

## Economic Review

Federal Reserve Bank of Dallas  
September 1988

### **1 The Reserve Role of the Dollar and the United States as Net Debtor**

*Leroy O. Laney*

Over the past year, arguments have emerged that the dollar's position as the world's primary reserve currency may be in danger. These arguments have centered on a three-year decline in the dollar's value and, in particular, on the transition of the United States to a net debtor country. This fear has been encountered before in the flexible exchange rate era during periods of dollar weakness, but the net debtor position seems to have added a new dimension. Historical comparisons indeed indicate a link between net debtor status and the demise of a key currency. This article's examination of overall reserve currency characteristics, however, suggests that the dollar may be as secure as ever in its present role.

### **15 Drought 1988: Farmers and the Macroeconomy**

*Hilary H. Smith*

The 1988 drought has slashed grain production and has forced distress sales of livestock, but its effects on the national economy in general, and on inflation in particular, are likely to be modest. The forecasted large declines in crop production will cause only minor ripples in U.S. gross national product. Further, simulations in this article show that a doubling of corn prices would temporarily increase the consumer price index (CPI) by less than 1 percent. Should the drought be followed by normal growing conditions in 1989, the decrease in commodity prices would net out the drought's effects on the CPI by early 1990.

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# The Reserve Role of the Dollar and the United States as Net Debtor

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Since the advent of floating exchange rates in the early 1970s, the U.S. dollar has undergone two major downswings (Chart 1). Toward the end of the first of those declines, some concern was focused on the evolution of a multiple-currency reserve asset system—born of diversification incentives in the new environment. During the more recent period of depreciation, conjecture along these lines was largely missing, even though it sometimes arose in a slightly different context.

The question of the central role of the dollar in the world financial system apparently is still not completely settled. Recently, a few observers have been pessimistic about the dollar's future, emphasizing the relatively low U.S. savings rate, macropolicies that do not become the world financial leader, and the emergence of other countries as centers of financial strength. The newly emerged net debtor position of the United States has evoked historical comparisons that associate reserve currency countries with net creditor status.

This article reviews and updates the perceived characteristics of a "key currency country." The conclusion is that while some long-term erosion of the dollar's role is possible, it is difficult under existing circumstances to conceive of a

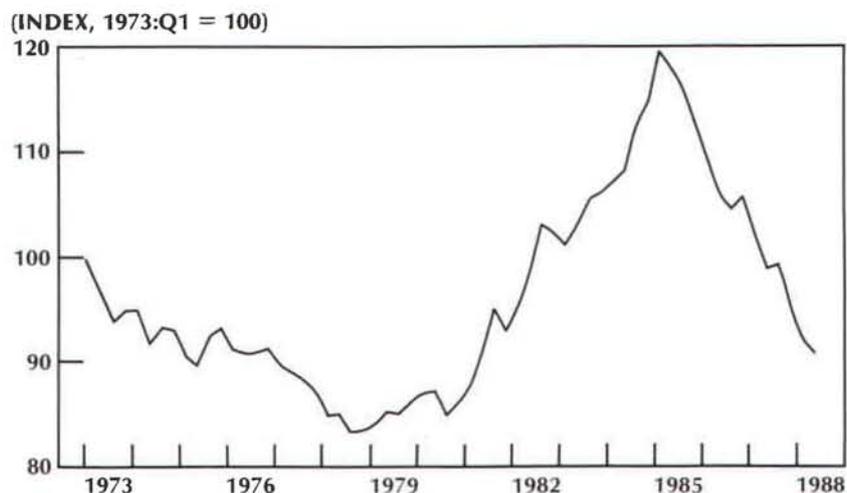
world in which the dollar does not continue to play a major reserve currency role—regardless of the net debtor investment position of the United States.

## **Reserve currency country characteristics**

It is appropriate to begin with the inherent determinants of a reserve currency, but examination of history and the present situation disallows any true "axioms" of reserve currency status. Some degree of abstraction and intractability is unavoidable, and necessary as well as sufficient conditions for reserve currency status are difficult to isolate. One can frequently think of both actual and potential exceptions to any given condition. Consequently, the following list of reserve currency country characteristics is not necessarily in order of importance. Problems arise in providing any such ordinal ranking. These characteristics are at least desirable attributes of a reserve currency country, even if one can conceive of an actual example or a hypothetical situation in which some of them either might not be necessary or would not be sufficient.<sup>1</sup>

1. *A relatively large economy.* A country with a large economy relative to its major trading partners is likely, other things equal, to have its currency emerge as a transactions

Chart 1  
**Real Trade-Weighted Value of U.S. Dollar, 1973-1988**



SOURCE: Federal Reserve Bank of Dallas.

currency, primarily because its volume of international trade is also likely to be large absolutely compared with the volumes of these trading partners. The transactions role, in turn, enhances the private and official reserve asset roles, and the official intervention role, of the currency. For example, the rise of the dollar as an international reserve currency during the 20th century has corresponded to growth in the U.S. share of world trade.

2. *A developed capital market.* It is difficult to conceive of a currency gaining a significant reserve status in today's world without the issuing country having a well-developed and relatively sophisticated financial market. Such a market fulfills trade finance and investment needs for the private sector and official intervention needs for monetary authorities. A developed capital market is also likely to generate a high volume of international capital flows, which, if denominated in the home currency, has the same consequences as a high volume of trade flows. Along with the size of the market, however, the absence of capital controls is also important. Capital must be free to flow into and out of the currency if international transactors are to use the currency on a large scale as a trade finance or investment medium.

3. *A low inflation rate.* If a currency is to gain and retain status as a store of value internationally, a relatively low domestic inflation rate is essential. Higher inflation leads to exchange rate depreciation and losses on assets denominated in the currency; it may also lead to more variation in

both the domestic price level and the exchange rate because higher inflation rates generally exhibit more volatility. Holders then not only face expected declines in the value of their assets but also must live with greater uncertainty about the expected values.

4. *A stable macroeconomic environment.* Other aspects of the macroeconomy can be important in addition to the inflation rate. A record of positive and steady economic growth is essential over the longer term. This macroeconomic stability requires sound underlying economic policies, including basic monetary and fiscal policies. In particular, monetary authorities must have the confidence of the international financial community, and chronic fiscal imbalances are undesirable.

5. *A relatively small external sector.* When a reserve-center country has some degree of insulation from external economic developments, other countries are more likely to alter their policies in adjustment to the domestic economy than vice versa. This characteristic toward unilateral adjustment develops more naturally if the country is able to maintain some independence from external constraints, and it tends to be associated with the size characteristic.

A related aspect is that the reserve-center country has automatic financing available for the overall payments deficits it necessarily must incur because the rest of the world demands assets denominated in its currency. The country has the privilege of creating the world's money, conceptually

ally corresponding to any monetary authority being able to create domestically held money. Just as for the domestic case, however, this privilege can be misused. Forcing excess international liquidity on the rest of the world, as would occur in the case of fixed exchange rates when the reserve-center country's currency comes under downward pressure, leads to world inflationary tendencies.

It is, of course, possible to conceive of a small, open economy that serves as virtually nothing but a bank—in effect, as an intermediary that accepts other currencies and issues its own. It is difficult to conceive of such a country achieving major reserve currency status, however.

6. *A current account surplus.* Characteristic 5 alludes to the necessity that a reserve-center country be able to incur a secular deficit in its balance of payments in order to increase world liquidity—an aspect that can be abused if the deficit is too large. What is true of the balance of *payments* does not necessarily apply to the balance of *trade* or the current account, however. In fact, a more desirable configuration in the balance of payments accounts is a surplus on the current account (an inflow), counterbalanced by a larger long-term capital outflow that then allows some inflow on the short-term capital account of the balance of payments. If world use of the reserve-center liquidity is to expand, capital outflows must exceed the desired current account surplus. International liquidity can therefore be augmented, but secular current account deficits that ultimately erode the international investment position of the country do not occur.

7. *A net creditor country.* Discussion of secular deficits or surpluses on the current account of the balance of payments brings us to the desired net investment position of the country. Ultimately, if a country is to continue to finance its balance of payments by obligations denominated in its own currency, it is undesirable for that country to be a large and growing net debtor to the rest of the world. Some time may pass before a net debtor country sees its role as a reserve currency country erode, but it is conceivable that eventually this characteristic may come into play. (See the Appendix.)

8. *A relatively large volume of short-term public debt.* These considerations bring us back to the depth of domestic capital markets. Developed capital markets are likely to be accompanied by a deep market in government debt; nevertheless, this aspect is somewhat different. Here we have another aspect that may seem contradictory at first and that may be abused if taken too far. There is certainly no requirement that a reserve currency country run continual government deficits financed by borrowing, but the existence of a substantial outstanding *stock* of short-term gov-

ernment debt traditionally has provided the least risky and the most liquid of financial markets to the international community.

