflation that followed. We began to raise the funds rate in late 1977 and continued to raise it through 1978, but our actions came too late and were too restrained. Money growth remained high and inflation continued to accelerate. Ultimately, in a crisis atmosphere, the funds rate moved up by about eight percentage points in late 1979 and early 1980, and the relatively mild recession of 1980 ensued. This was followed by a brief recovery and then by the much deeper and more protracted recession of 1981-1982, which was very costly in terms of lost jobs and output. About the only good thing one can say about the performance of the economy in the early 1980s is that the rate of inflation was cut roughly in half. The rate remained in a range of 3 to 5 percent throughout the remainder of the 1980s.

These developments in the late 1960s and 1970s highlighted the link between excessive money growth and inflation and led to a number of changes in our procedures that involved setting more explicit goals for the growth of the money supply and working to control this growth more closely in order to achieve these goals. In 1970 the FOMC first began to set explicit short-run targets for money growth, and as the decade progressed the use of the money supply as a target became more firmly institutionalized. In 1975, in response to a congressional resolution, we began to announce quarterly targets for the growth rates of several so-called monetary aggregates—the various "M's" with which you are all familiar. The Humphrey-Hawkins Act of 1978 improved our procedures by requiring us to set money growth targets on a calendar-year basis. Earlier we had set four-quarter-ahead targets each quarter, so that by the time we reached the end of a target period we were already working on a new target with a new time frame.

These steps were all in the right direction, but even after Humphrey-Hawkins was passed there was still a flaw in the targeting procedure, which is usually referred to as the "base drift" problem. Base drift arises under our procedure because the base for the target set each year is the *actual* level of the monetary aggregate in the preceding period rather than the *target* level in that period. Consequently, any target miss in the preceding period is forgiven when a new target is set, and the base for the new target "drifts" either upward or downward. Consequently, the longer-term growth rate of money over a period of several years can be well above any of the individual annual target rates if the actual growth rates persistently exceeded the target rates. This is exactly what happened in the late 1970s. The upward base drift in this period, along with our tendency to raise the funds rate rather gradually when money growth first accelerated in 1977 and 1978, were major factors contributing to the subsequent double-digit inflation.

Some General Observations About Past Policy

This brief review of events over the last three decades points to several generalizations which have influenced my thinking on what constitutes an appropriate monetary policy. The first and most

obvious point is that the level of the federal funds rate and the direction of changes in the funds rate are not reliable indicators of monetary policy. A particular level of the rate could be consistent with a relatively restrictive stance or a relatively easy stance depending on what else is happening in the economy and the financial markets. The funds rate increased in 1968, in 1972, and in 1977 and 1978. Yet in retrospect it is clear that policy in each of these periods was not too tight but too easy. Consequently, money growth accelerated.

We also know from our experiences over this period—if we did not know it before—that rapid money growth inevitably leads to an acceleration of inflation. Just as inevitably, pressures eventually mount both inside and outside the Fed to take aggressive action to bring this inflation under control. In each of the three episodes I reviewed, these actions unfortunately were followed by recessions.

Another generalization suggested by our experience over the last 30 years—and one that I believe is extremely important—is that expansionary monetary policies and high rates of inflation do *not* lead to faster economic growth. To put it in the jargon of economists, there is no trade-off between inflation and longer-run economic growth. On the contrary, persistently high rates in inflation have generally been associated with relatively low rates of real economic growth.

A fourth conclusion, which has been a major disappointment for me, is that the development of our monetary targeting procedures beginning in the early 1970s was not sufficient to prevent us from making some of the same policy errors in the late 70s we had made twice before in the preceding 15 years or so. As I suggested earlier, upward base drift in our money supply targets probably contributed to the very high trend growth in the monetary aggregates in the late 70s. And our reluctance to adjust the funds rate upward as promptly as we might have when the indications of excessive money growth and rising inflation first became available was probably also a factor. Together these two factors largely neutralized the institutional improvements we made in this period.

A final general observation suggested by our experience over the last 30 years is that despite our strong desire at the Fed throughout this period to hold inflation under control, the record unfortunately makes it clear that we were less than fully successful. There has been a noticeable tendency, on average and in retrospect, to follow policies that have allowed the price level to creep upward. This same tendency has been apparent in many other industrial countries over the same period. No statistic better illustrates this tendency than the *fourfold* increase in the price level since 1965. Economists have devoted much effort in recent years to trying to understand the reason for this experience.

One popular explanation in the academic literature, sometimes referred to as the "time inconsistency" problem (or in layman's terms, "changing your mind"), runs along the following lines. Suppose that a central bank commits itself to an anti-inflationary monetary policy and that this commitment is credible to the public. The bank may well have every intention of fulfilling this promise at the time it is made. (I am assuming here that the bank is not legally or constitutionally bound to fulfill its commitment.) Subsequently, however, the bank will see that the credibility of its promise gives it an opportunity to stimulate real economic activity temporarily by surprising the public with an unexpectedly expansionary policy—that is, an unexpected acceleration in the growth of the money supply. The bank may find it exceedingly difficult to resist the temptation to exploit this opportunity even if it wishes to keep inflation low. To the extent that central banks succumb to this temptation in practice, their behavior, in combination with the public's ability to form expectations of policy actions that are correct on average, inevitably leads to inflation. The extent to which this notion applies to our own experience in the United States is not entirely clear yet, but the idea probably deserves further thought and research.

A second explanation for the apparent inflationary tendency in our policy over time is the one-sided political pressures brought to bear on policy. Government officials and others routinely exhort the Fed to follow "easier" policies, by which they mean lower short-term interest rates. These exhortations arise because many people believe (1) that the Fed can "trade off" a higher rate of inflation for more economic growth and (2) that the Fed determines the rate of interest independently of the rate of inflation and other economic conditions. As I have already suggested, both these beliefs strike me as misguided. A particularly damaging misperception among some government leaders is the one I mentioned at the beginning of my remarks: namely, that a rise in the federal funds rate represents a "tighter" monetary policy. As the experience of the 1960s and 1970s

illustrated time and time again, this misperception has frequently led observers to conclude that the Fed is following an excessively "tight" policy when in fact the reverse has been true.

Let me state and then underline my conviction that the FOMC has never *consciously* made decisions on the basis of political considerations. Political pressures are always present, however, and it seems possible that at times these pressures may have had some effect on policy at the margin. In any case, the key point is not why monetary policy has had an inflationary tendency over the last three decades, but that in fact it has had this tendency, and I think it would be hard for anyone to dispute this point.

Suggestions for Improving Monetary Policy

In view of our experience over the last three decades, what can we do to improve monetary policy in the longer-run, strategic context I discussed at the beginning of my comments? As I see it, the most important lessons from our experience over this period are that price stability should be the primary objective of monetary policy and that a specific timetable should be set for achieving it. As many of you know, Congressman Stephen Neal, Chairman of the Subcommittee on Domestic Monetary Policy of the House Committee on Banking, Finance, and Urban Affairs, has introduced a Resolution that would instruct the Fed to make price stability its overriding goal and direct the Fed to achieve this goal within five years. I recently testified in favor of this Resolution, as did Chairman Greenspan and three other Federal Reserve Bank presidents.

A further lesson from our experience is that our procedures for controlling the growth of the money supply need to be improved. My own view is that setting targets for money growth that cover periods not of just one year but several years would help us greatly in our efforts to achieve longer-run price stability. Obviously, we must then hit the targets consistently. Persistent overshoots of the annual targets must not be allowed to cumulate as happened in the late 1970s. A big step forward in this regard is the recent development of a statistical model by the staff of the Board of Governors that provides an early warning to the FOMC as to whether its policies are working to increase longer-run inflationary pressures or decrease them. This is the so-called "P* model" that you've probably seen discussed in the financial press. In my judgment, a multi-year procedure for setting money supply targets guided by something like the P* model would provide a reliable and powerful strategic framework for moving toward full price stability.

A final lesson suggested by our experience is that if we want to hit our monetary targets and achieve price stability, we will have to be prepared to adjust the federal funds rate (or whatever other operating instrument we may be using) promptly at the first signs of excessive money growth and incipient inflation. I call this willingness to move the funds rate up promptly "erring on the side of restrictiveness." The 1960s and 70s suggest that the risks of policy errors are asymmetric. Increases in the funds rate can be reversed quickly if they turn out to be inappropriate. In contrast, failure to let the funds rate rise in a period when market forces are naturally putting upward pressure on interest rates can raise inflation expectations and put even greater upward pressure on rates. As this process proceeds, an ever-increasing upward adjustment in the funds rate becomes necessary to bring it in line with market forces. In this situation we risk losing control of the rate of growth in money and inflation. In short, we need to act *before* inflation gets out of hand rather than after.

Prospects for Monetary Policy

My greatest hope is that a policy of the kind I have just outlined will be put in place soon. I am generally optimistic regarding the prospects for such an outcome, although realism requires a note of caution.

My optimism reflects positive recent developments in each of the three areas I just reviewed. *First*, there is a growing consensus within the Federal Reserve System and among members of the FOMC that price stability should be the overriding goal of monetary policy. I can say without qualification that, as a group, the current members of the FOMC and nonvoting presidents are the most dedicated inflation fighters I have seen since I have been associated with the Committee. Moreover, the view that price stability should be the primary goal of monetary policy is now shared by at least some members of Congress. The introduction of the Neal Resolution and the public discussion of its provisions represent considerable progress, even if the Resolution is not enacted in the near-term future. *Second*, while we have not changed our procedures for setting annual money supply targets, we are paying more attention to longer-run money growth and its implication for inflation. The development of the P* model I mentioned earlier reflects this emphasis. *Finally*, I believe there is a growing recognition within the Fed that the goal of price stability requires us to adjust the

funds rate or other operating instrument more promptly *before* inflation accelerates. Twice in the 1980s—in 1984 and again in late 1988 and early 1989—we let the funds rate increase substantially even though inflation was not rising rapidly at the time. Each of these times we were criticized by some for being too "restrictive," but I am convinced that these actions contributed to the relatively stable inflation and surprisingly persistent economic growth we have enjoyed over the last seven years.

Having said this, I have to acknowledge in all candor that my optimism regarding our ability to pursue a policy aimed at achieving true price stability is a cautious optimism at this point. It is cautious because a large part of the general public and many government leaders are still relatively unconcerned about inflation. I was shocked to read of a recent poll showing that 82 percent of the members of the National Association of Business Economists do not favor the objectives of the Neal Resolution. The majority of those surveyed apparently believe that the cost of reducing inflation below its current 4 to 5 percent trend rate would be too great because the public has become so accustomed to inflation at about this rate. I cannot agree with this conclusion. Nothing in our experience over the last 30 years indicates that we can maintain inflation at a steady 4 to 5 percent rate indefinitely. If we accept a 4 to 5 percent rate as tolerable, I am confident it will be only a matter of time before we are faced with a much higher rate. Further, I believe that a *gradual* reduction in the rate over a relatively long but well-defined period of time could be accomplished without unacceptable costs to the economy.

In conclusion, the Federal Reserve has made considerable progress toward developing and implementing an appropriate monetary policy aimed at attaining price stability and the strong growth in production and jobs that go with it. We still have a great deal of work to do in developing public and Congressional support for this policy, however, and we obviously must succeed in this effort because without this support the policy itself will surely fail. I hope that you will support our efforts to achieve this important goal.

The EMU: Forerunners and Durability

Robert F. Graboyes

The European Community is stepping tentatively toward a European Monetary Union (EMU) that would replace most of Western Europe's currencies with a single money, perhaps called the European Currency Unit (ECU).[1] No previous monetary union ever involved such a large portion of the world economy or resulted in the disappearance of so many major trading currencies. Historical evidence presented here suggests that a durable monetary union requires that one monetary authority control policy for the entire union and that it have sufficient power to enforce the agreement on the member nations.

For non-Europeans, transacting business with entities in a European Monetary Union would be quite different from dealing with entities in today's separate nations, each with its own currency. Furthermore, dealing with a stable, apparently permanent union would be very different from dealing with a precarious union poised to break apart at the seams. A number of possible effects of an EMU on the world economy have been expressed by its supporters, including: [1] Giscard d'Estaing (1969/pp17-18) argued for an EMU on the grounds that its currency would rival the dollar as the medium of international exchange and thus capture some of the financial rewards of issuing a reserve currency. Johnson (1973/pp95-96), however, thought the dollar was too entrenched to be easily challenged; [2] Many hope an EMU will increase European (and world) output [see Cooper (1973/p252) for a contrary view]; [3] An EMU could lower European (and world) inflation [see Cohen (1981) for a contrary view].

In a monetary union, two or more countries agree to a jointly managed monetary policy. Allen (1976/pp4-5) lists three minimal conditions for a monetary union:

One effective currency: There must either be a single currency or several currencies, fully and permanently convertible into one another at immutably fixed exchange rates (say, 10 francs = 1 pound), thus acting as a single currency.

One effective exchange rate: There can be only a single exchange rate (and thus, one exchange rate policy) between the union currency and external currencies. For example, if both France and Germany use ECUs, then France cannot have an exchange rate of 1 U.S. dollar per ECU while Germany's rate is 2 U.S. dollars per ECU. If they did set rates in this way, free convertibility would mean that someone could make limitless profits by paying France 1 dollar for an ECU, then selling the ECU to Germany for 2 dollars, then using the 2 dollars to buy 2 ECUs from France, then selling the 2 ECUs to Germany for 4 dollars, and so on. Eventually, either the exchange rate differential would evaporate, exchange controls would have to be imposed, or France would run out of ECUs.

One monetary policy: Nations joining a monetary union give up the power to conduct independent monetary policies. Monetary policy consists of controlling the quantity of money (or at least its high-powered component) via open market operations, rediscounting, reserve requirements, credit controls, intervention in foreign exchange markets, and exchange controls. Under an independent monetary policy the individual country decides its rate of inflation by controlling nominal money growth, nominal interest rate, or exchange rates.

I. History of Monetary Unions

Monetary unions appear to have existed as far back as Ancient Greece and certainly existed in medieval Europe (Nielsen/1937/p595). This section examines historical examples of monetary unions, paying special attention to the causes that led to a union's demise.

[1] The ECU currently exists (defined as a weighted basket of European currencies) but only serves as a unit of account. The ECU described in this paper would be a full-fledged money, serving also as the medium of exchange and store of value. At this writing, West Germany and East Germany have just formed a monetary union as a step toward political reunification.

Monetary Unions That Failed

Colonial New England: Until around 1750, a monetary union existed in the New England colonies (Lester/1939/pp7-8). The paper money of each of the four colonies (Connecticut, Massachusetts Bay, New Hampshire, and Rhode Island) was accepted as legal tender by the others, even for tax payments. The union lasted nearly a century and relied on the economic dominance of Massachusetts, whose monetary policy was followed in lockstep by the other colonies. The three smaller colonies eventually grew to challenge Massachusetts's economic primacy (see population data in HSUS/1975/p1168) and began to overissue currency in the 1730s and 1740s (McCusker/1978/pp131-35). Regional monetary cooperation deteriorated, and in 1751, Massachusetts redeemed its paper money, resumed a silver standard, and ceased accepting the other colonies' paper money.

