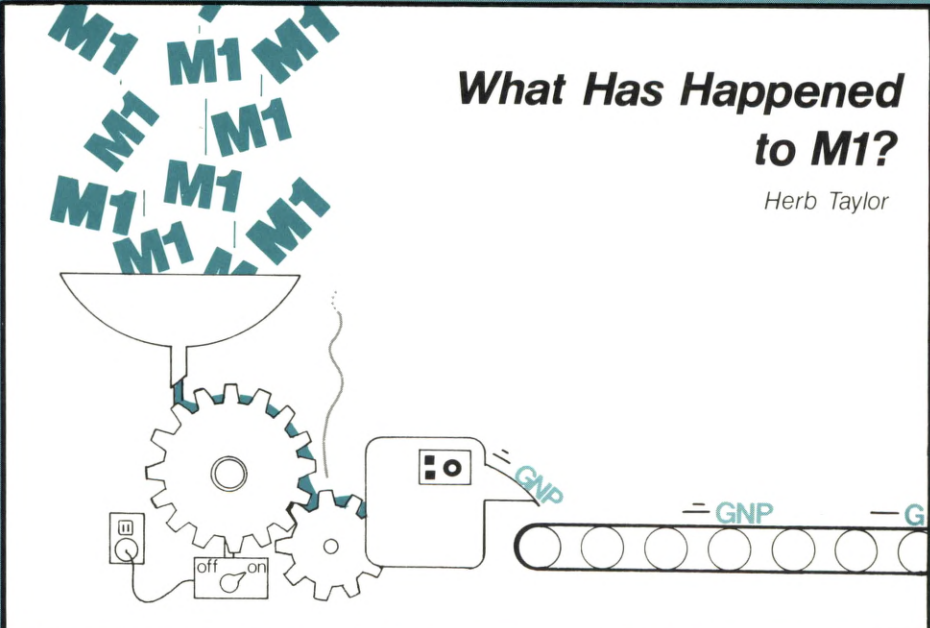


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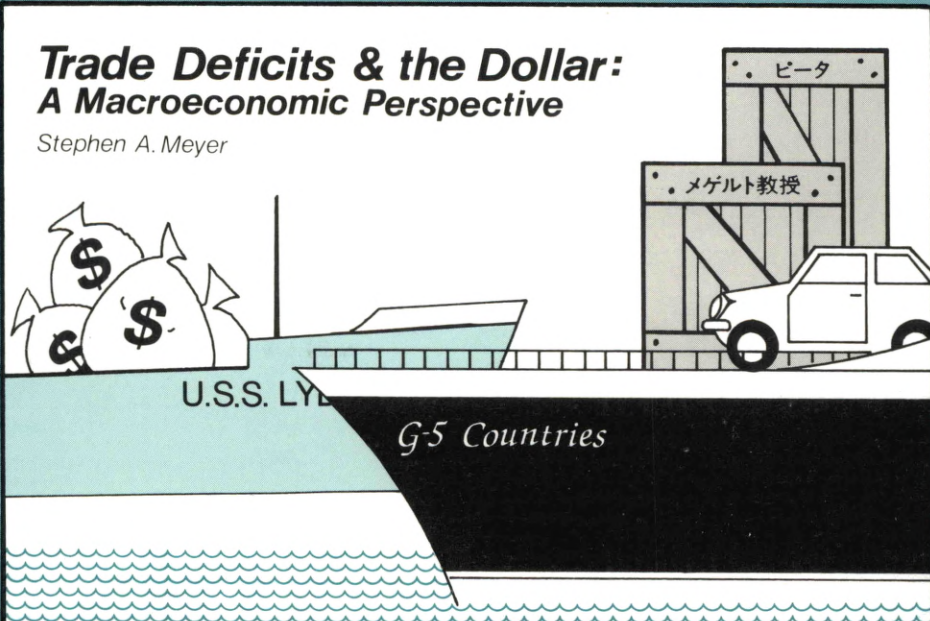
Federal Reserve Bank of Philadelphia

SEPTEMBER • OCTOBER 1986



**What Has Happened
to M1?**

Herb Taylor



**Trade Deficits & the Dollar:
A Macroeconomic Perspective**

Stephen A. Meyer

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BUSINESS REVIEW

Federal Reserve Bank of Philadelphia
Ten Independence Mall
Philadelphia, Pennsylvania 19106

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WHAT HAS HAPPENED TO M1? 3

Herb Taylor

During the 1960s and 1970s, at least one economic relationship was pretty predictable: a percentage point increase in M1—the money supply—produced a percentage point increase in GNP. But not so in the 1980s, as M1 has surged higher and higher, while GNP has grown modestly at best. Although extraordinary economic events, like the sizable budget and trade deficits, may seem to be “clogging the economic machinery,” the evidence suggests that, in fact, the M1-GNP link has actually weakened.

**TRADE DEFICITS & THE DOLLAR:
A MACROECONOMIC PERSPECTIVE 15**

Stephen A. Meyer

Many of the hundreds of items Americans buy every day are made not here, but abroad, in industrialized countries like Germany and Japan, and in less developed countries, like Korea and Brazil. U.S. imports are so high relative to our exports, in fact, that we now have a severe trade deficit. How can we get rid of it? The answer lies not so much in tariffs and protectionism, but in addressing the macroeconomic issues that give rise to the deficit in the first place.

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What Has Happened to M1?

*Herb Taylor**

During the course of the 1960s and 1970s there seemed to be a strong link between growth in the money supply, as measured by M1, and growth in economic activity, as measured by the gross national product (GNP). Throughout the 1970s, policymakers became more confident in this linkage and the Fed moved toward using M1 growth as an important monetary policy indicator and predictor of future economic performance. This movement culminated in the

Fed's October 1979 decision to switch its operating procedures and focus its efforts on achieving its announced annual money growth targets. But no sooner had the Fed begun to rely more heavily on M1 than the relationship between M1 growth and GNP growth seemed to fall apart. Thus far in the 1980s, growth in the money supply has produced far less growth in nominal GNP than would have been expected on the basis of the previous twenty years' experience. As a result, the Fed has backed away from targeting money growth, at least until the sources of the apparent breakdown in the M1-GNP linkage can be identified.

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Measuring the extent to which the M1-GNP relationship has broken down recently is easy enough to do; explaining the breakdown is more difficult. The many unusual economic and financial circumstances that we have experienced in the last few years provide a variety of potential explanations. But one approach to linking GNP growth to money growth and other key economic variables offers some opportunity to assess the possibilities. Evidence based on this approach is consistent with the view that GNP's responsiveness to money growth has been reduced, at least temporarily, by a combination of declining inflation expectations and recent deposit market deregulation.

THE RELATIONSHIP BETWEEN M1 AND GNP HAS BROKEN DOWN . . .

One of the easiest ways to characterize the relationship that prevailed between M1 and GNP during the 1960s and 1970s—and to document its breakdown in the 1980s—is to look at the performance of what is often called a St. Louis-type equation.¹ The idea behind the St. Louis approach is to link GNP growth directly to a number of key economic variables whose movements reflect changes in domestic stabilization policy and international economic conditions. Empirical estimates of St. Louis equations suggest that for the period of the 1960s and 1970s little is to be gained by expanding the list of these key variables beyond two: growth in the M1 measure of the money stock and growth in cyclically adjusted government expenditures.² Between these two variables,

money growth is clearly the dominant influence. Although different statistical procedures suggest different quarter-to-quarter patterns in the response of GNP growth to changes in the policy variables, the end result is almost always found to be the same: a percentage point increase in M1 ultimately produces a percentage point increase in GNP, while the initially positive impact of an increase in government spending ultimately disappears.³

When St. Louis equations are applied to the 1980s it is apparent that money growth has not been eliciting the GNP response that it used to. For instance, when a standard St. Louis equation estimated on the basis of our experience during the 1960s and 1970s is fed the money growth and cyclically adjusted government expenditures growth for the 1980s, it predicts GNP growth of about 11½ percent per year between 1980 and 1985. In fact, GNP growth averaged only about 8 percent per year, so money growth has been overpredicting GNP growth by an average 3½ percentage points over the last six years. The pattern of forecast errors that the standard equation produces is shown in Figure 1: GNP responds to money growth about as predicted in 1980; then 1981 begins a three-year period during which money growth substantially overpredicts GNP growth; 1984 marks an apparent return to the historical link between money and GNP growth; then in 1985 money growth again overpredicts GNP growth by a wide margin. The

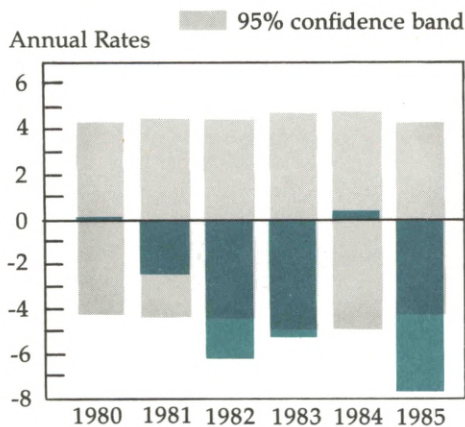
¹The St. Louis equation was originally presented in Leonall C. Anderson and Jerry Jordan, "Monetary and Fiscal Policy Actions: A Test of their Relative Importance in Economic Stabilization," Federal Reserve Bank of St. Louis Review (November 1968) pp. 11-24. An excellent summary of subsequent developments in the estimation of the St. Louis equation appears in Dallas S. Batten and Daniel L. Thornton, "Polynomial Distributed Lags and the Estimation of the St. Louis Equation," Federal Reserve Bank of St. Louis Review (April 1983) pp. 13-25.

²The growth of total government expenditures is an inappropriate measure of independent, or exogenous, fiscal policy actions affecting GNP growth because some government

expenditures are affected by GNP growth. Expenditures for unemployment compensation and other income maintenance programs, for example, automatically grow more rapidly when the economy moves into recession and GNP growth slows; then their growth automatically slows as the economy expands and GNP growth picks up. The high employment, or cyclically adjusted, measure of government expenditures attempts to eliminate this automatic response component.

³These conclusions about the relative impact of stabilization policies are supported by an exhaustive study of alternative specifications reported in Dallas S. Batten and Daniel L. Thornton, "How Robust Are the Policy Conclusions of the St. Louis Equation? Some Further Evidence," Federal Reserve Bank of St. Louis Review (June/July 1984) pp. 26-33.