9. *World political leadership, military strength, and the legal system.* Noneconomic aspects can be important also. They may be correlated with economic factors but deserve independent attention. Attainment of reserve currency status has been related historically to a major role in world affairs and active pursuit of foreign policy goals. An active foreign policy may not result in world currency status, but achievement of such a status without some substantial role in world affairs is more difficult to imagine.<sup>2</sup>

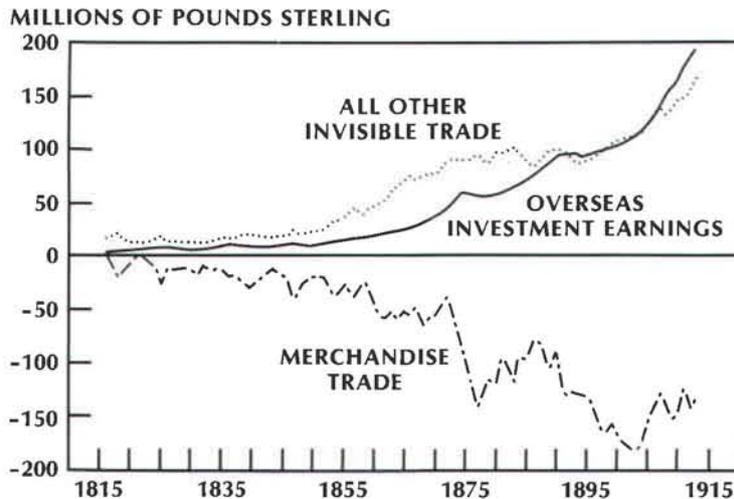
Military presence can be so closely related to a world political role that some may think it does not deserve separate mention in this context, but the two are separable. An international role for a country's currency may just as likely derive from world economic strength and leadership as from a strong national defense, but in historical instances military might has been at least highly correlated with reserve currency status. Even in the present decade, "safe-haven" arguments relatable to this aspect have been set forth to explain currency strength.

Historically, of course, a strong military establishment has often been related to the development of a colonial empire or a trading network, which carried with it cultural and language ties as well as financial and other linkages. Language, financial, and other connections may remain even after military dominance has subsided.

The safe-haven aspect transcends national security and also includes the legal system. Secure property rights can be important for financial, as well as real, investment in a country or its possessions. These also influence the development of a dominant currency. In the final analysis, legal aspects are likely to be at least as important as the military strength of the nation that stands behind a currency.

10. *Recognizability of the currency unit as a medium of exchange.* As a final item in a list that could be longer, it is useful to note an aspect crucial to all media of exchange, domestic or international, even if the point may seem implicit or trivial. As with several of the above characteristics, perhaps, it is difficult to distinguish between a necessary precondition to the evolution of a reserve currency and a result of reserve currency status, but this aspect nevertheless seems worth mentioning as an attribute of world money. The currency—in the literal sense of the word, rather than financial instruments denominated in it—is likely to be recognizable and passable as a medium of exchange outside home-country borders. One cannot help invoking the currency substitution literature to support this point.<sup>3</sup>

Chart 2  
**Current Account Components  
 for United Kingdom, 1816-1913**



SOURCE: B. R. Mitchell, with the collaboration of Phyllis Deane, *Abstract of British Historical Statistics* (Cambridge: Cambridge University Press, 1962; reprinted as Department of Applied Economics Monograph no. 17, 1976)

In today's world, the U.S. dollar continues to be the predominant foreign currency circulated abroad, throughout most of the world. This dominance over other international moneys is surface evidence of the dollar's transactions and vehicle role. It is hard to imagine any other currency playing quite so predominant a role in this sense in today's world, despite gyrations in the dollar's value.

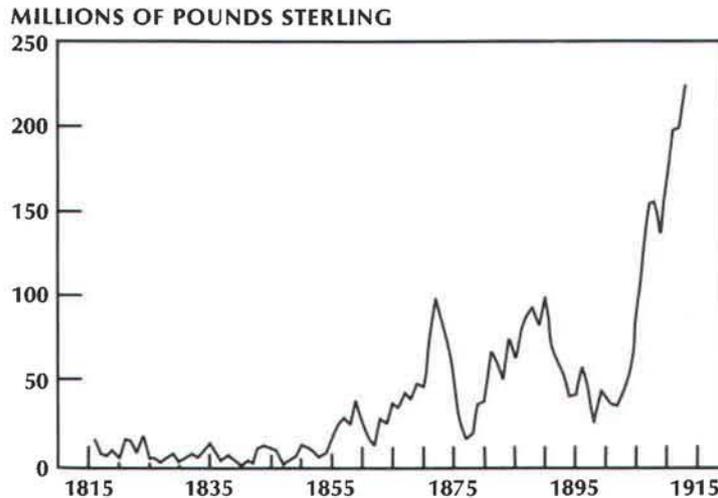
**International use of national moneys:  
 a brief historical review**

The use of one entity's money by a foreign economy or group of economies has a varied tradition, long predating the development of financial systems. The emergence of truly international money has corresponded historically to establishment of some form of international monetary order and trading system. The Florentine fiorino was succeeded by the Venetian ducato in Mediterranean trade of the 16th century, followed by the Dutch florin. International currency status was validated during these times when other European states actually began to imitate the coinage. Perhaps the best example of international money during the early years of American colonization was the Spanish reale, which circulated throughout much of the Western world for the better part of three centuries.

By far the most important pre-20th-century world currency was the British pound sterling under the classical gold standard of the 19th century. Although gold and other precious metals as money *per se* are not the subject of this analysis, it has been argued that the classical gold standard was actually a pound standard based on gold. The pound remained an important international currency well into the 20th century, but its zenith was from the late 19th century until World War I. The pound had the distinction of being the first currency to attain the status of international money in a world that had developed a relatively sophisticated financial structure. Even under the gold standard, moreover, some official reserves were held as sterling-denominated financial instruments rather than as specie.

Many of the above reserve currency attributes characterized the British pound during the pre-World War I period. The gold standard and ready convertibility of the currency to gold ensured world confidence in the stability of sterling. In the 19th century, world economic and monetary leadership devolved on Great Britain. This role, in turn, was related to the country's international trade and investment growth, as well as to the emergence of London as the financial center of the trading world.

Chart 3  
**Overall Current Account Balance  
of United Kingdom, 1816-1913**



SOURCE: Mitchell, with Deane, *Abstract of British Historical Statistics*.

International trade was undoubtedly important in the rise of sterling. At the beginning of the 19th century, Britain led the industrial revolution but later lost her industrial lead to other countries, such as Germany, France, and the United States. The loss of commercial leadership, however, was more than compensated for by investment leadership. It has been estimated that in the 1900-1913 period, Britain's net foreign investment (primarily long-term) was about two-fifths of total net national investment, and that by 1913 the share of foreign assets in the country's total wealth may have been as high as one-third.

It was the outflow of British capital investment that financed persistent trade deficits of less mature economies—those of the United States, Canada, Australia, Argentina, among others. Also, the willingness of other countries to leave their liquid assets on deposit in British banks meant a continuous short-term loan to England (the automatic balance of payments financing that later accrued to the United States).

An inspection of British balance of payments data during the century preceding the First World War is also instructive in light of the basic reserve currency characteristics listed above. (See Charts 2 and 3.) The trade account was always in deficit. The current account, on the other hand, was increasingly in surplus over this time.

How could a current account surplus country provide liquidity to the rest of the world? Britain was such a large

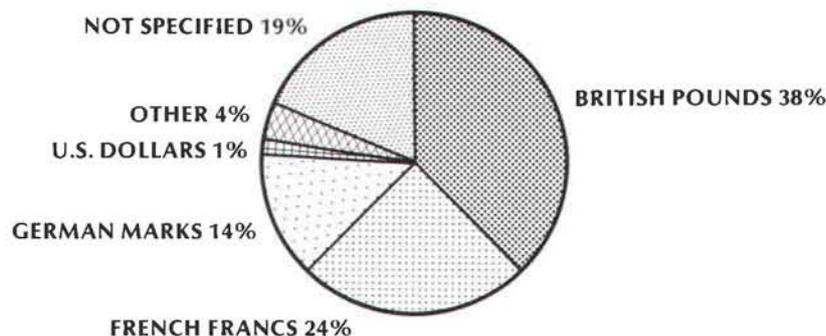
net investor on long-term capital account that this outflow still left room for short-term capital inflows into sterling. British liquid liabilities to foreigners could increase because the net long-term investment outflow more than compensated for the growing current account surplus. Evidence of the net creditor position of the country over that time is apparent in the charts. Overseas investment earnings were growing substantially during the period. Had it not been for this net investment income component and other invisible income, the current account would have been in deficit.

The huge export of capital by Great Britain for several decades before 1914 laid the foundation for a great rise in international trade during the 19th century, for the use of the British pound in third-country transactions, for the use of British capital markets in international operations, and for the expansion of the British banking system throughout the world. Also undeniable is that political and other institutional aspects played a role in the rise of sterling and throughout its period of dominance.

#### **The emergence of other currencies and sterling's decline**

The concept of a key currency was not unknown even under the gold standard, as is illustrated by the previously observed fact that at least some portion of the world's official international reserves were held not in gold but in foreign exchange during that era.<sup>4</sup>

Chart 4  
**Currency Composition of Official Foreign  
Exchange Reserves, End of 1913**  
(Computed from 1913 Dollar Amounts)



**SOURCE OF PRIMARY DATA:**  
Peter H. Lindert, *Key Currencies and Gold, 1900-1913*, Princeton Studies in International Finance no. 24 (Princeton: Princeton University, Department of Economics, International Finance Section, August 1969).

Interestingly, all of this foreign exchange was not held in sterling. In addition to Britain, both France and Germany served as major reserve centers by that time. In 1913, sterling's role may have begun to erode already, but only about 38 percent of total official foreign exchange was held as claims against Britain. Over 24 percent was held against France, and almost 14 percent against Germany.<sup>5</sup> (See Chart 4.) Evidence indicates that most of the gains on sterling by other official currency balances occurred after the turn of the century and that competition among reserve centers was more Anglo-German than Anglo-French; claims on France were predominantly official franc balances of Imperial Russia alone. But each of these reserve centers exhibited balance of payments behavior characteristic of a key currency country: they incurred overall payments deficits during the period and had a declining ratio of owned reserves to liquid foreign liabilities. This era was distinctly different from any post-gold standard world because gold parities did exist among the reserve currencies. Certain similarities to a future gold-exchange standard—and even after that, a multiple reserve-center paper money world—were nascent, however.

