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Comment Brian D. Wright

The huge diversion of corn in the United States for use in biofuels, beginning in 2005, is an unprecedented phenomenon that has transformed the economic outlook for farmers and animal feeders in the United States, and for consumers globally dependent on grains as a staple food. In the seven years since then, the rationales for this expansion have changed frequently. Initially, the driver was the sudden need for a substitute after a fuel oxygenate

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was reported to pollute groundwater and have carcinogenic properties. Then scientists, environmentalists, and farmers supported further expansion as a gasoline substitute that reduced the emission of carbon dioxide. Serious scientific concerns regarding climatic effects of induced land-use changes have recently broken this consensus, but agricultural sector support and energy security arguments have kept the main policies in place.

In his chapter for this conference, Abbott focuses appropriately on the effects of biofuels policy on price volatility, as distinct from the effects on price levels. As Abbott notes, much has been written on this controversial issue, but his review shows how confused and confusing the literature on this politically sensitive topic has been. Given the very rapid expansion of the grain ethanol industry, the continuing changes in its drivers, and the complexity of the regulatory environment, this confusion is understandable.

Abbott's contribution is to make a serious and informative effort to characterize the rapidly evolving policy environment and relate it to the evolution of prices of corn, ethanol, gasoline, and crude oil, and of margins for blenders and ethanol producers. He carefully discusses constraints in the supply chain, including Renewable Fuel Standard (RFS) yearly mandates, the "blend wall" constraining domestic use in reformulated gasoline, MTBE oxygenate substitution, ethanol production capacity constraints, and corn stock constraints. As in Abbott, Hurt, and Tyner (2011), he rightly recognizes the nonlinear interactions of these constraints, and the key role played by corn stocks in the response of corn prices to short-run shocks in demand or supply.

Starting in 2005, he identifies (table 3.2) seven distinct "watershed periods" for ethanol-related constraints: ethanol gold rush, food crisis, Great Recession, commodity boom restarted, blend wall imminent, export relief, and subsidies ended. In assessing price volatility, he first considers daily, monthly, and annual observations, but concludes that the interval of observation is "far more important than frequency." The standard deviations tend to be higher for longer periods, and "strongly influenced by the means of subperiods" (96). He settles on monthly data for later discussion. His analysis is understandability limited by the lack of a dynamic model for the effects of corn stocks and RINs on monthly volatility.

Abbott briefly recognizes that apparent volatility might be influenced by trends, but does not follow up with any attempt to separate trends from variation around those trends. Given the large price changes over the period, this issue deserves more attention. To take an extreme case, crude oil price is constant until 1973, so the volatility from 1960 to 2012 (tables 3.2 and 3.5), likely dominated by trend, is not informative about crude oil price variation in his data, which was zero from 1960 to 1973 (figure 3.1).

Abbott shows how correlations between prices of crude oil, gasoline, ethanol, and corn differ between watershed periods. It is striking how they differ between regimes. For example, the crude oil/corn price correlation

varies from -0.12 in the commodity boom to 0.96 in the Great Recession. But again, the trends in each series deserve more attention. To again take the extreme example, the high crude oil/corn price correlation of 0.85 for 1960 to 2012 might well reflect long-run moves in both series, but might well be a spurious measure of their economic relationship.

The accuracy and interpretation of price correlation measures is important. Abbott argues that ethanol plant capacity constraints were binding over most of the period since 2005, contrary to conclusions of other writers. His policy review and the evidence he presents on margins for ethanol production, and on the price of RINs, are highly informative and align with his conclusion. However in the excellent discussion in his conclusion, he notes that:

When capacity constraints bind, corn and crude oil prices can live independent lives. Ethanol profit margins vary as these prices vary, and have yielded positive profits except during brief subperiods when capacity constraints do not bind. Except during those subperiods, crude oil price volatility is not passed directly to the corn market via the biofuels mechanism. (127)

Given this discussion, the high correlation of crude oil and corn prices of 0.83 for 2005 to 2012 is not what one might expect, and not obviously consistent with the dominance of capacity constraints. Abbott implies at the end of his abstract that he believes trends in both series distort these correlations. If he can further clarify this issue his analysis will be more ultimately persuasive.

If Abbott is correct, we are now in a new regime where trade has declined in importance and the RFS and the blend wall are more prominent as key constraints in the ethanol market. If the blend wall is continually shifted outward, capacity constraints could bind for many years.

Abbott deserves credit for taking the meandering policy path seriously and showing how policy changes affect the relations between prices of crude oil, ethanol, and corn. (Given the rapidity of regime changes, he might be more careful to emphasize that some correlations relate less to annual than to monthly volatility.) Some observers have argued that the exposure to the more elastic crude oil market demand will actually stabilize the corn market. Others believe that corn ethanol policy has introduced crude oil price fluctuations as a new source of demand-side instability into the grain market. Abbott's careful work will help us analyze corn market volatility and its relation to biofuels policy, as that policy further evolves.

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