FIGURE 1
Errors in Forecasting
Recent GNP Growth Using a
Standard St. Louis Equation



See Appendix for details.

overpredictions of GNP growth in 1982 and 1985 represent significant breaks with the past M1-GNP relationship by usual statistical standards. As Figure 1 shows, both of these overpredictions exceed estimated 95 percent confidence bands. We would expect to see such large forecasting errors less than 5 percent of the time if the relationship that prevailed in the 1960s and 1970s were still operating.⁴

... AND IT IS DIFFICULT TO SAY JUST WHY ...

Unfortunately, while the magnitude and pattern of the apparent breakdown in the M1-GNP relationship is clear, its cause is not. So many unusual economic and financial developments have arisen over the past several years that it is difficult to isolate the impact of each. Deposit market deregulation, particularly the nationwide authorization of NOW accounts in 1981 and Super-NOW accounts in 1983, seems likely to

⁴The Appendix provides a detailed description of the statistical analysis that produced the results shown in Figure 1 and in subsequent figures in this article.

have altered the M1-GNP relationship, at least temporarily. But the change in the public's inflation outlook since the inflation rate peaked in 1980-81 could be altering the responsiveness of GNP to M1 growth as well. On top of that, back-to-back recessions in 1980 and 1981-82, federal budget deficits hovering around \$200 billion since 1982, and a trade deficit that widened to nearly \$100 billion in 1985 are all symptomatic of more fundamental changes that could be exerting an unusually strong influence on GNP growth and obscuring its link to the growth of M1. Some further results based on the St. Louis approach can help us assess whether some combination of deregulation and declining inflation expectations have reduced GNP's responsiveness to M1 growth, or whether unusual economic conditions have simply made that responsiveness more difficult to see.

The Long Recession. While monetary and fiscal policies influence the overall level of demand for goods and services, producers' response to that demand varies over the business cycle. During economic expansions, output tends to increase by more than sales, and inventories of goods accumulate. When the economy goes into recession, output tends to decline by more than sales as producers work off the accumulated inventories. Since GNP includes both final sales and producers' additions to inventories, GNP figures tend to overstate the growth in demand during expansions and to understate it during recessions. As a result, money growth usually underpredicts GNP growth during expansions and overpredicts it during recessions. So money's large overpredictions of GNP growth in the 1980s may simply reflect the fact that, for whatever reason, the economy spent a larger proportion of time in recession during the 1980s than it did during the the 1960s and 1970s.⁵

⁵This business cycle explanation for the recent breakdown in the M1-GNP relationship is analyzed extensively in Lawrence J. Radecki and John Wenninger, "Recent Instability in M1's Velocity," Federal Reserve Bank of New York *Quarterly Review* (Autumn 1985) pp.16-22.

One way to assess whether an unusual business cycle pattern helps account for the apparent breakdown in the M1-GNP linkage is to subtract inventories from GNP and examine the behavior of final sales. If the business cycle explanation is correct, then money growth and government spending ought to continue to predict final sales reliably during the 1980s even though their GNP predictions go awry. But when a St. Louis-type equation linking growth in the money supply and cyclically adjusted government expenditures to growth in final sales is used to forecast into the 1980s, it turns out that this relationship has broken down as well (see Figure 2). The pattern of the errors in predicting final sales growth was somewhat different from the pattern in predicting GNP growth, but the average amount by which money growth overpredicted growth in final sales over the period was about the same as it was for GNP. So it seems that the prolonged

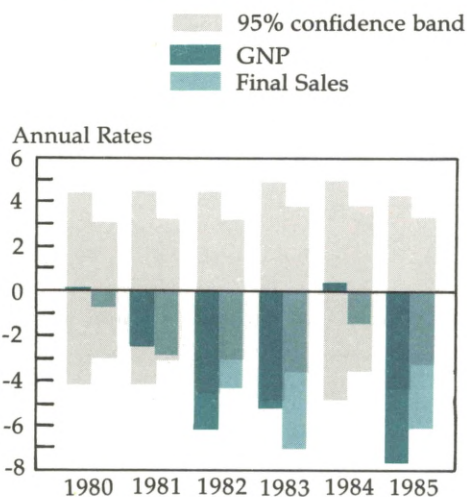
period of recession in the early 1980s does little to explain the diminished response of GNP to M1 growth that we have experienced thus far in the decade.

Taxes. Fiscal policymakers have two tools at their disposal, spending and taxation, and theoretically both could affect the level of GNP. St. Louis-type equations typically include only changes in cyclically adjusted government spending, because changes in cyclically adjusted tax revenues did not seem to contribute much statistically to the determination of GNP growth during the 1960s and 1970s. But under the Reagan Administration, tax policy has been subject to more substantive changes than in the recent past and now may be exerting a stronger independent influence on GNP.

On balance, tax law changes enacted in 1981 and 1982 have sharply reduced tax revenues relative to government spending—as the size of recent federal budget deficits attests. Some have claimed that these large deficits tend to raise interest rates and “crowd out” private credit demands, thus reducing the overall level of spending and GNP. A more conventional analysis suggests that the tax cuts’ most important effect is to increase disposable income and hence boost overall spending and GNP. In either case, failing to take account of the impact of taxes could distort our picture of the observed M1-GNP relationship in the 1980s. To investigate this possibility, a St. Louis-type equation incorporating the impact of cyclically adjusted government tax revenues was used to forecast GNP growth over the 1980s. As Figure 3 shows, including tax revenues reduces the equation’s average errors somewhat, but it does not alter the basic pattern of the breakdown in the linkage between M1 and GNP. Clearly, taxes are not the whole story.⁶

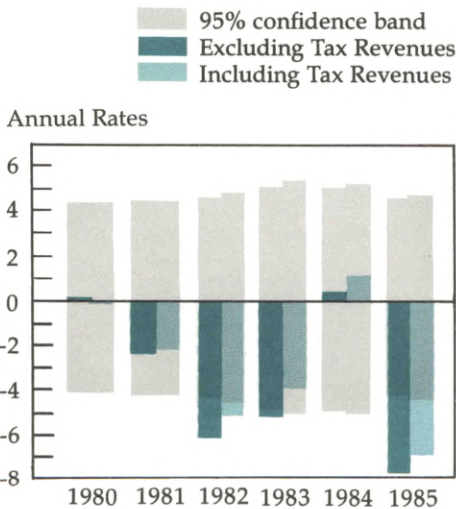
⁶Changes in the tax code could have altered GNP not only by changing the overall level of tax revenues but also by changing individuals’ and businesses’ economic incentives and hence the structure of the economy. The St. Louis approach used here, like most macroeconomic models, cannot provide much help in assessing this possibility. It

FIGURE 2
Errors in Forecasting
Recent Growth in GNP and
Final Sales Using a Standard
St. Louis-Type Equation



See Appendix for details.

FIGURE 3
Errors in Forecasting
Recent GNP Growth Using a
Standard St. Louis Equation
and One Including Cyclically
Adjusted Tax Revenues



See Appendix for details.

Trade. In principle the nation's GNP is affected not only by domestic monetary and fiscal policies, but by economic developments abroad as well. Some of the goods and services produced in the U.S. are exported to foreigners whose demands for them depend primarily on economic conditions in their own countries. In order to take this into account, St. Louis equations sometimes include growth in exports as an inde-

would seem, however, that the tax breaks for investment spending and the lower marginal tax rates on personal income that the tax law changes included would contribute to unusually strong, rather than unusually weak, GNP growth. A good discussion of the relevant tax law changes and their implications for individuals and businesses can be found in two recent articles by Stephen A. Meyer in this *Business Review*: "Tax Cuts: Reality or Illusion?" (July/August 1983) pp. 3-16 and "Tax Policy Effects on Investment: The 1981 and 1982 Tax Acts," (November/December 1984) pp. 3-14.

pendent determinant of GNP growth along with growth in the money supply and government expenditures. When they do, fluctuations in export demand seem to contribute little to fluctuations in GNP growth over the 1960s and 1970s. But, as with taxes, this situation may have reversed itself in the 1980s. The relatively slow economic recoveries in other industrialized countries and the well-publicized debt problems of some of the less industrialized countries have depressed the demand for U.S. exports over the past several years. The drag on GNP growth created by this unusually weak export demand may explain the apparent weakness in the response of GNP to recent money growth. To test this possibility, a St. Louis-type equation that includes growth in exports was used to forecast GNP growth for the 1980s. The results, presented in Figure 4a (p. 8), indicate that taking account of foreign economic conditions, as reflected in U.S. export growth, does little to explain the unexpectedly slow growth in GNP in the 1980s.

Of course, some recent international developments—those affecting exchange rates and the value of the dollar—could have contributed to unusually low GNP growth by boosting our imports as well as reducing our exports. After declining steadily in value during the 1970s, the dollar rose sharply against other major currencies between 1980 and early 1985. This dollar appreciation made U.S.-produced goods expensive relative to foreign-produced goods, and thus not only reduced foreign demand for U.S. exports but also increased U.S. demand for foreign imports—a combination that has produced record trade deficits in the U.S. To the extent that the dollar's strength has come from an independent increase in foreign demand for dollar-denominated assets—perhaps occasioned by renewed confidence in the American economy or increased uncertainty about those of other nations—it would have done more than usual to increase our demand for imports, and hence more than usual to depress GNP growth.

If recent international developments have contributed to the apparent M1-GNP breakdown

by creating an extraordinary U.S. demand for imports, then we would expect U.S. import expenditures to grow more rapidly than domestic monetary and fiscal policies would dictate. But when a St. Louis-type equation linking growth in the money supply and cyclically adjusted government expenditures to growth in import expenditures is used to predict into the 1980s, the results do not indicate that the growth in import expenditures has been unusually strong in the 1980s. In fact, the forecast errors, shown in Figure 4b, indicate that, if anything, U.S. import expenditures have been growing more slowly than expected over the last six years.⁷ In short, international trade developments do not seem to be responsible for the apparent breakdown in the relationship between money growth and GNP growth.⁸

**... BUT IT SEEMS THAT
DISINFLATION AND DEREGULATION
HAVE BROKEN THE M1-GNP LINK**

We have explored the possibility that the historical relationship between GNP growth and M1 growth has been obscured lately by the unusually strong impact of other economic developments and we have come up empty. So it seems that

⁷Perhaps the most prominent feature on the international economic landscape over the past several years has been OPEC and its impact on the relative price of oil. In theory, it is not obvious that changing oil prices should have any impact on the relationship between money and GNP growth. Empirically, when growth in the relative price of energy was included in a St. Louis-type equation, it produced no significant improvement in the equation's forecasting performance. This is consistent with the findings in John A. Tatom, "Energy Prices and Short-Run Economic Performance," Federal Reserve Bank of St. Louis *Review* (January 1981) pp. 3-17. Tatom found that increases in the relative price of energy had only a small and transitory effect on GNP growth.