Latin Monetary Union:[2] In the mid-1860s, France, Belgium, Switzerland, Italy, and Greece formed the Latin Monetary Union, considered by some to be the first international effort to regulate exchange rates (Wisely/1977/p51). Member countries could mint unlimited quantities of certain gold and silver union coins, all of which were legal tender across the union. Each country could mint limited quantities of smaller-denomination (subsidiary) silver coins, but these were legal tender only in the individual issuing country. Subsidiary coins had a lower silver content than the union coins. Despite the coins' lower intrinsic value, public offices in one country were required to accept up to 100 francs in the other countries' subsidiary coins on individual transactions, a loophole that helped destroy the union.

The union money supply was to be determined by the market. The central banks promised to freely exchange gold and silver for coins. This bimetallic standard soon began to strain the union by forcing the central banks to guarantee that the ratio of gold to silver prices (per unit weight) would remain fixed. But, the relative values of gold and silver were determined in world markets, and the Latin Union was too small to determine world prices. The union overvalued silver which the members attempted to force on each other, eventually forcing the suspension of silver convertibility and a move to a *de facto* gold standard. Outstanding silver coins remained legal tender, and subsidiary coins were treated virtually as legal tender.

At this point, the subsidiary coins became the union's principal problem. Their intrinsic value was less than their face value, and the union members went back and forth in repealing and reenacting the legal tender status of specific countries' subsidiary coins (Nielsen/1937/p597). World War I created enormous financing needs, and some members introduced paper standards and began depreciating their currencies. Despite theoretical limitations on the production and movement of subsidiary coins, these low-value pieces were overissued and continually flowed into whichever country had the least depreciated money. Finally, in late 1920, the members began refusing to accept not only each others' subsidiary coins, but also the overvalued silver union coins. The Latin Union ceased to exist as a practical matter, though it continued in name until the late 1920s. The Latin Union was said to have "decreed one common currency without setting up a common monetary policy (Fratiani and Spinelli/1984)." Alternatively, the Latin Union can be said to have decreed a common monetary policy but left each national central bank to police its own compliance.

Scandinavian Monetary Union: In the 1870s, Sweden, Denmark, and Norway formed the Scandinavian Monetary Union under which, like the Latin Union, gold coins of each country circulated freely as legal tender in all three countries (see Lester/1939/pp176-81). Subsidiary coins also circulated across borders as legal tender, and by 1900, banks in all these countries also accepted each member country's banknotes at par (Nielsen/1937/p598). By 1905, the union was considered so complete that exchange rates ceased being quoted.

As long as limited stocks of gold restrained the production of money, the union worked well. In the end, though, World War I financing needs led many countries to inflate their currencies and dump gold at the same time Scandinavia was maintaining a fixed Krone gold price. The depreciated currencies were then used to purchase gold at official (cheap) rates; the gold was then exchanged for Scandinavian currency, which was less depreciated than that of other countries. Scandinavia was required by the union agreement to issue currency to buy the gold flowing in, thus causing the Scandinavian money supplies to rise with world inflation. Eventually, the countries losing gold were forced off the gold standard, but not early enough to prevent inflation in Scandinavia.

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[2] Much of the technical and chronological detail of this section comes from Nielsen (1937/pp596-98).

In 1916, Sweden gave the King the right to exempt the central bank and mint from their obligation to purchase gold at a fixed price (Lester/1939/pp175-87), a policy recommended by Knut Wicksell and Gustav Cassel. For a time, Denmark and Norway believed themselves exempt from Sweden's gold embargo and, because their currencies were more depreciated than Sweden's, they began shipping gold to Sweden as the rest of the world had done previously. In 1917, Sweden prohibited unlimited gold shipments from the other union members, largely eliminating the purpose of the union.

Gold convertibility placed a limit on Scandinavian money supply growth (though the limit became unacceptably high once other countries began leaving the gold standard). Without convertibility, the only control on money issuance was the resolve of the central banks, and this proved to be weak. All member countries' subsidiary coins were still legal tender across the union, so Denmark and Norway began shipping large quantities of these small coins to Sweden, just as the Latin Union members had shipped to whichever member had the strongest currency at a given time. Finally, in 1924, shipment of subsidiary coins was prohibited, effectively terminating the union.

East African Currency Area: Under British colonial administration, monetary policy was generally carried out by a *currency board*, an agency that stood ready to change the colonial currency for foreign currency, and Sterling in particular. Under such an arrangement, in 1922, British East Africa (Kenya, Uganda, and Tanganyika, plus Zanzibar in 1936) adopted a common currency, the East African shilling (Pick/1971/pp257,566,586). After independence East Africa remained part of the Sterling Area that guaranteed local currency convertibility into pounds. Explicit and implicit British subsidies to the emerging nations were sufficient to offset their desires for independent monetary policies. In 1966, Kenya, Uganda, and Tanzania (the merger of Tanganyika and Zanzibar) each adopted its own local shilling, but all three remained legal tender across the region (Cowitt/1989/p99), and all remained convertible into pounds. Depreciation of the pound in the late 1960s and early 1970s led to the dismantling of the Sterling Area in 1972. Without the Sterling Area constraints on national monetary policies, the three East African national monetary authorities were free to pursue increasingly independent policies. In 1977, the East African Currency Area ended as each country pursued a different rate of inflation and the values of the currencies diverged.

Monetary Unions That Endure

Zollverein (German Customs Union):[3] Despite efforts at political unification, in 1815 the German Federation was composed of 39 separate independent states, each with its own standards for coinage (some gold, some silver) and for weights and measures. Many coins were debased, and there were paper moneys, though none was legal tender. The Congress of Vienna in 1815 removed restrictions on labor mobility, but the myriad coins made trade and factor movements difficult and expensive.

In 1834, the Zollverein (Customs Union) was founded with the intention of reducing cross-border transactions costs. In 1838, most of the states agreed on two monetary standards (the Thaler and Gulden), leaving states free to pick one or the other. In 1847, the central bank of the Kingdom of Prussia (with two-thirds of the German population and territory) was given primary central banking responsibility for most of the states of the Federation. In 1857, the Zollverein outlawed gold as a monetary standard across the union, effectively putting the entire union on a silver standard.

Prussia's stewardship of the monetary union held the arrangement together through the time of German unification in 1871. The Prussian bank then evolved into the Reichsbank, which survived until World War II, and was supplanted by the institutions that grew into today's Bundesbank. Thus, a vestige of this union still survives in the deutsche mark. Two factors seem responsible for the union's durability prior to political unification: [1] Prussia had the size, power, and will to enforce compliance with the agreement on the smaller states; and [2] the enactment of consistent metallic standards depoliticized the currency by removing the princes' ability to debase their coinage (Holtfrerich/1989/p237).

CFA Franc Zone: The CFA (Communauté Financière Africaine) Franc Zone encompasses most of the former French colonies of West and Central Africa, plus one former Spanish colony. The CFA Zone is one of the most successful modern monetary unions, having held a large number of geographically, politically, ethnically, and economically disparate nations together for over 30 years.

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[3] Most of this account is taken from Holtfrerich (1989).

A common currency, the CFA franc (equal to 1/50 of a French franc since 1948) circulates across the region and has endured the departure of colonial administration and the establishment in the early 1960s of the modern monetary authorities. There are two central banks, responsible for monetary policy in two different groups of countries.[4] Member nations of each central bank pool their reserves in the French Treasury. There are few exchange controls on converting CFA francs into French francs, though there are some trade and capital controls. Convertibility is guaranteed by an overdraft privilege at the French Treasury.

The CFA Zone has proven successful by a number of measures. Its inflation has been much lower than in surrounding countries, largely because the Zone's rules sharply limit the amount of credit the banking system can extend to national governments. By the early 1980s, however, that limit was being circumvented by lending to parastatals (state-owned enterprises), which were not technically government entities. Recently, the viability of the Zone has been called into question because of its $600 million combined overdraft and fears that the whole system might remain permanently in deficit (FT/3-21-90/p4).

France is crucial to the union, still exercising considerable authority over policies and playing a large role in the individual countries' economies through direct assistance and by subsidies that protect these economies from outside competition. Despite Africa's tendency to reject all things colonial, the gains from continued association with the French apparently are viewed as outweighing the negatives of granting France power over the region's monetary policy. France has been able to maintain its influence in the area because its economic size (relative to that of the Zone) makes it the dominant partner. The total CFA franc money supply is less than 3 percent of the French money supply.

Belgium/Luxembourg: Belgium and Luxembourg maintain separate currencies (Belgian francs and Luxembourg francs), linked at par and legal tender in both countries (Cowitt/1989/pp561-67; Pick/1971/p311). Monetary policy is effectively under the control of Belgian monetary authorities, though a joint agency manages exchange regulations.

Switzerland/Liechtenstein: The Swiss franc is the currency for both countries (Cowitt/1989/-pp689-93; Pick/1971/p292). Monetary policy for both countries is managed by the Swiss National Bank.

France/Monaco/Andorra: Both Monaco and Andorra (along with French colonies) use the French franc, with French authorities in full control of monetary policy (Cowitt/1989/p593). Andorra also uses the Spanish peseta.

Italy/San Marino/Vatican City: Vatican City issues its own Vatican lira at par with the Italian lira (Pick/1971/p590), with both legal tender in both countries. San Marino also uses both the Italian and Vatican lire and mints some coins of its own. Italian authorities effectively control the monetary policies of the Vatican and San Marino.

U.S./Liberia: In 1944, the Liberian dollar was pegged to the U.S. dollar at par. In fact, U.S. banknotes were made legal tender and have remained the country's only circulating paper money, with Liberian coins minted for use as small change. In the early 1980s, Liberia, while it had no currency of its own and thus no printing presses to run, circumvented the discipline imposed by its use of the U.S. dollar. It began minting large quantities of 5-dollar coins, using them to pay the military and the civil service. Since Liberia has no exchange controls, the principal result was in line with Gresham's Law—the Liberian coins drove out much of the supply of U.S. currency in the country.

U.S./Panama: With its founding in 1904, Panama pegged its currency, the balboa, to the U.S. dollar. U.S. currency and coins are legal tender and constitute the bulk of circulating money. The Banco Nacional de Panama issues balboas but is not a central bank; it maintains no control over the country's money supply.

II. POTENTIAL GAINS FROM MONETARY UNION

Nations do not surrender the privilege of creating money without having good reason to do so. Friedman argued that floating exchange rates (which are

[4] The West African Currency Union (Banque Centrale des Etats de l'Afrique de l'Ouest) covers roughly the same area as the former French West Africa. It includes Benin, Togo, Côte d'Ivoire, Senegal, Mali, Niger, and Burkina Faso. The Central African Currency Union (Banque des Etats de l'Afrique Centrale) approximately covers what was French Equatorial Africa and Cameroon, plus Equatorial Guinea, a former Spanish colony. Members include the Central African Republic, the Congo, Cameroon, Gabon, Chad, and Equatorial Guinea. The Comoros, a republic in the Indian Ocean, is part of a broader Franc Zone, but has its own currency, the Comoros Franc.

necessary if countries are to pursue different rates of inflation) are the exchange rate regime most compatible with a free market and free trade (Friedman/1982/pp67-69). National monetary sovereignty is the usual regime for reasons of history and politics, as well as for purely economic reasons.

To help understand why European countries might join a monetary union, this section examines the gains which might accrue to members of a union. This section includes a discussion of three theories of optimum currency areas—a term for areas which some theory holds *ought* to form monetary unions.

Benefits of a Monetary Union

A group of countries may conclude that the benefits of monetary union outweigh the benefits of monetary independence. Benefits of a union include:

Cheaper cross-border trade: With separate currencies, every international transaction entails calculating an exchange rate, enduring exchange risk, and changing currency one for another. Under a union, such costs disappear.

Wider access to markets: By eliminating the extra costs associated with cross-border trades, industries with economies of scale may be able to produce at efficiently high levels.

Increased seigniorage: When someone accepts a U.S. dollar created by the U.S. government, he has effectively lent the government one dollar's worth of resources interest-free. Subtracting out printing and administrative costs yields the profit to the government from money creation or *seigniorage*. The smaller the economy covered by a currency, the less inducement for foreigners or locals to hold deposits and conduct business in that currency. For a firm doing business across Europe, the dollar in 1990 may be a more attractive transactions medium than either the French franc or the deutsche mark, simply because the dollar has wider acceptance across a greater number of markets. Because of its wider market access, though, an ECU in 1994 may be more attractive to the same firm than the dollar. If so, there would be an inducement to switch one's currency holdings from dollars to ECUs, and Europe, not the U.S., would get the seigniorage.

Political divisiveness: EMU proponents argue that separate currencies foster economic nationalism. A major motivation for an EMU is a widespread belief that a common currency will help solidify the Continent's political bonds.

Theories of Optimum Currency Areas

The above list of advantages of monetary unions does not provide a coherent, manageable theory explaining which areas should form monetary unions and which areas are likely to form them. Ideally, one would like a simpler theory that captured all these factors. Preferably, the theory would specify a single variable that simultaneously decreases the advantages and increases the disadvantages of monetary independence. In fact, there are at least three major theories of *optimum currency areas*, each positing a different principal reason monetary unions form. The reasons include:

Factor Mobility: This is the extent to which factors of production (labor, capital) are free to move across borders (Mundell/1968/pp177-86). For example, workers can move freely throughout the United States. Suppose the demand decreases for Northern products and workers to produce them and increases for Southern products and workers. Wages or employment would fall in the North and rise in the South. Workers will migrate to the South to benefit from higher wages or employment. In the end, wages in the two regions will equalize once more as migration makes labor scarce in the North and plentiful in the South.

Now, suppose it is the demand for Mexican goods that drops relative to those of the U.S. If Mexico can conduct an independent, expansionary monetary policy, it may be able briefly to stimulate its depressed economy or at least chosen sectors of the economy. It can print money, thus taxing holders of currency to redistribute their wealth to the unemployed. Or, it could devalue the peso, stimulating the economy (or parts of the economy) by simultaneously making all Mexican goods cheaper to U.S. buyers. The perceived ability (real or not) to stabilize an economy by using monetary policy is often given as a reason for maintaining an independent monetary policy. If, however, labor can move freely across borders, then Mexico has no more need for monetary independence than does Dinwiddie, Virginia.

