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# Recent Macroeconomic Dynamics and Agriculture in Historical Perspective

David Orden

This article explores the similarities, differences, and implications from the 1970s–1980s experience for the macroeconomic dynamic that may arise from the 2008 price spike and subsequent recession. Role of monetary policy (deviations from Taylor rule) is assessed. This is an argument that has not been too prominent in public discourse about causes of the financial crisis or the policies undertaken to restore stability to financial markets and avoid an even deeper downturn than occurred. The “misery index” is compared across the past and recent macroeconomic events. Effects on agriculture of exchange rates are reviewed, effects dependent on currency values and interest rates that can change quickly and in unexpected ways.

*Key Words:* monetary policy, exchange rates, macroeconomic effects on agriculture

**JEL Classifications:** E52, F41, Q18

The commodity price spike that peaked in the first half of 2008 raised the specter of high farm product prices not felt since the early 1970s, and the recession of 2007–2009 has proven to be the worst global downturn since the Great Depression. One line of reasoning is that monetary policies played a central role in each of these periods. The comparison is inflationary financing of the Vietnam War (leading to breakdown of fixed exchange rates) and subsequent expansionary monetary policy designed to soften the mid-1970s recession having a parallel in loose monetary policy to ease the post-9/11 downturn setting the stage for an excessive boom and the depth of the current recession. This is an interesting but imperfect parallel. We

know from history that the 1970s policies, although perhaps easing that recession, also postponed part of the pain, which was then incurred in a dynamic of macroeconomic instability (stagflation, recession) that played out over more than a decade. Are we in for another long period of macroeconomic instability and if so, will monetary policy be central to it?

Although making macroeconomic forecasts is fraught with uncertainty, this article explores the implications that can be drawn from the earlier experience for the macroeconomic dynamic that may play out from today’s recession and the implications of this dynamic for agriculture. These two episodes, one of which was, and one of which is likely to be, a defining set of macroeconomic events for a generation, have both similarities (for example, the previous monetary story) and important differences (for example, differences in oil sector shocks) that may affect how the macroeconomic dynamics evolve in the 2010s.

The article is organized as follows. Section 1 reviews the arguments that emerged in the

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1970s and early 1980s about macroeconomic effects on agriculture, particularly monetary policy felt through the exchange rate. A review of these arguments, and of the econometric evidence developed about these effects, were the topic of a paper I presented at the 2002 SAEA annual meeting (Orden, 2002). Further econometric evidence along these lines is developed in the Baek and Koo (2010) and Saghainan papers in this session, whereas this article is more qualitatively descriptive. Section 2 of the article briefly reviews one main tenant of macroeconomic analysis since the late 1980s—the Taylor (2008) rule that has replaced the earlier Friedman (1953) rule as a proposed steady-growth anchor for monetary policy. The third section returns to the issue of exchange rate effects on agriculture, reviewing two recent studies and the concern about sustainability of large U.S. current account deficits. A few concluding observations are made about what may come next in macroeconomic dynamics and agriculture. I can only characterize these as casual (but directed) prompts to discussion.

### If the Schuh Fits

When the U.S. abandoned the Bretton Woods agreement on relative fixity of exchange rates in 1971, a new era of international capital mobility was launched and the rules of the game for macroeconomic interdependence among nations were altered. Twenty years earlier, Milton Friedman had argued in his classic article “The Case for Flexible Exchange Rates” that open markets for currencies were the least disruptive mechanism for managing adjustments to changes affecting international payments. That view seemed finally to have come into its time. Yet looking back from a vantage point 35 years after the U.S. gave up its fixed exchange rate, the economic turmoil that followed the initial devaluation and subsequent floating the dollar against other major currencies was not anticipated. The turmoil included, for the U.S., substantial inflation through the 1970s, then movements in the real exchange rate—sequential appreciation followed by depreciation during the 1980s—in excess of 40% over periods of several years’ duration. Forty

percent is a significant realignment in relative prices and several years is long enough to force economic adjustments.