⁸In principle, it is possible that all of the factors we have discussed thus far, when taken together, explain the apparent breakdown in the M1-GNP relationship. To evaluate this possibility, equations linking GNP and final sales growth to growth in M1, cyclically adjusted government expenditures and revenues, and exports, were used to forecast into the 1980s. This produced no substantive change in the pattern of the errors or their statistical significance.

FIGURE 4a
Errors in Forecasting
Recent GNP Growth Using a
Standard St. Louis Equation
and One Including
Growth in Exports

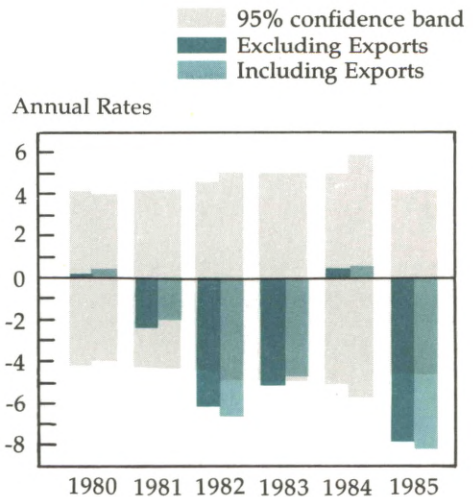
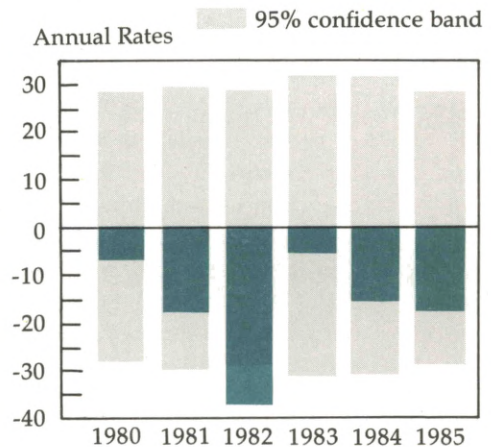


FIGURE 4b
Errors in Forecasting
Import Growth Using a
Standard St. Louis Equation



See Appendix for details.

GNP growth has indeed become less responsive to growth in M1 than it used to be. Two recent phenomena offer plausible explanations for the change: a new inflation outlook and deposit market deregulation. Both would reduce the responsiveness of GNP to increases in the supply of money essentially by increasing the public's demand for money at the same time. Money supply increases that simply accommodate such increases in money demand do nothing to stimulate spending and raise GNP in the usual way. And while direct evidence is difficult to accumulate, the indirect evidence we have suggests that recent declines in GNP's responsiveness to M1 growth represent some combination of these two influences.

Inflation Expectations. The amount of money that people want to hold in their portfolios depends partly on the volume of transactions that they intend to carry out and partly on the rate of return that it pays relative to other financial assets. The more transactions people plan to undertake, the more money they want to have available. On the other hand, the wider the spread between the rates of interest on various financial instruments and any return that money might offer, the smaller the proportion of their portfolio people want to devote to money. One important determinant of market interest rates is the expected rate of inflation. The higher the rate of inflation people expect down the road, the higher market interest rates go, as lenders attempt to preserve the purchasing power of the funds in which they will be repaid.⁹ So, in short, high rates of expected inflation, by putting upward pressure on market interest rates, tend to reduce the public's demand for money. Low expected inflation rates, on the other hand, by allowing market interest rates to fall, help raise the public's demand for money. There is some evidence that

during the 1960s and 1970s the public took higher current money growth as an indicator of higher future money growth, and hence higher future inflation.¹⁰ This direct effect of money growth on inflation expectations would have amplified its impact on GNP growth by tending to raise market interest rates and thus reducing growth in money demand. In recent years, however, the public's inflation outlook seems to have changed. After the Fed's intense battle against inflation beginning in 1979 and the prolonged period of recession during which inflation was wrung from the economy in the early 1980s, people became less likely to interpret more rapid current money growth as indicative of an inflationary trend. Without its boost to inflation expectations, and hence market interest rates, more rapid money growth would do less to slow growth in money demand, and hence less to stimulate spending and increase GNP growth than in more inflationary times.

Attempts to accumulate evidence on the impact of changing inflation expectations on the M1-GNP relationship are handicapped by data problems. While the rate of inflation people actually experience can be measured simply by collecting information about the prices of available goods and services, the rate of inflation people expect to experience cannot be observed so directly. Therefore, analysts often rely on survey-based measures of inflation expectations, despite surveys' widely recognized imperfections. But at least one measure, which is based on the semi-annual Livingston Survey, offers some support for the role of changing inflation expectations in the M1-GNP breakdown.

Every June and December since 1946, Joseph Livingston, business columnist with *The Philadelphia Inquirer*, has been polling economists on their outlook for the economy six months to a

⁹A more detailed discussion of how market interest rates respond to changes in the expected rate of inflation can be found in Herbert Taylor, "Interest Rates: How Much Does Expected Inflation Matter?" this *Business Review* (July/August 1982) pp. 3-12.

¹⁰Empirical support for the role of money growth in the formation of inflation expectations can be found in Donald J. Mullineaux, "Inflation Expectations and Money Growth in the United States," *American Economic Review* (March 1980) pp. 149-161.

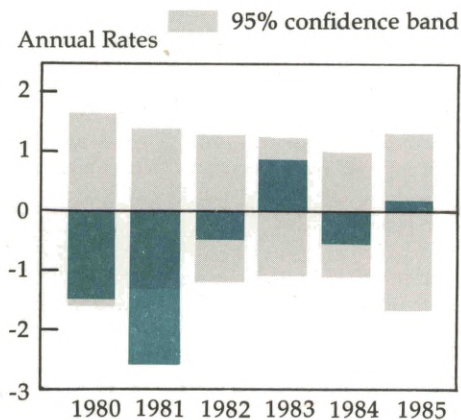
year down the road. The average of their forecasts for changes in the Consumer Price Index is a widely used measure of inflation expectations in the economy. An analysis of this series' behavior indicates a significant positive relationship between inflation expectations and money growth during the 1960s and 1970s. When that relationship is used to predict into the 1980s, however, we find that the expected rate of inflation has been persistently lower than money growth during the 1980s would imply. As shown in Figure 5, money growth most substantially overpredicted the changes in expected inflation during a three-year period beginning in 1980. Considering the lags in money's impact on GNP, this period of uncharacteristic decline in inflation expectations could be particularly helpful in explaining the substantial decline in GNP's responsiveness to M1 growth during the three-year period beginning in 1981. On the other hand, declining inflation expectations do not seem to have played such a major role in the 1985 M1-GNP breakdown. It seems that dereg-

ulation figured more prominently in this more recent episode.

Deregulation. While declining inflation expectations seem to have boosted the public's demand for money one way—by reducing rates of interest on other financial assets—deposit market deregulation has been doing it the other way—by raising rates of return on money itself. Prior to 1980, most people had to hold their money either in currency or in regular checking accounts on which banks are prohibited from paying any interest. But with the nationwide authorization of NOW and Super-NOW accounts, banks and thrift institutions can now offer individuals interest on their checkable deposits.¹¹ Thus deregulation has effectively raised the return on money relative to other assets and, consequently, increased the amount of money people want to keep on hand. Increases in the money supply that simply accommodate this increase in money demand would do nothing to stimulate additional spending and raise GNP in the usual way. As a result, forecasts based on the historical relationship between money growth and GNP—such as those from the St. Louis equations—would tend to overpredict GNP growth during the period of adjustment to the deregulated environment.

To some extent, the St. Louis equations' overpredictions of GNP growth that we found may reflect the initial impact of changes in deposit market regulations. NOW accounts were authorized nationwide in December 1980, Super-NOW accounts were introduced with a \$2,500 minimum balance restriction in January 1983, and the regulatory minimum balance on Super-NOWs was reduced to \$1,000 in January 1985. Each

FIGURE 5
Errors in Forecasting the
Change in Inflation Expectations
on the Basis of Recent
Monetary Growth



See Appendix for details.

¹¹NOW accounts became available in New England as early as 1972. The authorization to offer NOWs was extended to depository institutions in New York in 1978 and in New Jersey in 1979. ATS accounts also were authorized in 1978. The Monetary Control Act of 1980 not only allowed all commercial banks, mutual savings banks, and savings and loans to offer NOWs, but also allowed credit unions to offer interest-bearing checking accounts, called share drafts.

step expanded individuals' opportunity to earn a rate of return on their checking account balances that is closer to the rate of return on other financial assets. This narrowing spread not only encouraged people to switch from their old regular checking accounts to the newer accounts, but encouraged them to keep larger balances in those new accounts as well. Thus, the new accounts boosted the public's overall demand for money and the amount of money that the Fed would need to supply to maintain GNP.

In addition to the initial impact of their introduction, the new accounts may have further diminished the response of GNP to money growth by increasing the sensitivity of the public's demand for money to declines in market interest rates. With NOWs and Super-NOWs paying a relatively high rate of interest, recent declines in market rates have made the spread between the return on money and the return on other assets much narrower than in the past, and hence created an unusually strong incentive for individuals to hold additional money balances. For instance, between 1984 and 1985 market interest rates on short-term securities declined from roughly 11 percent to about 7 percent. This decline leaves the spread between market rates and the rate on regular checking accounts, which pay no interest, at 7 percent, but it reduces the spread on Super-NOW accounts paying 6 percent interest to a single percentage point. With the cost of holding money rather than short-term financial assets so low, Super-NOW depositors find that there is little payoff to actively managing their accounts so as to minimize the share of money in their portfolios. So they are much more inclined to let their average money balances rise than they would be if they still held regular checking accounts. As a result, the Fed would have to create a larger increase in the money supply than it did previously in order to bring market interest rates down and stimulate new spending.¹²

¹²This rationale for the heightened sensitivity of money demand to interest rate movements is given a more formal

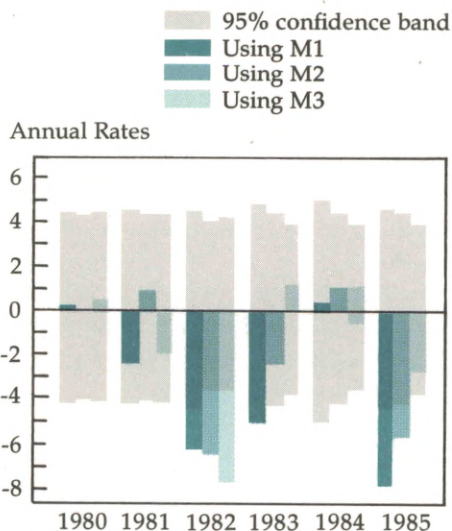
The complexity of the deregulation process makes it difficult to pinpoint the timing and the magnitude of its impact on the public's demand for money.¹³ But the idea that deregulation has thus altered the M1-GNP relationship is supported by the recent behavior of the broader monetary aggregates. Presumably, a portion of the funds households choose to shift into NOW and Super-NOW accounts are funds that they previously would have held in small time and savings deposits or other relatively liquid assets. But the public's holdings of many of these "near money" assets are already included in the broader money measures, M2 and M3. Consequently the shifts of funds induced by the introduction of NOWs and Super-NOWs should not affect M2 or M3 and their relationship to GNP by as much as they affect M1 and its relationship to GNP.