Even if monetary policy can stimulate real activity in a closed economy, capital mobility makes such stimulation impossible in an open economy. Suppose Mexico is depressed and the U.S. booming, and interest rates are equal in both countries. If Mexican authorities use monetary policy in an effort to stimulate domestic production, this will exert downward pressure on Mexican interest rates. If those holding capital in Mexico cannot freely move

their assets to the U.S., then monetary policy may have some stimulative effects. If, however, there is capital mobility, downward pressure on Mexican interest rates will only drive assets abroad without having any stimulative effects. Similarly, the Federal Reserve Bank of Chicago cannot stabilize Midwestern employment by lowering interest rates. If it did, assets would flee to the other Districts thus instantaneously equalizing interest rates again. Thus, the existence of labor and capital mobility reduces the attractiveness of pursuing an independent monetary policy (Mundell/1968/pp177-79).

Internal vs. External Transactions: McKinnon (1963) saw optimum currency areas in a given region as defined not by factor mobility, but rather by the ratio of transactions *within* the individual countries to transactions *between* the countries. An appreciation of the mark against the franc will increase the prices the French pay for German goods. If France buys so much from Germany that such an exchange rate move will be viewed by Frenchmen as a rise in their own price level, then, by McKinnon's criterion, France and Germany ought to form a monetary union. On the other hand, if Mexico buys little from Malawi, then a rise of the Malawi kwacha against the Mexican peso will not be seen by Mexicans as a rise in the price level. Thus, by McKinnon's reckoning, Mexico and Malawi do not belong in the same monetary union because changes in the peso/kwacha exchange rate will change the Mexican or Malawian price levels imperceptibly or not at all.

Political Cohesion: Kindleberger (1973/pp424-34) saw optimum currency areas as defined by a region's sense of political community. Simply put, if French are French first and Europeans second, and Germans are Germans first and Europeans second, then they ought to have separate currencies. If they are Europeans first and French or Germans second, they ought to have a single currency. Throughout history, he notes, almost every country has had its own currency and none, he asserts, has had different currencies for different regions (though one could argue with this, looking at examples like state-issued moneys in the nineteenth-century U.S.).

III. STABILIZING FACTORS IN AN EMU

Theoretical gains from a monetary union are only realized if the agreement setting up the union can be enforced upon the members. As with any contract, there must be enforcement mechanisms built into the agreement which constrain the members' actions to serve the good of the group. This section seeks to identify institutional differences between those unions which failed and those which still endure. Then we ask whether such conditions exist in today's Europe.

Surrendering Monetary Independence: Institutional Arrangements

The effects of a European Monetary Union on the U.S. depend crucially on whether the union seems stable or transient. This section looks at the institutional forms a union can take, catalogued by the number of currencies circulating within the union and by the domain of the central bank or banks. This will help in later sections to identify the specific forms that seem to encourage stability, based on historical evidence. First, institutional arrangements can include:

Unionwide Currency: The ECU, for instance, would circulate in every member country;

Separate Currencies: Instead of adopting an ECU, a European Monetary Union could agree that francs, marks, pounds, etc., would each freely circulate in all union countries at fixed exchange rates.

Second, union monetary policy can be set by:

One Unionwide Central Bank: This supranational institution would set policy for all members;

One National Central Bank: The central bank of one country (say, Germany) could by mutual agreement set policy for all members;

Multiple National Central Banks: Each country would have its own central bank, required to follow a policy consistent with union agreements;

Multiple Nonnational Central Banks: Different regions of the union would have separate central banks, but the borders of their regions would not follow national boundaries, as the Federal Reserve Districts do not follow U.S. state boundaries. [See the accompanying piece, "A Yankee Recipe for a EuroFed Omelet," for a discussion of this possibility.]

Whichever arrangement is chosen, in a successful, lasting monetary union money moves with little or no restriction, and people must be indifferent between any two banknote portfolios of equal value and between any two deposit accounts of equal value

(they are generally not indifferent as to how they divide their holdings between banknotes and deposits). Under a union subject to periodic exchange rate realignments, no one will be indifferent to the national makeup of his currency and deposits. Under the supposedly fixed exchange rates of the Bretton Woods arrangement (which had some characteristics of a monetary union), people cared a great deal about whether their pockets were filled with dollars or pounds because the possibility of a devaluation or revaluation of, say, the pound against the dollar meant big gains or losses, depending on which currency gained and which lost and where the holder of currencies lived.

Since 1978, most of the European Community countries have been members of the European Monetary System (EMS), an agreement to limit exchange rate movements and to harmonize the member nations' economic policies. It has given rise to the European Currency Unit (ECU), a common unit of account. The EMS has had some success in bringing rates of inflation closer together. However, the EMS is not a monetary union—no one pretends that exchange rates will not change.

Incentives for Monetary Restraint

Table I catalogues the monetary unions by the two criteria (number of currencies, domain of central banks) presented in the above discussion of institutional arrangements. In each case, monetary restraint was imposed on members by some factor that limited political authorities' influence over monetary policy. Such restraint was provided either by a viable metallic standard or by the presence of a single authority with the power to impose its will. In this admittedly limited number of cases, multiple currencies do not appear to threaten the arrangement. The Luxembourg franc, Vatican lira, San Marino lira, Liberian dollar, and Panamanian balboa have not been overissued to the point of threatening the respective union (though Liberia has recently pushed its arrangement somewhat).

Table I

Monetary Union	Single or Multiple Currencies	Money Supply Under Control of	Money Supply Restrained by	Restraining Factor Failed Because of
New England	Multiple	Individual colonies	Massachusetts*	Growth of smaller colonies
Latin Union	Multiple	National Banks	Gold, silver in coins	Silver depreciated, limited bimetallism continued Some members left gold standard during WWI Subsidiary coin loophole
Scandinavian Union	Multiple	National Banks	Gold standard	Collapse of world gold standard during WWI Subsidiary coin loophole
East African Currency Area	Multiple	National Banks	Convertibility under Sterling Area	Convertibility broken with Sterling Area collapse
Zollverein[a]	Multiple	National banks	Prussia* Metallic standards	
Belgium/Luxembourg	Multiple	Belgium[b]	Belgium*	
Switzerland/Liechtenstein	Single	Switzerland	Switzerland*	
France/Monaco/Andorra	Single	France	France*	
Italy/San Marino/Vatican	Multiple	Italy/Vatican[c]	Italy*	
CFA Franc Zone	Single	Multinational banks	France*	
U.S./Liberia	Single	United States[d]	United States*	
U.S./Panama	Single	United States[d]	United States*	

Notes:
* Economic dominance of one member enabled it to enforce restraint
[a] Evolved into today's deutsche mark
[b] Luxembourg has some power over foreign exchange regulation.
[c] San Marino issues no currency, but mints its own coins.
[d] Liberia and Panama theoretically have independent currencies (the Liberian dollar and the Panamanian balboa), but in practice only mint coins. Liberia has in recent years minted sufficient coins to threaten its arrangement with the U.S. dollar.

The four failed unions were each composed of between three and five countries of similar economic size. In each case, overissue of money was initially restrained by factors which separated the money from the political authorities. In each case, the depoliticizing factor disappeared, leaving the individual political jurisdictions free to determine their own money supplies, and leaving monetary authorities vulnerable to political pressures. Members preyed on their partners by issuing excessive amounts of money, which union members were forced to accept.

These observations accord with what cartel theory would suggest. A monetary union is a cartel whose product is money instead of oil or coffee or diamonds. Like all cartels, members of a monetary union must restrict output or suffer declining joint profits (in this case, seigniorage). As with other cartels, restricting production depends on maintaining an agreement among members on how to share the profits. Over time, cartels generally break down because at some point, members allow pursuit of individual self-interests to override pursuit of the cartel's common goals. Salin (1984/pp196-214) describes the current European Monetary System as a cartel.

The exception to this rule is the cartel which has one member with both the motive and the economic power to impose the agreement on all the other members. OPEC held together because Saudi Arabia, with one fourth of world production, was willing and able to expand and contract its production in response to changing world demand and supply conditions. Furthermore, the Saudis enjoyed sizable international reserves, out of which current expenditures could be financed, if necessary. When other members of OPEC violated their agreement by overproducing, the Saudis could threaten to expand their production to punish the cartel, and this threat was credible. Similarly, France has economic and noneconomic reasons for wanting the CFA Franc Zone to survive, giving it the ability and desire to keep the system operating, and the member countries and the multinational central banks are fully aware of France's special position.

One of the major obstacles in the way of an EMU is the lack of a dominant member to serve as the union's enforcer. Liechtenstein completely surrendered its monetary policy to the Swiss National Bank. The German Bundesbank has been suggested for a similar role in a European Union. Now, the advent of a German Monetary Union should give Germany an even larger percentage of the Western European economy. While it is the largest economic power in the region, however, it does not dominate Western Europe, since its Gross Domestic Product is only about 1/4 of the total Common Market GDP (perhaps 30% or more if estimated East German GDP is added). It has been suggested that all of Western Europe similarly assign Germany power over the joint money stock; this seems unlikely due to political reasons.

Other Factors Encouraging Permanent Union

As mentioned above, it is unlikely that any member of a European Monetary Union will emerge as a sufficiently dominant force in the union to enforce a monetary cartel. Further, it seems unlikely that Western Europe would give sole power of monetary policy to some large (but not dominant) member, such as Germany. Without such a dominant member, other factors would have to emerge to solidify the union.

Some proponents of a European Monetary Union hope to model their system on the U.S. Federal Reserve, with national central banks becoming the equivalents of Federal Reserve District Banks, which constitute a sort of monetary union. Money circulates unrestricted throughout the U.S., and nobody cares whether the bills bear the seal of the Richmond Fed or the Cleveland Fed or any other regional Federal Reserve Bank. This situation suggests asking what steps are required to create such a system in Europe, and what obstacles could prevent Europe from developing as cohesive a system as the Federal Reserve.

Emergence of Europe as a Political Community: The more Europeans begin to think of themselves as Europeans rather than Dutch, Italians, Greeks, etc., the stronger the EMU will be. The Common Market's founders dreamed of a United States of Europe. Some of Europe's current leaders appear to support subordinating nationalism to continental interests. The willingness of their constituents to go along is less certain. There are many barriers to overcoming ancient nationalistic tendencies. Linguistic, religious, political, and cultural differences still separate the nations of Europe.

A Common European Fiscal Policy: It has been argued that one reason for the solidity of the United States as a currency area is the size of the federal government compared with state and local governments. This size makes possible fiscal transfers from booming regions to depressed regions. These

fiscal stabilizers, it is argued, reduce demands for monetary stabilization of regional economies. Tower and Willett (1976/p25) write that independent fiscal policies within a currency area are likely to be of a "beggar-my-neighbor" character, leading to inefficiencies.

The fiscal tools of the Common Market (eg, the Common Agricultural Policy, the Customs Union) are small but have grown in importance. Still, the present-day Common Market has limited ability to tap the wealth of, say, Germany, to ameliorate economic difficulties in, say, Greece or Ireland. This limitation has been cited as an obstacle to a successful EMU (Leigh-Pemberton/1989/p6). Ingram (1973/p8), though, recalls that the federal government was small compared with the states until the New Deal. An explicit agreement to transfer spending powers from the national governments to the European Community, plus explicit agreement to use such power to smooth regional disturbances, would help solidify an EMU by reducing the need for regional monetary stabilization policy. Such regional issues might be important if labor migration were judged to have pecuniary or nonpecuniary costs. Again, the problem arises that such agreements often fail during downturns affecting the whole union.

It is often stated that a monetary union requires fiscal harmonization or else divergent national policies will strain the monetary accord. In one sense, this claim is an overstatement. The monetary union really requires *either* fiscal harmonization *or* common knowledge that monetary policy cannot later be used to correct a member's fiscal policy errors. In other words, if the central bank of a monetary union is willing to bail out individual nations whose obligations cannot be met, then fiscal policies will have to be harmonized. If, however, each nation knows the central bank will not subsidize its desire to live beyond its means, then that will by itself "harmonize" policies. In the United States, for example, overextended states and localities have had no guarantee, traditionally, that the U.S. Treasury (and, indirectly, the Fed) would bail them out.

Europe 1992: The U.S. is a common market in the sense that goods, labor, and capital circulate with limited interference. The Europe 1992 Project is aimed at making Western Europe a similarly united market, rather than a collection of national markets with numerous barriers. The Project aims to create a common legal framework, common product standards, and a free flow of goods and factors across borders. If the aims are achieved, the European Community will certainly become more of an optimum currency area. As is true with the political unity of the continent, though, it remains to be seen whether Europe 1992 will succeed. The legal traditions of the countries are vastly different. Noneconomic factors (eg, fear of terrorists and criminals) may reduce the actual mobility across borders. Further, it remains to be seen whether the countries of Europe will give up their often subtle barriers to free trade.

Nonnational Central Banks: There is strong pressure in Europe to retain the existing central banks, with each responsible for its own nation's monetary policy. Allen (1976/p11) wrote that it would be difficult to persuade these institutions, each with a long history of independence and power, to simply disappear. Yet, as this paper has shown, multiple central banks encourage the dissolution of a monetary union. A possible compromise between retaining and abolishing national central banks would be to retain the national banks, but redefine the boundaries over which they have authority. This idea is pursued in the accompanying article "A Yankee Recipe for a EuroFed Omelet."

IV.
CONCLUSIONS: CAN THE EMU FLY?

A successful monetary union requires that the countries involved gain from the union agreement, and it requires institutions which enforce the agreement once it is reached. The theoretical motives behind a monetary union (factor mobility, cross-border transactions within the community, political cohesion) appear to be increasing. In all successful historical unions examined, monetary policy was in the hands of a single monetary authority or, where there were several central banks one was sufficiently dominant to impose the agreement on other members. "Self-regulating" standards (eg, metallic content of money) enforced by multiple authorities did work for a time in several cases. In each case, though, financial pressures and weakening of the self-regulating mechanism eventually led members to violate their union agreements. In each of the four failed unions examined, members destroyed the union by overissuing their moneys.

According to the criteria set forth in the optimum currency area literature, Western Europe's motives for forming a monetary union are increasing. The factors of production are increasingly mobile within the community as controls are being dropped on

movements of humans and capital. Transactions occurring *between* European Community members are increasing, compared with transactions wholly *within* individual member nations. The region's sense of political community, while still sharply limited, nevertheless seems to be rising as numerous political leaders preach the virtues of continental over national interests.

However, no centralized EMU enforcement mechanism appears to be on the horizon. The ECU (or permanently tied separate currencies), being fiat money, will not even have a temporarily self-regulating standard, as the Latin and Scandinavian Unions had in gold and silver. Several decades of experience with exchange rate mechanisms like the current European Monetary System's have met with only limited success because economic pressures induce individual members to pursue domestic self-interests over the common good. To be sure, inflation rates in the EMS have converged (and exchange rates stabilized). But during this period, Western Europe has experienced no extraordinary strains, such as war or prolonged recession. Even the moderate economic difficulties of the 1970s were sufficient to ruin several earlier arrangements. A permanent EMU would likely require either a supranational monetary authority (possibly with some degree of decentralization) or the delegation of all authority to the German Bundesbank.