Within agriculture, the “new macroeconomics” of the world economy has had substantial implications. Nominal agricultural prices skyrocketed along with other primary commodity prices early in the 1970s with inflationary monetary policies and dollar flexibility at least partly responsible. International capital flows expanded after two decades of slow growth. The U.S. trade deficit turned increasingly negative, but agricultural exports, in particular exports through commercial channels, not foreign aid, rose strongly through the 1970s. By the late 1970s, agricultural exports were up, but real agricultural prices and net farm income were down. Things got much worse when the dollar began to appreciate beginning in 1980. Exports fell by nearly one-third in value by 1985 and, with high interest rates, land prices could not be sustained. In the ensuing farm financial crisis, supply control interventions and farm program fiscal costs were driven to record levels.

A view that emerged from this period of turbulence was that macroeconomic policy effects on agriculture, particularly effects delivered through the exchange rate, can swamp those of agricultural policy. The classic modern article on exchange rate impacts on agriculture in the U.S. was written by G. Edward Schuh (1974) and published in the *American Journal of Agricultural Economics* in February 1974. Schuh made the fundamental argument that the exchange rate was an omitted variable in economic analysis of the U.S. farm sector, and he drew sweeping implications. Throughout the 1950s, the “farm problem” had been described as one of technical change that induced a shift in production toward land-augmenting intermediate and capital inputs, lowered the real prices at which agricultural products could be procured, and put severe adjustment pressure on the farm sector, particularly farm labor. Agricultural policy interventions of the time (high support prices and land retirements) were perceived to overvalue agricultural resources relative to free markets, leading to welfare costs. A paradox was a country with an advanced agriculture being dependent on export

subsidization instead of being competitive in world markets.

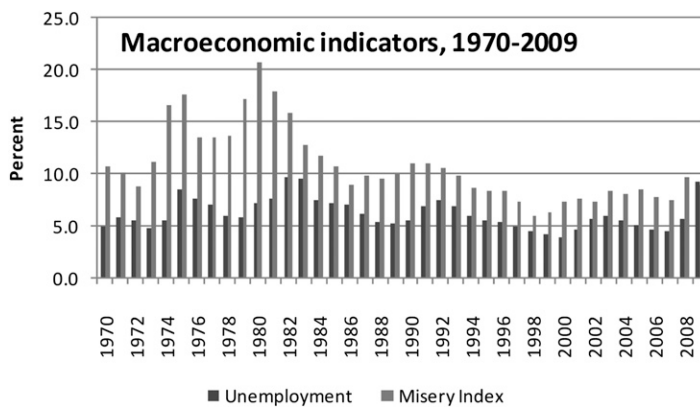
Schuh argued for a new interpretation of these developments: the U.S. dollar had become overvalued in the early 1950s and overvaluation had depressed agricultural prices and exports. This had led to a socially inefficient *undervaluation* of agricultural resources; it had induced even more technical change, thus aggravating what would have been in any case a serious problem of structural adjustment; and it had resulted in a larger share of the benefits of technical change going to consumers rather than producers. In this interpretation, farm policies had served to offset negative exchange rate impacts on the farm production sector. When those farm policies started to shift in the 1960s toward letting prices fall and compensating farmers with direct cash payments instead of high price supports, prices fell toward the disequilibrium levels associated with exchange rate overvaluation.

In Schuh's view, devaluation in the 1970s restored the dollar to a more nearly equilibrium value and, as a consequence, agriculture experienced a macroeconomic-led boom. As he put it: "If this interpretation is correct, an important share of the rise in agricultural prices in mid-1973 is a result of monetary phenomena which induced an export boom in an economy that was already responding to expansive monetary policies, and in the case of agriculture, increased the foreign demand for U.S. output at the same time that this demand was already

rising from temporary bad weather conditions in other countries and a temporary decline in the Peruvian fishmeal industry" (p. 12).