To evaluate whether it is, in fact, primarily M1's relationship to GNP that has broken down recently, St. Louis-type equations estimated with M2 and M3 growth in place of M1 growth were used to forecast GNP growth over the 1980s. The results, shown in Figure 6 (p. 12), indicate that in general the broader aggregates, particularly M3, do a better job of predicting GNP growth than does M1 over the last six years. So it seems that the breakdown in the relationship between money and GNP has centered on M1, as the deregulation explanation implies. The relative performances of the three aggregates during 1985 in particular, are consistent with the idea

statement in Thomas D. Simpson, "Changes in the Financial System: Implications for Monetary Policy," *Brookings Papers on Economic Activity* 1 (1984) pp. 249-265.

¹³Simpson's *Brookings* paper offers estimates of the magnitude of recent changes in the public's demand for M1. For a presentation of similar evidence and a discussion of some of the difficulties in linking the changes to deregulation, see Rik W. Hafer, "Monetary Stabilization Policy: Evidence from the Money Demand Forecasts," Federal Reserve Bank of St. Louis *Review* (May 1985) pp. 21-26. A thorough review of recent money demand behavior is provided by Robert J. Gordon, "The Short-Run Demand for Money: A Reconsideration," *Journal of Money, Credit, and Banking* (November 1984, Part I) pp. 403-434.

FIGURE 6
Errors in Forecasting
Recent GNP Growth Using
Standard St. Louis Equations
with M1, M2, and M3 as
Alternative Money Measures



See Appendix for details.

that deposit market deregulation has contributed significantly to the breakdown in the M1-GNP link by increasing the sensitivity of the public's demand for money to interest rate declines. Figure 6 also shows one noteworthy exception to the overall superior performance of M2 and M3. In 1982 all of the aggregates overpredicted GNP growth by a significant margin and the broader aggregates did worse than M1. This reinforces the view that changing inflation expectations contributed significantly to the M1-GNP breakdown around that time.¹⁴

¹⁴In principle, deposit market deregulation and the changes in the public's demand for money that it creates could affect GNP's response not only to changes in the supply of money but to changes in fiscal policy or international economic developments as well. The test results presented in previous sections did not allow for this possi-

WHAT WILL HAPPEN TO M1?

A significant change in the observed relationship between GNP growth and growth in M1 has occurred during the 1980s, and conclusive evidence as to its cause eludes us. But the St. Louis approach illustrates the magnitude of the breakdown in the M1-GNP linkage and provides some avenues for assessing the possible explanations for it. The evidence based on this approach is consistent with the view that money's impact on GNP is not being obscured by an unusually strong influence from some other economic forces—such as fiscal policy or the international economic situation. Rather it seems that the responsiveness of GNP growth to M1 growth has actually declined, and that the decline has been the result of deposit market deregulation combined with changing inflation expectations. Optimism about the inflation outlook, by helping to bring market interest rates down, and deregulation, by helping to bring interest rates on checkable deposits up, have worked to boost the public's demand for M1. As a result, increases in the supply of M1 have stimulated less of a spending increase than they would have in the past.

Indications are that 1986 will mark another year in which GNP's response to money growth will fall short of predictions based on the experience of the 1960s and 1970s. But if we have put our finger on the right combination of factors behind the recent breakdown, then a predictable link between M1 and GNP growth may soon re-emerge. The deregulation process itself is over; remaining regulations limiting individuals' opportunities to earn competitive interest on their deposits were eliminated this year. Changes in the public's money management practices engendered by deregulation should begin winding down as well. The spread between the interest

bility. However, when the forecast errors from the standard St. Louis equation were correlated with recent growth in the money supply, cyclically adjusted government expenditures and taxes, and exports, only the correlations with money growth were statistically significant. This suggests that it is GNP's response to money growth that has changed over the past six years.

rates on the new checking accounts and the interest rates on other financial assets has already been substantially narrowed and, in the future, competition should induce depository institutions to adjust the rates they pay on these accounts as other market rates change. As for inflation expectations, while it is difficult to foresee how money growth will influence the public's inflation outlook in the future, the big changes seem

to have occurred in the early 1980s and are now behind us. Of course, the linkage between M1 growth and GNP growth that ultimately emerges may not correspond exactly to the one that we observed in the 1960s and 1970s. But the key long-run link between money growth and GNP growth—that each percentage point increase in the money supply ultimately produces a percentage point increase in GNP—should reemerge.

APPENDIX

A standard St. Louis equation specification might be written:

$$GNP_t = \alpha + \beta(d,q)M1_t + \gamma(d,q)G_t + e_t$$

where GNP_t = seasonally adjusted quarterly GNP growth

$M1_t$ = seasonally adjusted quarterly M1 growth

G_t = cyclically adjusted government expenditures growth

e_t = random error

α represents a constant; $\beta(d,q)$ and $\gamma(d,q)$ are polynomial distributed lags of q quarters and degree d .

In order to quantify the relationship between GNP and M1 during the 1960s and 1970s, St. Louis equations were estimated for the sample period 1963:II through 1979:IV (excluding lags), using ordinary least squares (OLS) regression. Precise specifications were chosen with a grid search procedure. First, the maximum number of quarters to be included in the distributed lags was set at 5 quarters and the specification with the combination of lag length and polynomial degree which minimized the estimated standard error of the regression was selected. Then the maximum number of lags was set at 9 quarters and the process was repeated—similarly with maximum lags of 13 and 17 quarters. The four equations thus selected were then used to construct annual GNP forecasts for the period 1980 through 1985. Because the annual forecasting properties of the four equations were so similar, only the results for equations estimated using up to 9 quarters are reported in this article.

NOTES TO FIGURES

Figure 1. The equation used to construct these forecasts had the following estimated constant and sums of the distributed lag coefficients (standard errors appear in parentheses):

$$\begin{array}{lll} \alpha = 2.16 & \Sigma\beta(6,7) = .953 & \Sigma\gamma(7,7) = .122 \\ (1.86) & (.291) & (.121) \end{array}$$

Along with the R^2 , the standard error of the regression (σ_e) and the Durbin-Watson statistic (DW) for the equation were:

$$R^2 = .42 \quad \sigma_e = 3.62 \quad DW = 2.10$$

Figure 2. In the final sales equation, growth of final sales, measured by GNP less additions to inventories, replaced growth in GNP as the dependent variable in a St. Louis-type equation. Estimating the equation over the 1963:II through 1979:IV sample period produced the following results:

$$\begin{array}{l} \alpha = 2.26 \quad \Sigma\beta(6,7) = .952 \quad \Sigma\gamma(7,7) = .150 \\ (1.39) \quad (.210) \quad (.087) \\ R^2 = .51 \quad \sigma_e = 2.62 \quad DW = 2.08 \end{array}$$

Figure 3. The estimated equation used to generate these forecasts was of the form:

$$GNP = \alpha + \beta(d,q)M1_t + \gamma(d,q)G_t + \delta(d,q)R_t + e_t$$

where R_t = cyclically adjusted government tax revenue growth.

The results of OLS regression over the sample period 1963:II through 1979:IV are:

$$\begin{array}{l} \alpha = 3.01 \quad \Sigma\beta(6,7) = .788 \quad \Sigma\gamma(7,7) = .070 \quad \Sigma\delta(2,2) = .083 \\ (1.53) \quad (.308) \quad (.127) \quad (.063) \\ R^2 = .45 \quad \sigma_e = 3.60 \quad DW = 2.10 \end{array}$$

Figure 4a. The estimated equation used to generate the forecasts was of the form:

$$GNP = \alpha + \beta(d,q)M1_t + \gamma(d,q)G_t + \xi(d,q)XP_t + e_t$$

where XP = growth in dollar expenditures on U.S. exports of goods and services.

The OLS regression results for the period 1963:II through 1979:IV were:

$$\begin{array}{l} \alpha = 2.57 \quad \Sigma\beta(6,7) = 1.031 \quad \Sigma\gamma(7,7) = .069 \quad \Sigma\xi(9,9) = .019 \\ (1.89) \quad (.335) \quad (.127) \quad (.065) \\ R^2 = .59 \quad \sigma_e = 3.36 \quad DW = 1.89 \end{array}$$

Figure 4b. A standard St. Louis-type equation was used to link M1 and cyclically adjusted government expenditure growth to growth in U.S. expenditures on imported goods and services. The estimated relationship based on OLS regression over the period 1963:II through 1979:IV was:

$$\begin{array}{l} \alpha = -4.54 \quad \Sigma\beta(2,7) = 3.98 \quad \Sigma\gamma(3,7) = -.037 \\ (11.70) \quad (1.76) \quad (.737) \\ R^2 = .13 \quad \sigma_e = 22.17 \quad DW = 2.40 \end{array}$$

Figure 5. An inflation expectations formation model of the form:

$$\Pi_t^e - \Pi_{t-1}^e = \phi + \theta(d,q)M1_t + n_t$$

where Π_t^e is the 6-month-ahead Livingston survey inflation forecast and n_t represents a random error, was estimated for the period 1963:II through 1979:IV. The OLS results were:

$$\begin{array}{l} \phi = -.503 \quad \Sigma\theta(4,5) = .207 \\ (.490) \quad (.112) \\ R^2 = .33 \quad \sigma_n = .641 \quad DW = n/a \quad \text{obs} = 34 \end{array}$$

Figure 6. Standard St. Louis equations in which M2 and M3 replaced M1 as the money measure were estimated over the period 1963:II through 1979:IV using OLS. The results were:

M2

$$\begin{array}{l} \alpha = -.37 \quad \beta(9,9) = 1.028 \quad \gamma(6,6) = .061 \\ (2.36) \quad (.250) \quad (.115) \\ R^2 = .45 \quad \sigma_e = 3.61 \quad DW = 2.11 \end{array}$$

M3

$$\begin{array}{l} \alpha = 1.40 \quad \beta(4,6) = .593 \quad \gamma(7,8) = .209 \\ (2.11) \quad (.179) \quad (.132) \\ R^2 = .37 \quad \sigma_e = 3.71 \quad DW = 2.04 \end{array}$$

Trade Deficits and the Dollar: A Macroeconomic Perspective

*Stephen A. Meyer**

It is common knowledge that the United States now imports far more than it exports, and it is widely believed that this trade imbalance has harmed manufacturing industries in the U.S. At a minimum, it is clear that imported goods have supplied a growing share of American consumers' and firms' purchases during the past several years. This situation is viewed with concern by many businessmen in the U.S., by labor leaders,

and also by government officials. Many of those individuals are calling for action by the U.S. government to reduce imports and spur exports in order to reduce the trade imbalance.