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A Yankee Recipe for a EuroFed Omelet

Robert F. Graboyes

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The architects of the European Monetary Union (EMU) face a dilemma in trying to balance the advantages of decentralized administration against the dangers of nationalism. In this respect, the American model suggests a way to stabilize the EMU by disengaging it from everyday politics.

The map of the twelve U.S. Federal Reserve districts is an odd-looking thing. Politically and economically dissimilar states are lumped together. Some states are split in two. No state is by itself a Fed district. These boundaries make it difficult to easily identify district interests in the way one can speak of urban interests or Texas interests or Rust Belt interests, and this is precisely what is interesting and stabilizing about Fed districts.

One state's interest groups can easily organize support for a pork-barrel policy to benefit that state at the expense of the rest of the country. Fed district lines, though, discourage beggar-thy-neighbor politics by scrambling the usual coalitions constructed along state lines. Suppose a pressure group wished to lobby the Cleveland Fed for a policy detrimental to neighboring districts (say, lax credit approval standards by Cleveland's discount window).

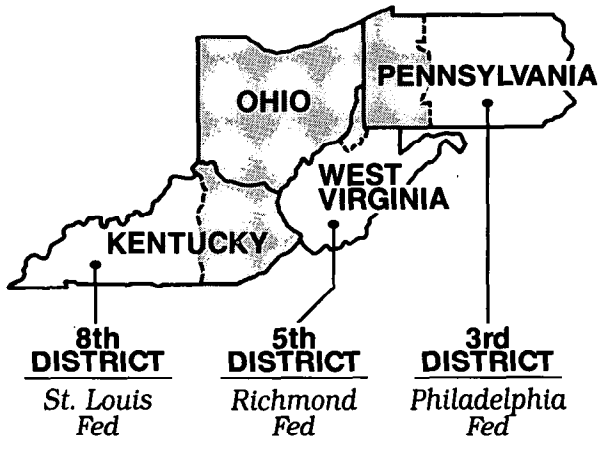
The pressure group would have to garner support in Ohio, Pennsylvania, Kentucky, and West Virginia, four states with markedly different interests. Ohio lies completely within the Fourth District, so a consensus there might be attainable. Half of Pennsylvania, though, lies in the Philadelphia Fed's district, so that state's interest groups would be hesitant to support a policy harming eastern Pennsylvania but helping Kentucky, Ohio, and West Virginia, as well as western Pennsylvania. Similarly, half of Kentucky is in the St. Louis Fed's domain. Few West Virginia pressure groups would join the coalition, since only a tiny piece of West Virginia is in Cleveland's district.

On occasion, however, a consensus can arise in one Fed district, pitting it against the other districts. For example, a districtwide recession can lead to one-sided pressures on that district's Fed (which may have a representative on the Federal Open Market Committee) to support looser credit conditions nationally. The decentralized Fed, though, reduces the frequency of such demands reaching Washington by requiring that such pressure must filter through debate at the district level before it reaches the Federal Open Market Committee. This structure slows down the deliberative process enough that policymakers at the highest level do not have to respond to every ephemeral economic disturbance.

So, decentralization assures that disparate voices will be heard, while the jagged district boundaries assure that these voices will be organized through channels other than the usual political ones organized along state lines.

The Fed's ragged district lines offer powerful advice to the budding European Monetary Union — insulate a EuroFed from nationalistic pressures by

4th FEDERAL RESERVE DISTRICT
(Cleveland Fed)
Plus portions of Pennsylvania, West Virginia, and Kentucky in Neighboring Fed Districts



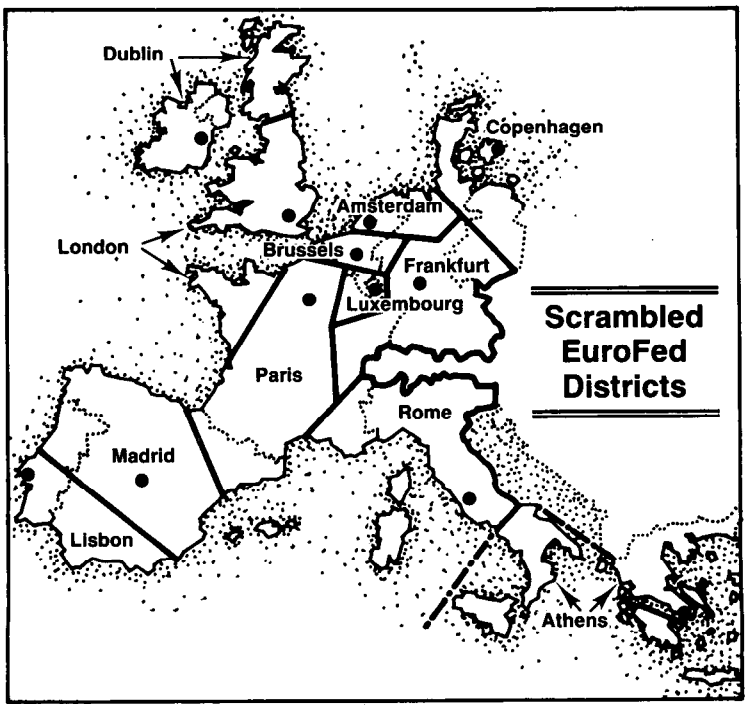
scrambling its districts' borders. Rename the Bundesbank the Frankfurt EuroFed, but let it represent only part of Germany plus part of France, with a governing board coming from both to control any tendency to favor only Germany. Rename the Danmarks Nationalbank the Copenhagen EuroFed, and let it represent Denmark plus some parts of Germany not under the Frankfurt EuroFed, and so on with all the other central banks.

In other words, design EuroFed districts that break up nationalistic pressures rather than exacerbate them, yet which still confer the other benefits of decentralized administration. Entangling member nations at the district level would also make secession from the EMU an administrative nightmare (like unscrambling an emu's egg, so to speak), and that would bolster confidence in the EMU on world markets.

A glance at the map shows that drawing twelve scrambled districts for twelve countries is harder than drawing twelve scrambled districts for fifty U.S. states. Some districts might inevitably have distinct economic interests. Undoubtedly, it would take complex negotiations to design the borders and the regional EuroFeds' voting structures. Supplemental measures might be needed to adequately insulate the EuroFeds from political logrolling. Like the district Feds, EuroFeds might be well-served by different classes of directors representing, say, industry, labor, national governments, the banking sector, etc. To prevent any one nation from dominating a EuroFed, each district's board could include members from other countries on a rotating basis, for example, giving the London EuroFed board a succession of members from Greece, Portugal, Belgium, and so on.

The goal is to insure that national political coalitions do not easily or quickly translate into EMU pressure groups, making money just one more log to roll (eg, I'll voter tighter credit if you'll vote higher wine subsidies).

National politics would certainly inject itself into the process of drawing lines. For example, would Britain allow Northern Ireland to fall within the Dublin District? As difficult as these negotiations would be, scrambling monetary boundaries at the founding of the EMU would recognize and deal *up front* with an ugly reality — nationalism has been ripping European institutions apart for centuries. The point here is that the EMU's founders can choose to face that reality now and put it behind them. Or, they can simply string the existing central banks into a loose confederation, with each bank representing purely national interests. Then they will be sure to face the reality every day as long as the union survives.



Fifth District Bank Performance

John R. Walter and Donald L. Welker[1]

PREFACE

The final four years of the 1980s were difficult for banks in the U.S. Between 1986 and 1988 problems in the agricultural and oil sectors led to losses and numerous bank failures. The nation's largest banks suffered losses as income was set aside in 1987 and 1989 to deal with problems in portfolios of loans to less developed countries (LDCs). Losses in real estate loan portfolios, due to weak real estate markets, had a significant negative effect on bank earnings in 1989. In addition, concerns for future bank earnings were raised by regulators and bank analysts because of banks' increased lending for highly leveraged corporate takeovers.

Despite the difficulties of banks nationwide, Fifth Federal Reserve District commercial banks as a group were able to maintain historically high profit rates throughout the years 1986 through 1989.[2] While 770 U.S. banks failed between January 1986 and December 1989, only two were Fifth District banks.[3] District banks almost completely eliminated their modest LDC debt exposure by selling these loans in the secondary market during 1988. Still, the outlook for District banks on other fronts may not be so sanguine. Thus, while the degree of exposure of District banks to highly leveraged loans is difficult to determine, real estate lending could limit the future profits of District banks because such loans grew as a percentage of all loans. Most ominously, nonperforming real estate loans expanded rapidly during 1989.

Fifth District commercial banks maintained a high profit rate during 1989. They outperformed banks in the rest of the United States by holding down interest costs, noninterest costs, and provisions for loan losses, and by paying out less in taxes. Fifth District banks also added enough equity capital during the year to improve their capital ratios. Their nonperforming loans grew to a high level by Fifth District standards but remained well below the average experienced by banks elsewhere in the nation. Banks outside the District suffered a significant decline in profits due to a large increase in provisions for loan losses during the year.

The next section gives the nonbanker an introduction to a bank's balance sheet by discussing the structure and adjustments to Fifth District banks' balance sheets that allowed them to maintain strong profits in 1989. The third section then reviews, in detail, Fifth District banks' income and expense results.

AN INTRODUCTION TO THE BANK BALANCE SHEET

An annual review of bank performance begins with the end of the preceding year. Balance sheet data appearing under the caption ***1988*** in Table I refer to summed figures for all banks in the Fifth Federal Reserve District at the close of business on Friday, December 30, 1988, the last business day of the year. Comparable information for 1989 is recorded for Friday, December 29, 1989. [NOTE: Data will be denoted as follows: Table I, line a = **(Ia)**.]

The first item on the balance sheet, ***cash and deposits in other financial institutions*** **(Ia)**, has a different meaning for banks than for other types of businesses. Most businesses regard cash (currency and coin) and deposits as sterile assets to be kept to a bare minimum consistent with operating requirements. Banks also prefer to minimize currency and coin holdings, but tend to view their deposits at other "correspondent" banks as working balances to help pay for the services correspondents provide them. Thus a $369 million reduction in cash and deposits in other financial institutions from year-end 1988 to year-end 1989 could mean District banks held less cash in their vaults, but could also mean they required fewer or less costly services from

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[1] Valuable research assistance was provided by Marc D. Morris.

[2] The Fifth Federal Reserve District includes Maryland, Virginia, North Carolina, South Carolina, the District of Columbia, and most of West Virginia. The District of Columbia is referred to as a "state" in this study.

[3] Data on number of bank failures: 1986-88 figures from "Seven Years of Failures," *American Banker*, January 1, 1989; 1989 figures from Federal Deposit Insurance Corporation, Division of Research and Statistics. Figures include assistance transactions.

Table I

Balance Sheet of Fifth District Banks

($Millions)

	1988	1989	Change
Assets			
a Cash and deposits in other financial institutions	21,417	21,047	(369)
b Investment securities	43,220	52,215	8,996
c Loans & Leases—Total (=d+e+f+g+h+i)	148,551	163,702	15,151
d Home mortgage	29,268	33,485	4,217
e Commercial real estate	34,523	39,764	5,241
f Business	37,960	40,872	2,913
g Consumer	32,506	34,226	1,720
h Agricultural	1,331	1,431	100
i Other	12,963	13,924	961
j Less: Allowance for loan and lease losses	(1,856)	(1,994)	(138)
k Fed funds sold	8,547	9,361	814
l Other assets	10,179	11,259	1,080
m Total assets (=a+b+c+j+k+l)	**230,057**	**255,591**	**25,534**
Liabilities			
n NOW accounts	17,192	18,172	981
o Money market deposit accounts	27,933	28,753	820
p Savings and consumer time deposits	63,061	71,953	8,892
q Demand deposits	34,011	33,883	(128)
r Time deposits with denominations over $100,000	28,816	31,145	2,329
s Deposits in foreign offices	5,776	5,930	154
t Fed funds purchased	27,096	36,469	9,373
u Other liabilities	11,103	12,392	1,288
v Total liabilities (=n+o+p+q+r+s+t+u)	**214,988**	**238,697**	**23,709**
Equity			
w Stock	6,304	6,893	589
x Undivided profits and reserves	8,765	10,001	1,236
y Total equity (=w+x =m−v)	**15,069**	**16,894**	**1,825**

Source: Consolidated Reports of Condition and Income.

correspondents, or chose to pay fees for services in lieu of holding correspondent balances. Available data are not sufficient to determine the relative importance of the three explanations.

Investment securities **(Ib)** refers to Fifth District banks' investments in U.S. government securities and municipal securities (debt issued by state and local governments). U.S. government securities can be sold quickly if cash is needed. They also have no credit risk or risk of default, since the federal government backs them. Most municipal securities are considered to have minimal credit risk and, in addition, provide a source of tax-exempt income. Banks in the Fifth District increased their holdings of government securities by nearly $9 billion in 1989.

District banks lent about $15.2 billion more in 1989 than they received in repayments from their borrowing customers **(Ic)**. Inevitably, banks make some loans that are never fully repaid. They provide for this credit risk with an ***allowance for loan and lease losses*** **(Ij)** which is deducted from ***total loans and leases*** **(Ic)** to arrive at a figure for the net loans that are believed collectible. Among Fifth District banks during 1989, the increase in the allowance for loan losses of only $138 million relative to additional loans of $15.2 billion suggests a relatively high degree of confidence that the loans will be repaid.

The balance sheet does not show the amount actually charged off as loan and lease losses in 1989. To derive this amount, it is necessary to use the income statement (Table II) as well as the balance sheet. The income statement shows that ***provision for loan and lease losses*** **(IIn)** totalled $791 million at the end of 1989. The $791 million plus the balance sheet figure of $1,856 million in end-of-1988

Table II

Income Statement of Fifth District Banks

($Millions)

	1988	1989
Interest Income		
a Interest on balances with depository institutions	426	442
b Interest and fees on loans and leases	14,776	17,911
c Interest and dividends on securities	3,474	3,925
d Interest income from trading accounts	71	168
e Income from fed funds sold	610	838
f Total interest income (=a+b+c+d+e)	**19,356**	**23,284**
Interest Expense		
g Interest on deposits	8,988	11,181
h Expense of fed funds purchased	1,956	2,830
i Interest on borrowings	341	496
j Interest on mortgage indebtedness	19	20
k Interest on subordinated notes	74	87
l Total interest expense (=g+h+i+j+k)	**11,378**	**14,614**
m Net interest income (=f−l)	**7,978**	**8,670**
n Provision for loan and lease losses	735	791
o Noninterest income	2,518	2,836
p Noninterest expense	6,951	7,540
q Gains or losses on securities	50	77
r Income before taxes (=m−n+o−p+q)	2,860	3,252
s Income taxes	656	816
t Extraordinary income—net of taxes	19	4
u Net income (=r−s+t)	**2,223**	**2,441**

Source: Consolidated Reports of Condition and Income.

allowance for loan and lease losses **(Ij)** indicates that $2,647 million was available in 1989 to absorb loan and lease losses. Inasmuch as the year-end allowance for losses was $1,994 million **(Ij)**, charge-offs less recoveries and adjustments during 1989 must have been $2,647 − $1,994 = $653 million.

