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ECONOMICS COMMENTATOR

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AGRICULTURE OUTCOMES AND MONETARY POLICY ACTIONS: KISSIN' COUSINS?

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President Clinton recently signed legislation providing additional capital for the agricultural sector. This action has again been the basis for considerable discussion concerning the differences in the performance of the general economy and the performance of the agricultural sector. This article is the first of three articles dealing with Federal monetary policy actions and the resultant outcome on agriculture and was paraphrased from the original article published as a recent research paper released from the St. Louis Federal Reserve Bank. Readers are encouraged to read the complete article, "Agriculture Outcomes and Monetary Policy Actions: Kissin' Cousins?" by Kevin L. Kliesen and William Poole, REVIEW, MAY/JUNE 2000 Vol. 82, No. 3.

MONETARY POLICY ACTIONS AND AGRICULTURE OUTCOMES

The topic of the impact of monetary policy on agriculture is one that is often debated but equally as often misunderstood. The misunderstanding arises because too few realize that most of what goes on in agriculture has nothing to do with monetary policy. Monetary policy involves the process by which policymakers manage the amount of money and credit they create for the economy. However, the fundamental forces that shape the agricultural industry—forces that determine the behavior of prices and output—are a consequence of non-monetary conditions. Nevertheless, monetary policymakers are called upon periodically to influence outcomes in the farm sector through "easier" monetary conditions. In fact, altering monetary policy from its primary objective of achieving price stability will only make agricultural conditions more difficult.

The chief focus of this article is on the supply and demand conditions in agriculture. This first article contains an analysis of recent trends in farm incomes

and why farm incomes will always be volatility. The second article in this series will discuss the particular conditions of supply and demand in agricultural markets. An analysis of outcomes for price and output can be achieved by combining the analysis of supply and demand conditions. For illustrative purposes, the agricultural sector is compared and contrasted with computer manufacturing, another industry characterized by rapid productivity growth and falling prices.

Income Volatility in Agriculture

The United States is currently in the midst of a record-breaking business expansion: 112 months and counting as of July 2000. Nearly as remarkable, the current expansion follows on the heels of the 92-month-long expansion in 1982-90, and is more than twice as long as the average of all post-World War II business expansions. These two expansions were separated by one of the mildest recessions in U.S. history. Since 1982, the output of U.S. final goods and services—or real GDP—has nearly doubled, growing at an average annual rate of almost 3.75 percent per year. By contrast, real GDP grew at about 2.25 percent per year from 1972 to 1982, a period wracked by two severe economic downturns and high and rising inflation. This period preceded the "financial crisis" situation in the agricultural sector that is still referenced today.

Economists will argue that a case can be made that improved monetary policy has played an important role, though certainly not the only role, in achieving this long period of sustained economic growth at a healthy pace. If the Federal Reserve had not concentrated its efforts on controlling inflation, the rate of consumer price index (CPI) inflation could not have declined from more than 13 percent in 1980 to 2.7 percent over the 12 months ending December 1999. This is true regardless of whatever else might have been going on. By sharply reducing the rate of price inflation and establishing firm expectations in the marketplace that inflation would remain low, monetary policy has contributed to higher productivity growth and enhanced the economy's stability. In general, the current business expansion has bestowed numerous benefits for virtually every demographic group in the United States¹. Still, we know

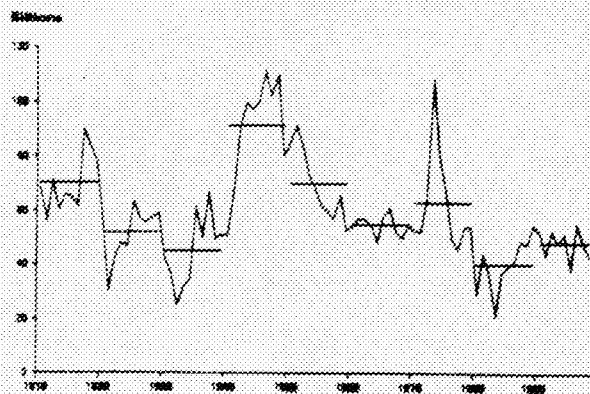
¹ Poole, William and Howard J. Wall. "Price Stability and the Rising Tide: How Low Inflation Lifts All Ships," *The Regional Economist*, Federal Reserve Bank of St. Louis (January 2000), pp. 5-9.

that some members of our society have been left behind. Many of those in farming and ranching will respond to these words by thinking, "Yes, many of us in agriculture have been left behind."

Indeed, the last couple of years have been rough for U.S. agriculture, but agriculture always has been a risky and uncertain business. In ancient times, farmers suffered from droughts and locusts. Today, farmers still suffer from droughts and locusts. In addition, ancient farmers suffered not only from natural hazards but also from market disruptions brought on by war, the edicts of emperors, and other man-made problems. When viewed in this context, it is not surprising that income volatility is an prevalent characteristic of farming.