Much public discussion about why the U.S. imports more than it exports has focused on claims of unfair trading practices—usually by one industry or country at a time. Some U.S. firms charge their foreign competitors with “dumping”—exporting goods at a lower price than is charged to domestic wholesalers; some countries are accused of imposing barriers to imports from the U.S.; and some are charged with subsidizing exports. This way of thinking about trade problems is *microeconomic* in nature —it

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focuses on one good or one country at a time.

This microeconomic focus on the imbalance in U.S. international trade leads people to propose solutions targeted at perceived trade problems in specific countries or industries. *Problem:* The U.S. imports more from Japan than we export to Japan. *Proposed solution:* We should impose restrictions on the entry of Japanese goods into the U.S., or perhaps we should pressure Japan to remove its barriers to the entry of U.S. made goods. *Problem:* The U.S. steel industry has difficulty competing with imported steel. *Proposed solution:* We should restrict imports of steel. *Problem:* Other countries recently have had more success exporting wheat than has the U.S. *Proposed solution:* The U.S. government should subsidize wheat exports, either directly or by offering low cost financing to buyers of U.S. wheat. All of these proposed solutions to trade problems are microeconomic in nature; each is aimed at one manifestation of the U.S. trade deficit rather than at the overall trade imbalance.

While a microeconomic approach can shed some light on how the U.S. trade deficit affects particular industries, it cannot account for the overall size of the trade imbalance. Economic theory indicates that the total size of the trade deficit is a *macroeconomic* phenomenon; the evidence reveals that the large trade deficit reflects imbalances in the U.S. economy as a whole, not just in particular industries. This article provides a macroeconomic perspective on the U.S. trade imbalance, and describes how monetary and fiscal policies, in the U.S. as well as abroad, have been major factors causing the U.S. trade deficit.¹ In particular, the differences in monetary and fiscal policies pursued by the U.S. and by other industrial countries led to more rapid growth of demand for goods and services by U.S. residents than by those living in other countries, and also led to appreciation of the dollar. That combi-

nation generated a large increase in the U.S. trade deficit.

The macroeconomic perspective on the causes of the U.S. trade imbalance indicates that appropriate changes in monetary or fiscal policies, either in the U.S. or abroad, or both, will weaken the dollar and move the U.S. toward a more balanced international trade position. Even without changes in macroeconomic policy, the dollar would eventually depreciate as a result of the enormous foreign debt the U.S. would accumulate from continuing large trade deficits.² But the evidence suggests that we would have to wait many years for that adjustment process to work. If we want to reduce the U.S. trade deficit quickly, as recommended by many businessmen, labor leaders, and politicians, then changes in U.S. macroeconomic policies would be an effective tool. So would changes in the macroeconomic policies of other industrial countries. Coordinated changes in macroeconomic policies in the U.S. and other countries could be even more effective.

In fact, a joint announcement in September of 1985 by the U.S. Treasury Secretary and by the Finance Ministers of France, Germany, Japan, and the United Kingdom, that changes in their countries' macroeconomic policies would be forthcoming, preceded a sharp decline in the foreign exchange value of the dollar. While the dollar had begun to decline in March of 1985, following a move to easier monetary policy in the U.S., the value of the dollar in terms of French francs, German marks, Japanese yen, and British pounds declined much more sharply following the September announcement that coordinated macroeconomic policy changes would be undertaken.³

²For a careful technical discussion of this adjustment process, see Rudiger Dornbusch and Stanley Fisher, "Exchange Rates and the Current Account," *American Economic Review* (1980) pp. 960-971.

³For a discussion of the reasons underlying the change in U.S. monetary policy, see "Record of Policy Actions of the Federal Open Market Committee," *Federal Reserve Bulletin* (April 1985) pp. 231-237.

¹For a technical, detailed, and balanced treatment of the issues discussed in this article, see the papers and comments in *The U.S. Dollar—Recent Developments, Outlook, and Policy Options* (Federal Reserve Bank of Kansas City: 1985).

HOW STRONG DID THE DOLLAR BECOME, AND HOW BIG IS THE TRADE DEFICIT?

From the end of 1980, when the U.S. dollar was relatively weak against foreign currencies, to its peak in February of 1985, the dollar's value rose by 18 percent in terms of Canadian dollars, by 18 percent in terms of Japanese yen, by 89 percent in terms of German marks, by 117 percent against the British pound sterling, and by 149 percent in terms of French francs.

On average, the dollar's value in terms of the currencies of our major trading partners (including the five just named) rose by about 55 percent. Economists refer to this weighted average value of the dollar as the *nominal effective trade-weighted index* of the dollar, and it means that on average it took 55 percent more foreign currency to buy a dollar in February of 1985 than it did at the end of 1980.⁴ But that number does not necessarily indicate how much more expensive goods made in the U.S. became relative to foreign made goods. The reason is that there was more inflation abroad than in the U.S. at the same time that the dollar was appreciating, so some of the dollar's rise in value just compensated for the higher inflation abroad. The *real* effective trade-weighted index of the dollar adjusts for differences in inflation rates across countries.⁵ This index implies that the dollar appreciated by 49 percent

⁴That number is a weighted average of the percentage rise in the value of the dollar against the currencies of the other industrial countries, where the weight on each foreign currency is the share of U.S. international trade done with the country that issues that currency. The particular exchange rate index referred to here is compiled by Morgan Guaranty Trust Company of New York, and is available in their publication, *World Financial Markets*.

Several ways of calculating exchange rate indexes are described briefly in the December 6, 1985 *Weekly Letter* of the Federal Reserve Bank of San Francisco.

⁵To calculate the real effective trade-weighted index of the dollar, first the difference in inflation rates between the U.S. and its trading partners is subtracted from the percent change in the exchange rate; then the weighted average of exchange rate changes is constructed. Morgan Guaranty's *World Financial Markets* also gives a real effective exchange rate index.

in real terms, from its low point in the third quarter of 1980 to its peak in February of 1985 (see Figure 1, p. 18).

A very striking picture emerges when we compare the real trade-weighted value of the dollar with the figures for the U.S. trade balance from 1980 to 1985 (see Figure 2, p. 18). The shifts in buying patterns and production decisions induced by the dollar's real appreciation on foreign exchange markets were sufficiently large to push the U.S. trade balance from a *surplus* of \$32 billion in 1980, which amounted to 1.2 percent of U.S. gross national product (GNP) in that year, to a *deficit* of \$79 billion in 1985, equal to 2.0 percent of GNP.⁶

If we want to reduce the size of the U.S. trade deficit, it is important to understand the reasons for the appreciation of the dollar and the resulting change in trade patterns. Economic theory argues that we should look at macroeconomic relations and macroeconomic policies in our search for understanding.

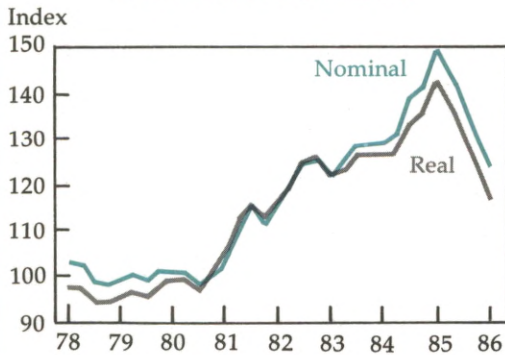
A MACROECONOMIC PERSPECTIVE ON THE TRADE DEFICIT

There is a simple macroeconomic relation linking the values of a country's exports, imports, total production of goods and services (GNP), and total demand for goods and services by residents of that country (called "gross domestic purchases"). Gross domestic purchases is typically divided into three categories that reflect different types of spending: consumer spending, which includes purchases of durable goods such as automobiles;

⁶These numbers refer to the U.S. balance of trade in goods and services. The merchandise trade balance, which measures trade in goods only, shows a much larger deficit in 1985—roughly \$120 billion. The difference between these two measures of the trade balance reflects substantial U.S. exports of financial and other services, and also net earnings on foreign assets owned by U.S. residents. Because we are comparing the trade balance to GNP, and because GNP includes services as well as goods, it makes sense to use a measure of the trade balance which includes services.

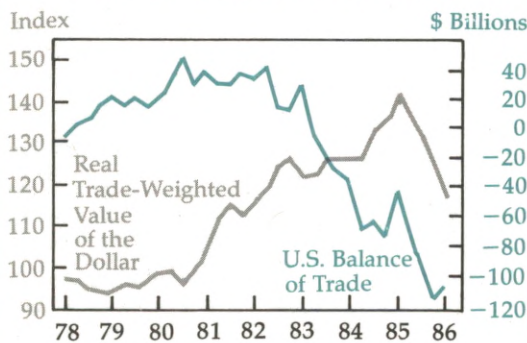
Data on the composition of U.S. GNP and the U.S. trade balance are available in *Survey of Current Business*, published by the U.S. Department of Commerce.

FIGURE 1
REAL AND NOMINAL
TRADE-WEIGHTED INDEX
OF THE DOLLAR



SOURCE: Morgan Guaranty Trust Company of New York, *World Financial Markets* (published bi-monthly)

FIGURE 2
AS THE DOLLAR
APPRECIATES, THE TRADE
IMBALANCE WORSENS



SOURCES: Real Trade-Weighted Value of the Dollar is as in Figure 1; U.S. Balance of Trade is "Net Exports of Goods and Services," in National Income and Product Accounts Tables, published monthly by U.S. Department of Commerce in *Survey of Current Business*.

investment spending, which includes business spending on plant, equipment and inventories, and also spending on new residential construction; and government purchases of goods and services by federal, state, and local governments.