As stated in the previous summary lines, Schuh persistently tied his assessment of exchange rate effects on agriculture closely to monetary policy effects on the exchange rate. By the early 1970s, expansionary monetary policy resulting from seeking "guns and butter" in the late 1960s without raising corresponding tax revenue made it infeasible to maintain the fixed dollar exchange rate. Devaluing the dollar and then letting it float against major currencies induced a monetary-driven boom in commodity prices. When a supply-side oil shock added further upward pressure to commodity prices and threatened a slowdown in the economy, a response of further monetary expansion to accommodate the supply shock created further inflationary pressure. Whereas the traditional expectation was that inflation resulting from monetary expansion would dampen unemployment, in this case, both rose simultaneously. A new term, "stagflation," entered macroeconomic discussion and a new measure arose in public discourse. The "misery index" was a simple sum of the unemployment rate and the inflation rate. Hardly a theoretical construct, the misery index nonetheless captured the new dynamic not of an inflation/unemployment trade-off, but of a cascading of undesirable outcomes.

The unemployment rate and misery index are shown in Figure 1 for the period 1970–2009. These are indicators of performance of



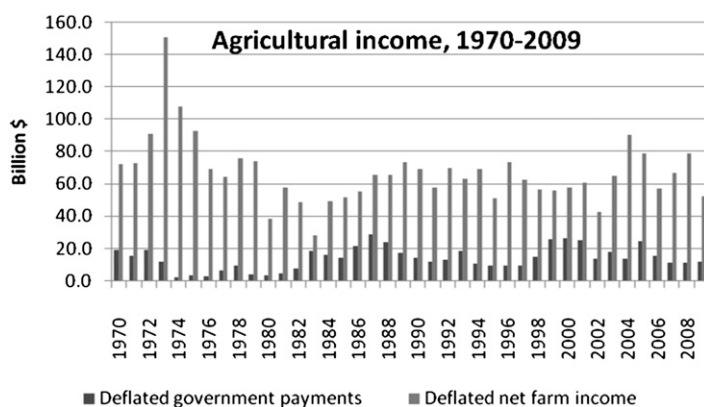
**Figure 1.** Macroeconomic Indicators, 1970–2009

the economy in terms of what can plausibly be considered the two fundamental objectives of macroeconomic policy: achieving price stability and maintaining full employment. The years 1973–1985 are an evident rough time in relation to these objectives and can be called the stagflation period in which both of these rates and their sum were persistently higher than they had previously been or have been subsequently. Unemployment remained above 5% and the misery index remained above 10% for 13 years. Peaks of misery (index over 15%) occur in 1974–1975 and 1979–1982. Looking in more detail, inflation and unemployment rise simultaneously in 1974 after a sharp oil-price shock. During 1975, unemployment rises but inflation falls and from 1976–1979, unemployment falls. Inflation jumps up in 1979, with a second oil shock, and in 1980, inflation and unemployment again both rise.

How did agriculture fare during the stagflation period? Two basic indicators are shown in Figure 2. The level of (deflated) net farm income is a basic performance measure. The amount of that income coming from direct government payments is a key indicator of the agricultural policy stance. Net farm income jumps in 1973 to what in retrospect remains an outlier of its highest value over the 40 years. Net farm income is still well above its early 1970s level in 1974 and 1975; the 1973–1975 period is the boom Schuh attributed in part to expansionary monetary policy. Then net farm income comes down from its peak during the

next 2 years of relative macroeconomic misery, nor is farm sector performance measured by net farm income particularly strong in the midyears of the stagflation period. The latter part of the stagflation period is associated with the tight post-1979 monetary policy designed to bring down the rate of inflation, which drops from 13% in 1979 to just 2% in 1986. The consequences of this monetary policy are severe for agriculture: net farm income drops sharply from over \$70 billion in 1979 and remains below that level for the next 9 years. The collapse sets the stage for payments to farmers becoming much larger as a share of net income in the mid-1980s.

Not surprisingly, attention in agricultural economics turned to assessing the effects of macroeconomic instability on agriculture during the stagflation period. The earliest attempts to evaluate Schuh's argument empirically were conducted in a partial equilibrium spatial modeling framework. This work focused on assessing the elasticities of price transmission and of supply and demand that affected trade of agricultural products. The assessments seemed able to attribute only a small part of the substantial relative price movements in the early 1970s to the exchange rate—results consistent with Schuh's long-run equilibrium claim but not supportive of the exchange rate being as significant an omitted variable as he described, at least when it came to the inflationary farm sector boom that was occurring. Partial equilibrium spatial modeling subsequently gave way



**Figure 2.** Agricultural Income, 1970–2009

to computable general equilibrium models—models that offered a more complete linkage of real exchange rate movements to underlying causes, accounted for market equilibrium for multiple traded and nontraded goods, and provided somewhat more support for real exchange rate effects on agriculture.