Federal legislation requires every depository institution (commercial banks, savings and loan associations, savings banks, and credit unions) to hold reserves in the form of vault cash or deposits with one of the twelve Federal Reserve Banks. These required reserves are in proportion to certain classes of the institution's deposits. A depository institution with reserves in excess of the required amount may lend these fed funds to other institutions that have inadequate amounts of required reserves. Such loans show up on the lending bank's balance sheet as ***fed funds sold*** **(Ik)**. Fed funds are generally lent overnight, and the rate they earn changes daily with supply and demand.

The remaining asset category in Table I is ***other assets*** **(Il)**. This category consists mainly of buildings and equipment including automated teller machines and computers. It also includes prepaid expenses such as insurance premiums and magazine subscriptions. In 1989, Fifth District banks added more than $1 billion, net of depreciation expense, to other assets.

The liabilities section of the balance sheet shows that Fifth District banks obtained funds from a variety of sources. The first item in this category, ***NOW accounts*** (negotiated order of withdrawal accounts) **(In)**, is a relatively new type of checking account that

pays interest. The Depository Institutions Deregulation and Monetary Control Act of 1980 allowed banks and other depository institutions nationwide to offer NOW accounts. Before 1980 only depository institutions in the New England states had been allowed by Congress to offer such accounts. Bank depositors added just under $1 billion to their NOW accounts in District banks in 1989.

Between 1979 and 1982 money market funds (MMFs) offered by investment companies grew rapidly at the expense of deposits in depository institutions. Interest rate ceilings limited the rates depository institutions could pay on deposits to levels below rates paid on MMFs. To allow depository institutions to compete with investment companies for deposits ***money market deposit accounts*** (MMDAs) **(Io)** were authorized December 1982. Like MMFs offered by investment companies, MMDAs offered by banks and other depository institutions pay a market-determined rate of interest and provide limited check writing privileges. MMDAs offer a safety advantage: they are insured by the Federal Deposit Insurance Corporation (FDIC), an agency of the federal government, while MMFs are not.

Innovative banking products have augmented but not replaced ***savings and consumer time deposits*** **(Ip)**. These traditional savings accounts include passbook savings accounts, "statement" savings accounts (which do not require passbooks), and small certificates of deposit, which are deposits left with the bank for a specified period. Savings and consumer time accounts continue to represent the largest single component of bank liabilities in the Fifth District. In fact, depositors expressed their approval of these accounts at District banks by depositing $8.9 billion more than they withdrew in 1989. A portion of this increase in savings was provided by interest accumulated on balances carried over from 1988. This built-in growth factor makes savings deposits particularly attractive to banks.

Table I shows that ***demand deposits*** **(Iq)** continued to supply nearly $34 billion to banks in the District. Balances of these non-interest-earning checking deposits were down slightly (by $128 million) from the previous year. Contrary to popular belief, demand deposits do not represent a source of "free" money because banks must supply costly check-clearing and bookkeeping services to holders of these deposits. As is the case for all deposits, what matters is the differential or "spread" between the interest and noninterest costs associated with deposits and the yields on the banks' earning assets. This yield-cost spread remained positive and large in 1989, a period characterized by interest rates that were relatively high from a historical perspective.

The deposits described up to this point tend to be those attracted mainly from a bank's local community or service area. In contrast, funds in ***time deposits with denominations over $100,000*** **(Ir)** may come from anywhere in the world. These large certificates of deposit (CDs) are frequently referred to as "hot money" because they may move from one bank to another in response to interest rate changes of less than one-tenth of one percent. Large denomination time deposits provide a ready source of available funds to banks confronted with strong loan demands. When loan demands diminish, the bank lowers its rates on these deposits as they mature and the deposits move to other institutions paying higher rates. Large time deposits provided $2.3 billion of additional funds to Fifth District banks in 1989.

Only a few banks in the District engage in foreign operations to the extent of maintaining offices overseas. For this reason, ***deposits in foreign offices*** **(Is)** is a relatively minor source of funds. Less than $0.2 billion was added to deposits held in foreign offices during the past year.

Fed funds purchased **(It)** or borrowed is the mirror image of fed funds sold on the asset side of the balance sheet. Since fed funds are generally borrowed for no more than one day, the rate a bank pays on such borrowings varies daily with the fed funds market rate. Fifth District banks, therefore, elected to fund more than 14 percent of their assets with a liability that was extremely sensitive to interest rate movements. Nearly $9.4 billion was added to fed funds borrowing in 1989.

The difference between fed funds sold **(Ik)** of $9.4 billion and fed funds purchased **(It)** of $36.5 billion, $27.1 billion, was supplied to Fifth District banks by depository institutions in the rest of the nation. Generally, large banks tend to be net buyers of fed funds while small banks tend to be net sellers.

The last category of liabilities, ***other liabilities*** **(Iu)**, is a catchall category that includes diverse items such as accounts payable, income taxes payable, and even subordinated term debt. Subordinated debt, while included in other liabilities, resembles capital since it helps protect depositors from losses. Specifically,

in the event of a bank failure, subordinated debt is not repaid until the bank's depositors are repaid.

A relatively small but indispensable source of funds to a commercial bank is equity, sometimes called equity capital or shareholders' investment. ***Total equity*** **(Iy)** rose about $1.8 billion at Fifth District banks in 1989. About $1.2 billion was a result of ***undivided profits and reserves*** **(Ix)** or earnings retained in the business after paying dividends of $1.0 billion. The banks also issued more ***stock*** **(Iw)** than they retired, realizing roughly $600 million from stock sales to investors. The increase enabled District banks as a group to produce an equity capital-to-assets ratio of 6.6 percent, a ratio significantly higher than the average for all U.S. banks. In general, the higher the equity-to-assets ratio, the sounder the bank.

The structure of the balance sheet and changes made to the structure have important consequences for income and expense. Measures of Fifth District banks' performance, in other words their income and expense results, are highlighted below.

Measures of Bank Performance

Net Interest Margin
(gross interest revenue − gross interest expense)[4]

1989 compared with 1988—see Table III: Fifth District banks' ***net interest margin*** **(IIIc)** declined by four basis points as ***gross interest revenue*** **(IIIa)**, expressed as a percentage of average assets, rose by 85 basis points, while ***gross interest expense*** **(IIIb)** rose 89 basis points.

Reason interest income and expense rose: Interest rates fell through most of 1989, but over the year, still averaged 150 basis points higher than in 1988.

Why expenses grew faster than income: The greater increase in ***gross interest expense*** **(IIIb)** resulted in part because District banks' liabilities were more sensitive to interest rate movements than were assets.

Differences by size category: Small District banks (assets less than $100 million) and medium-sized District banks (assets of $100 million to $1 billion) actually *improved* net margins 1989 over 1988. Their asset and liability interest rate sensitivities were less pronounced than at large District banks where, on average, net interest margin declined.

Shifts in asset and liability compositions: Accounting for some of the increase in ***gross interest revenue*** **(IIIa)** were increased holdings of securities **(Ib)**, an earning asset, and decreased holdings of cash and deposits in other financial institutions **(Ia)** which earn no interest income. District banks also increased the share of federal funds **(It)** in their liability structure relative to other interest-bearing deposits and demand deposits. Cost per dollar of fed funds borrowings was less than those of most other sources of funds **(VIIIf)**.

Comparison of Fifth District banks with the average U.S. bank: Fifth District banks produced higher ***net interest margins*** **(IIIc)** than did their counterparts throughout the country **(IVc)** by holding down ***gross interest expense*** **(IIIb, IVb)**. Comparatively low interest expenses resulted from District banks' lack of dependence on foreign office deposits, greater use of savings, NOW, and MMDA deposits, and, importantly, from the lower rates paid on equivalent types of accounts.

Loan and Lease Loss Provision

1989 compared with 1988: ***Loan and lease loss provision ÷ average assets*** **(IIId)** declined slightly on average at Fifth District banks to the lowest level since 1983.[5]

Growth of troubled loans: The ratio ***past-due and nonaccrual loans ÷ total loans*** was at its highest level in recent years as ***charge-offs ÷ total loans*** declined at District banks.[6]

Declining allowance for loan losses: For all District banks ***allowance for loan losses ÷ past-due and nonaccrual loans*** declined from 144 percent to

[4] All ratios through the remainder of the paper are expressed in percentage terms. As an example: at Fifth District banks net interest margin, ***(gross interest revenue − gross interest expense)/average assets***, was 3.61 percent in 1988 and 3.57 percent in 1989, so that it declined by 3.61 − 3.57 = 4 basis points.

[5] Loan and lease loss provision is an expense charged against income each year and added to allowance for loan and lease losses—a contra-asset account—from which charged-off loans are subtracted. Provision for loan and lease losses is the bank's estimate of the portion of loans and leases that will not be collected.

[6] Past-due loans here and throughout the article are those for which the borrower is 90 days or more late on scheduled payments. Nonaccrual loans are those that are no longer accruing interest on the bank's books because the bank believes that the loan is not likely to be repaid. Charged-off loans are those loans that have been removed from the bank's balance sheet because of the bank's view that they are not going to be repaid by the borrower.

Table III

Income and Expense as a Percent of Average Assets[1]

Fifth District Commercial Banks, 1986-89

Item	1986	1987	1988	1989
a Gross interest revenue[2]	8.63	8.23	8.74	9.59
b Gross interest expense[2]	4.98	4.62	5.13	6.02
c Net interest margin[2] (=a−b)	**3.65**	**3.61**	**3.61**	**3.57**
d Loan and lease loss provision	0.40	0.50	0.33	0.32
e Noninterest income[2]	1.10	1.11	1.14	1.16
f Noninterest expense[2]	3.28	3.17	3.14	3.09
g Securities gains	0.15	0.07	0.02	0.03
h Income before taxes (=c−d+e−f+g)	**1.23**	**1.12**	**1.30**	**1.34**
i Taxes	0.23	0.25	0.30	0.34
j Other[3]	0.00	0.00	0.01	0.00
k ROA: Return on assets[4] (=h−i+j)	**1.00**	**0.88**	**1.01**	**1.01**
l Cash dividends declared	0.34	0.47	0.48	0.41
m Net retained earnings	0.66	0.41	0.53	0.60
n ROE: Return on equity[5]	**15.87**	**13.83**	**15.59**	**15.38**
o Average assets ($ millions)	181,133	203,376	221,614	242,587
p Net income ($ millions)	1,817	1,775	2,234	2,449
q Loan and lease loss provision ($ millions)	733	1,022	732	788
r Loan and lease charge-offs, net of recoveries ($ millions)	533	727	745	660
s Percent of banks with net income less than or equal to zero	8.3	10.3	10.1	12.1

Note: Discrepancies due to rounding error. With the exception of row s, data for each year include only those banks that were operating at the beginning of the year. The resulting figures may not agree precisely with their counterparts in Table II where figures include data from newly formed as well as existing banks.

[1] Average assets are based on fully consolidated volumes outstanding at the beginning and at the end of the year.

[2] Figures in these rows differ from those published in previous years due to changed definitions.

[3] Includes extraordinary items and other adjustments after taxes.

[4] Return on assets is net income divided by average assets.

[5] Return on equity is net income divided by average equity. Average equity is based on fully consolidated volumes outstanding at the beginning and at the end of the year.

Source: Consolidated Reports of Condition and Income.

113 percent. The sources of this fall were growth in past-due and nonaccrual loans and smaller provisions for loan losses relative to loans in 1989 than in 1988. Allowance ÷ past-due and nonaccrual loans at Fifth District banks, was at its lowest level in the past several years.

Description of allowance for loan losses: Allowance for loan losses acts as a buffer from which loan charge-offs are subtracted. It protects a bank's capital against loan losses. The higher a bank's allowance for loan losses relative to loans or nonperforming loans, the more secure the bank, other things equal.

Differences by size category: While District banks of all sizes experienced growth in past-due and nonaccrual loans relative to total loans, only at large

Table IV

Income and Expense as a Percent of Average Assets[1]

All U.S. Commercial Banks, 1986-89

Item	1986	1987	1988	1989
a Gross interest revenue[2]	8.37	8.22	8.85	9.84
b Gross interest expense[2]	5.03	4.88	5.36	6.35
c Net interest margin[2] (=a−b)	**3.34**	**3.35**	**3.49**	**3.48**
d Loan and lease loss provision	0.76	1.24	0.53	0.92
e Noninterest income[2]	1.26	1.39	1.46	1.54
f Noninterest expense[2]	3.17	3.26	3.29	3.34
g Securities gains	0.13	0.05	0.01	0.02
h Income before taxes (=c−d+e−f+g)	**0.81**	**0.29**	**1.13**	**0.79**
i Taxes	0.19	0.18	0.33	0.30
j Other[3]	0.01	0.01	0.03	0.01
k ROA: Return on assets[4] (=h−i+j)	**0.63**	**0.11**	**0.83**	**0.50**
l Cash dividends declared	0.33	0.36	0.44	0.44
m Net retained earnings	0.31	−0.24	0.39	0.07
n ROE: Return on equity[5]	**10.22**	**1.88**	**13.50**	**8.03**
o Average assets ($ billions)	2,799	2,926	2,994	3,138
p Net income ($ billions)	17.4	3.3	24.8	15.8
q Loan and lease loss provision ($ billions)	21.3	36.3	15.9	28.8
r Loan and lease charge-offs, net of recoveries ($ billions)	16.1	16.0	17.7	21.4
s Percent of banks with net income less than or equal to zero	20.6	18.2	13.8	11.8

Note: Discrepancies due to rounding error. With the exception of row s, data for each year include only those banks that were operating at the beginning of the year.

For footnotes see Table III.

Source: Consolidated Reports of Condition and Income.

banks did provision for loan losses relative to assets decline. Small banks increased provisions relative to assets above their 1988 level, while medium-sized banks maintained a constant ratio.

Comparison of Fifth District banks with the average U.S. bank: On average, in 1989, U.S. banks increased loan loss provisions **(IVd)** 81 percent over their 1988 level while Fifth District banks' average increase was only 7 percent, slower than District asset growth. Less District income was consumed by provision for loan losses and profits were higher. ***Allowance for loan losses ÷ past-due and nonaccrual loans*** was still considerably greater at District banks in 1989 than at the average U.S. bank. Likewise, while ***past-due and nonaccrual loans ÷ total loans*** increased in 1989 at District banks, it was still only approximately *one-third* that for the average for all U.S. banks. District banks' ***charge-offs ÷ total loans*** was between one-third and one-half the U.S. average.

