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Traceability and Identity Preservation Policy: Private Initiatives vs. Public Intervention

Peter Goldsmith¹
University of Illinois

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¹ *Dr. Peter Goldsmith*
NSRL Endowed Fellow in Agricultural Strategy
The Department of Agricultural and Consumer Economics
The University of Illinois
433 Mumford Hall
1301 West Gregory Drive
Urbana, Illinois 61801
217-333-5131
Fax-333-5538
[*pgoldsmi@uiuc.edu*](mailto:pgoldsmi@uiuc.edu)
[*http://www.ace.uiuc.edu/faculty/goldsmith/*](http://www.ace.uiuc.edu/faculty/goldsmith/)

Abstract

Firms within the food supply chain must decide what information to provide and how to provide it. This applies to collecting information from upstream suppliers as well as to supplying information to downstream customers. Components of this vertical information situation include farmer supplier identity preservation to capture value and the buyer information needs concerning geographic location of production or seller identity in order to manage risk.

A policy question is raised as to how vertical information flow; in the form of segregation, traceability, or identity preservation, should be accomplished. This question has recently come to the policy forefront through European labeling/traceability issues, the Canadian BSE incident, Country of Origin Labeling legislation, and biosecurity concerns. The US food industry often contends that mandated macro government systems (e.g. full traceability systems, animal passports, ISO 9000) would be misplaced and ineffective. They point to the tremendous private quality control systems, already in place in the industry. Though the industry's quality systems may not be in the public domain as in Europe, they are nonetheless present. The argument continues that proprietary systems contribute to a firm's competitive advantage and mandating a system would distort investment and incentives.

Within this classic debate about public policy versus private strategies is a fundamental question about the role of commodities in the economy. Are they an inferior form of market development whereby the natural and preferred tendency is for supply to differentiate? Put another way is the economy better off with differentiated or undifferentiated (commodity) basic inputs?

This article contributes to the policy debate by discussing why and how commodities many times are preferred by end users and thereby a signal of a properly performing economy not a market "failure." The discussion will also shed light on why farmer premiums remain low and how greater value can be created at the production stage.

Introduction

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Methodology

The research in this manuscript is based on an alternative analytical perspective, that the value proposition drives the cost model. To better understand the IP proposition, one must begin with demand, the needs of end users, which then reveal the underlying pulling forces serving as incentives for suppliers to partake and the system to adjust. Beginning with end users and working backward reveals not only how the system adjusts in an attempt to service its needs but also the incentives for agri-food firm procurement to search for input or process substitutes.

To understand the needs of end users, needs assessments² with senior executives in the US and Mexico who were responsible for the firm’s purchasing raw commodities¹ were conducted (Table 1). Ten companies were the subjects of the interviews. U.S. raw agricultural inputs were the main source of the respondents’ supply base. Respondents

² See Goldsmith et al., 2002; Johnson et al. 1987; Soriano, 1995; and Yin, 1994 and for a detailed discussion of the methodology.

were directly responsible for the purchase of soybeans, corn, or small grains. Final demand was either for feed or food use; conventional or organic.

The semi-structured interview was composed of two categories of questions. In the first category (90% of the interview), researchers methodically asked a series of questions for the buyer to describe how inputs were purchased. Buyers were not directly asked about identity preservation. The needs assessment approach minimizes interview bias because the focus is on a subject well known to the interviewee, in our case raw agricultural product procurement. Needs, the procurement process, and market for substitutes became evident working through a detailed description of each buyer's "problem." Maps emerge of the procurement system that forms an overview of the norms of the industry, which in our case describe the state of demand for product information (both by the supplier and the buyer) and the role agricultural producer-suppliers play or could play in meeting end-user needs and making the buyer more competitiveⁱⁱ.

Previous work has described the changing information needs along the value chain in the post-modern agri-food economy (Sporleder and Goldsmith, 2001; Sporleder and Goldsmith, 2003). Not only is the quantity of information transmission increasing but the quality and dynamics of the information is changing as well. It is almost as if our ability to measure, capture, organize and transmit information is outstripped by the dynamics of the markets for information. Customers require greater and greater customization, governments are increasingly vigilant over safety and security issues, and suppliers increasingly recognize the need to be compensated for their value-add. From this it can be assumed that information need is increasing and that increased vertical and

horizontal transmission of information would result. But empirically most raw agricultural product transactions still continue with a minimal amount of information exchange. Premiums to producers remain small and end-user traits in grain and livestock have seen less demand than expected. The following results from semi-structured interviews with procurement executives provide an alternative explanation for this phenomenon, where more vertical information is not always better.

Traceability and Identity Preservation

The majority of U.S. grains and oilseeds markets require minimal vertical information flows, and the spot market is the primary form of governance. Contracting, though, has become a common governance mechanism for segregated grains and oilseeds. Opportunities appear to loom large to remove risk and improve quality in the grain supply chain through preservation of product identity. For example, six specific factors affect the use and development of identity preservation systems: biotechnology, precision agriculture, measurement technology, food safety, competition, and the role of nontraditional players (Bender). Yet producers are frustrated at the low level of value available to them from IP demand. The United States continues to struggle to develop markets and pay significant premiums (>5% of the commodity price) where identity is preserved. More common are segregated markets utilizing annual contracts and modest premiums (<5% of the commodity price), such as Frito Lay with white corn.