The relation is that:

$$\text{GNP} + \text{Imports} = \text{Gross Domestic Purchases} + \text{Exports}$$

In plain English, this relation states that the total demand for goods and services within a country, plus foreign demand for the country's export goods—the sum on the right hand side of the equation—must be met by domestic production (GNP) or by imports. This equation can be rearranged to show the macroeconomic relation between GNP, total domestic demands for goods and services, and the trade balance:

$$\text{GNP} - \text{Gross Domestic Purchases} = \text{Exports} - \text{Imports}$$

So a country's trade balance is simply the difference between its total production of goods and services (GNP) and total domestic spending on goods and services. If a country produces more goods and services than are bought by domestic residents (including purchases for inventories) then the excess production must be going into export markets, and the country will have a trade surplus. But if the country's residents buy more goods and services than are produced domestically, then goods must be imported to fill the gap, and the country will have a trade deficit.

Because we know that the U.S. trade balance has worsened during the past five years, we can infer that the quantity of goods and services *bought* by American consumers, businesses, and governments has grown more than the quantity of goods and services *produced* here. U.S. macroeconomic policies played a large role in generating this outcome, and thereby contributed to the large U.S. trade deficit.

HOW DID U.S. MACRO POLICIES
CONTRIBUTE TO THE TRADE DEFICIT?

Changes in the U.S. government's tax and spending policies, beginning in 1981, helped to generate substantial increases in consumer spending, in investment spending, and in government

purchases. At the same time, those policy changes contributed to the strong appreciation of the dollar, which made it cheaper to meet the increased demands by importing many of the goods rather than producing them here. Changes in U.S. monetary policy, beginning late in 1979, also contributed to the appreciation of the dollar. Those fiscal and monetary policy changes contributed to the U.S. trade deficit by generating incentives for U.S. residents to buy more goods than the U.S. economy produces domestically.

Fiscal Policy Changes Increased Government, Business, and Consumer Spending. Two major changes in U.S. fiscal policies were enacted in 1981. First, the incoming administration put the U.S. on a long-term course of raising military expenditures to modernize and build up defense capabilities. This translated into strong growth of federal government purchases of goods and services, as the military acquired new and more sophisticated hardware and as military salaries were raised to attract and retain more recruits. Largely as a result of the continuing defense build-up, federal government purchases rose at an average annual rate of 11.3 percent during 1981 through 1985. At the state and local levels, government purchases grew more slowly, at a 7.4 percent annual rate, bringing the growth rate of total government purchases during those five years to 9.0 percent per year. By comparison, GNP grew at a 7.9 percent annual rate during the same period.

The second change in fiscal policy was embodied in the Economic Recovery Tax Act of 1981, which included major changes in both business and personal taxes. The 1981 tax act substantially increased businesses' incentives to invest, especially in equipment and in commercial buildings. The after-tax profitability of investment was raised by increasing the size of depreciation write-offs allowed by the tax code, and also by making the investment tax credit more widely available. Even though these tax changes were partly reversed in 1982, the net effect of the tax changes was to promote investment spending by U.S. businesses—indeed, that was the intended pur-

pose of the tax changes.⁷ At least in part because of these tax changes, investment spending grew at an average annual rate of 8.9 percent during 1981 through 1985, again faster than the growth rate of GNP.

It is less clear how much the changes in personal taxes embodied in the 1981 tax act changed consumption spending. Much of the cut in personal income taxes was offset by continuing increases in social security taxes and by bracket creep due to inflation, but on balance there was a slight cut in tax rates on personal income between 1981 and 1985.⁸ Also complicating the picture is the fact that economic theory indicates that there are some reasons why personal tax cuts might raise the share of consumption spending in GNP, and other reasons why tax cuts might not affect that share.⁹ In fact, consumption spending rose at an average annual rate of 8.3 percent during 1981 through 1985, also faster than the growth rate of GNP.¹⁰

⁷For a discussion of how the 1981 and 1982 tax acts changed business taxes and firms' incentives to invest in various kinds of plant and equipment, see Stephen A. Meyer, "Tax Policy Effects on Investment: The 1981 and 1982 Tax Acts," this *Business Review* (November/December 1984) pp. 3-14.

⁸The effects of the 1981 personal income tax cuts on families at various income levels are treated in detail in Stephen A. Meyer, "Tax Cuts: Reality or Illusion?" this *Business Review* (July/August 1983) pp. 3-16.

⁹For a careful discussion of the effects of changes in after-tax rates of return on savings behavior, see Robert H. DeFina, "The Link Between Savings and Interest Rates: A Key Element in the Tax Policy Debate," this *Business Review* (November/December 1984) pp. 15-21.

¹⁰Tax changes are not the only factor that could have pushed up consumption spending relative to GNP. Demographic factors also may have played a role. People between the ages of 45 and 65 comprise a shrinking share of the U.S. population, while people between 20 and 45, and people over 65, comprise a growing proportion of the population. Because people from 45 to 65 do the bulk of the saving in the U.S., while those under 45 and those over 65 typically consume a larger fraction of their incomes, the changing age composition of the U.S. population probably also contributed to the rising ratio of consumption spending to GNP.

While these changes in spending do not seem dramatic, they imply that total domestic spending grew at an average annual rate of 8.5 percent during 1981 through 1985, faster than the 7.9 percent average growth rate of GNP. That difference in growth rates over five years was enough to raise total domestic spending on goods and services in the U.S. from slightly less than 99 percent of U.S. GNP in 1980 to 102 percent of U.S. GNP in 1985. That 3 percent swing corresponds to the deterioration in the U.S. trade balance from a surplus of a little more than 1 percent of GNP in 1980 to a deficit of 2 percent of GNP in 1985 (Figure 3). GNP was slightly less than \$4 trillion in 1985, so a U.S. trade deficit equal to about 2 percent of GNP corresponds to the \$79 billion trade deficit figure reported earlier.

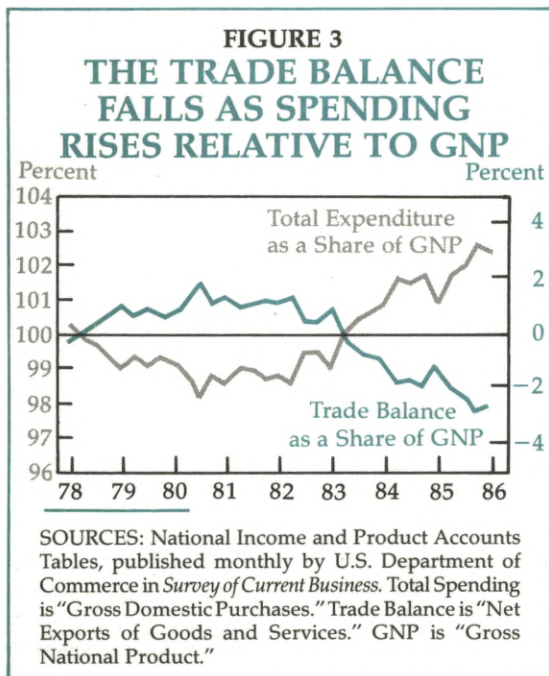
These statistics raise an important question. Why didn't the production of goods and services in the U.S. rise fast enough to meet the growing demands for goods and services, even though continuing high unemployment rates and low capacity-utilization rates indicated that

there was excess capacity in the U.S. economy? A crucial part of the answer is that the same macroeconomic policy changes that contributed to strong growth of total demand also were among the major factors that caused the dollar to appreciate. And the appreciation of the dollar reduced the cost of imported goods relative to goods produced in the U.S., so it was cheaper to satisfy the growing demand by importing a large share of the goods rather than producing them in the United States. The dollar's appreciation also raised the cost of U.S. goods to foreigners, making U.S. exports less desirable.

U.S. Monetary and Fiscal Policy Changes Contributed to Appreciation of the Dollar. Policy changes began late in 1979 and early in 1980 when the Federal Reserve tightened monetary policy in an effort to reduce the double-digit inflation that marked the late 1970s. The result was not only lower inflation, but also lower *expected* inflation, and higher interest rates. The fiscal policy changes that began in 1981 increased the demand for credit to finance additional purchases by business and government. The drop in savings rates limited the domestic supply of credit. That combination also resulted in higher interest rates. Thus, the mix of monetary and fiscal policy changes, which raised interest rates and lowered expected inflation, contributed to higher real interest rates (market interest rates minus expected inflation) in the U.S.

Even though monetary policy was tightened in other industrialized countries as well during the early 1980s, foreign central banks did not allow interest rates to rise as much as in the U.S., in general. So real interest rates in the U.S. rose relative to those in the other major industrialized countries. When the Federal Reserve became more accommodative and helped to push down U.S. interest rates beginning in mid-1982, in response to a dramatic drop in U.S. inflation and a continuing recession, foreign central banks largely followed suit. Thus, real interest rates in the U.S. remained higher than foreign rates, with little change in the differentials (Figure 4).

The rise in real interest rates in the U.S. rel-



ative to those abroad increased the attractiveness of U.S. assets relative to foreign assets. Investors, both in the U.S. and abroad, responded by attempting to dispose of foreign assets in order to buy U.S. assets. In order to do so, they had to sell foreign currencies to buy dollars in the foreign exchange market. And that pushed up the value of the dollar.

Dollar Appreciation Made Imports Relatively Cheaper. From 1980 to 1985 the average price of goods made in the U.S. *rose* by a little more than 30 percent. Outside the U.S., prices of foreign-made goods rose somewhat more. But the price of imported goods in the U.S. *fell* by 0.5 percent during the same period, because the dollar's appreciation meant that fewer dollars were required to buy foreign currencies. Thus, the

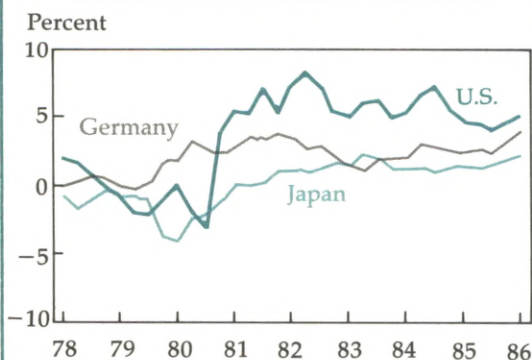
increased value of the dollar in terms of other currencies reduced the price of foreign-made goods *relative* to those made in the U.S. by almost one-third from 1980 to 1985.