The decline of the British pound began irreversibly during the interwar years, as an international monetary anarchy characterized by currency blocs and substantially divergent economic conditions evolved. Attempts to restore the international gold standard failed, and the system degener-

ated into protectionism and monetary nationalism in the years leading up to the Second World War.

#### **The postwar years and the rise of the dollar**

As the 20th century progressed, the U.S. dollar gradually overtook the British pound as the world's principal reserve currency. The dollar's role was enhanced by the rise of the New York financial market earlier in the century, but its central position was cemented in the years following the Second World War. The international monetary system evolved during the 1950s and 1960s in a fashion not envisioned by the architects of the Bretton Woods Agreement of 1944. The dollar was fixed to gold and other currencies were fixed to the dollar, but increasingly the dollar took over the role of primary international reserve asset.

With the demise of the gold-exchange standard (linking the dollar to gold and other currencies to the dollar) implicit under the Bretton Woods system, the world monetary system no longer had any anchor. National fiat currencies became international money, gold became a commodity, and the world had come quite some distance from the classical gold standard prevailing at the beginning of the century.

One aspect of this historical discussion was usually present throughout, however. There was competition among various forms of international money (even in antiquity, when coinage had intrinsic value, and even under the 19th-century gold standard, when different national cur-

rencies did exist alongside gold): currencies that were identifiably different from each other tended to compete as international money. And each country on the gold standard at least had an exit capability in terms of changing its currency's gold parity or going off gold entirely. One can, therefore, discern elements of competition for the role of international money—at times subdued and at other times apparent—throughout history.

When the Bretton Woods system finally broke down in the early 1970s, the competition became somewhat more obvious. The U.S. dollar, however, still maintained its central role as the world's major reserve and transactions currency.

### **Currency composition of international liquidity: recent experience**

This brings us to a closer examination of recent trends in the currency composition of international liquidity. Such a currency breakdown is particularly interesting in today's fiat currency world because, *de facto*, there exists greater uncertainty than ever as to what international money is. The International Monetary Fund's Special Drawing Right (SDR) certainly has not fulfilled the role originally intended for it. A first cousin to the SDR as an artificial monetary unit in today's world is the European Currency Unit (ECU), the monetary reference unit of the European Monetary System, but this unit suffers many of the same handicaps as the SDR in becoming actual money. Both are really units of account only.<sup>6</sup>

As for national currencies, there has been some diversification out of the dollar since the advent of flexible exchange rates in the early 1970s. With the dollar no longer at the center of the world monetary system, some diversification would have been expected.

Only limited data are available to impute the currency composition of world money in today's environment. The discussion here focuses on official balances, but mainly because these are an isolatable component for which data are readily available. The currency composition of official foreign exchange also should reflect the private sector's preferences, to some extent at least, as central banks hold reserves partly to back international trade vehicle-currency demands.

Charts 5 and 6 indicate the share of national currencies in total identified official foreign exchange of IMF member countries, denominated in SDRs, annually from 1974 to 1986. The charts break this total into industrial countries and developing countries, according to IMF classification. Over the period depicted, encompassing the entire period of flexible exchange rates thus far, there has been a notice-

able reduction in the share of U.S. dollars. The industrial countries as a group tend to hold more dollars than the developing countries, but the greatest reduction in dollar share over this period was undertaken by the industrial countries. The industrial-country share fell from 87 percent to 71 percent, while the developing-country share dropped only from 67 percent to 60 percent.

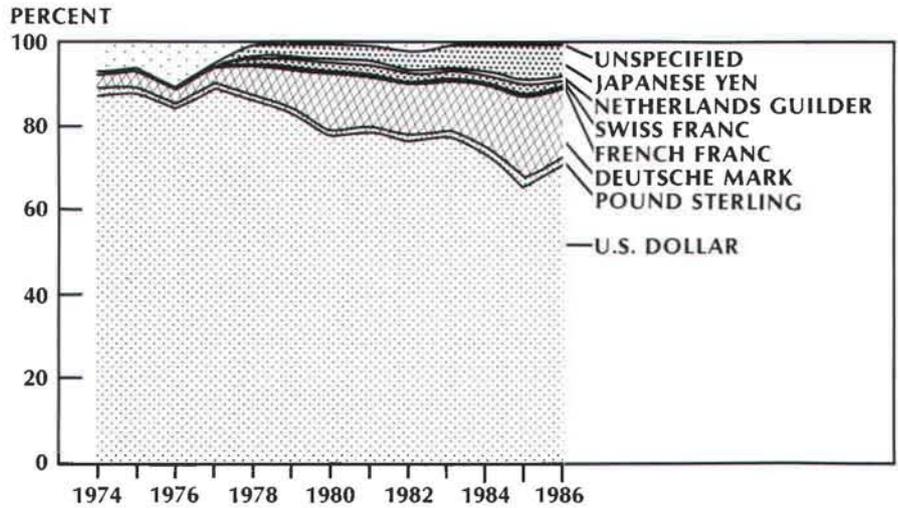
The currencies with the greatest rising shares were the German mark and the Japanese yen. The mark rose from 3 percent to 15 percent for the industrial countries, while its share of developing-country foreign exchange remained virtually unchanged. The yen still claims only a small fraction of total official foreign exchange, but its share did rise, from practically nothing at the beginning of the period to just under 8 percent for the industrial countries and 6 percent for the developing countries by the end of 1986.

The other currencies included in the charts account for very small individual proportions, and most also had relatively unchanging shares over the period. The British pound's fraction hovered between 1 percent and 2 percent for the industrial-country group, with little apparent trend. There was, however, a marked decline in the pound's share for the developing countries, from 11 percent to 4 percent. Even so, most of the pound's share today is in holdings of developing countries, mostly those with former colonial or commonwealth ties. These same kinds of linkages explain the quite small French franc component.

The Swiss franc, usually considered a hard currency alongside the German mark, has not shown a noticeable rise in its share since the advent of flexible exchange rates. At least some of this tendency can be attributed to the great reluctance of Switzerland to take on much of a reserve currency role. Indeed, inflows into the Swiss franc relative to the size of the country's monetary base make it quite difficult for the currency to play this kind of role. The same reluctance applies, of course, to most nondollar countries; the inflationary consequences would be enormous and, ironically, would erode one of the very reasons these countries' currencies are desired as a store of international value.

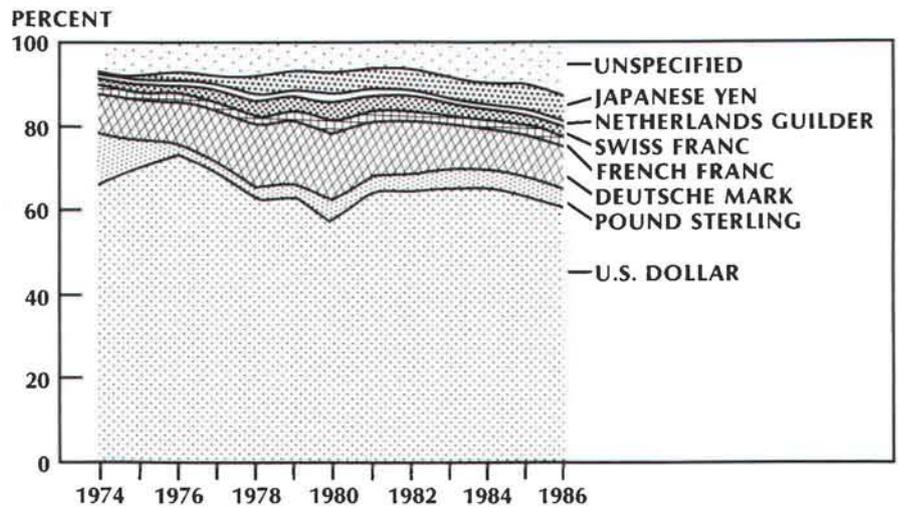
One might also consider available data on private international liquidity. Chart 7 depicts a recent currency breakdown (computed from dollar amounts) of Bank for International Settlements data on Eurocurrency deposits in its reporting area. This kind of breakdown may be particularly interesting because Eurocurrency deposits are outside the regulatory control of national authorities and might be more indicative than an official breakdown of the overall market's currency preferences. The Euromarkets provided an original channel for reserve currency diversification during the 1970s. The Eurocurrency shares turn out to be not

Chart 5  
**Currency Composition of Official Foreign  
 Exchange of Industrial Countries, 1974-1986**



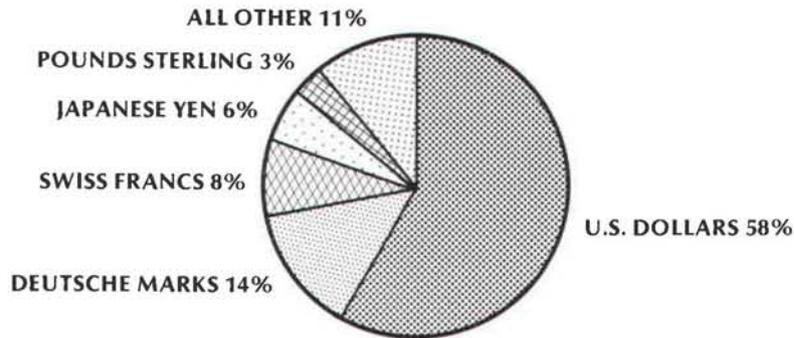
SOURCE OF PRIMARY DATA: International Monetary Fund.

Chart 6  
**Currency Composition of Official Foreign  
 Exchange of Developing Countries, 1974-1986**



SOURCE OF PRIMARY DATA: International Monetary Fund.