On another level, the attempt to understand exchange rate impacts on agriculture became redirected, like macroeconomics itself, by the turbulence in the world economy. Exchange rates did not settle down to an equilibrium devaluation approximately 10–15% during the 1970s, and macroeconomic policies seemed to be spinning out of control compared with the relative stability of the preceding period. This brought attention to Schuh's broader claim about the importance of monetary policy for agriculture. Did loose monetary policy cause flexible prices (like those for agricultural products) to overshoot their long-run equilibrium levels rising relative to more slowly adjusting (sticky) prices in other sectors? Did this account for the price boom in agriculture that Schuh had identified with the exchange rate? Later, when inflation was being squeezed out of the U.S. economy and the dollar appreciated in the 1980s, did tight monetary policy cause real agricultural prices to fall?

The argument that monetary policy has non-neutral effects on agricultural prices is hardly a new one (such effects had been argued forcefully by George Warren [1928] during the 1920s). With newly floating exchange rates after 1973, this nonneutrality argument was given renewed impetus by an influential model of Rudiger Dornbusch (1976). In the Dornbusch model, monetary expansions that lower domestic interest rates cause exchange rate overshooting so that subsequent appreciation maintains arbitrage conditions equating returns on domestic and foreign assets. Several research efforts provided a basis for assessing these effects on exchange rates, and by extension on flexible agricultural prices, in traditional macroeconomic econometric models; among them were Hughes and Penson (1985) and Rausser et al. (1986). The latter authors used results from such a model to argue that deflationary monetary policy had "taxed" agriculture significantly in the early 1980s.

Yet a third approach to empirical modeling adopted the methods of time-series analysis to seek causal relationships and dynamic impacts from monetary indicators to agriculture in small dynamic models without too many a priori restrictions. These models provided an alternative to overidentified structures imposed either by traditional Keynesians or by the new neoclassical rational expectations school. Early work on empirical modeling of monetary effects on agriculture by Bessler (1984), Chambers (1984), and myself (for example, Orden and Fackler, 1989), among others, adopted this approach. This was followed later by such papers as Dorfman and Lastrapes (1996), and Saghaian, Reed, and Marchant (2002), which brought additional developments in identifying time-series models to bear on measurement of relative price effects. Dorfman and Lastrapes (1996) imposed the theory-derived long-run restriction of monetary neutrality to identify policy shocks and used Bayesian techniques to investigate sensitivity of their results to various aspects of model specification. Their identifying restriction ensured that the price level, sectoral prices, and money rose equiproportionately in the long run. They found plausible short-run monetary policy impacts on interest rates, output, and the price level. Again, monetary shocks raised real agricultural prices in the short run but explained only a small fraction of crop and livestock relative price variability. Saghaian, Reed, and Marchant (2002) developed a Dornbusch type of model that explicitly incorporated a flex-price as well as sticky-price sector. Their theoretical results showed that overshooting in the flex-price sector dampens exchange rate overshooting. In their empirical analysis, agricultural commodity prices and industrial prices overshoot their long-run equilibrium in relation to the money supply with agricultural prices again rising relative to industrial prices in the short run.

### **Tayloring a New Suit**

As shown in Figure 1, macroeconomic performance from the mid-1980s through the late 2000s is more stable than during the stagflation period. Some macroeconomists have dubbed this period the "great moderation." One can see