Growth of troubled real estate loans: As real estate values stagnated or fell in many regions of the country in 1988 and 1989, ***real estate loan losses*** began to grow throughout the nation and in the Fifth District. Past-due and nonaccrual real estate loans increased quickly at District banks in 1989, growing by 72 percent. Since District banks began 1989 with far fewer past-due and nonaccrual real estate

Table V

Return On Assets and Equity

Fifth District Banks

(Percent)

	Small	Medium	Large	Total
ROA: Return on assets[1]				
1987	1.05	1.06	0.82	0.88
1988	0.96	1.14	0.98	1.01
1989	0.88	1.13	1.00	1.01
ROE: Return on equity[2]				
1987	11.14	13.31	14.50	13.83
1988	10.15	14.36	16.90	15.59
1989	9.12	13.85	16.83	15.38

Note: Data for each year include only those banks that were operating at the beginning of the year.

[1] See footnote 4, Table III.

[2] See footnote 5, Table III.

Table VI

Bank Performance Measures by Fifth District State—1989

(Percent)

	DC	MD	NC	SC	VA	WV
Small Banks						
a ROA	0.04	0.92	0.61	0.83	0.96	0.97
b ROE	0.42	9.76	5.51	7.85	9.76	10.97
c Nonperforming loans and leases	1.23	1.35	1.32	1.04	1.44	2.08
d Net charge-offs	0.42	0.20	0.37	0.48	0.45	0.63
e Number of banks	11	47	38	60	128	126
Medium-Sized Banks						
f ROA	0.96	1.12	1.22	0.80	1.28	1.11
g ROE	13.06	13.59	13.23	10.72	16.72	12.70
h Nonperforming loans and leases	1.29	0.71	1.15	1.09	0.90	1.92
i Net charge-offs	0.23	0.24	0.33	0.50	0.34	0.49
j Number of banks	7	39	21	13	43	37
Large Banks						
k ROA	0.75	0.91	1.04	1.10	1.08	0.87
l ROE	14.99	14.00	17.67	18.07	18.55	13.28
m Nonperforming loans and leases	1.18	1.41	0.91	1.01	0.80	0.91
n Net charge-offs	0.49	0.58	0.22	0.44	0.49	0.70
o Number of banks	5	12	10	4	8	1
Total						
p ROA	0.75	0.94	1.04	1.01	1.10	1.03
q ROE	13.92	13.66	16.78	14.79	16.97	12.01
r Nonperforming loans and leases	1.20	1.30	0.93	1.03	0.88	1.92
s Net charge-offs	0.45	0.50	0.23	0.46	0.46	0.56
t Number of banks	23	98	69	77	179	164

Notes: Banks not operating at the beginning of 1989 and those West Virginia banks headquartered outside the Fifth Federal Reserve District are excluded from these totals. Nonperforming loans and leases are loans and leases past due 90 days or more and those not accruing interest, as a percent of total loans. Net charge-offs are loan and lease charge-offs, net of recoveries, as a percent of loans.

Table VII

Average Rates of Return on Selected Interest-Earning Assets

Fifth District Commercial Banks, 1986-89

(Percent)

Item	1986	1987	1988	1989
Total loans and leases	10.63	10.05	10.52	11.47
Net loans and leases[1]	10.77	10.19	10.66	11.62
Total securities	8.30	7.61	8.01	8.58
All interest-earning assets	9.78	9.25	9.84	10.78

Note: Data for each year include only those banks that were operating at the beginning of the year.

[1] Net loans and leases are total loans and leases net of the sum of allowance for loan and lease losses and allocated transfer risk reserve.

Table VIII

Average Cost of Funds for Selected Interest-Bearing Liabilities

Fifth District Commercial Banks, 1986-89

(Percent)

	Item	1986	1987	1988	1989
a	Interest-bearing deposit accounts	6.77	6.12	6.59	7.49
b	Large certificates of deposit	7.07	6.65	7.43	8.91
c	Deposits in foreign offices	6.40	6.69	7.05	9.15
d	Other deposits	6.74	5.97	6.34	7.04
e	Subordinated notes and debentures	8.48	9.21	8.85	10.33
f	Fed funds	6.92	5.87	7.16	8.91
g	Other	5.19	7.34	7.76	9.05
h	All interest-bearing liabilities	6.76	6.13	6.72	7.79

Note: Data for each year include only those banks that were operating at the beginning of the year.

loans than was average for all banks, ***past-due and nonaccrual real estate loans ÷ total loans*** for District banks was still only *one-third* of the ratio for all U.S. banks at the end of 1989. Growth in the share of real estate loans during 1989, from 43 to 45 percent of all loans, suggests that District banks' losses could be even greater in 1990.

Noninterest Income and Expense

1989 compared with 1988: Fifth District banks had a two basis point improvement in ***noninterest income ÷ average assets*** **(IIIe)** and a five basis point decline in ***noninterest expense ÷ average assets*** **(IIIf)**; large District banks were responsible for most of both.

Composition of change at large banks: The improvement in ***noninterest income*** at large District banks was the result of increases in fiduciary income, foreign exchange trading income, and other miscellaneous forms of noninterest income. Other miscellaneous noninterest income includes income sources such as rental fees on safe deposit boxes, proceeds on the sale of travelers checks, and fees on credit cards issued by the bank. Service charge income relative to assets was unchanged at large banks. The decline in ***noninterest expense*** at large banks resulted from declines in salaries expense, bank premises expense, and other miscellaneous noninterest expenses. Other miscellaneous noninterest expenses includes such expenses as federal deposit insurance premiums, advertising costs, and management fees paid by subsidiary banks to their parent bank holding companies (discussed below).

Changes at small and medium-sized banks: No change in ***noninterest income*** occurred at *small* District banks as compared to 1988; ***noninterest expense*** increased because salaries and bank premises expense increased relative to assets. *Medium-sized* banks suffered a decline in ***noninterest income*** from

the previous year, which was partially offset by a decrease in *noninterest expense*.

Comparison of Fifth District banks with the average U.S. bank: Compared with Fifth District banks, the average U.S. bank had a larger improvement in *noninterest income* **(IVe)**, but much of the increase was largely offset by increased *noninterest expense* **(IVf)**. The average U.S. bank had a small increase in service charge income but a significant improvement in other forms of noninterest income including income from fiduciary activities, gains on trading accounts, and other miscellaneous forms of noninterest income. Salary expenses relative to assets at the average U.S. bank increased only slightly but most of the increase in noninterest expense was in the category of miscellaneous noninterest expenses. As in past years, the average U.S. bank produced a significantly higher level of noninterest income than the average Fifth District bank **(IVe, IIIe)**, but also a higher level of noninterest expenses **(IVf, IIIf)**. In 1989, less expense remained after netting noninterest income from noninterest expense at U.S. banks than at Fifth District banks, providing a profit advantage for the average U.S. bank.

Management fees in noninterest expense: Banks owned by bank holding companies (BHCs) often pay fees to their BHCs in return for services provided by the BHCs. These fees are not reported by banks separately but are lumped together with several different expenses as other noninterest expenses. Bank holding companies (firms owning the stock of one or more banks), do however, report management fees as a line in their income statements. Management fees for banks owned by BHCs headquartered in the Fifth District amounted to about .12 percent of assets in 1989 and 13 percent of net income, levels little changed from 1988. Because management fees, relative to net income, are significant, they are important to track. Because they can only be derived from BHCs' reports, however, and since BHCs headquartered in the Fifth District own banks in other Federal Reserve Districts, it is impossible to determine how the fees affect Fifth District bank performance. Reporting bank performance on a state or Federal Reserve District basis will become more and more difficult in the future as banking organizations continue to expand across state boundaries.

Taxes

1989 compared with 1988: *Taxes ÷ average assets* **(IIIi)** increased at Fifth District banks. On average, District banks' tax rate (*taxes ÷ pre-tax income*) was 25 percent, up slightly from 1988.

Differences by size category: Small and medium-sized District banks paid higher tax rates than large District banks, though the variance among size classes was not great.

Comparison of Fifth District banks with the average U.S. bank: Fifth District banks' tax rate was considerably lower than the average U.S. bank's. The average rate paid by U.S. banks was 38 percent. While rates paid by U.S. banks in the small and medium-sized categories differed little from the rates paid by Fifth District banks of the same sizes, the average large U.S. bank had a rate almost twice as high as the average large District bank. Fifth District banks on average derive a higher proportion of their income from federal *income-tax-free assets* such as municipal securities and loans to municipalities than does the average U.S. bank. Small and medium-sized District banks differed little from equivalent-sized banks throughout the nation, but large District banks were significantly more dependent on tax-free income than were their counterparts elsewhere in the nation.

Profits

1989 compared with 1988: *Return on assets* (ROA) **(IIIk)**, net income ÷ average assets, for the average of all Fifth District banks was unchanged between 1988 and 1989 at 1.01 percent. Profits measured by *return on equity* (ROE) **(IIIn)**, net income ÷ average equity, declined at Fifth District banks in 1989 relative to the 1988 level, as District banks added to equity.

Differences by size category—see Table V: Small District banks' average ROA fell rapidly in 1989, as it had in 1988, because of higher levels of provision for loan losses, noninterest expenses, and taxes. While medium-sized District banks' 1989 ROA declined slightly from 1988 due to a decline in noninterest income and an increase in taxes, they remained the strongest ROA performers, outperforming small and large District banks by a considerable margin. Only large District banks were able to improve on their 1988 ROA in 1989. This was the result of higher noninterest income and significant declines in provision for loan losses and noninterest expenses.

Comparison of Fifth District banks with the average U.S. bank: The average U.S. bank experienced large declines in both ROA **(IVk)** and

ROE (IVn) in 1989 since almost 54 percent of their income before taxes and provision for loan losses was set aside for current or future loan losses. On the other hand the *percent of banks with net income less than or equal to zero* throughout the nation (IVs) fell again in 1989 for the fourth year in a row to a level below that for the Fifth District (IIIs) where the percent was up in 1989. The higher level in the Fifth District was the result of a higher proportion of newly formed banks. With new banks removed, the percentage of banks with losses was lower in the District than for the U.S.

Profits by Fifth District state—see Chart, Table VI, and Table IV: ROA was, on average, higher in each of the Fifth District states (VIp) than it was for the U.S. (IVk). Banks located in *Virginia* (VIp) produced the highest Fifth District ROA for the second year in a row. *Washington, D.C.* banks (VIp) trailed the group but continued their improvement since 1987.

Table IX

Equity to Asset Ratios[1]

Fifth District	Small	Medium	Large	Total
1986	9.41	7.92	5.56	6.31
1987	9.63	8.00	5.70	6.41
1988	9.68	7.92	5.91	6.55
1989	10.01	8.19	5.95	6.61
All U.S. Banks				
1986	8.31	6.94	5.50	6.17
1987	8.55	7.22	5.18	6.02
1988	8.69	7.21	5.58	6.27
1989	8.92	7.47	5.42	6.20

[1] End-of-year equity divided by end-of-year assets. Equity capital is common stock, perpetual preferred stock, surplus, undivided profits, and capital reserves.

Capital

1989 compared with 1988—see Table IX: As was the case in 1988, Fifth District banks added to capital during 1989.

Differences by size category—see Table IX: While the 1988 increase in capital was mostly due to increases at large banks, in 1989, *small* and *medium-sized* banks also added significantly to *equity ÷ assets*. Small District banks added to equity capital by issuing common stock and increasing surplus. Medium-sized banks increased equity relative to assets through increases in common stock, surplus, and retained earnings. Large banks added to equity relative to assets simply by retaining a significant amount of earnings.

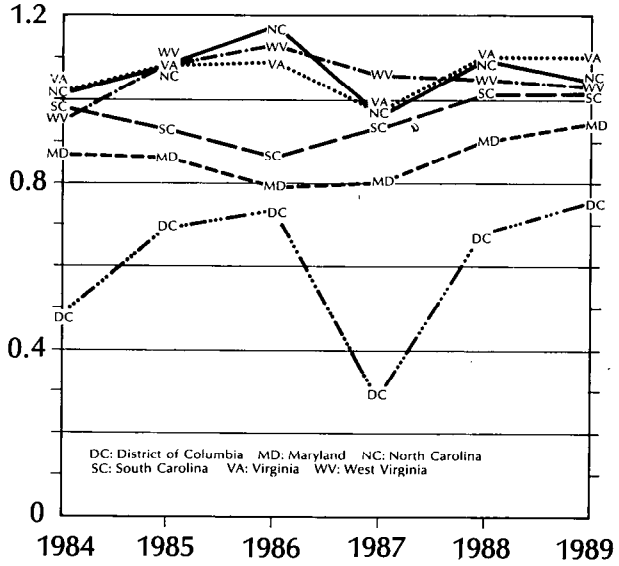
Retained earnings and dividends—see Table III: At Fifth District banks, retained earnings (IIIm) were increased at the expense of dividends (IIIl).

Comparison of Fifth District banks with the average U.S. bank—see Table IX: In 1989, Fifth District banks improved their equity-to-assets ratio in comparison with the average U.S. bank, in which *equity ÷ assets* fell during the year. Small and medium-sized banks throughout the nation improved their equity ratios in comparison to 1988, but still lagged Fifth District banks in the same size categories. Large U.S. banks, on the other hand, suffered a significant decline in *equity ÷ assets*.

Chart

RETURN ON ASSETS

Banks in Fifth District States



Real Output and Unit Labor Costs as Predictors of Inflation

*Yash P. Mehra**

Two popular inflation indicators commonly monitored by analysts are the pace of real economic activity and the rate of growth of labor costs. It is widely believed that if the economy grows at a rate above its long-run potential or, if the rate of growth of labor costs exceeds the trend rate in labor productivity, then inflation will accelerate. These beliefs derive from the "price markup hypothesis" implicit in the Phillips curve view of the inflation process. This view assumes that prices are set as a markup over productivity-adjusted labor costs and that they are also influenced by demand pressures. It assumes further that the degree of demand pressure can be measured by the excess of actual over potential output (termed the output gap). Thus, the Phillips curve view of the inflation process implies that past real output (measured relative to potential) and past growth in labor costs (adjusted for the trend in productivity) are relevant in predicting the price level.

This paper evaluates the role of unit labor costs and the output gap in predicting inflation by examining the predictive value of these factors using tests of Granger-causality and multi-period forecasting. Since testing for Granger-causality amounts to examining whether lagged values of one series add statistically significant predictive value to inflation's own lagged values for one-step ahead forecasts, this test is also termed as the test of "incremental predictive value". Since other macroeconomic variables such as money and interest rates can add substantial predictive value [see, for example, Hallman, Porter, and Small (1989) and Mehra (1989b)], the "incremental predictive values" of unit labor costs and the output gap are also evaluated when these other variables are included. In addition, the contribution of these factors over longer forecast horizons is also studied.

The empirical evidence presented here finds that unit labor costs have no incremental predictive value for inflation, but the output gap does. This result holds even after one allows for the influence of money and interest rates on inflation. However, the evidence reported here also implies that the output gap helps predict inflation only in the short run. In the long run the rate of inflation is given by the excess of M2 growth over real growth, which is consistent with the Quantity Theory of Money.