This characteristic is illustrated nicely by changes in farm incomes during the 1990s. After rising to a 21-year high of \$54.9 billion in 1996, real, or inflation-adjusted, net farm income subsequently fell 13 percent in 1997 and roughly another 10.5-percent in 1998. Although the final numbers are not yet available, the latest projections from the U.S. Department of Agriculture (USDA) suggest that some improvement occurred in 1999. This improvement will most likely be attributed entirely to a nearly \$11 billion jump in government income transfers to farmers. For a longer-term perspective (Figure 1), consider that real net farm income averaged \$47.7 billion between 1990 and 1998, roughly 20 percent more than the \$39.8 billion annual average seen during the 1980s.

Figure 1. Real Net Farm Income, 1910-1988.



Note: Nominal net farm income measure from U.S. Department of Agriculture deflated by the GDP price deflator (1996=100). Horizontal lines indicate decade averages.

By comparison, the early 1990s, then, were not so bad. However, farm income during those years pales next to the \$62.6 billion average real net farm income during the 1970s. The tumultuous 1970s, frankly, were an unusual decade. Some of agriculture's good fortune for that period was purchased at the cost of severe problems in the 1980s. Although farm incomes during the 1970s rose rather sharply for a few years, this surge was the result of several unsustainable factors, such as the United States allowing the Soviets to enter the U.S. market to buy every bushel of corn, wheat, and soybeans they could. But by 1980, against the backdrop

of high and rising inflation, high and rising interest rates and a depreciating dollar, real farm income had plummeted. Just three years later, it plunged another 27 percent to \$21 billion. By 1983, real net farm income was down more than 80 percent from where it had been just a decade earlier and even lower than the \$25-billion low point reached during the depths of the Depression in 1932.

Many specific factors which account for sharp swings in farm income have been well chronicled in the literature and will be discussed below in the context of changes in supply and demand over time.² Rising farm incomes during the 1970s, which were boosted largely by a sharp rise in exports, helped to fuel an outbreak of speculative behavior by farmers, ranchers, and investors to counter the corrosive effects of high and rising inflation. As the real price of U.S. farmland soared, so did farm debt. The resulting financial imbalances that built up during the 1970s, not surprisingly, were unsustainable.

Because farming is an inherently risky business, swings in farm incomes over time can be, have been, and probably will continue to be, quite dramatic. The question that many are asking in light of the recent legislative financial assistance for the agricultural sector is, "Is there something inherently unstable in agricultural production—that is, beyond normal variations in weather or, perhaps, macro-policy mistakes—that contributes to these swings in farm incomes over time?" The answer, to be blunt, is no. The basic characteristics of agricultural product markets that contribute to trends in farm incomes over time are readily explainable within the context of an analysis that looks at the basics of supply and demand conditions, the interaction of which determines prices and quantities of agricultural products.

Supply Conditions in Agriculture

In terms of sheer producing power per unit of input, American agriculture ranks as an unqualified success. Indeed, for 100 years or more, U.S. agriculture has been characterized by fantastic productivity advances. During the past 75 years, the number of acres harvested for corn grain has declined by 16 percent while production has increased five-fold. The number of cattle and calves peaked at around 132 million in 1975. Since then, the cattle inventory has dropped by about a quarter while meat production has increased 11.5 percent.

In the aggregate, the amount of output produced by each farmer, including farm employees, has risen from almost \$2,300 in 1910 to roughly \$35,600 in 1998—or a little more than 3 percent a year.³ (These

² Belongia, Michael T. "The Farm Sector in the 1980s: Sudden Collapse or Steady Downturn?" *Review* (November 1986), pp. 17-25.

³ Real farm output series calculated at the Federal Reserve Bank of St. Louis using previously published BEA data. The denominator in the farm output per worker series is the Average Number of Farm Workers on Farms, and was obtained from the National Agricultural Statistics Service (NASS).

figures, including the real net farm income measure cited earlier, are in constant dollars, with a base year of 1956.) Much of this increase has occurred since 1973, a period when productivity in the non-farm sector began to slow dramatically. From 1973 to 1998, the amount of farm output per worker rose at an average annual rate of nearly 5 percent per year. In contrast, the productivity growth in the non-farm business sector during this period measured 1.5 percent a year.

Given that agriculture has been able to increase production with fewer farmers and ranchers is testament to the tremendous benefits gleaned from technological innovations. The advent of genetically modified organisms in many crops, which follows the advances in genetic improvements applied to livestock production, promises both increased production and reduced reliance on pesticides. Likewise, the use of satellite technology to better apportion fertilizer and other soil nutrients, combined with the increased usage of low-till farming, offers the promise of increased production with reduced chemical fertilizer applications. Some of these technological innovations are controversial. But these controversies are a whole other subject. What needs to be emphasized is that productivity improvement in agriculture is a great American triumph, and understanding it is essential to understanding the basics of agricultural markets.

A useful way to summarize this discussion is to envision the usual upward-sloping supply curve with a big arrow on it, pointing to the right, to indicate that the entire supply curve is shifting out rapidly over time as productivity improvements accumulate. But since supply bounces around from year to year depending on growing conditions—the droughts and the locusts—it also is necessary to envision a couple of dashed supply curves parallel to the solid one.

