

# Pricing Efficiency in Agricultural Markets: Discussion

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The interest in pricing efficiency in markets rests upon possible inaccurate value determination emanating from a market which in turn sends incorrect signals to producers and/or consumers. The extent to which inefficient resource allocation may be caused by pricing inefficiency is of long-standing concern to economists and policymakers. Clearly, the importance of the topic needs minimal justification.

The paper by Buccola provides a useful summary of this topic. The review of the methods and empirical findings associated with this rather broad topic is treated by Buccola in his usual deft fashion. There is little to quarrel with in the Buccola paper. However, the opportunity to expand on the Buccola review is too tempting to resist. Some of the terrain is deserving of expansion and/or retrospective examination.

The main message Buccola delivers is that agents' costs or transaction costs have been ignored or not fully considered in many efficiency studies. Clearly, this is true. It is also true that costs typically are difficult to measure and that the effect of risk on cost, an important factor to Buccola, may be difficult to conceptualize. However, simple recognition of the potential importance of costs is not sufficient for progress in our research methods and findings. Some testable hypotheses need to evolve that embody the essence of cost phenomena on pricing efficiency. This point is addressed more fully later.

## Issues

Perhaps the part of the Buccola paper which is too narrowly focused is the section on issues.

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The issues of pricing efficiency seem to be equated to causes of pricing inefficiency, which Buccola identifies as nonoptimizing behavior, inefficiency in related markets, missing markets, nonexcludable consumption, successful collusion, and/or risk. I differ with Buccola in the sense that I do not take the potential causes of pricing inefficiency to be synonymous with the issues surrounding pricing efficiency. There are some important issues that are not adequately captured by his categories of risk (or information) distortions and imperfectly competitive distortions.

Specifically, the institutional setting, inclusive of the exchange arrangement in particular markets, may have a separate and distinct impact on pricing efficiency. Inaccurate, inequitable, or manipulated prices all are of concern in pricing efficiency, only the last of which emanates necessarily from imperfect markets. Inaccurate price, as an issue, may refer to the price differentials (premiums or discounts) received by producers offering a particular grade or quality to the market. Current examples of sensitive issues involving pricing efficiency, in this sense of accurate price differentials, include: the controversy over "value equaling price" in the beef industry (Purcell), the value of protein in wheat (Hill, Bailey, and Bender), or the relative values of staple versus strength and fineness in cotton fiber (Jones-Russell and Sporleder). End-use grading has been an issue for years (Office of Technology Assessment). These examples are nontrivial and cut deeply into what economists know or can contribute to real-world pricing efficiency problems.

This "accuracy" problem may be linked to the thin market problem. The linkage between pricing efficiency and thin markets is that thin markets conventionally are regarded as pricing inefficient. Although "thin" is one of those descriptors in economists' jargon that is widely used but imprecisely defined, it is a useful concept when applied to pricing accuracy. The

notion is that biased or nonrepresentative price signals are reflected to vertically linked markets, due to the institutional setting in which price discovery occurs (e.g., government grades), which result in short- or intermediate-term misallocation of productive resources (Hayenga et al.). Thinness in terms of few negotiated trades in a specific market at a point in time may contribute to inaccurate prices serving to compound the potential price differential inaccuracy. Thus, the institutional setting in terms of government grades and standards may create short- or intermediate-term inefficiency that is substantial. One would argue that in the longer term, grades and standards would be changed to minimize potential inaccurate price differentials. However, in the longer term, technology may play a role in making certain aspects of commodity quality criteria obsolete (Jones-Russell, Sporleder, and Talpaz).

Another important aspect of the institutional setting may be the exchange mechanism. Recent work on this topic, as reflected by Kilmer, suggests that transaction costs may play an important role in the adoption of a particular exchange mechanism. A new hypothesis along these lines is that even in imperfectly competitive (oligopolistic) markets, certain exchange mechanisms may lead to the same pricing efficiency consequences typically attributed to low concentration or to markets structured competitively (Sporleder). In other words, for agricultural commodity markets where third-party description plays a critical role, certain exchange mechanisms may produce competitive results and efficient prices even when the market is imperfectly structured. There is some broad evidence from both the experimental economics literature and the electronic marketing literature sufficient to warrant further investigation of this hypothesis. It is clear that the consequences of various exchange mechanisms deserve more attention than conventional wisdom would dictate.

Another issue that has surfaced during this decade is the relative importance of pricing efficiency in the more aggregate context of international competitiveness. Schmitz et al. demonstrate linkages between hypothetical cartel strategies by grain exporters and international commodity trade patterns. In an era when agricultural competitiveness in world markets is a popular issue, research on the performance implications of international cartels

in agricultural or food product markets gains a higher priority. The point is that, in the future, domestic policies may evolve as a compromise between pricing efficiency and international competitiveness. Pricing efficiency in domestic commodity markets as a policy objective may diminish in priority relative to policies designed to bolster international competitiveness when the policies conflict.