Most premiums for producing enhanced grains have settled in the range of 5% with a few products (e.g., non-GMO soybeans) garnering 10% (Sporleder and Goldsmith, 2003).

Why do premiums remain low? While demand for high-information grains appears to be

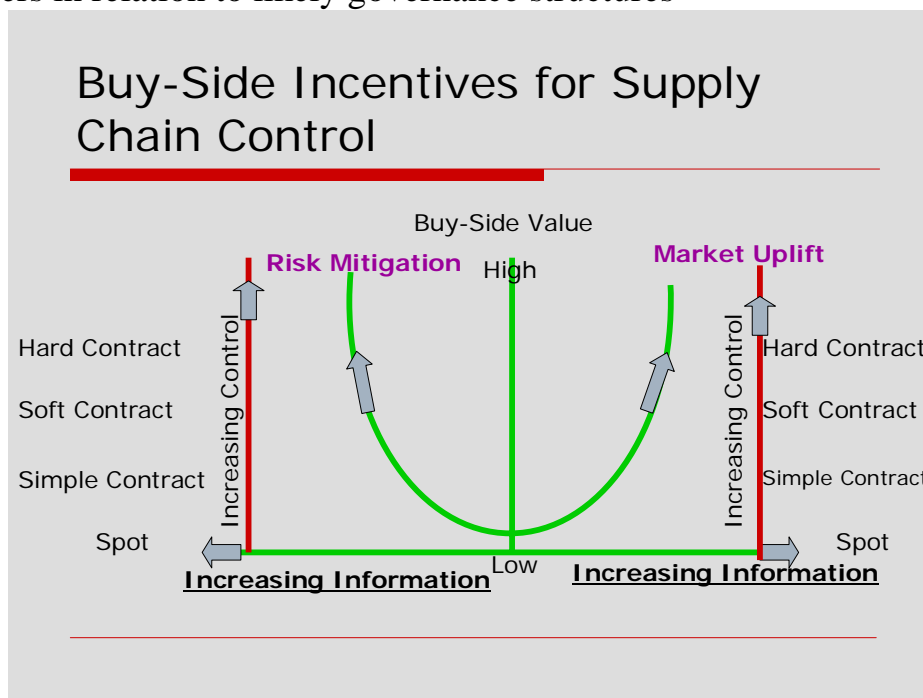
growing, where and how along the supply chain is the value created and captured?

Though it appears that the modern economy demands ever-increasing amounts of differentiation, opportunities for grain producers to create and capture significant new sources of value remain elusive.

Identity Preservation Half-Pipe

Preference for information flows may differ between buyers and sellers. For example, sellers may think that their differentiated product warrants a premium in the marketplace as compensation for additional costs incurred in production and handling. The buyer may not be willing to pay for the product because the added information is insufficient to afford the necessary market price premium, or uplift (Figure 1, right-hand side of half-pipe), or to mitigate significant risks (left-hand side of half-pipe).

Figure 1. Identity preservation half-pipe: incentives for supply-chain control by buyers in relation to likely governance structures



Imagine a farmer producing a high-quality white corn for an end user, such as a snack food manufacturer. Does preserving the identity of the supplier of white corn make the snack food more valuable in the end user's market? Can the end user exercise more pricing control (i.e. raise prices) because of the source of white corn, the notion of market uplift? And is the supplier unique in the ability to provide the input? If so, the vertical information has currency, the supply base is limited, and price premiums will prevail. Ingredient branding is an example of the presence of market uplift. IBM is willing to pay the premium to Intel and share their brand (Intel Inside™) because it affords IBM pricing power in the marketplace, and there is only one Intel. The branded or identity-preserved chip has currency and captures value in the marketplace for IBM even though going on the spot market for computer chips is possible.

Similarly, on the left-hand side of the half pipe is the opportunity for risk reduction. An example would be the vertical control exercised by Gerber over its baby food supply chain. As risk (uplift) becomes more strategic to the firm; the value rises, the buyer willingness to pay increases and the governance structure (i.e. contract) becomes more formal. There is a direct relationship between the strategic importance to the buyer, the value in the marketplace and the governance choice. For commodity transactions the identity of the supplier is not important and differentiation is a cost not a benefit.

Governance through the spot market is preferred, providing buyers with the greatest flexibility and mitigation of supply risk.

In commodity transactions, market uplift and risk are both trivial, making intensive vertical information flows unnecessary (low on the half-pipe). This is the most common case where segregation of the product (corn separate from soybeans) is valued while the identity of the producer or the process is unimportant. In this case the vertical information flow is product specific; it is the product, not the supplier, product/service bundle, or process that defines the transaction.

Private markets for traceability, which allow a buyer to identify an input's journey through the supply chain, or identity preservation, which allows a supplier to maintain the distinctiveness of its product as it moves down the supply chain, are quite common. They reside at the upper end of the half-pipe. The products are strategic to the buying firm in terms of market-uplift or risk. Other products may not be strategic. They reside on the lower portion of the half-pipe. Their transactions are governed more loosely, the information necessary for the transactions is minimal, and the information system is a public good.

