



The effect of ethanol listing on corn prices: Evidence from spot and futures markets

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ABSTRACT

The use of corn for ethanol has been the topic of heated discussions in the media and among policy makers. As part of this debate, some observers have argued that the use of corn in the production of ethanol has had adverse effects on corn prices. This paper contributes to this reviving debate by examining the impact of the listing of ethanol futures in the Chicago Board of Trade on the spot and futures prices for corn. We find a significant listing effect, indicating that the listing of ethanol has had a positive contribution to both price and volatility in the corn market, especially in the spot and the shorter maturity futures contracts, and mostly through its interaction with trading volume in the corn market. We discuss the policy implications of the findings for investors and its relevance for the ongoing debate on US energy policy. We conclude with some suggestions for future research.

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1. Introduction

Ethanol began trading in the Chicago Board of Trade (CBOT) in March 2005 as a result of joint work with the CBOT and the ethanol industry. The listing of ethanol as a tradable contract has allowed investors as well as academics to track trading volume and price trends on a daily basis. Today, traders on the CBOT can take short or long positions in ethanol contracts going out several years into the future, providing them with a valuable tool to manage price volatility in the ethanol market. Although the introduction of ethanol futures contracts signifies a milestone in the developing ethanol market, the media as well as policy makers have been divided about the use of ethanol as an alternative fuel, however, resulting in a heated discussion on the benefits and advantages of using corn for ethanol.¹

Ethanol can be produced from starch or sugar-based feed stocks including common crops such as corn and sugarcane. In Brazil where ethanol has been widely used in cars since 1979, sugarcane is the main ingredient used in the production of ethanol. However, in the U.S., ethanol is made from corn even though corn is a less efficient source than sugarcane and one of the main criticisms of ethanol's critics has been the adverse effect on corn prices of using corn for ethanol.² Some observers even blame the 2008 mid-year bubble in corn prices on the use of corn to produce ethanol.³ As Fig. 1 suggests, there has been a dramatic increase in corn prices since 2005, interestingly around the time when ethanol was listed in the CBOT. In addition, trading activity in the corn market has also increased following the listing of ethanol (Fig. 2). It is interesting to note that these price and trading activity trends in the corn market also coincide with the initiation of the Energy Policy Act in

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¹ Proponents of ethanol suggest that U.S. ethanol production (a) has been replacing more of imported gasoline or crude oil saving Americans an average of \$45 million a day, (<http://www.drivingethanol.org/>) (b) helps reduce the economy's dependence on imports, (c) supports the creation of new jobs, boosting local economies ("Ethanol: Energy Well Spent." Natural Resources Defense Council, February 2006) and (d) provides a more efficient source of energy than gasoline. Farrell et al. (2006) suggest that current corn ethanol technologies are much less petroleum-intensive than gasoline providing further support for ethanol.

² Other opponents argue that (a) corn ethanol produced in the U.S. is less efficient than ethanol made from other sources and put pressure on the government to stop corn-for-ethanol subsidies for this inefficient source of energy, (b) replacing more of ethanol for gasoline will add complexity to the refining infrastructure, placing extra pressure on refineries, leading, in turn, to higher gasoline prices at the pump ("High Oil Prices? Blame Ethanol, OPEC Says." *The Wall Street Journal*, July 16, 2008), and (c) transporting ethanol is more costly than transporting gasoline since ethanol cannot be shipped by regular petroleum pipelines.

³ "Why Ethanol Production Will Drive World Food Prices Even Higher in 2008." Earth Policy Institute, Jan. 24, 2008; "Fuel or Folly? Ethanol and the Law of Unintended Consequences." *San Francisco Chronicle*, April 2, 2008; "Rethinking Ethanol." *The New York Times*, May 11, 2008.

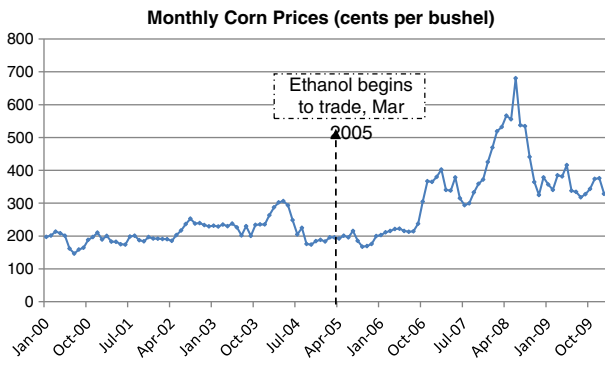


Fig. 1. Monthly corn spot prices over the period 2000–2010.

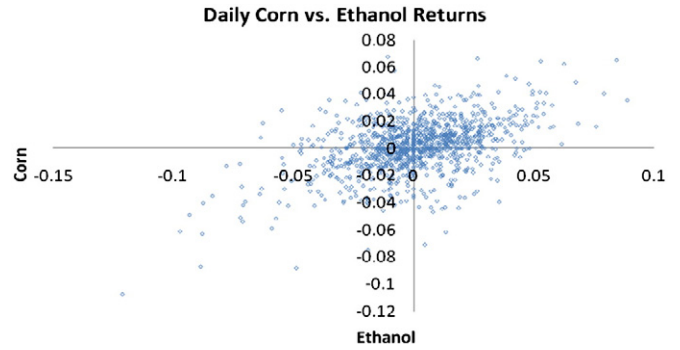


Fig. 3. Daily corn returns versus ethanol nearby contract returns over the period 2005–2010.

mid-2005 which led to major changes in the U.S. energy policy including a mandate to increase the amount of ethanol blended into gasoline sold in the U.S as well as significant tax incentives for the production and use of biofuels. Considering these two significant developments in the market regarding the production, use and trading of ethanol, it would be appropriate to suggest that a possible listing effect will be a combination of ethanol listing on the CBOT and the major change in U.S. energy policy.