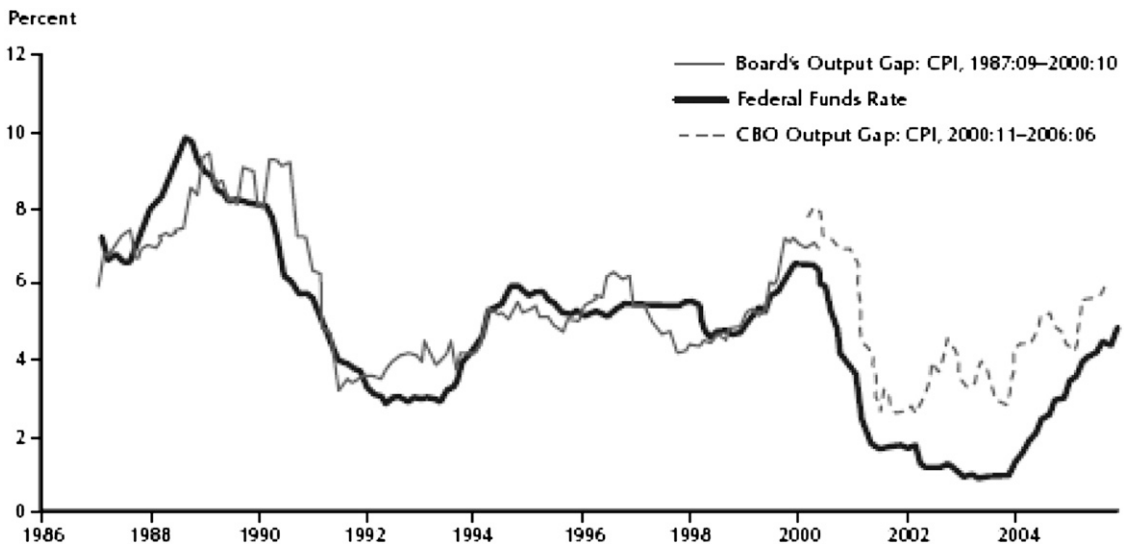


the basis for this claim, even if a bit of hubris now seems evident with the depth of the recession that began in 2007. Moreover, at a global level, macroeconomic performance was not as stable during this period as shown for the U.S. (Diaz-Bonilla, 2008). Still, during the great moderation period, the misery index exceeds 10% in the U.S. only in the 3 years 1990–1992 and, for the most part, unemployment is below 5% in all years but these 2009.

One line of reasoning about the relatively good macroeconomic performance since the mid-1980s is that monetary policy has been managed with moderation. This is illustrated in Figure 3, which shows the movement of the federal funds rate quite closely to what is called the Taylor rule. This rule proposed by John Taylor in 1993 relates the federal funds rate to a long-run inflation target along lines of the earlier Friedman rule for stable monetary growth. However, the Taylor rule also allows for setting interest rates countercyclically to respond to short-run deviations of real gross domestic product from a measure of potential real gross domestic product. Taylor argues that his rule, centered around a target inflation rate of 2%, basically described behavior of the monetary authority (the Federal Open Market Committee [FOMC]). More importantly, he argues that following this rule contributed

significantly to successful macroeconomic outcomes in terms of inflation and unemployment. William Poole (2007), president of the Federal Reserve Bank of St. Louis, notes several deviations by the FOMC from the Taylor rule. For example, the rate was raised above what the rule suggested in 1989 in response to rising inflation (Figure 3) and was lowered more than the rule suggested in 1990–1991 and kept down in 1992–1994 in response to recession. It was lowered again in 1998 compared with the level suggested by the Taylor rule in the wake of the Asian financial crisis and other financial turmoil.

How does agriculture fare during the great moderation period? As shown in Figure 3, agricultural income is also relatively stable after the mid-1980s compared with the stagflation period. In that sense, one might say that agriculture shares in the relative calm and prosperity that is reflected in the macroeconomic indicators. During the worst episode for the misery index during this period, agriculture is not adversely affected. Conversely, agriculture suffers a relative downturn during 1998–2002 with net farm income held up by a substantial increase in government payments. The financial crisis in Asia and slowdown in the world economy contributed to this agricultural downturn on the demand side. However, the U.S.



**Figure 3.** Federal Funds Rate Compared with the Taylor Rule. Source: Poole (2007, p. 6)

misery index is at its lowest ebb during these years.