The plan of this paper is as follows. Section I presents the price equations used in this paper and discusses how tests of Granger-causality and multi-step forecasting are employed to test predictive value. Section II presents empirical results, and Section III contains concluding observations.

I. THE MODEL AND THE METHOD

1. Specification of the Price Equation

A Price Equation Consistent with the Phillips Curve: The view that systematic movements in labor costs and the output gap can lead to systematic movements in the rate of inflation derives from price-type Phillips curve models[1] [see, for example, Gordon (1982, 1985), Stockton and Glassman (1987), and Mehra (1988)]. A price equation incorporating this view could be derived from the following set of equations:

$$\Delta p_t = \Delta p_{t-1} + a_1 \Delta w_t + a_2 g_t + e_{1t}, \quad a_1 > 0,\ a_2 > 0 \quad (1)$$

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[1] The Phillips curve model was originally formulated as a wage equation relating wage inflation to the unemployment gap, defined as the difference between actual and natural unemployment. Subsequently, this equation has been transformed into a price equation relating actual inflation to lagged prices and the output gap [See Humphrey (1985)]. Hence, the term price-type Phillips curve is used here.

$$\Delta w_t = \Delta w_{t-1} + e_{2t} \quad (2)$$

$$g_t = g_{t-1} + e_{3t} \quad (3)$$

where all variables are in natural logarithms and where p_t is the price level; w_t, productivity-adjusted labor costs; g_t, output gap; and e_{1t}, e_{2t}, and e_{3t}, serially uncorrelated random disturbance terms. Equation (1) describes the price markup behavior. Prices are marked up over productivity-adjusted labor costs and are influenced by cyclical demand as measured by the output gap. Equations (2) and (3) describe stochastic processes for wage inflation and output gap variables. It is hypothesized that these variables follow a random walk.[2]

Substituting (2) and (3) into (1) yields (4):

$$\Delta p_t = \Delta p_{t-1} + a_1 \Delta w_{t-1} + a_2 g_{t-1} + \epsilon_{1t} \quad (4)$$

where ϵ_{1t} is $(e_{1t} + a_1 e_{2t} + a_2 e_{3t})$. Equation (4) says that inflation depends upon its own past behavior as well as upon the past behavior of the labor cost and output gap variables. If $(a_1, a_2) \neq (0,0)$ in (1), then past values of the output gap and labor costs make a statistically significant contribution to the explanation of inflation as in equation (4). Equivalently, these variables Granger-cause inflation.

An Expanded Price Equation: Recent research on M2 demand suggests that the velocity of M2 is stationary. The rate of inflation in the long run is therefore determined by the rate of growth in money over real output.[3] Mehra (1989b) shows that an inflation equation incorporating this long-run relationship accurately predicts inflation during the last three decades. This inflation equation is of the form:

$$\Delta p_t = \Delta p_{t-1} - b_1 (p_{t-1} - \overset{*}{p}_{t-1}) + b_2 \Delta R_{t-1} \quad (5)$$

where $\overset{*}{p}_t$ is the long-run equilibrium price level (in logs) defined as $M2_t - y_t$ and where R_t is the nominal interest rate. Equation (5) states that lagged values of M2 velocity $(p_{t-1} - M2_{t-1} + y_{t-1})$ and changes in the interest rate are relevant in predicting inflation.

An inflation equation that includes variables from both price-type Phillips curve and Quantity Theory of Money models could be written as:

$$\Delta p_t = \Delta p_{t-1} + a_1 \Delta w_{t-1} + a_2 g_{t-1} - b_1 (p_{t-1} - \overset{*}{p}_{t-1}) + b_2 \Delta R_{t-1}. \quad (6)$$

An interesting empirical issue is whether labor cost and output gap variables still help predict inflation once one includes variables suggested by the Quantity Theory of Money.

2. Implementing Tests of Predictive Value

The predictive value of labor costs and the output gap is evaluated using two procedures. The first is the Granger-causality test, which tests the additional contribution a variable makes to one-step ahead forecasts based on inflation's own past behavior. Such contributions are examined in price equations, such as (4) and (6). The second procedure evaluates the predictive contribution of a variable over forecast horizons of 1 to 3 years.

Testing for Granger-causality: A variable X2 Granger-causes a variable X1 if lagged values of X2 significantly improve one-step ahead forecasts based only on lagged values of X1. To test such causality, one estimates the following regression:

$$X1_t = a + \sum_{s=1}^{n1} b_s X1_{t-s} + \sum_{s=1}^{n2} C_s X2_{t-s} + \epsilon_t \quad (7)$$

and then determines, by means of an F test, whether all $C_s = 0$. The superscripts n1 and n2 above the summation operators refer to the number of lagged values of X1 and X2 included in regression (7), and ϵ_t is a serially uncorrelated random disturbance term. If an F test finds that estimated $C_s \neq 0$, then X2 Granger-causes X1. Equivalently, X2 has an "incremental predictive value" for X1.

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[2] These assumptions are made simply to highlight the causal role of labor costs and output gap in influencing inflation. They imply that the two variables are exogenously determined. As a result, the reduced form equation for inflation [see equation (4) in the text] implies unidirectional causality from these variables to the rate of inflation. Alternatively, one could assume that both variables are also influenced by inflation. In that case, one might find causality running in both directions [see, for example, Mehra (1989a)].

[3] This result is illustrated as follows. The hypothesis that M2 velocity is stationary can be expressed as:

$$V2_t \equiv p_t + y_t - M2_t = \overset{*}{\alpha} + \epsilon_t \quad (i)$$

where all variables are in their natural logarithms and where p_t is the price level; y_t, real output; M2, the M2 measure of money; $\overset{*}{\alpha}$, a constant term; and ϵ_t, a stationary random disturbance term. $\overset{*}{\alpha}$ can be viewed as the long-run equilibrium value of M2 velocity. Equation (i) says that M2 velocity in the long run never drifts permanently away from $\overset{*}{\alpha}$. This equation can be alternatively expressed as:

$$p_t = \overset{*}{\alpha} + M2_t - y_t + \epsilon_t \quad (ii)$$

Equation (ii) implies that the long-run price level is given by the excess of M2 over y. Equivalently, the rate of inflation in the long run is given by the excess of M2 growth over real growth.

In order to implement this test several decisions have to be made. How many lagged values of X1 and X2 should be included in (7)? Should variables be in levels or differences? Should other variables besides X1 and X2 be included? The answers to such questions are important since the choice can affect the outcome of Granger-causality tests.

Lag lengths were selected using the "final prediction error criterion" (FPE) due to Akaike (1969). The FPE criterion is:

$$\text{FPE (k)} = \frac{T+k}{T-k}\,\sigma^2 \qquad (8)$$

where k is the number of lags; T, the number of observations used in estimation; and σ^2, the residual variance. The procedure requires that the equation be estimated for various values of k, FPE be computed as in (8), and the value of k be selected to minimize FPE. In the empirical search the maximal value of k was set at eight.

F statistics computed from regressions like (7) do not have standard F distributions if regressors happen to have unit roots and are thus nonstationary [see Stock and Watson (1989)]. To guard against that problem, all variables used here were first tested for unit roots. The test used, one proposed by Dickey and Fuller (1981), involves estimating the following regression:

$$X1_t = \alpha + \beta\, TR + \sum_{s=1}^{n} d_s\, \Delta X1_{t-s} + \rho\, X1_{t-1} + \epsilon_t \qquad (9)$$

where X1 is the variable being tested for a unit root; TR, a time trend; Δ, the first difference operator; and ϵ, a serially uncorrelated random disturbance term. TR is included because the alternative hypothesis is that the variable in question is stationary around a linear trend. If there is a unit root in the variable X1, the coefficient ρ should be one.

Two test statistics that test the null hypothesis $\rho = 1$ are usually computed. One is the t statistic computed as $((\hat{\rho}-1)/\text{s.e.}(\hat{\rho}))$, where s.e.$(\hat{\rho})$ is the estimated standard error of $\hat{\rho}$. The other statistic is $T(\hat{\rho}-1)$. If the computed values of these statistics are too large, then one rejects the null hypothesis that variable X1 has a unit root. Since these statistics have non-standard distributions, relevant critical values are tabulated in Fuller (1976). If a variable is found to have a single unit root, then it enters in first differenced form when performing Granger-causality tests. Otherwise, it enters in level form.

It is also known that causality inferences between two variables, say inflation and output gap, are not necessarily robust to inclusion of other macroeconomic variables that could influence inflation. In order to ensure that the inferences are robust, causality tests are performed, including an oil price shock variable as well as dummies for President Nixon's price controls. In addition, causality tests are performed including the macroeconomic variables suggested by the Quantity Theory view of the inflation process.

Testing for Long-Term Forecast Performance: The predictive value of labor costs and the output gap in inflation models is also evaluated with estimations and long-term forecasts conducted over a rolling horizon as in Hallman, Porter, and Small (1989). In particular, the forecast performance of competing inflation equations is compared over the period 1971 to 1989. The forecasts and errors were generated as follows.

Each inflation equation was first estimated over an initial estimation period 1954Q1 to 1970Q4[4] and then simulated out-of-sample over 1 to 3 years in the future. For each of the competing equations and each of the forecast horizons, the difference between the actual and predicted inflation rates was computed, thus generating one observation on the forecast error. The end of the initial estimation period was then advanced four quarters, to 1971Q4, and the inflation equations were reestimated, forecasts generated, and errors calculated as above. This procedure was repeated until it used the available data through the end of 1989. The relative predictive accuracy of the inflation equations is then evaluated comparing the forecast errors over the different forecast horizons.

Data: The data used are quarterly and cover the sample period 1953Q1 to 1989Q4. The price level (p) is measured by the implicit GNP deflator; productivity-adjusted labor costs (w) by actual unit labor costs (computed as the ratio of compensation per hour to output per hour in the non-farm business sector); output gap (g) by the ratio of real GNP to potential output; money by the monetary aggregate M2; the nominal interest rate (R) by the 4-6 month commercial paper rate, and oil price shocks by the ratio of the producer price index for fuels, power, and related products to the producer price index. Two dummies are used for President Nixon's price

[4] The whole sample period covered in this article is 1953Q1-1989Q4. The estimation begins in 1954 because past lags are included in the inflation equation.

controls. The first is for the period of price controls and is defined as one in 1971Q3-1972Q4 and zero otherwise. The second dummy is for the period immediately following price controls and is defined as one in 1973Q1-1974Q4 and zero otherwise. All the data used are taken from the Citibank data base, except the series for potential GNP which is a series prepared at the Board of Governors and given in Hallman, Porter, and Small (1989).

Potential output measures the economy's long-run capacity to produce goods and services. It is therefore determined, among other things, by the trend growth in productivity, the labor force, and average weekly hours; factors which could be considered "real" as opposed to monetary. Figure 1 graphs the measure of potential output prepared at the Board of Governors. Actual output is also shown. As can be seen, actual output does diverge from the potential in the short run. However, over the long period these two series stay together.

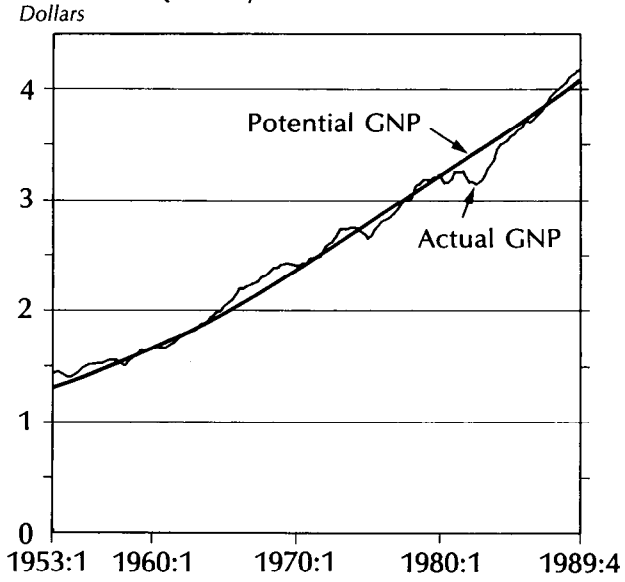
Some analysts [see for example, Gordon (1985, 1988)] have tested the price markup hypothesis using not actual but cyclically adjusted unit labor costs data. The reasoning is that actual unit labor costs tend to get pushed around by the strong cyclical nature of productivity growth. The price markup hypothesis states that firms look through cyclical movements in productivity and apply markups to long-run, trend, or normal unit labor costs. Hence, the proper measure of unit labor costs should be a trend measure.

In order to investigate this possibility, two trend measures of unit labor costs were generated using the procedure given in Beveridge and Nelson (1981). The Beveridge-Nelson procedure assumes that a time series in question contains a stochastic trend component plus a cyclical component. The stochastic trend component is modeled as a random walk with drift. The procedure then extracts this random walk component, which is referred to as the "permanent" or the "trend" component of a series.[5]

[5] Quite simply, the permanent component of a series is defined as the value the series would have if it were on its long-run path in the current time period. The long-run path in turn is generated by the long-run forecasts of the series. (This is to be contrasted with the standard linear time trend decomposition procedure, in which the long-run path is generated by letting the series follow a deterministic time trend). The Beveridge-Nelson procedure consists of fitting an ARMA model to first differences of the series and then using the model to generate the long-run forecasts of changes in the series. The permanent component of a series in the current period is then roughly the current value of the series plus all forecastable future changes in the series (beyond the mean rate of drift).

Figure 1

ACTUAL AND POTENTIAL GNP



One trend measure (denoted as pw1) is generated by applying the Beveridge-Nelson procedure to actual unit labor cost data. The other trend measure (denoted as pw2) is the ratio of compensation per hour to the "permanent" component of output per hour, the latter being generated by the above decomposition procedure.

II. Empirical Results

Unit Root Test Results: Table I reports unit root test results for the price level (p_t), unit labor costs (w_t), and the output gap (g_t). The top panel in Table I reports results of unit root tests performed including a constant and a time trend [see equation (9) of the text]. As can be seen, these results are consistent with the presence of a unit root in all the variables [see t1 and $T(\rho - 1)$ statistics in Table I].