In addition, the appreciation of the dollar reduced the labor cost (in dollars) of producing goods abroad relative to producing them in the U.S. (Figure 5, p. 22). Wages normally are set in the currency of the country in which workers live. And wages typically adjust slowly, if at all, in response to exchange rate changes. So, for example, if the wage (in dollars) of workers in the U.S. and the wage (in German marks) of workers in Germany remain unchanged while the dollar appreciates against the mark, then the dollar value of the German workers' wage falls because each German mark is worth fewer dollars.

Because of the appreciation of the dollar, a large share of the increased spending on goods and services that was generated by the changes in U.S. fiscal policy was met by imports rather than by increased domestic production, even though there was slack in the U.S. economy.¹¹ Wholesalers and retailers in the U.S. increased the share of imports in their total purchases. And U.S. firms that have foreign plants expanded their production abroad relative to their production in the U.S., and then shipped those foreign-made goods to the U.S.

While the dollar's appreciation made imports relatively cheaper for Americans, it also made

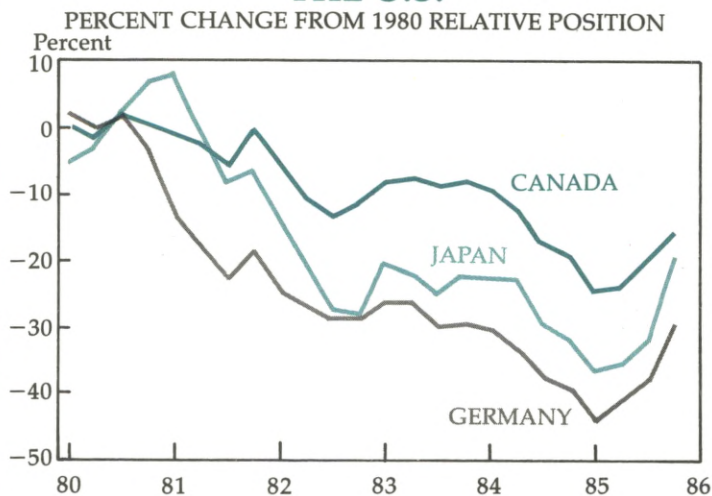
FIGURE 4
SHORT-TERM
REAL INTEREST RATES



NOTE: A real interest rate is defined as a nominal (market) interest rate minus expected inflation for the time period that matches the interest rate. Because it is not possible to observe inflation expectations directly, it is necessary to use some proxy. Here, expected inflation is proxied by a 4-quarter moving average of actual quarterly inflation, where the moving average includes the two preceding quarters, the current quarter, and the next quarter. All interest rates are 3-month market rates: for the U.S., the 3-month CD rate; for Germany, the rate on 3-month bank deposits; and for Japan, guideline rates on 3-month bank deposits. All data are taken from *International Financial Statistics*, published monthly by the International Monetary Fund.

¹¹The change in relative production costs caused by the dollar's appreciation also helps to explain why the service sector of the U.S. economy has grown more strongly than the manufacturing sector since the current economic expansion began late in 1982. As a result of the dollar's appreciation, much of the increased demand for goods in the U.S. has been met by imports during the past four years. While it is fairly easy to produce goods abroad for sale in the U.S., it is impractical to import the services of barbers, waitresses, or lawyers. Even though appreciation of the dollar did reduce the relative cost of services produced outside of the U.S., it was not possible to import very much in the way of services produced abroad; almost all of the increased demand for services within the U.S. was met by increased domestic production.

FIGURE 5
SINCE 1980, UNIT LABOR COSTS
ABROAD HAVE FALLEN RELATIVE TO
THE U.S.



SOURCE: Data are taken from a table titled "Cost and Price Comparisons for Manufacturing," in *International Financial Statistics*. Numbers shown in this figure are the ratio of the relative normalized unit labor cost index for the foreign country to that for the U.S.

U.S. goods relatively more expensive for people living abroad. As a result, U.S. companies found that the market for their exports shrank as demand shifted away from higher-priced U.S.-made goods, and toward goods made in other countries.

So changes in U.S. fiscal and monetary policies in the early 1980s contributed to the large U.S. trade deficit by raising the demand for goods and services in the U.S. and by contributing to the appreciation of the dollar. The appreciation of the dollar from 1980 to 1985 played a major role in generating an increasing gap between total demand and production of goods and services in the U.S.—a gap that translated into a growing trade deficit.

MACRO POLICIES ABROAD ALSO CONTRIBUTED TO THE TRADE IMBALANCE

While U.S. macroeconomic policies were

changing in the early 1980s, the governments of many other industrial countries were moving in the opposite direction—raising taxes and cutting government expenditures. Increasing taxes on business and personal incomes helped to push down investment spending and consumption spending as a share of GNP in many of the other industrial countries. And the cuts in government spending reduced the share of GNP taken by the governments of those countries. Overall, total spending on goods and services in other industrialized countries was declining relative to their GNP, while total spending in the U.S. was rising relative to our GNP. So changes in fiscal policy abroad reinforced the effects of U.S. fiscal policy in terms of creating a trade deficit for the U.S.

and a matching trade surplus for other countries.

Changing fiscal policies in other countries also affected their credit markets. By adopting policies that reduced consumption relative to GNP, those countries generated an increased flow of savings in their domestic credit markets. And by reducing investment and government spending as shares of GNP, they also reduced demands for credit. That combination held down real interest rates in those countries, which made their assets comparatively less attractive than higher-yielding assets in the U.S. As investors abroad decided to acquire more of the higher-yielding U.S. assets, they bid up the value of the dollar in foreign exchange markets. Through this mechanism, contractionary fiscal policy in other industrial countries reinforced the upward pressure on the dollar that resulted from expansionary fiscal policy in the U.S.

Monetary policy decisions abroad also played some role in the appreciation of the dollar. When U.S. monetary policy was made tighter to reduce inflation in late 1979 and in 1980, foreign monetary authorities did not tighten as much, so interest rate differentials widened, which contributed to appreciation of the dollar.

With macroeconomic policies in the other industrial countries tending to move in the opposite direction from U.S. policies in the first half of the 1980s, those foreign policies reinforced the effects of U.S. policies: the dollar's rise and the trade imbalance. Just as changes in macroeconomic policies in the U.S. and abroad contributed to the increased strength of the dollar and to the large U.S. trade deficit, changes in macroeconomic policies can weaken the dollar and help to reduce the U.S. trade imbalance.

CHANGES IN MACRO POLICIES COULD REDUCE THE U.S. TRADE DEFICIT

If the only objective of changing macroeconomic policies were to shrink the U.S. trade deficit, it would be easy to find policy changes to do so. But policymakers have other objectives as well, and some policy changes that would reduce the trade deficit may be incompatible with those other objectives.¹²

One way to reduce the U.S. trade deficit involves reversing the fiscal policy stance the U.S. adopted in 1981. Enacting a tax package that significantly reduces investment incentives (which some of the tax reform proposals now being considered by Congress would do) is likely to reduce the share of GNP that goes to investment spending. It would also reduce real interest rates because it would reduce firms' demand for

financing to undertake investment projects. Reversing the increase in government purchases as a share of GNP which occurred from 1980 to 1985 would reinforce the drop in real interest rates. By shrinking purchases relative to GNP, such policy changes would shrink the trade deficit. By reducing real interest rates in the U.S., they would also contribute to a downward adjustment in the dollar, which would help reduce the trade balance further.

Such changes in fiscal policy would be contractionary, however. Reducing incentives for investment spending would tend to cause slower economic growth in the U.S. Reducing government purchases would likely dictate less defense spending than is now envisioned. Therefore, this option on fiscal policy might not be very appealing to U.S. policymakers.

A second possibility would be to ease monetary policy in the U.S. further. A substantially more expansionary monetary policy would contribute to depreciation of the dollar, so long as such a change in monetary policy is not matched by other countries. It would raise expected inflation in the U.S., reduce real interest rates (at least temporarily), and make the value of the dollar decline. And depreciation of the dollar would help reduce the trade deficit. But, in addition, a substantially more expansionary monetary policy would generate higher inflation in the U.S., eventually. Inasmuch as policymakers in the U.S. have stated that *reducing* inflation further is an important objective, a move to an even more expansionary policy also might not be very appealing.

A third possibility involves changes in macroeconomic policy in other industrial countries. Germany, Great Britain, and Japan all are considering tax cuts to stimulate investment spending or consumption demand. Tax cuts would generate more rapid economic growth and help to reduce unemployment in those countries, whose economies have been growing sluggishly in the recent past. Such tax cuts also would raise real interest rates in those countries, making assets denominated in their currencies more attractive

¹²While reducing the U.S. deficit from its present size is desirable, that does not necessarily mean that the U.S. should have *no* trade deficit. Indeed, if we want foreign countries that have borrowed from U.S. banks to pay interest and eventually to repay those debts, then the foreign countries (as a group) will have to run trade surpluses to accumulate the dollars they will need to repay their loans. Foreign countries as a group can run trade surpluses only if the U.S. has a trade deficit.

to investors. That, in turn, would cause their currencies to appreciate relative to the dollar. The combination of spending rising relative to GNP in those countries, and currencies appreciating relative to the dollar, would reduce those countries' trade surpluses and thereby reduce the U.S. trade deficit.

If we want to reduce the U.S. trade deficit quickly, the macroeconomic perspective reveals that changes in U.S. macroeconomic policies, or changes in macroeconomic policies in other industrial countries, would be effective tools. Coordinated changes in macroeconomic policies could be even more effective.

The Group-of-Five Plan Changes Macroeconomic Policies. A combination of tax cuts abroad and reductions in government spending in the U.S., along with concurrent cuts in interest rates, is at the heart of the program that the finance ministers of the Group-of-Five (G-5) countries—France, Germany, Great Britain, Japan, and the U.S.—announced following their meeting in New York in September of 1985. They unveiled a program that they said was intended to shrink the trade imbalance between the U.S. and the other industrial countries, among other objectives. They would do so by changing relative interest rates to make foreign assets more attractive in comparison to U.S. assets, thus encouraging some depreciation of the dollar, and by narrowing the gap between GNP and the total demand for goods and services in each of the countries.