After 2001, a substantial deviation from the Taylor rule is evident in Figure 1 with monetary policy more expansionary than the rule suggests as a guide. This followed the disruption of 9/11. Taylor acknowledges that the monetary authorities were very clear that they were pursuing a discretionary policy to address a fear of adverse effects from deflation. To Taylor, “there was no greater or more persistent deviation of actual Fed policy since the turbulent days of the 1970s.” He subsequently has argued that this monetary excess was “the main cause of the boom and the resulting bust” that followed. The loose monetary policy during this period induced the housing boom (a phenomenon also observed in the 1970s). Not only did low interest rates directly spark higher asset prices, but also indirectly those low rates induced lower default rates and more risky lending practices. Worldwide, the U.S. policy contributed to lower interest rates as well, and internationally interest rates correlated negatively across countries with the extent of their housing boom. When interest rates were raised starting in 2004, it marked the end of the boom period. Because that boom had been excessive as a result of loose monetary policy, the bust that followed was also too severe.

Taylor’s argument for the centrality of monetary policy does not end there. Rather, he argues the initial responses to the crisis were misdirected toward increasing liquidity rather than recognizing that increased risk was the central issue. Furthermore, when interest rates were lowered very sharply between August 2007 and April 2008, it induced a sharp depreciation of the dollar and contributed to the large increase in oil prices. For a brief time, it appeared that stagflation might return—that inflation would pick up even while the economy slowed and unemployment rose. However, events have not played out that way. The commodity price spike in 2008 subsided with the depth of the financial collapse that occurred. Even with the extraordinary measures taken by the Federal Reserve to stabilize the financial sector, inflation also subsided. Unemployment rose to its highest level since

1982, but the misery index is still below the level that occurred during that year from the stagflation period. It remains below its 1990–1992 peak level from within the great moderation period.

### Exchange Rate Effects on Agriculture

The preceding section has brought up to date the argument about the key role of monetary policy that Schuh emphasized in his assessments of exchange rate impacts on agriculture. I do not mean to argue that this has been the dominant line of macroeconomic reasoning during the turmoil since 2007. Clearly a substantial debate will now ensue in macroeconomics about the wisdom of the extraordinary measures the Federal Reserve has taken, the risk of deflationary damage to the economy that existed or was avoided. Importantly, this debate will address the stance of monetary policy as the economy picks up and whether appropriate steps are taken to avoid an upturn of inflation (Taylor and Ciorciari, 2009).

As these arguments are made, and how ever events unfold, it is evident that on a basic level, Schuh’s emphasis on exchange rate effects on agriculture has become part of mainstream assessments for this sector of the economy. Here, I call attention to two recent studies, one an *ex post* evaluation of causes of the sharp run up of agricultural and other commodity prices in 2007–2008 and the second an *ex ante* evaluation of projected agricultural performance under alternative global macroeconomic scenarios.

In the first study, Abbott, Hurt, and Tyner (2008) put substantial weight on the depreciation of the dollar as an explanation of the high dollar-denominated agricultural and oil prices in 2007–2008. Specifically, they show that dollar-denominated prices rose quite a bit more than prices denominated in real Euros or the USDA index of real foreign currency costs. For example, corn and wheat dollar prices increased by 143% and 217%, respectively, from 2002 to March 2008, but those prices rose only 37% and 79%, respectively, in real Euros (46% and 91% using the USDA index). Abbott, Hurt, and Tyner (2008) contrast these results to the



similar percentage increases that occurred in prices denominated in these terms for the commodity price spike of 1995–1996. They conclude (pp. 37–38) that the difference highlights “the key role played by exchange rates (or whatever they are a symptom of) in the current [2007–2008] price run-ups.” They attribute the dollar depreciation to a variety of causes, among them, the persistent large U.S. trade deficits, the credit crisis making the U.S. a less safe haven for investments, and the Federal government’s interest rate cuts. However, they remain eclectic about disentangling the various causes of dollar depreciation as opposed to measuring its effects on commodity prices denominated in different currencies.