Clearly, one cannot assume that the corn supply in the U.S. is constant and that greater use of corn for ethanol would mean less corn for food. However, even assuming a dynamic corn supply, one would expect the price processes in these markets to be somehow interlinked. In fact, a simple analysis of daily changes in corn and ethanol prices suggests almost a 50% correlation between the two (see Fig. 3) suggesting a strong link between the two price processes. The relatively high correlation between the returns in these markets may explain the significant increase in the trading activity in the corn market following the listing of ethanol (Fig. 2).

In this study, we examine the impact of listing of ethanol futures on corn prices and empirically test the validity of the argument that the listing of ethanol in the CBOT has impacted price and volatility in the corn market. However, it must be noted that any possible listing effect will be driven by not only the listing of ethanol futures in the CBOT but also by the initiation of the Energy Policy Act as both took place in the mid-2005. Therefore, it will be appropriate to define the listing effect examined in this study as a combination of ethanol listing in the CBOT and regulation change. Several recent studies in the literature have examined the relationship between food and fuel prices. Ajanovic (2011) reports no significant impact of biofuels production on feedstock prices as feedstock production has also continuously increased to keep up with the increasing demand for biofuels in the energy market. However, she also adds that this upward trend will eventually call sustainability issues into question. Similarly, Zhang et al. (2010) find no direct relationship between

fuel and agricultural commodity prices, however, they report an indirect effect through sugar prices as sugar is the number one input for ethanol production globally. In another study, Chen et al. (2010) examines the impact of oil prices on grain prices and find that changes in grain prices are significantly influenced by changes in crude oil prices. They also note that grain commodities are competing with the derived demand for biofuels during periods of higher oil prices. Alghalith (2010) finds similar results and reports that higher oil prices as well as price volatility lead to higher food prices.

Even though the literature offers mixed evidence on the interaction between food and fuel prices, no prior study has specifically focused on the impact of ethanol trading as a financial contract on corn prices. We are particularly interested in the volatility effects of the listing because an increase in corn price volatility would mean higher risk for investors as well as market participants on the supply and demand side of the corn market. It is possible that ethanol listing may have created speculative opportunities for investors in the market who take simultaneous positions in the highly liquid corn and the growing ethanol futures markets. In fact, at the peak of the price bubble in 2008, commodity fund investors, including hedge funds like Soros Fund Management run by George Soros, controlled a record 4.51 billion bushels of corn, wheat and soybeans through the futures markets of Chicago Board of Trade, equal to half the amount held in U.S. silos on March 1, 2008.⁴ From this perspective, one can argue that trading activity in the ethanol futures market which might partially be influenced by governmental regulations⁵ may have had a marginal contribution to corn price volatility through speculative activities by hedge funds.⁶ On the other hand, one might also argue that ethanol listing may have provided hedgers in the market another risk management tool to manage price volatility in the corn market, possibly leading to lower volatility in the corn market. Therefore, the main contribution of our study is to empirically test the validity of these opposite arguments.

A second contribution of this study is to extend the analysis to both spot and futures prices for different maturities in the corn market. As futures prices for different maturities reflect traders' expectations of future supply/demand conditions, we also explore possible listing effect on future price expectations for corn. Hence, our empirical results that capture the impact of the listing of ethanol in the corn spot and futures markets may shed some light on the recent debate regarding the introduction of ethanol as a substitute energy fuel and its impact on corn prices for different maturities.

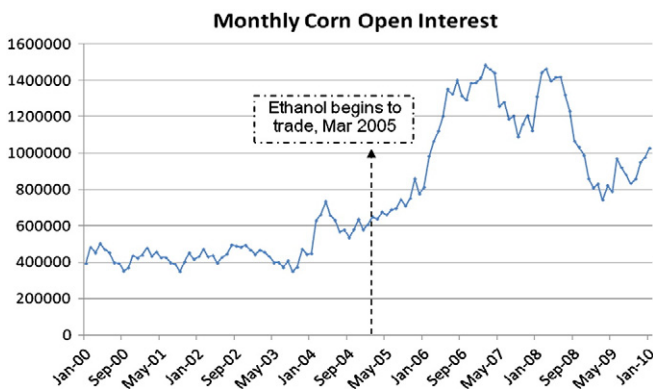


Fig. 2. Monthly open interest in the corn market over the period 2000–2010.

⁴ Wilson, J. (2008), "Wall Street Grain Hoarding Brings Farmers, Consumers Near Ruin," Bloomberg, (April 28, 2008).

⁵ The Energy Policy Act of 2005 and later the Renewable Fuel Standard program created in 2007 by the Environmental Protection Agency which requires a minimum amount of ethanol blended into gasoline sold in the U.S.

⁶ Evidence indicates an unexpected increase in futures trading volume due to, for example, the introduction of ethanol may cause an increase in cash price volatility for commodities (Yang et al., 2005).

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