Chart 7  
**Currency Composition of Eurocurrency Liabilities,  
 End of 1987**  
 (Computed from 1987 Dollar Amounts)



NOTE: Non-dollar positions exclude positions in the United States and ECU-denominated liabilities.  
 SOURCE OF PRIMARY DATA: Bank for International Settlements.

much different from the total official shares, however. Only the Swiss franc is noticeably higher, which may highlight that currency's attractiveness as a private reserve currency even if it is not so much an official one. (The dollar's share at the end of 1987 had shrunk somewhat from previous years as a result of valuation effects.)

The gradual currency diversification of total official foreign exchange reserves since the mid-1970s can be divided into several periods. The dollar share of reserves remained roughly stable until about 1977, when the overall depreciation that lasted until about mid-1980 began. It was during that period of depreciation that the dollar's share fell from about 79 percent to 67 percent. Some of the currency diversification was reversed initially in the subsequent upswing, but the IMF data show that there was a decline of about 5 percent in the dollar's share from 1983 through 1986 as the deutsche mark and the yen became more important, especially for industrial countries.

In 1986, there was actually a substantial increase in official holdings of dollars, especially noticeable in Chart 5 for the industrial countries. The U.S. current account deficit of the 1980s initially was financed mostly by cutbacks in U.S. bank lending abroad and, after that, by large increases in foreign purchases of U.S. securities. More recently, foreign official intervention to support the dollar has been an important source of current account finance.<sup>7</sup> The dollars so acquired were losing value relative to industrial countries' home cur-

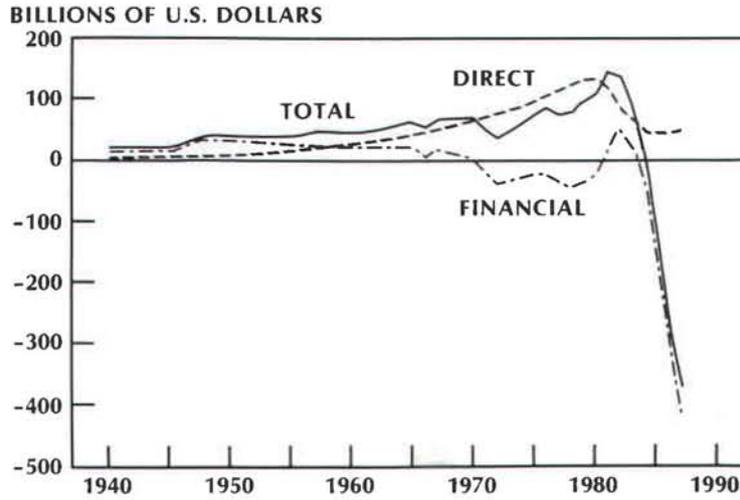
rencies. In other words, acquisition of these dollars may not have been a very good investment choice for foreign monetary authorities even if they deemed the intervention necessary to affect exchange rates in the short run. In the fourth quarter of 1987, for example, the West German Bundesbank announced a 6.6 billion deutsche mark charge against earnings, attributable to the lower value of U.S. dollar reserves.

This discussion of the currency composition of official foreign exchange should not be misinterpreted as suggesting that central banks do or should manage their currency exposures in the same fashion or with the same motives as private-sector entities. Most central bank foreign exchange portfolios cannot be managed aggressively, but central bank currency portfolio composition is likely to reflect private-sector preferences in the aggregate. It is also noteworthy that non-reserve-center institutions that are heavy borrowers of foreign exchange can more actively manage their net currency exposure by means of the currency composition of their debt structure.

#### **The international role of the dollar and U.S. net debtor status**

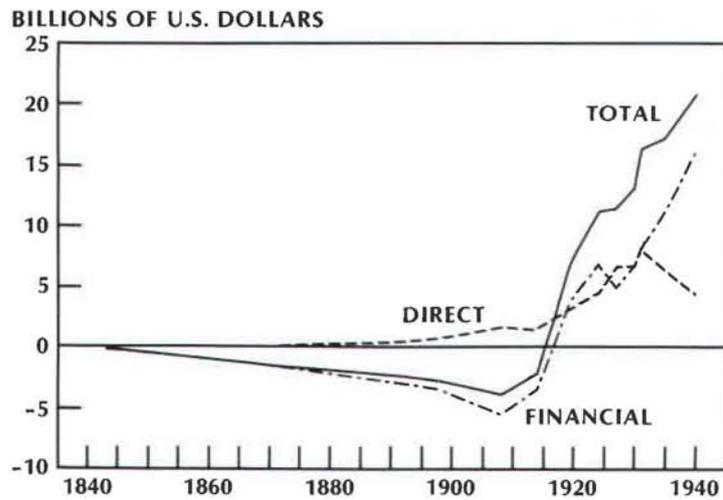
Current accounts fluctuate cyclically, and as long as imbalances are not long-lasting, there is no reason to believe they are very important. But does the net international asset position that evolves when countries do run chronic imbal-

Chart 8  
**U.S. Net Foreign Investment Position, 1940-1987**



SOURCE: U.S. Department of Commerce

Chart 9  
**U.S. Net Foreign Investment Position, 1843-1940**



SOURCE: U.S. Department of Commerce

ances really make a difference? An answer to this question hinges on several factors.

Certainly, net debtor status itself is not pejorative, especially for a non-reserve-center country. In fact, debtor countries have a game-theoretic advantage over creditors. One has only to witness the present developing-country debt situation or earlier defaults on such debt. One might argue, however, that while the non-center country can repudiate its debt, the center country can just inflate the debt away if it wishes. This point has not gone unmade in recent debates on problem developing-country debtors.

There has been considerable recent discussion of the newly achieved net debtor status of the United States (Chart 8), even though most of the discussion has not been in relation to the international role of the dollar itself. At least two major issues have been identified. First, the measurement problems are considerable, as is the case in determining any country's net international asset position.<sup>8</sup> Second, there seems to be substantial room for different points of view.

The net capital inflows in the past few years that have caused the move into net debtor status have allowed greater domestic investment and increased the U.S. capital stock, leading to greater current and future domestic production. Some analysts have pointed out that the United States has been a net debtor before—in fact, throughout the 19th century and until after the First World War. (Chart 9 depicts the net foreign investment position of the United States from early in the 19th century until the Second World War.) The capital inflows in those times financed the building of an infrastructure for a developing economy. As with all development lending, the idea was that these foreign investments would yield a high enough return and an export capacity in the future to service and repay the debt. They did.

Conceptually, in fact, if the United States continues to be a good place to invest relative to other countries, then by definition it will continue to incur current account deficits and the net debtor investment position will continue to increase. This prospect could be interpreted as a measure of U.S. strength rather than weakness.

More pessimistic observers are not so sure that the more mature U.S. economy today has the same growth potential it had a century ago, and they argue that it is inappropriate for the richest country in the world to be a net debtor to the rest of it. In the nearer term, as mentioned earlier, the net investment income component of the current account switches from an inflow to an outflow, making the adjustment more difficult than if one considers trade flows only. Finally, the foreign investment might leave, but it could not

do so suddenly except at great capital and exchange rate loss. If the foreign capital inflow does slow, as it necessarily will if the current account deficit is reduced, greater pressure is put on domestic saving to provide investment needs. Although some controversy surrounds the measurement—both in absolute terms and across countries—of national savings rates, the United States has not been a high savings rate country in recent years.

What is of most concern to some, however, is that the United States is bringing in foreign capital denominated in its own currency. Exchange rate risk is with the lender, a unique situation for this country compared with the world's other net debtors today. There could be problems if the world suddenly became less willing to hold claims on the United States, but how likely is a gradual transition?

An answer to this question is necessarily complex, but the issues are more easily understood by a historical inspection of the evolution and composition of the U.S. net external asset position. The movement into net debtor status by the United States in recent years, shown in Chart 8, is dramatic.

Decomposition of the net investment position into financial and direct investment is enlightening, because the total net position usually gets most of the attention. The United States was a net debtor in financial investment throughout the 1970s and became a net creditor only for a brief period in the early 1980s. This shift was due mainly to a surge in bank-reported claims on foreign countries that rapidly reversed itself in 1982. When looking at financial debt, then, it is misleading to state that this country has recently become a net debtor for the first time since World War I.

Turning to net direct investment, it is evident from both Charts 8 and 9 that the United States has been a net creditor in this category since early in its history and that it still remains one. Clearly, it has been deterioration in net financial investment that has driven the more frequently observed overall net investment position negative in recent years.

Even aside from the matter of currency denomination of debt, there still exists a question of whether it is appropriate for this country to be a net debtor. Were it not a reserve-center country, the United States would—presumably—still be a large, rich economy in a mature stage of development. It might be argued that such a country should incur a secular current account surplus, investing abroad in developing countries with greater growth potential. However, it is not at all obvious in today's world that non-U.S. countries hold greater growth potential and higher expected returns. There is also little to suggest that once a country reaches a certain level of development, its savings-investment balance or the related current account configuration should reverse itself. The stage of a country's development may not be as im-

portant as underlying demographic characteristics, which can alter savings rates over time.

The point can be reached that the U.S. dollar's share of the aggregate world portfolio becomes so saturated that the currency's reserve role will decline. The interesting observation at the current juncture is that the drop in the exchange rate from early 1985 to early 1988 was not sufficient to cause such decline in the dollar's reserve role. There is some evidence now, in any case, that the adjustment mechanism will help alleviate the accumulation of debt.