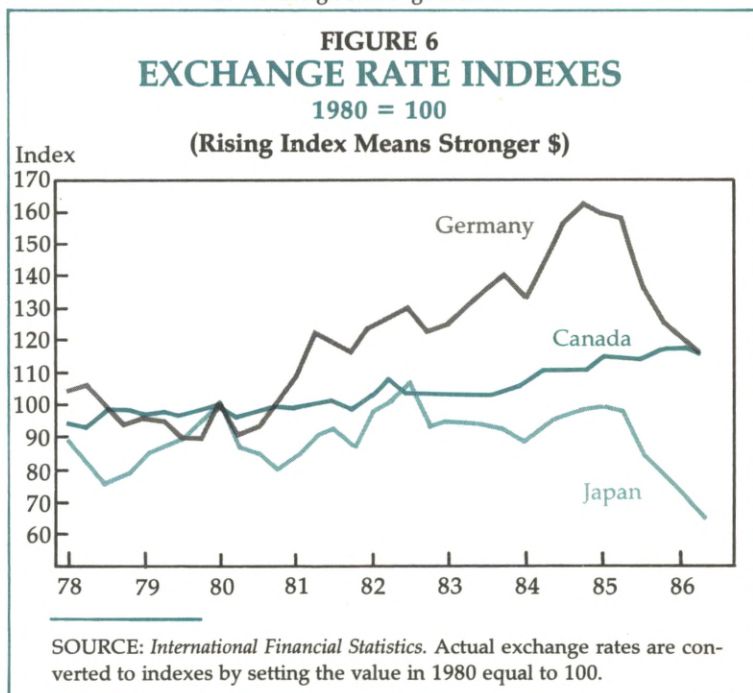
In the months since the G-5 ministers announced their intention to change macroeconomic policies in their countries, the value of the dollar has fallen by roughly 19 percent against the currencies of our major trading partners,

on average, including a 36 percent depreciation against the Japanese yen (Figure 6). That depreciation reflects the macroeconomic policy changes announced by the G-5 ministers, at least in part.¹³

Are Macroeconomic Policies Being Changed?

So far, the G-5 countries do seem to be moving toward implementing the policy changes that their finance ministers announced. The G-5 countries did act in concert to cut their discount rates. The U.S. has passed legislation designed to reduce government spending and its budget deficit. The European countries are slowly

¹³Economic theory indicates that the value of the dollar will begin to fall before the promised policy changes are implemented, as long as investors believe that the policies actually will be changed. Informed investors understand the effects of the promised policy changes, so they anticipate them by disposing of some of their dollar-denominated assets in order to acquire more foreign-currency-denominated assets before the depreciation of the dollar occurs. Therefore, the dollar would start to depreciate as soon as investors make their move to unload dollars and obtain other currencies in the foreign exchange market.



moving toward tax cuts designed to stimulate investment spending and consumer spending. And the Japanese government, which in late 1985 adopted a more restrictive monetary policy to raise the value of the yen on foreign exchange markets, has since reversed that monetary policy change and is moving toward more expansionary fiscal policy. It does seem to be the case, then, that macroeconomic policies are being changed—in the U.S. and in other countries in ways that will shrink the gaps between purchases and production and lead to a smaller U.S. trade deficit.

CONCLUSIONS

Focusing on macroeconomic relations and on the overall size of the large U.S. trade deficit, rather than on trade imbalances within one industry or with one country, indicates that macroeconomic policies are largely responsible for the increase in the value of the dollar and in the size of the U.S. trade deficit over the last five years. Changes in both fiscal and monetary pol-

icies—in the U.S. and abroad—contributed to the dollar's strength and to the trade imbalance.

These conclusions about the role macroeconomic policies play in the strength of the dollar and the large U.S. trade deficit imply that we should look to changes in fiscal and monetary policies in the U.S. and abroad, rather than to restrictions on imports of particular goods or from particular countries, if we want action to reduce the overall size of the U.S. trade deficit. Just such changes in macroeconomic policies were endorsed by the finance ministers of five large industrial countries at their meeting in New York in September of 1985. Anticipations of those policy changes have already contributed to a decline in the value of the dollar. If fully implemented, they also will contribute to improvement in the U.S. trade balance, because the anticipated policy changes partly reverse the macroeconomic policies that initially led to the dollar's increased strength and to the growing trade deficit.

Working Papers

The Philadelphia Fed's Research Department occasionally publishes working papers based on the current research of staff economists. These papers, dealing with virtually all areas within economics and finance, are intended for the professional researcher. The 17 papers added to the Working Papers Series in 1985 are listed below.

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- No. 85-3 Gerald A. Carlino and Edwin S. Mills, "The Determinants of County Growth." Reissued in the *Journal of Regional Science*, forthcoming.
- No. 85-4 Michael Smirlock, "An Analysis of Cross Hedging CDs with Treasury Bill Futures: Bank Specific Evidence." Reissued in *Advances in Futures and Options Research*, forthcoming.
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- No. 85-17 Herb Taylor, "Deposit Market Deregulation and the Demand for Money."

Selected Abstracts 1985

85-1

CHANGING RATES OF RETURN ON RENTAL PROPERTY AND CONDOMINIUM CONVERSIONS

Theodore M. Crone

In the 1970s about 350,000 housing units in multi-family structures in the U.S. were converted to a condominium or cooperative form of ownership. This paper shows how changes both in rents and in housing prices influence the expected rate of return on rental property and therefore the probability of conversion. A minimum logit chi-square model was applied to data from 34 metropolitan areas to estimate the effects of these changes. The evidence suggests that changes in housing prices had a greater effect on conversions than changes in the expected net return on rental property.

85-6

DOES DEDUCTIBILITY INFLUENCE LOCAL TAXATION?

Robert P. Inman

Recent proposals to reform the U.S. tax code all contain significant reforms of the current provisions allowing for the deductibility of state and local taxes. While there are compelling efficiency and equity arguments for the removal of deductibility, there are possibly significant consequences of reform for the financing of state and local services which must be weighed in the balance too. This paper examines the effect of deductibility reform on the revenue decisions of the largest U.S. cities. The analysis of eight alternative reforms concludes: (1) total taxes change very little in the long-run, falling at most by 13% and, for many cities, even rising slightly; (2) fees and license revenue (predominantly a tax on firms) generally fall, in some cases by 30% or more; (3) the net effect on total revenues (tax plus fees) is generally small, never declining by more than 12% even with full loss of deductibility; and (4) policies to offset city revenue losses are effective in neutralizing the negative effects of deductibility reform.

85-9

UNIONS' MONOPOLY POWER INCREASES EFFICIENCY

Robert H. DeFina

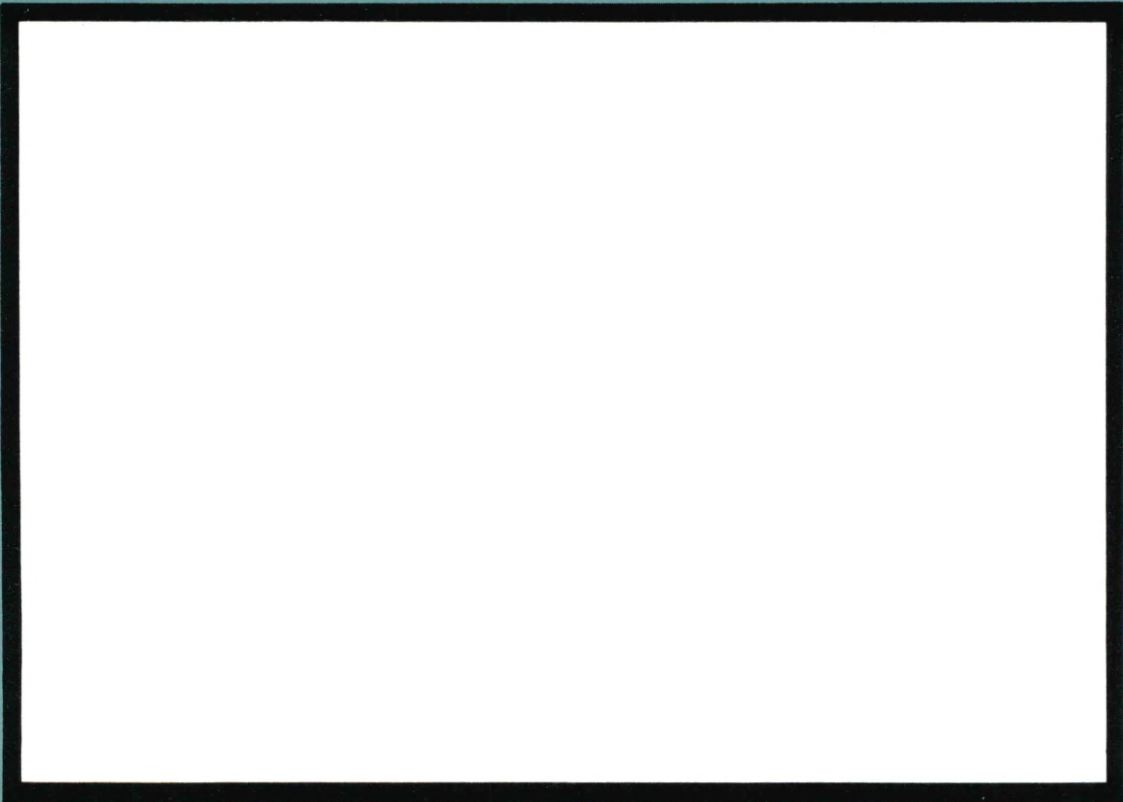
This study investigates the efficiency consequences of the union wage differential, following the general equilibrium methodology used by DeFina (1983). That approach is taken one step further, by accounting more thoroughly for preexisting distortions. This step appears quite significant, for when these distortions are recognized, the union wage differential is found to increase efficiency. Using plausible estimates for the model's parameters, this gain amounts to about 0.2 percent of GNP. This finding of a positive impact of the union wage premium is unique among studies of the wage differential.

85-11

INTRA- AND INTERINDUSTRY EFFECTS OF BANK SECURITIES MARKET ACTIVITIES: THE CASE OF DISCOUNT BROKERAGE

Anthony Saunders and Michael Smirlock

Despite substantial debate, there has been little empirical analysis of the economic arguments concerning commercial bank expansion into securities activities. This paper uses the stock price response of commercial banks and securities firms to examine the risk and return effects of the announcement of bank entry into one such activity, discount brokerage. Our findings indicate that while bank profitability and risk was largely unaffected by such entry, securities firms experienced a significant decline in market value. These results indicate that the objection of the securities industry to bank discount brokerage expansion was largely self-motivated and that bank safety and soundness would not be imperiled by such expansions.



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