In a forward-looking analysis, Shane et al. (2009) contrast projections of agricultural exports, prices, and net farm income for a base scenario of moderate dollar appreciation (approximately 20% from 2008–2017), a stronger dollar (appreciation of approximately 40% by 2017), and a weaker dollar (depreciation of 4% from 2008–2017). These alternatives reflect quite a lot of uncertainty about the future value of the dollar but include less of a range than the exchange rate variation experienced in the 1973–1986 period. Shane et al. (2009) identify whether the U.S. trade balance improves as the key macroeconomic outcome associated with the dollar’s value. They introduce different exogenous levels of the exchange rate into a global macroeconomic model (the Oxford Global Macroeconomic Model). The model then determines a path of macroeconomic outcomes (trade balance, GDP growth rates, oil prices, interest rates, inflation, and so on) consistent with the exchange rate assumption. These macroeconomic results are then fed into an agricultural sector model (PEATSim). The macroeconomic scenarios of an appreciating dollar reflect continued large trade deficits financed by borrowing abroad, whereas depreciation is associated with an improvement of the trade balance, which the authors argue will be more sustainable in the long term.

The alternative scenarios lead to quite different projections for U.S. agriculture. Agricultural exports increase to \$98 billion by 2017 in the base scenario of moderate appreciation.

Exports are only \$68 billion by 2017 with the stronger appreciation, whereas the weak dollar scenario results in exports increasing to \$137 billion, nearly double the outcome from the strong dollar case. Exports of livestock products (pork and poultry) are most sensitive to the dollar’s value. Agricultural commodity prices are in the range of 15–20% higher with a weak dollar than in the base scenario, whereas the scenario of strongest dollar appreciation leads to lower dollar-denominated prices. Taking output revenue and input costs into account, net farm income declines in the short run (from 2008–2009) in all scenarios, as has occurred. Longer-term, net farm income is projected at nearly \$120 billion in 2017 under a weak dollar but only \$70 billion under the strongest dollar. If one puts stock in results along these lines, they clearly demonstrate the substantial impact the value of the dollar (and associated macroeconomic outcomes) will have on U.S. agriculture.

The focus by Shane et al. (and to a lesser extent Abbott et al.) on the U.S. current account imbalance, how it will evolve, whether it is sustainable at recent high levels, and the role exchange rates might play in reducing these deficits reflect a strong second tenant in macroeconomic dialogue (the first being the effects of monetary policy discussed previously). A central argument has been that the U.S. trade deficits are not sustainable, pose serious long-term risks, and should be addressed by coordinated policy actions. These arguments have been made, for example, by the macroeconomic group at the Peterson Institute for International Economics, well before the recent financial crisis (Ahearne et al., 2007). Proponents of policy measures to address the nonsustainability of the U.S. trade deficits fear that market forces may at some point respond to this imbalance in a disruptive manner. It would be better if it could be addressed by policy coordination. The recent financial crisis has certainly been as adverse a shock to the U.S. and world economies as those fearing a harsh correction can have feared. However, it is not clear that it either had its roots in the U.S. current account imbalance or will lead to a substantial adjustment to it.

## Concluding Remarks

At this point, it should be evident that I will hedge my bets on the macroeconomic dynamics that will emerge in the wake of the current deep recession. One of my objectives has been to bring forward the line of reasoning about monetary policy that underlay Schuh's earlier emphasis on exchange rate effects on agriculture. That argument has not been very prominent, at least in my observation, in the public discourse about causes of the financial crisis or the policies undertaken to restore stability to financial markets and avoid an even deeper recession than has occurred. A second objective has been to compare the recent agricultural commodity price boom with that of the 1970s. The evidence shows some similarities (e.g. the effects of depreciation on agricultural prices) but also a fundamental dissimilarity. Although momentarily it looked in mid-2008 that a new stagflation might occur, since then, U.S. inflation has subsided, at least so far. The misery index remains at just 10%, not near its high levels of the 1970s and 1980s. That index came into use to reflect an era of macroeconomic explosion not implosion, and it may not be well suited to measuring misery in a deflationary period. Third, what will happen to the value of the dollar? It could remain weak for several reasons, for example because of the large U.S. trade deficits or low U.S. interest rates (Garten, 2009). However, it could also strengthen as inflation worldwide exceeds U.S. rates or monetary policy is tightened to suppress U.S. inflation. The two recent studies reviewed demonstrate the substantial effects of the value of the dollar on agriculture. It is worth keeping in mind in this context that the recent boom of high agricultural prices and net farm income has occurred in a period of a weak dollar and exceptionally low interest rates. Those circumstances can change and can change quickly.

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