The statistical inference about the presence of a unit root in a series can be sensitive to whether or not the time trend or constant is included. Since the estimated coefficients on the time trend and constant are not always statistically significant [see t values on α and β in Table I], the unit root tests were repeated excluding the trend and constant. Such unit root test results are reported in the lower two panels of Table I. As can be seen, these results tell a somewhat different story about the output gap. In

Table I

Unit Root Test Results for Nonstationarity, 1953Q1-1989Q4

Constant and Trend Included

x_t	α	β	ρ	t1	$T(\rho-1)$	n[a]
Price level (p_t)	.03 (2.6)	.12 (2.6)	.99	2.5	−1.20	4
Unit labor costs (w_t)	−.01 (1.4)	.15 (1.9)	.99	1.7	−1.47	3
Output gap (g_t)	.16 (.7)	−.02 (.8)	.92	2.8	−10.44	2
		Trend Excluded				
Price level (p_t)	.00 (.3)		1.0	.16	.01	4
Unit labor costs (w_t)	.003(2.6)		1.0	.35	.07	3
Output gap (g_t)	.000 (.1)		.93	2.83*	−9.0	2
		Constant and Trend Excluded				
Price level (p_t)			1.0	1.6	.04	5
Unit labor costs (w_t)			.99	1.0	−.19	3
Output gap (g_t)			.93	2.85**	−9.0**	2

Notes: This table presents results of testing for nonstationarity in time series data. In particular, unit root test results are reported from estimated regressions of the form:

$$x_t = \alpha + \beta TR + \sum_{s=1}^{n} d_s \Delta x_{t-s} + \rho x_{t-1}$$

where x_t is the time series in question; TR, a time trend; Δ, the first difference operator; n, the number of first differenced lagged values of x included to remove serial correlation in the residuals; and α, β, d_s, and ρ are parameters. The variable x has a unit root and is thus nonstationary if $\rho = 1$. The statistic t1 is the t statistic and tests the null hypothesis $\rho = 1$ (the 5 percent critical value is 3.45 with the trend; 2.89 without the trend, and 1.95 without the constant; Fuller (1976), Table 8.5.2). The statistic $T(\rho - 1)$ also tests the null hypothesis $\rho = 1$ (the 5 percent critical value is −20.7 with the trend; −13.7 without the trend; and −7.9 without the constant; Fuller (1976), Table 8.5.1). The reported coefficient on the trend is multiplied by 1000.

a. The value of the parameter n was chosen by the "final prediction error" criteron due to Akaike (1969). The Ljung-Box Q-statistics, not reported, do not indicate the presence of serial correlation in the residuals.

** significant at .05 level
* significant at .10 level

particular, these test results do not support the presence of a unit root in the output gap. In sum, these results together suggest that in performing Granger-causality tests the output gap regressor may enter in levels[6] whereas price level and unit labor costs variables need to be differenced at least once.[7]

[6] In view of this ambiguity about the presence of a unit root in output gap, I also discuss Granger-causality test results when the output gap regressor enters in first differenced form.

[7] I also investigated the presence of a second unit root in the price level and unit labor costs data. The unit root tests were performed using first differences of these series. The test results, however, appear sensitive to the nature of tests used and/or to the treatment of time trend. In view of these ambiguous results, I report results using first as well as second differences of these series wherever appropriate.

Granger-causality Results: Table II reports results of testing for the presence of Granger-causality running from the output gap and unit labor costs to the price level. Both actual and trend unit labor costs are considered. Moreover, Granger-causality is tested using the price specification of the form (6). The results are presented for the whole period 1953Q1-1989Q4 as well as for the subperiod 1953Q1-1979Q4.

In panel 1, the price level and unit labor costs regressors are in first differences and the output gap is in levels. In panel 2, the price level regressor is in second differences but other regressors are as in panel 1. F statistics presented in panel 1 test the null hypothesis that the output gap and labor costs

Table II

F Statistics for the "Incremental Predictive Value" of Unit Labor Costs and Output Gap Variables

Variable x	Lag (n1, n2)	Sample Period 1955Q2-1989Q4 F Statistics (df)		1955Q2-1979Q4 F Statistics (df)	
Panel 1: $\Delta p_t = a + \sum_{i=1}^{n1} b_i \Delta p_{t-i} + \sum_{i=1}^{n2} d_i x_{t-i}$					
Δw	(4,1)	.19	(1,127)	.38	(1,86)
$\Delta pw1$	(4,1)	.00	(1,127)	.03	(1,86)
$\Delta pw2$	(4,1)	.15	(1,127)	.25	(1,86)
g	(4,1)	3.72**	(1,127)	3.42*	(1,86)
Panel 2: $\Delta^2 p_t = a + \sum_{i=1}^{n1} \Delta^2 p_{t-i} + \sum_{i=1}^{n2} d_i x_{t-i}$					
Δw	(4,1)	1.16	(1,127)	.16	(1,87)
$\Delta pw1$	(4,1)	.26	(1,127)	.02	(1,87)
$\Delta pw2$	(4,1)	.97	(1,127)	.16	(1,87)
g	(4,1)	9.46***	(1,127)	3.85**	(1,87)
Panel 3: $\Delta p_t = a + \sum_{i=1}^{n1} b_i \Delta p_{t-i} + f_1 \Delta R_{t-1} + f_2 (p_{t-1} - \overset{*}{p}_{t-1}) + \sum_{i=1}^{n2} d_i x_{t-i}$					
Δw	(4,2)	2.24	(2,124)	1.86	(2,84)
$\Delta pw1$	(4,1)	.00	(1,125)	.18	(1,85)
$\Delta pw2$	(4,2)	2.15	(2,124)	1.72	(2,84)
g	(4,1)	2.51	(1,125)	1.13	(1,85)
Panel 4: $\Delta^2 p_t = a + \sum_{i=1}^{n1} b_i \Delta^2 p_{t-i} + f_1 \Delta R_{t-1} + f_2 (p_{t-1} - \overset{*}{p}_{t-1}) + \sum_{i=1}^{n2} d_i x_{t-i}$					
Δw	(4,1)	.01	(1,125)	.08	(1,85)
$\Delta pw1$	(4,1)	.03	(1,125)	.30	(1,85)
$\Delta pw2$	(4,1)	.00	(1,125)	.15	(1,85)
g	(4,1)	7.16***	(1,125)	2.68*	(1,85)

Notes: This table reports F statistics to test whether labor cost and output gap variables have incremental predictive value for changes in the price level or the rate of inflation. w is actual unit labor costs; pw1 and pw2, two measures of the permanent component of unit labor costs (see text); and g, the output gap. The lag lengths (n1, n2) were selected by the "final prediction error criterion" due to Akaike (1969). df is the degrees of freedom parameter for the F statistic. All regressions were estimated including four lagged values of an oil price shock variable and dummies for President Nixon's price controls.

*** significant at .01 level
** significant at .05 level
* significant at .10 level

regressors have no predictive value for the rate of inflation. The null hypothesis in panel 2 is that such regressors have no predictive value for explaining changes in the rate of inflation. As can be seen, F values are small for labor costs regressors but large for the output gap variable. These results suggest that the output gap does help predict the price level whereas unit labor costs do not.

These results do not change when the price equation is expanded to include the variables suggested by the Quantity Theory of Money [see equation (6) of the text]. The relevant F statistics are presented in panels 3 and 4 of Table II. As can be seen, F values remain large only for the output gap regressor, though even this result is sensitive to whether the price level regressor is in first or in second differences. The monetary variables, however, remain significant when the output gap regressor is included in the price regression. Overall, these results indicate that output gap does have predictive value for the rate of inflation.[8]

Results on Long-Term Forecast Performance: Table III presents evidence on the incremental predictive value of the output gap[9] for long-term forecasts[10] in three benchmark inflation models. The first model considered is an autoregressive model (hereafter termed Autoregressive) in which current inflation depends only on its own past behavior. In particular, it is postulated that changes in inflation follow a fourth-order autoregressive process:

$$\Delta p_t - \Delta p_{t-1} = a + \sum_{s=1}^{4} b_s (\Delta p_{t-s} - \Delta p_{t-s-1}) + e_t. \qquad (10)$$

The second model chosen is given in Mehra (1989b). This model, which includes variables indicated by the Quantity Theory of Money (hereafter termed QTM), postulates that changes in inflation depend

[8] This conclusion needs to be tempered by the fact that the output gap regressor when entered in first differenced form usually does not Granger-cause the rate of inflation.

[9] I do not report results for unit labor costs variables because such variables generally are not statistically significant in inflation regressions. Moreover, these variables do not appear to make any contribution toward improving long-term forecasts of inflation.

[10] The relative forecast evaluation is conditional on actual values of the right-hand side explanatory variables. Hence, the forecasts compared are not "real-time" forecasts. However, the multi-step forecasts generated are dynamic in the sense that the own lagged values used are the ones generated by these regressions.

Table III

Summary Error Statistics from Alternative Inflation Models

Inflation Model	One Year Ahead			Two Year Ahead			Three Year Ahead		
	ME	MAE	RMSE	ME	MAE	RMSE	ME	MAE	RMSE
Autoregressive	−.46	1.14	1.50	−.69	1.41	1.91	−.97	1.77	2.27
Autoregressive plus Output Gap	.09	1.00	1.20	.19	1.07	1.35	.28	1.27	1.51
QTM	−.44	.96	1.20	−.64	1.08	1.34	−.79	1.17	1.46
QTM plus Output Gap	−.03	.78	1.01	−.03	.77	.98	.00	.86	1.04
P-Star	.01	.99	1.16	.06	.99	1.27	.15	1.11	1.34

Notes: See the text for a description of the models. The forecast errors that underlie the summary error statistics displayed above are generated in the following manner: Each inflation model was first estimated over 1954Q1-1970Q4 and forecasts prepared for 1 to 3 years in the future. The end of the initial estimation period was then advanced four quarters to 1971Q4, and each model was reestimated and forecasts prepared again for 1 to 3 years in the future. The procedure was repeated through 1986Q4 for the 3-year forecast horizon; 1987Q4 for the 2-year, and 1988Q4 for the 1-year. For each model and for each forecast horizon, forecasts were compared with actual data and the errors calculated. The error statistics are displayed above. This procedure is similar to the one followed in Hallman, Porter, and Small (1989). ME is mean error; MAE, mean absolute error; and RMSE, the root mean squared error.

on its own past values, the lagged change in the nominal rate of interest, and the lagged level of M2 velocity. In particular, this benchmark inflation equation[11] is:

$$\Delta p_t - \Delta p_{t-1} = a + \sum_{s=1}^{4} b_s (\Delta p_{t-s} - \Delta p_{t-s-1}) - c\,(p_{t-1} + y_{t-1} - M2_{t-1}) + d\,\Delta R_{t-1} + e_t \qquad (11)$$

where all variables are in natural logarithms and where y_t is real GNP. All other variables are as defined before. For comparison, results using the P-Star model given in Hallman, Porter, and Small (1989) are also presented. The P-Star equation implicitly includes the output gap as one of the regressors. In particular, this equation could be expressed as:

$$\Delta p_t - \Delta p_{t-1} = a + \sum_{s=1}^{4} b_s (\Delta p_{t-s} - \Delta p_{t-s-1}) + f\,g_t + h(p_{t-1} + y_{t-1} - M2_{t-1} - \bar{V2})$$

where all variables are as defined in this paper and where $\bar{V2}$ is the equilibrium M2 velocity [see page 12 in Hallman, Porter, and Small (1989)]. One obtains the P-Star equation by deleting the nominal rate and adding the output gap in equation (11).

Inflation equations (10) and (11) are estimated with and without the output gap variable, and their relative performance in predicting the rate of inflation over 1 to 3 years in the future is evaluated. The forecasts are generated as described earlier in the paper. Table III reports summary statistics for the errors that occur in predicting the rate of inflation during the 1971Q1 to 1989Q4 period. As can be seen by comparing the mean and the root mean squared errors (ME and RMSE), the output gap reduces forecast errors considerably. This improvement is evident in each of the three forecast horizons. For example, for the QTM equation the mean error in predicting the one year ahead inflation rate is −.4 percentage points. This error rises to −.8 percentage points as the forecast horizon extends to three years in the future. Adding the output gap regressor to the QTM equation virtually eliminates the mean error in each of the three forecast horizons. Furthermore, the root mean squared error declines anywhere from 16 to 30 percent when the output gap regressor is included in the price regressions. The QTM model with the output gap variable yields predictions of inflation that are even better than those generated by the Board's P-Star model (compare RMSE in Table III).[12]

The out-of-sample inflation forecasts are further evaluated in Table IV, which presents regressions of the form:

[11] The lag lengths in equations (10) and (11) were also chosen by the "final prediction error criterion".

[12] The output gap regressor entered in first differenced form does not contribute much to improving long-term forecasts of inflation.

Table IV

Out-of-Sample Forecast Performance, 1971-1989

Inflation Model	One Year Ahead			Two Year Ahead			Three Year Ahead		
	a	b	F	a	b	F	a	b	F
Autoregressive	.92	.78	2.5	1.7	.64	4.5**	2.3	.52	6.5**
	(1.1)	(5.9)		(1.6)	(4.2)		(1.9)	(3.0)	
Autoregressive plus Output Gap	.83	.87	.63	1.3	.80	1.23	1.8	.73	1.74
	(1.1)	(7.2)		(1.6)	(5.9)		(1.9)	(4.6)	
QTM	−.1	.98	.86	−.2	.97	2.0	−.5	.98	3.45**
	(.2)	(9.4)		(.2)	(8.1)		(.5)	(6.9)	
QTM plus Output Gap	.01	1.0	.02	−.25	1.0	.07	−.39	1.1	.24
	(.8)	(8.9)		(.4)	(9.5)		(.5)	(6.9)	
P-Star	−.3	1.0	.08	−.2	1.1	.20	−.35	1.1	.84
	(.3)	(7.4)		(.2)	(6.6)		(.3)	(6.1)	

Notes: The table reports statistics from regressions of the form $A_{t+s} = a + b\ P_{t+s}$, where A is the actual rate of inflation; P, the predicted; and s (= 1, 2, 3), number of years in the forecast horizon. The values used for A and P are the ones generated as described in Table 3. Parentheses contain t values. The F statistic tests the null hypothesis (a,b) = (0,1) and has the standard F distribution. See notes in Table 3.

** Significant at .05 level.

$$A_{t+s} = a + b\ P_{t+s} + e_t,\ s = 1, 2, 3 \qquad (12)$$

where A and P are the actual and predicted values of the inflation rate and where s is the number of years. If these forecasts are unbiased, then a = 0 and b = 1. The letter F denotes the F statistic that tests the null hypothesis (a,b) = (0,1). As can be seen from Table IV, these F values are consistent with the hypothesis that inflation forecasts from the price regression with the output gap regressor are unbiased. That is not the case, at least over some forecast horizons, with the forecasts derived from the particular regression that excludes the output gap variable.

III. Concluding Remarks

An important implication of price-type Phillips curve models is that prices are determined by the behavior of labor costs. If so, then labor costs should help predict the price level. The empirical evidence reported in this article does not support this conclusion.

The level of the output gap, defined as the difference between actual and potential output, however, does help predict the price level. In fact, the "incremental predictive" contribution of the output gap remains significant even after one allows for the influence of monetary factors on the price level. These results suggest that the Phillips curve model does identify one empirically relevant determinant of the rate of inflation, namely the behavior of the output gap.

The output gap regressor appears to be a stationary time series, whereas the price level is nonstationary. The statistical nature of these two time series thus implies that the output gap could not be the source of "permanent" movements in the price level. Hence, the contribution the output gap makes to the prediction of inflation is only short run (cyclical) in nature.

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