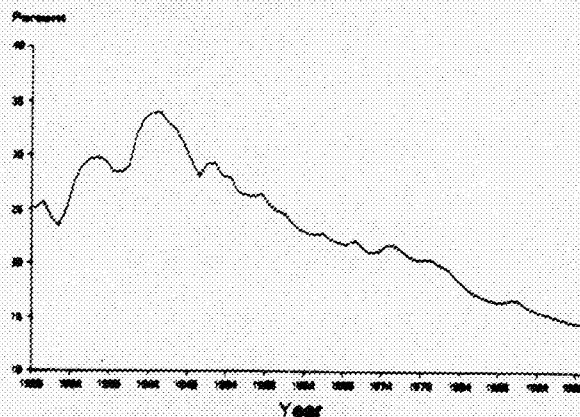
Demand Conditions in Agriculture

The demand for agricultural products, like other “normal” goods, of course, slopes down. For our purposes, though, the relevant questions are how steep is it and how does it move over time?

Let’s start with the movement over time. The demand for food rises as the population rises and as the average income of consumers rises. The effect of rising income has been understood for a long time. The demand for food products increases proportionately with population, but increases more slowly than does per-capita income. For example, if per-capita income rises by 3 percent in real terms, the percentage increase in demand for food products would be considerably less—perhaps only 1 percent. Thus, expenditures on farm commodities decline relative to the economy as a whole.

Figure 2 shows U.S. food expenditures as a share of total expenditures from 1929 to 1999.⁴ During the Depression years, and extending into World War II, when per-capita real income growth was relatively weak, consumption of food as a share of total expenditures rose from about 25 percent to nearly 35 percent. But as real income growth picked up after World War II, expenditures on food as a share of total consumption expenditures fell, reaching about 14 percent in 1999.

Figure 2. Food Expenditures as a Share of Total Consumer Expenditures



Note: See footnote 4.

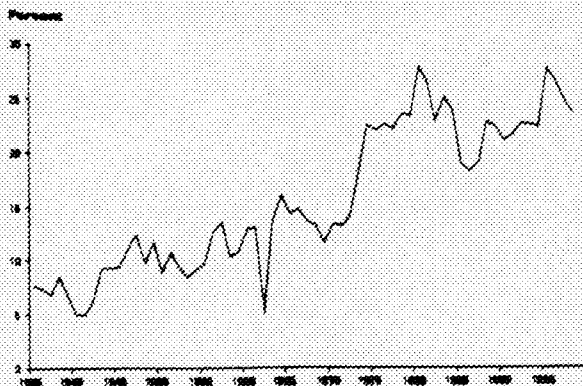
The market for U.S. agricultural production is not, of course, limited to U.S. consumers. The United States, by virtue of its abundant natural resources and plentiful supply of capital, enjoys a distinct comparative advantage in agriculture production relative to most other countries. Given the limited upside to boosting the domestic demand for farm products, one way to increase sales of U.S. farm products is to make them available to consumers in other parts of the world. And, in fact, the share of U.S. farm production that is exported has steadily trended up over time. From 1935 to 1954, U.S. farm exports averaged 8.5 percent of total farm output. This share reached a high of 28 percent in 1980 and has averaged roughly 25 percent since 1988 (see Figure 3). As important as exports are to U.S. producers, world demand for U.S. farm output is unlikely to grow rapidly. Moreover, as the recent Asian crisis showed, unexpected demand disturbances from foreign markets are a fact of life. It is probably true, then, that export demand—welcome though it certainly is—is more volatile than domestic demand.

What about the shape of the demand curve for food? Consumers in most high-income countries, don’t consume very much more food when its price declines—or, equivalently, very much less when its price increases. (See Figure 3.) Agricultural demand conditions can be

⁴ At the present time, the Bureau of Economic Analysis had yet to release its revised NIPA measures back to 1929; the data are only available from 1959 to 1999. Accordingly, the calculated food expenditure share is based on the unrevised data. However, the food expenditure share for 1959 is equivalent for both revised and unrevised data, which suggests that data revisions will have little, if any, effect on the calculated share.

summarized this way: The demand curve for agricultural products is quite steep, shifts out only gradually over time, and is somewhat volatile because export demand is volatile. The demand curve, in other words, is pretty steep—inelastic, in economists' lingo

Figure 3. U.S. Farm Exports as a Share of Farm Output



Source: U.S. Department of Agriculture.

In following articles in this series, this discussion of supply and demand conditions within the agricultural sector is combined into an analysis of the volatility of agricultural output and prices. From this analysis, a discussion of the role of monetary policy is examined.

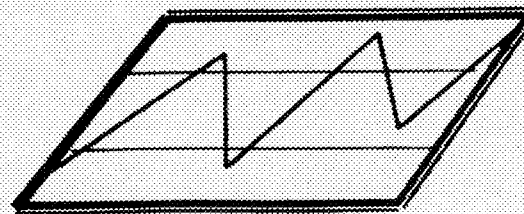
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