## Methods

Two rather diverse subjects may serve to extend Buccola's discussion under the methods section of his paper. One is spot-versus-futures market pricing efficiency while the second involves scope economies. Buccola treats the first subject under the heading "Long-Run Efficiency in Time-Space-Form," while the second subject is not mentioned.

The efficient market hypothesis, which occupies a central focus in the Buccola paper, must be interpreted carefully. Spot price changes have both random and systematic components whereas futures price changes are expected to be random walks or martingales more generally. As Tomek indicates, an efficient spot price is not necessarily a random walk and an imperfectly competitive market generates spot prices which are neither random walks nor efficient.

A fruitful future approach in modeling the efficient market hypothesis may well be through simultaneous determination of commodity spot and futures prices, along the lines suggested by Turnovsky. The approach is a rational expectations model of commodity spot and futures prices to analyze the effects of introducing a futures market on the behavior of spot prices. The relevance of the approach stems from hypothesized differences in fundamental supply and demand conditions for the cash commodity. These fundamentals may explain differences in random behavior for various commodity futures time series. In a certain world, supply and demand of cash commodities are not randomly shocked, because information is perfect. In an uncertain world, futures prices may not be random due to shortages or other temporal maladjustments between supply and demand.

The Turnovsky approach is to model firms and speculators as maximizers of expected utility of profits in period  $t$ . The analysis de-

finds conditional variance of profit in period  $t$  as a function of the conditional variance of the spot price. Results, similar to other risk-averse producers that hedge, show that a firm's planned output depends on the futures price rather than the expected spot price. Risk aversion influences hedging behavior but not production decisions.

By adding a speculator-expected-utility-of-profits component, Turnovsky sums over the various equations to obtain aggregate supply, inventories, and net positions by the firm and speculator in futures markets. The model allows effects of supply and demand fundamentals for the cash commodity to be investigated on the random behavior of futures prices. The approach has the desirability of simultaneous determination of cash and futures prices and merits consideration for use in applied research.

The second "method" worth some visitation is economies of scope. This concept is relevant in Buccola's overall context of cost emphasis as well as his heading entitled "Spatial Analysis, Industrial Organization, and Price Efficiency." An excellent review of economies of scope is provided by MacDonald and no attempt is made here to expand that review.

The concept of economies of scope is simply that diversified or multiproduct firms may have lower total costs than specialized or single-product firms. As MacDonald suggests, this concept leads to a number of quite precise and testable hypotheses about costs and multiproduct firms. A task for future research is to generate the theoretical and empirical interface among economies of scope, cost at an industry level, and pricing efficiency in markets. A potential starting point may be to extend the simultaneous model approach of Turnovsky to include a multiproduct output case.

### Empirical Results

The Buccola paper reviews some empirical research in the grain and oilseed markets, the livestock markets, and in food manufacturing and retailing. Again, Buccola's theme appears to be the sensitivity of empirical results to the treatment of cost. The review provided is adequate but could be extended with some additional points.

A recent article by Garcia, Hudson, and

Waller provides a tabulation of empirical studies categorized as "forecasting" and "nonforecasting" studies. Each study is examined and compared in terms of commodities, time period, general methods, and conclusions regarding the efficient market hypothesis. The authors conclude, among other things, that futures prices are better forecasters of storable commodities than of livestock. More importantly, they indicate a "technique bias" across studies; a conclusion consistent with the Buccola paper. They find more inefficiency indicated from weak-form analyses than from semistrong-form analyses. If so, this clearly indicates an anomaly worthy of attention in further research.

With regard to industrial organization studies in food manufacturing and retailing, the research frontier appears to involve a fusion or integration of conventional industrial organization theory with international trade theory. Trade theory, based partly on the concept of comparative advantage, leads to conclusions that unrestricted trade results in optimal economic performance. Some trade theorists are working to explicitly incorporate imperfectly competitive global markets and other key concepts from industrial organization in an effort to refine their models. This approach, along the lines of the new NC-194 regional project, promises to provide important insights into economic efficiency in our globalized food markets. Guidance for domestic market efficiency policies may emerge from this research.

### Conclusion

In sum, Buccola's paper provides an important review of pricing efficiency in agricultural and food markets. The central theme that costs and the treatment of them are important to the conclusions about efficiency is well taken. However, for us to make research progress which is additive over time, methods for actually considering costs and measuring them must be a part of our effort. An important task is to place priority on generating testable hypotheses which incorporate cost in the more conventional theory of pricing efficiency.

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