## Conclusion

It is very hard to argue convincingly that the net investment position of a country is a crucial determinant of reserve currency status. Today's world is not the same as when currencies were in transition previously. Differences are economic as well as geopolitical. It is also possible that the adjustment process triggered by a falling dollar will prevent U.S. net debtor status from becoming a threat to the dollar's reserve role.

It is tempting to draw analogies between the fall of sterling in the last century and what may happen to the dollar in the future and also to speculate on which currencies might be successors. Those who suggest that the alternative to the dollar today will be the Japanese yen or the German mark will have to address the unsuitability of these currencies from the standpoint of several reserve currency attributes discussed in this article.

1. For discussions on reserve currency country characteristics written earlier in the managed floating exchange rate period, see C. Fred Bergsten, *The Dilemmas of the Dollar: The Economics and Politics of United States International Monetary Policy* (New York: New York University Press for the Council on Foreign Relations, 1975); and Leroy O. Laney, "A Diminished Role for the Dollar as a Reserve Currency?" *Voice of the Federal Reserve Bank of Dallas*, December 1978, 11-23.
2. International relations specialists have taken "hegemonic" approaches to an international monetary order. Recent representative works in the area are Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 1984); and the articles by several authors in *International Regimes*, ed. Stephen D. Krasner (Ithaca: Cornell University Press, 1983). See also Robert Ayanian, "Political Risk, National Defense and the Dollar," *Economic Inquiry* 26 (April 1988): 345-51. Controversial counterarguments have been set forth by Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (New York: Random House, 1987).

3. It is not possible to include here all the most relevant citations in the explosion of this literature in the last decade, but for an overview, see the references cited in Thomas D. Willett in collaboration with Michael Bordo, Ehsan Choudhri, Douglas Joines, Leroy Laney, J. Harold McClure, Michael Melvin, Charles Pigott, and Anna Schwartz, "Currency Substitution, U.S. Money Demand, and International Interdependence," *Contemporary Policy Issues* 5 (July 1987): 76-82.
4. Lindert, accumulating data on reported official reserves of 35 countries at the end of 1913, finds that 16 percent of the reserves were held in foreign exchange rather than in metallic reserves—19 percent if silver is excluded (Peter H. Lindert, *Key Currencies and Gold, 1900-1913*, Princeton Studies in International Finance no. 24 [Princeton: Princeton University, Department of Economics, International Finance Section, August 1969]).
5. Lindert, *Key Currencies and Gold*, chap. 3 and Table 5.
6. One occasionally sees optimistic accounts of the rising role of the ECU (currently, a basket of five currencies: the U.S. dollar, the Japanese yen, the British pound, the German mark, and the French franc) as a parallel European currency. At present, however, although some official reserves are denominated in ECUs and the unit has been used increasingly as a unit of account for foreign bank loans, the ECU has a long way to go before becoming a significant transactions medium—the same problem that has plagued the SDR. For a review of recent growth of the private ECU market, see Rainer Stefano Masera, *An Increasing Role for the ECU: A Character in Search of a Script*, Princeton Essays in International Finance no. 167 (Princeton: Princeton University, Department of Economics, International Finance Section, June 1987).
7. Not all increases in foreign official reserves come from dollar-support intervention, it should be noted. Current account surplus countries can centralize funds at the monetary authority, and some intervention by industrial countries has been aimed more at realignment of their currencies with nondollar monetary units.
8. Usually, one defers to the U.S. Commerce Department's measurement of the net asset position of the United States, which is, of course, an accounting rather than an economic measure. The official estimates measure net securities holdings at market value but carry other components at book value. Distortions can occur with book-value measurement because U.S. direct investment abroad may be more seriously underestimated than foreign direct investment in the United States; the former is generally older than the latter. U.S. gold reserves included in the net investment position are also not valued at market prices, but it might be argued on the other hand that a comprehensive "mark-to-market" exercise would downgrade the value of U.S. bank loans to developing countries. Even those who argue that these measurement problems overestimate the current U.S. net debtor position do not contest the direction of movement, however. Besides, were one to cumulate unrecorded capital inflows in the statistical discrepancy item of the U.S. balance of payments, this country would probably have crossed the line into net debtor status sooner than the official figures show.

## Appendix

### Configuration of the Balance of Payments Accounts

Certain aspects referred to in characteristics 5, 6, and 7 in the text—that is, (1) the requirement that an overall deficit be common in the reserve currency country's balance of payments, (2) the desirability of a current account surplus, and (3) the desirability of being a net creditor country—can be related to each other by reference to configuration in the balance of payments accounts. To begin, we know from the balance of payments accounting identity that the sum of inflows and outflows must equal zero. If balance of payments accounts are disaggregated broadly into only three general components—current account flows ( $CA$ ), long-term capital flows, including direct and portfolio foreign investments ( $LTC$ ), and short-term capital flows, including both private and official short-term flows ( $STC$ )—these points can be illustrated.

The first characteristic simply requires that

$$(1) \quad (CA + LTC) = STC.$$
$$\left( \begin{array}{c} \text{net} \\ \text{outflow} \end{array} \right) = \left( \begin{array}{c} \text{net} \\ \text{inflow} \end{array} \right)$$

The second imposes the further constraint of a current account surplus, so that

$$(2) \quad CA + STC = LTC.$$
$$\left( \begin{array}{c} \text{net} \\ \text{inflow} \end{array} \right) + \left( \begin{array}{c} \text{net} \\ \text{inflow} \end{array} \right) = \left( \begin{array}{c} \text{net} \\ \text{outflow} \end{array} \right)$$

Finally, a secular current account surplus ensures

$$(3) \quad \sum_t^n (CA) > 0,$$

so that there is a tendency toward a net creditor position over time for the subject country.

Thus, the country is able to run a current account surplus while still performing the traditional financial intermediation function of lending long-term and borrowing short-term. Just like any other financial intermediary that provides maturity transformation as well as pure interme-

diation, the reserve-center country provides liquidity to the rest of the world.

It is necessary at this point to bring in the role of investment income, which normally appears in the services component of the current account. For this purpose, one might decompose the current account further:

$$(4) \quad CA = T + NII + S,$$

where  $T$  is net merchandise trade flows,  $NII$  is net investment income flows, and  $S$  is net flows in other services, or residual components of the current account. (Note that it is possible to incur a current account surplus even if the merchandise trade balance is negative over time.)

A net creditor position for the subject country is likely, in turn, to ensure an inflow on the net investment income account, which further reinforces the overall current account surplus. This net investment income surplus is forthcoming for at least two reasons. First, gross international assets (direct and financial) exceed gross international liabilities. The second aspect relates to the maturity structure of the international asset position. The configuration of balance of payments flows discussed above results in the country being a net long-term creditor and a net short-term debtor. To the extent that yields on longer-term direct and portfolio investments held abroad are greater than payment outflows to service shorter-term liabilities to foreigners, a net investment income inflow is further enhanced. This is likely to be the case if these short-term foreign liabilities are held predominantly in lower-yielding securities, such as usually relatively less risky obligations of the government.

Just the opposite effect can occur if the country is a net debtor. Net investment income eventually becomes negative, which adds to the current account deficit and subsequently adds further to the net debtor position. Ultimately, economic adjustment is called for by exchange rate depreciation, changes in relative national incomes, or changes in savings rates.

# Drought 1988: Farmers and the Macroeconomy

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The effect of the 1988 drought on U.S. agriculture has been severe, but the effect on the nation's economy as a whole and on inflation will probably be modest. Although some analysts predict a slowdown in the U.S. economy because of the drought, the more likely consequences are small short-lived increases in the consumer price index and small compositional shifts in total income and wealth. For uninsured farmers and ill-prepared ranchers in the drought areas, however, the consequences of the drought are severe.

Despite the frequency with which different parts of the country undergo dry spells, drought is somehow regarded as unexpected. In parts of Texas, for example, past experience suggests that farmers and ranchers should expect at least one dry year in five, interspersed with major once-a-decade droughts. Farming and ranching professionals cannot predict the onset of drought, but they can prepare for it. Drought is part of the risk calculus of their business.

Although media attention to the current drought began in early June, this drought, like all real ones, began much earlier. In some areas, the 1988 drought is a continuation of the 1987 drought.<sup>1</sup> There seems to be no firm definition of when a dry spell turns into a drought, but the memorable droughts in U.S. agriculture are measured in years. For example, the Trans-Pecos region of Texas had continuous drought from 1951 to 1956.<sup>2</sup>

Only when a drought represents a new era of persistently higher agricultural commodity prices does it pose a long-run problem for the economy in terms of a higher consumer price index (CPI). If corn prices were to double in 1988 and stay at the new level, the cumulative effects would be to make the CPI about 0.9 percent higher than otherwise. Less dramatic scenarios drop the peak impact that a temporary upward movement in corn prices would have on CPI to less than 0.5 percent.

The other consequences of the current drought for the national economy are likely to be small because the drought creates both winners and losers. The drought will redistribute income and wealth. Farmers and ranchers not in the drought zones, producers with irrigated operations, and those with grain inventories will be made better off by the drought. In the drought areas, farmers without irrigation capability and ranchers depending on forage for animal feed are those whose businesses will be hurt.

## **Drought: measures, incidence, and mechanics**

The Palmer Drought Severity Index (PI) is the most widely recognized measure of drought. It is a long-term measure of moisture conditions, and the accompanying map shows

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*The author extends thanks to John Rosine and Nicholas A. Walraven for corrections and comments and to William T. Long III for econometric counsel.*

the PI for July 30, 1988. If the drought ends in the fall, then this map likely provides an accurate picture of the drought near its peak because the PI changes slowly. According to the PI, much of the country was undergoing some degree of drought as of late July. "Extreme" is the PI adjective for the most intense drought, and the 1988 drought had reached that stage in the Upper Great Plains, in the Pacific States, and in some areas of the Southeast. The weather pattern is unpredictable, with central Nebraska having more rainfall than normal while neighboring Iowa was hit with extreme drought.

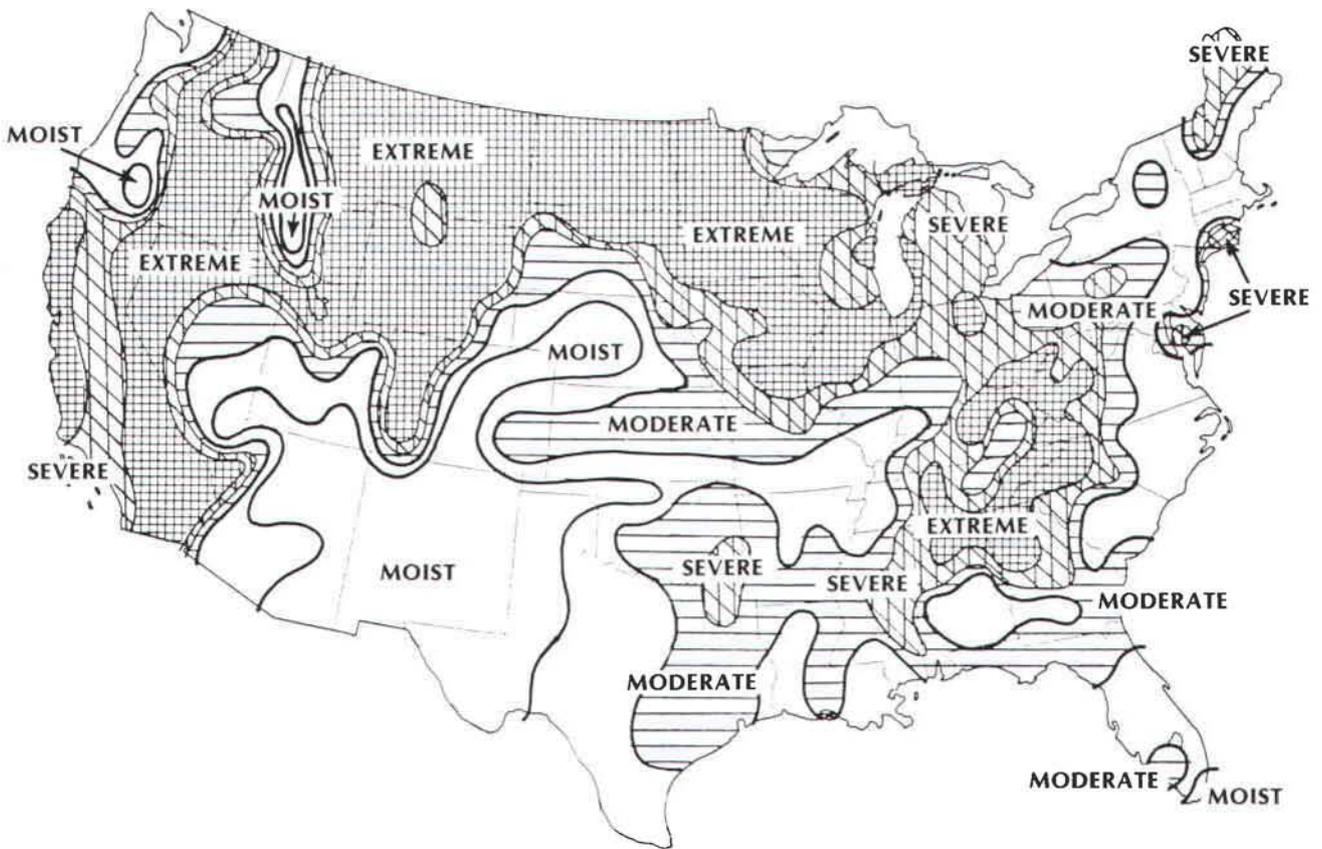
Both the livestock sector and the crop sector of the agricultural economy are affected by this drought. Corn is the major crop in trouble. There are also heavy losses in some areas to the spring wheat crop and other grains and to the

soybean crop as well. One August estimate is that U.S. corn production in 1988 will fall 37 percent from 1987.<sup>3</sup>

Of all livestock operations, range-fed cattle enterprises are most affected by the drought. As the quality of the forage deteriorates, the economics of this type of ranching often dictates that the operator without deep financial pockets sell his breeding herd because buying supplemental or, in some cases, complete replacement feed produces heavy economic losses.

The market mechanics of a typical drought can be described as follows. In early stages, the drought news is picked up by commodity traders and futures prices respond rapidly (Chart 1), Southern Hemisphere producers raise their planting intentions, spot prices move up because of forward

**Palmer Drought Severity Index**  
(As of July 30, 1988)



SOURCE: National Oceanic and Atmospheric Administration/U.S. Department of Agriculture Joint Agricultural Weather Facility.

Chart 1  
**Corn Futures**

DOLLARS PER BUSHEL, DECEMBER 1988



SOURCE: Chicago Board of Trade.

purchases by firms and countries, and the expected crop yields fall in the drought area. (According to some observers, Southern Hemisphere producers are already responding to the 1988 drought by boosting planting intentions as much as 10 percent.<sup>4</sup>) Later in 1988, the smaller U.S. crop is harvested, but spot prices may hold steady because most of the information about the drought and its effects on prices have been factored into purchasing decisions. Price declines could even occur as crops are moved rapidly into markets. In our winter of 1988-89 and into the following spring, Southern Hemisphere crops come onto the market and prices fall. In 1989, with normal weather, crop production in the United States rises, and the drought price premium is eliminated.

### Drought and the general economy

For the general economy, drought also has implications. There are price, income, and distributional effects. Some forecasters have lowered their predictions of U.S. economic growth because of the drought, but such judgments appear to overestimate the drought's consequences.<sup>5</sup>

Any effects of the drought show up on both production and income sides of the national income and product accounts (NIPA). The direct effect of drought-reduced agricultural production on real GNP (inflation-adjusted gross national product) is very small. On the product side of the

accounts, the value added by the farm sector is about 2.2 percent of GNP.<sup>6</sup> Given estimates of individual-crop production declines by the U.S. Department of Agriculture (USDA), total agricultural output is likely to fall almost 8 percent.<sup>7</sup> That would mean a GNP decrease of about 0.17 percentage point.<sup>8</sup>

On the income side of the NIPA, to balance the small decline on the product side, farmers' cash income will likely increase because of the drought, but such an increase would be more than offset by a decline in consumer income.<sup>9</sup> The demand for agricultural products is inelastic, so total farm revenue from commodity sales rises when quantity supplied falls (the increase in price is more than the fall in output).<sup>10</sup>

Consumer income declines as the increase in prices of raw agricultural commodities is translated into higher food prices. Late-June estimates are that food prices may go up 6 to 7 percent in 1989, instead of the initial estimates of 4 to 5 percent.<sup>11</sup> With the higher prices, consumers will attempt to substitute cheaper items for more expensive ones in their food purchases, but the effect of higher grain prices on food items is so pervasive that these substitutions should be minor. Food demand is both income-inelastic and price-inelastic, so food purchases in total should not decline much with the higher prices. Given integrated world markets for agricultural commodities, world prices for grains and foodstuffs are likely to rise because of the effects of the U.S. drought, thereby eliminating the possibility that lower-priced food imports could help hold down U.S. consumer food bills.

With about 65 million families in the United States each spending, on average, about \$100 a week for food, a 2-percentage-point increase in food prices means a loss of \$6.7 billion in purchasing power for that group.<sup>12</sup> In contrast, a \$10.4 billion estimate can be derived by taking 2 percent of the estimated \$520.7 billion food component of personal consumption expenditures from the NIPA.<sup>13</sup> Consumers have the choice of dipping into savings to fund the higher cost of food or cutting back on other household purchases or some combination of both.

If savings in the economy were to fall significantly because of higher food costs, then interest rates would move higher. If the consumers fund higher food bills completely from savings, then 1988 gross private savings could fall as much as 1.5 percent.<sup>14</sup> Assuming a unitary elastic response by interest rates to a shift in the domestic supply of loanable funds, a federal funds rate of 7.5 percent would increase to 7.6 percent. Such a minute change in interest rates is unlikely to have any detectable effect on the economy's performance.

Alternatively, consumers faced with \$10 billion in higher food costs could elect to reduce purchases of other goods and services. That would mean a compositional shift in the personal consumption expenditures category of the NIPA—into food and out of durables, nonfood goods, and services. As a worst-case example, if consumers completely offset increases in food costs by reducing purchases of durable goods, then expenditures on durables would fall 2.6 percent.<sup>15</sup> Consequently, if consumers were to offset higher food costs completely by restricting purchases from a narrow category of goods and services, then there could be some noticeable effects in those industries. Overall, though, personal consumption expenditures are a \$3 trillion category, so redistribution of \$10 billion among the components is not likely to have much effect.

### **Drought and the redistribution of income and wealth**

The drought will redistribute income and wealth among farmers, grain holders, consumers, and the U.S. Government. First, and most obviously, the drought will cause the heaviest losses to self-insured farmers growing nonirrigated spring crops that are drought-intolerant in areas of extreme drought. Good examples are Iowa farmers who grow rain-fed corn, a plant with high water needs. In contrast, winter wheat producers in many areas were helped by the drought because it provided ideal harvesting weather. Farmers who irrigate, although facing higher water costs and problems with heat-stressed crops, should benefit handsomely from higher commodity prices. Other beneficiaries of the drought include cattle ranchers who manage to come through the drought with their herds intact because they have effective drought contingency plans or their operations are outside drought areas. Later in the year when the drought-induced sell-off of cattle herds comes to an end, these operators will benefit from the higher prices caused by reduced beef supplies.

The run-up in commodity prices is adding wealth, at least on paper, to those holding inventories of the drought-affected crops. For example, the government-owned corn in inventory at the end of the 1987 marketing year last August totaled 1.4 billion bushels, while corn stocks in private hands at the same time reached 3.4 billion bushels. For comparison, normal U.S. corn production is about 7 billion to 8 billion bushels a year. The grain still in inventory is revalued at current prices, although this grain would not command such prices if all of it were released on the market at once. In addition, farmers who market their crops year-round, rather than dumping the crops during harvest, will benefit from higher prices.

Although new legislation to assist drought-distressed farmers was signed into law August 11, 1988, the U.S. Government could still spend less money on agricultural programs in 1988-89 than was anticipated in the fall of 1987. One quirk of the farm income support section of the 1985 farm law is its premise that the cause of low farm incomes is overproduction and low prices. The income support function of that farm law, in effect, grinds to a halt when low production accompanied by relatively high prices is the cause of depressed farm incomes. Some estimates are that planned outlays of the U.S. Department of Agriculture could be \$2 billion to \$10 billion less over the two fiscal years 1988-89 because of the drought.<sup>16</sup> The cost of the new drought-aid measure is expected to total \$3.9 billion.<sup>17</sup> If the reduction in outlays for regular farm income support during 1988-89 is closer to \$10 billion, then the drought, on net, will have lowered government expenditures on agriculture over this period.

### **Crop insurance and government intervention**

Agriculture has long been known as an especially risky enterprise when compared with most other lines of commerce. Part of the Federal Government's subsidies to agriculture have come in the form of multiple-peril crop insurance. Private markets, without government assistance, do not provide meaningful crop insurance coverage because a single event can trigger enormous claims.<sup>18</sup> The Federal Crop Insurance Corporation (FCIC), a government agency, subsidizes premiums, operating and administrative costs, and losses (which arise when premium income falls short of indemnities). If the crop insurance premiums accurately reflect the risks involved, then FCIC subsidies of the premiums by 30 to 65 percent automatically make crop insurance a good deal in the long run for the farmer.

For 1988, insurers estimate that 65 million to 70 million acres will be under some form of crop insurance, or only one-fourth to one-third of the acres planted to the major crops.<sup>19</sup> Self-insurance may well pay off in the short run, but it cannot match the performance of subsidized crop insurance in the long run. With indemnity levels up to 75 percent, full insurance coverage by farmers would have made the drought a nonstory for crop agriculture.

Despite the existence of subsidized insurance, many farmers elect to self-insure. Undoubtedly, part of the reluctance to buy even subsidized crop insurance is due to the U.S. Government's record of regularly providing additional income support or low-cost loans when there is a widespread downturn in farmers' economic fortunes.

### **Drought and the increase in the CPI**

Food is a component of the CPI. Increases in food prices will show up in the CPI, which is the most widely reported

inflation rate statistic. The rise in food prices will have a short-run effect on inflation, but like any one-time change in relative prices, there should be no real long-term inflationary effects.

To examine the short-run consequences, a simple and crude econometric model was used to estimate the effect of corn prices on the CPI. Corn was used because many drought-affected states are in the Corn Belt and corn has received much of the action in futures markets. Once the model was estimated, various drought scenarios were evaluated, using different corn price paths from May 1988 through October 1989. Chart 2 shows indexed values of corn prices and the CPI from 1960 through the first part of 1988. Although the two series hardly move in tandem, their simple contemporaneous coefficient is 0.71.

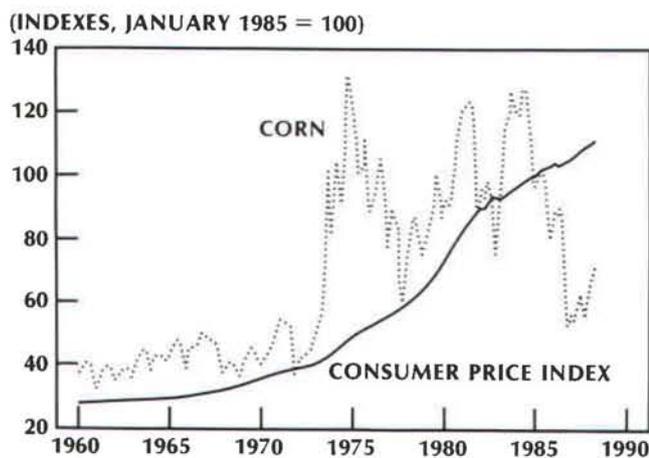
To begin with, the model posits that the CPI is a function only of lagged values of itself and lagged values of corn prices:

$$CPI_t = f(CPI_{t-i}, P_{c,t-j}),$$

where

- $CPI_t$  = consumer price index in period  $t$ ,
- $P_{c,t-j}$  = U.S. price of corn in period  $t - j$ , and
- $i, j$  = the number of lags determined by pretesting.

Chart 2  
**Movement of Corn Prices and the CPI**



SOURCES OF PRIMARY DATA: U.S. Bureau of Labor Statistics  
U.S. Department of Agriculture.

While expectations would make corn prices respond quickly to the drought, it was assumed that the adjustment of CPI to higher corn prices would be affected by past values of corn price in addition to current values because of the time delay in manufacturing food products and producing livestock. Further, to control the momentum in the CPI time series, lagged values of CPI were added to the model. The model was estimated using monthly data from January 1954 through April 1988.

### Econometric results

The data for CPI and corn price were drawn from CITIBASE, the Citibank economic database. The adjustments made to the data and the techniques used to estimate the model are briefly described in the Appendix. The results from the estimation are reported in Table 1.

The coefficient estimates show that the effect of lagged corn prices on CPI peaks early, then tails off. Corn price is significant at the 5-percent level at lags 2 and 5. The coefficients for lags 3 and 4 of both CPI and corn price are negative, which is unexpected, but those negative estimates are statistically insignificant and generally quite close to zero in size. Consequently, lags 3 and 4 were dropped from the final regression.

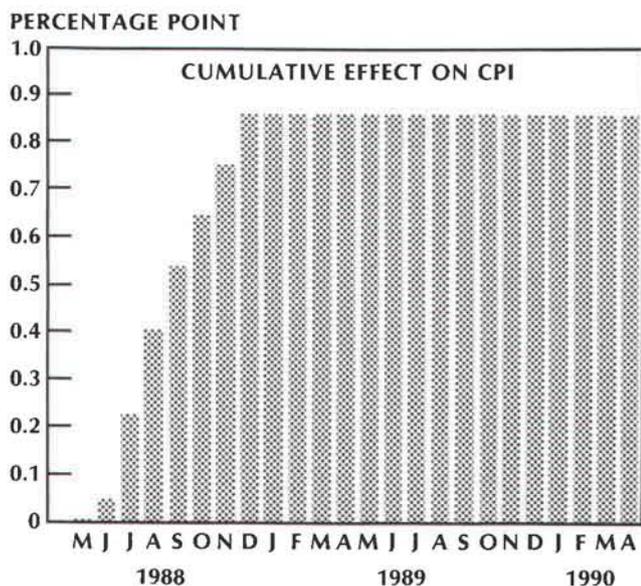
Table 1  
**CPI ESTIMATION RESULTS**

	Coefficient	t statistic
Intercept.....	.00036*	2.10
CPI for lag period		
t-1 .....	.26286*	5.42
t-2 .....	.23545*	4.88
t-5 .....	.10579*	2.16
t-6 .....	.06980	1.37
t-7 .....	.00991	0.19
t-8 .....	.03187	0.62
t-9 .....	.14709*	2.93
t-10 .....	.04354	0.89
Corn price		
for lag period		
t-1 .....	.00180	0.85
t-2 .....	.00505*	2.41
t-5 .....	.00411*	2.03
$\bar{R}^2 = .60$ ; $F$ statistic = 56.173.		

\* Significant at the 5-percent level.

Chart 3

### Scenario 1: Corn prices double



Interpretation of the individual coefficients is unwieldy: the parameter estimates are the change in the growth rate of the CPI for a 1-percentage-point change in the growth rate of corn prices. The simulations in the next section will link a series of percentage changes together to get the cumulative effect on the CPI for a particular series of corn price changes.

#### Simulation of the drought's effects on CPI

The effects on the CPI of different corn price time paths can be simulated. Three scenarios were devised to try to cover the span of likely outcomes. Corn prices double and stay at that level throughout the time horizon of the model in the first scenario. This action mimics a time during the early 1970s when drought and export demand suddenly pushed up corn prices. With the economic conditions of the 1980s, this scenario is unlikely to repeat itself, but it does outline what could be the "worst-case" results. In detail, corn prices were calculated to double over three months beginning with May 1988, then remain steady thereafter. The results are plotted in Chart 3. The effect on the CPI of the three-month rise in corn prices peaks in December 1988, with the CPI about 0.9 percent higher than it would have been without the drought.

Scenario 2 has corn prices doubling in the first three months, but then there is an eight-month period of steady corn prices, followed by a seven-month decline in corn prices to the predrought level. The logic behind this scenario is that the market processes the information about the likely effects of the drought during the first three months; after that and until Southern Hemisphere production is known, prices would remain relatively stable. In the spring of 1989, information on U.S. planting intentions and foreign production would be readily available. The drought price premium, given average weather, would be slowly squeezed out over the summer months and into the fall as the likely supplies of corn and other crops are confirmed.

Chart 4 shows Scenario 2. As with Scenario 1, the drought effect on the CPI peaks in December 1988, with the CPI about 0.9 percent higher than it otherwise would have been. By 1990, however, all but about 0.1 percent of that increase in CPI has been dissipated. Even this residual is just an artifact of price movements before May 1988 that were captured by the model's lag structure. In essence, all the effects of corn price movements have been completely netted out of the CPI by March 1990.

Scenario 3 incorporates a relatively modest 50-percent increase in corn prices from May 1988 through harvest in

Chart 4

### Scenario 2: Corn prices double, then slowly fall

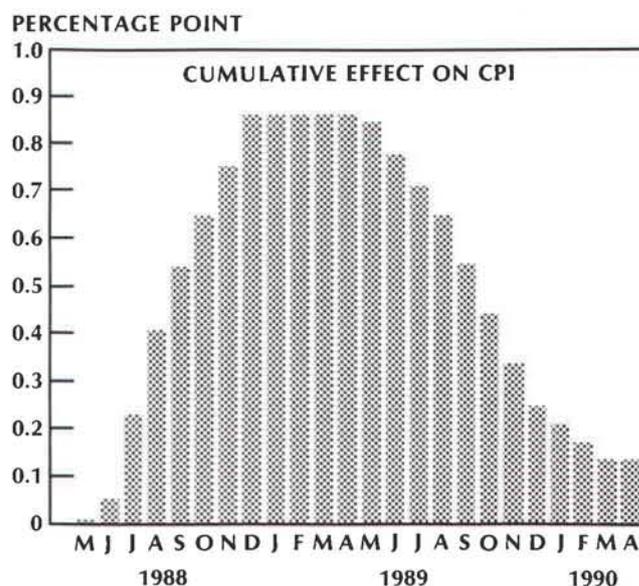
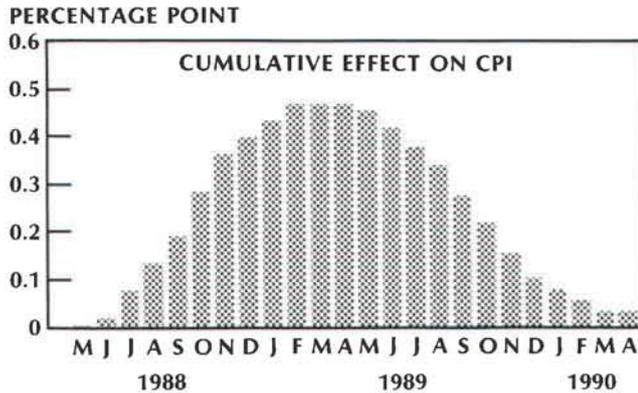


Chart 5

**Scenario 3:  
Corn prices slowly rise, then slowly fall**



September 1988. In this scenario the real effects of the drought reveal themselves slowly over the summer. From October 1988 until April 1989, corn prices are assumed to remain steady, awaiting developments in Southern Hemisphere corn-producing countries. This scenario assumes that prices begin to fall after new production reaches markets. Again, the drought price premium is expected to be squeezed out by October 1989. Chart 5 shows the response of CPI to this scenario: the maximum cumulative effect on CPI occurs in February 1989, with a total rise of about 0.5 percent; the net effect of corn price movements dies out in March 1990, with a residual close to zero.

**Summary**

The 1988 drought is having multiple effects on the economy, from basic rain-fed agriculture to river-borne transport. Smaller agricultural production will lower GNP by 0.17 percentage point. Other effects are compositional income changes and relative price changes.

Consumers, some self-insured farmers, and some livestock operators without contingency plans are facing drought-imposed income losses. Other agriculturalists, such as farmers who irrigate or those who have grain stocks, stand to gain by the drought. Consumers may well reduce purchases of nonfood goods and services but not by enough to influence the overall economy.

Only in the case where a drought represents a new era of persistently higher agricultural commodity prices does the drought pose a long-run problem in terms of a higher CPI. In the instance where corn prices doubled and stayed

at the new level, the cumulative effects are to make the CPI about 0.9 percent higher than otherwise. The more likely scenario showed that a 50-percent increase in corn prices, followed by a decline to the predrought level, would have a temporary effect of making the CPI about 0.5 percent higher than otherwise for several months in 1989.

1. "Less rain has fallen in North Dakota during the last nine months [September 1987 to May 1988] than in any nine-month period since the 1930s" (Bill Peterson, "Crops Endangered as Drought Sweeps Across Much of Nation," *Washington Post*, 9 June 1988, sec. A).
2. Data provided by George Bomar, a meteorologist with the Texas state government.
3. U.S. Department of Agriculture, National Agricultural Statistics Service, *Crop Production*, Report no. CrPr 2-2 (8-88), 11 August 1988.
4. Sue Shellenbarger, "U.S. Recovery in Farm Trade Is Endangered," *Wall Street Journal*, 24 June 1988, Southwest edition, sec. 1.
5. Lawrence Chimerine, Nariman Behraves, and John Hagens, "Executive Summary," in Wharton Econometric Forecasting Associates, *U.S. Economic Outlook, 1988-90*, July 1988.
6. U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, April 1988.
7. Based on share of total agricultural cash receipts from 1983 to 1986, the crop categories most affected by the drought—food grains, feed crops, and oilseeds, such as soybeans and sunflowers—are about 28 percent of agricultural output. On August 11, 1988, the USDA estimated that production would decline 14 percent for wheat, 37 percent for corn, and 23 percent for soybeans. Applying these percentages to the broader crop categories yields a high estimate of 7.6 percent for the total output decline in 1988 caused by the drought. (Sources of primary data: *Crop Production*, 11 August 1988; and U.S. Department of Agriculture, Economic Research Service, *Economic Indicators of the Farm Sector: National Financial Summary, 1986*, Report no. ECIFS 6-2, December 1987.)
8. Similar estimates have been made by others. For example, the U.S. Government's Drought Policy Committee estimated, as of July 15, 1988, that the effect of the drought would make GNP about 0.2 percentage point smaller.
9. See *Economic Indicators of the Farm Sector: National Financial Summary, 1986*, for a discussion of cash income and other measures of farm income.
10. "The demand for most agricultural commodities is price inelastic—certainly in the short run and often in the long run as well" (William G. Tomek and Kenneth L. Robinson, *Agricultural Product Prices*, 2d ed. [Ithaca, N.Y.: Cornell University Press, 1981], 69).
11. Chimerine, Behraves, and Hagens, "Executive Summary."
12. Scott Kilman and Richard Gibson, "The Grain Drain: Killing Drought Raises Food Prices, Portends Worsening of Inflation," *Wall Street Journal*, 14 June 1988, Southwest edition, sec. 1; U.S. Bureau of the Census, *Statistical Abstract of the United States: 1988* (Washington, D.C., 1987).

13. This number is the first-quarter figure at an annual rate (*Survey of Current Business*, April 1988).
  14. The estimate is derived by using the \$10.4 billion estimate of higher food costs and a 1987 estimate of \$672.6 billion for gross private savings (source of primary data: *Survey of Current Business*, April 1988).
  15. This estimate is based on a first-quarter estimate of an annual rate of \$396.2 billion for durable goods (*Survey of Current Business*, April 1988).
  16. Bruce Ingersoll, "Budget Savings from Drought Could Be High," *Wall Street Journal*, 8 July 1988, Southwest edition, sec. 1.
  17. Bruce Ingersoll and Scott Kilman, "U.S. Forecasts a 37% Plunge in Corn Harvest: Soybean Output to Decline 23%, Squeezing Supply; Relief Measure Is Signed," *Wall Street Journal*, 12 August 1988, Southwest edition, sec. 1.
  18. Insuring farmers against crop failure violates the tenet of independence of events that underlies insurance. For example, houses are insurable for perils that strike individually and randomly but not for perils that strike collectively and regularly. Thus, along the seashore, fire insurance for houses is available and cheap, but private flood insurance is not offered.
  19. American Association of Crop Insurers, "Record Number of Farmers Insure in 1988," News Release, 27 June 1988.
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## Appendix

### The Effect of Corn Prices on CPI: Data Adjustments and Model Estimation

There are several problems in attempting to regress CPI on corn price. The first is that neither series is stationary in the mean or in the variance, which is confirmed visually by Chart 2. To deal with nonstationarity, the data were transformed by taking the first differences of the logarithms of each series, thereby putting each series in terms of percentage changes. Second, the autoregressive nature of CPI must be treated. With much of the variation in current CPI likely explained by variation in past CPI, lagged values of CPI were included on the right-hand side of the regression.

In pretesting, regressions of the CPI on past values of the CPI were conducted to determine the appropriate number of lagged CPI values. Lags of the CPI variable were added one at a time to the right-hand side of the regression until the adjusted  $R^2$  declined. This decline occurred after lag 10; therefore, the number of CPI lags was set at 10. Starting with the 10-lag CPI model, lags of corn price were added one at a time. The adjusted  $R^2$  for the model peaked with

lags 5 and 6 of corn price, and in the interest of parsimony, the specification with five corn price lags was selected.

Coefficients on lags 3 and 4 of the CPI and corn price variables were negative and insignificant in the pretests. It is improbable that past values of the CPI and corn prices have negative effects on current values of CPI, so these lagged terms were eliminated and the final model was estimated without them.

To check the validity of including lagged corn prices as separate regressors, the joint significance of the lagged corn price coefficients was tested. The corn price coefficients for lags 1 through 5, which include the negative coefficients for lags 3 and 4, were found to be jointly significant at the 5-percent level. Further, corn price lags 1, 2, and 5 were likewise found to be jointly significant at the 5-percent level in the final model, which dropped lags with negative coefficients.