There tends to be a separating equilibrium whereby the higher valued products are bundled within private quality systems while the lower valued goods are bundled within the public quality system. The cost per unit of the private information system is higher, and can be higher, because of: 1) the higher value of the underlying good, and 2) the costs (downside) if such investments were not made. What would the risks be to Gerber if it only relied on the public information system- the USDA's programs in grades, standards, and inspection? Or what would the costs be to IBM and its brand if it

purchased processing chips on the spot market rather than leveraging Intel's ingredient brand?

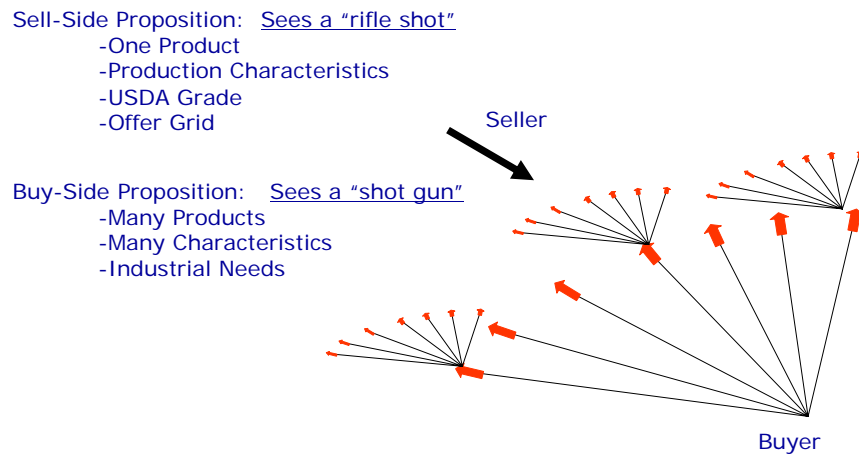
The policy question is then is there a place for a public quality system at the upper end of the half-pipe? Or more importantly, is there a place for "private-like" quality system at the lower end of the half-pipe?

Incentives for Vertical Information Flows: The Buyer's Problem

Figure 2 illustrates different perspectives that often exist between buyers and sellers of a commodity. While suppliers are selling a product, such as white corn, the buyer's proposition is much more fragmented. Firms buy numerous inputs, and raw agricultural products are simply one of those inputs; each input in turn is valued idiosyncratically for attributes associated with end use (Goldsmith and Bender).

The cost of preserving the identity downstream or knowing the origin or identity of the upstream suppliers depends on third-party verification systems, system complexity, asset-specific investments to accommodate monitoring, and the bureaucracy (Sporleder and Goldsmith, 2001). Segregation without identity preservation is less intense in terms of vertical information flow, and therefore less expensive on a per-unit basis. The efficiency advantage of the commodity system is its low informational costs in which products are readily substitutable and buyer and seller options are most flexible.

Figure 2. Differing perspectives: looking down the chain vs. looking up the chain



The valuation of product components and the underlying incentives of the sell-side agent can differ significantly from those of the buy-side agent. Vertical information flows are costly for buyers in numerous ways. Undifferentiated commodity purchases afford great flexibility through substitutability, common understanding of grades and standards, and the ability to commingle. Buying from a competitive commodity market also affords buyers the opportunity to manage price risks through buffer stocks and futures markets. Commodity purchasing is quick, low cost, and repeatable, with supply chains that exhibit well-established trade customs. Investment in vertical information capture and analysis adds new and uncertain costs and perhaps sunk investments to facilitate procurement. Because of this trade-off between information quantity and quality and cost, buy-side firms are selective as to

which inputs warrant investment (i.e., investments that are truly strategic). Buyers as economic agents in the supply chain prefer to avoid asset-specific investments.

From an investment allocation perspective, the buyer decides first where to put the marginal capital investment dollar. Among all the competing uses for capital in the firm, where is the greatest return on investment; in procurement? Many times the answer is no, but if procurement is selected as the destination for optimal capital utilization, then the firm must evaluate the strategic importance of the raw product compared to all other inputs. Analysis of commodity-retail price spreads reveals the declining role of the commodity input in the consumption experience. Greater returns on investment are being found on other inputs such as marketing and advertising. Buyers do not and can not have “relationships” with all their suppliers. Investing in relationships is expensive and requires a commensurate return on investment. In industrial marketing most transactions are transactional not relational (Rackam et al.).

One value of commodities to end users is that they are low cost. The buyer creates and captures value by taking a low-cost input and converting it into a higher-value product (“turning a sow’s ear into a silk purse”). Higher-cost or premium inputs have to be justified in terms of their market uplift or risk mitigation features. This makes incentives antithetical between the buyer and the seller. The buyer constantly scans for alternatives to reduce costs, either through engaging substitutes (e.g., high-oil corn and oil substitutes) or promoting greater supply (without contracting).

Finally, production agriculture is fraught with risk. Endemic to grain and oilseed production is variability caused by weather, seasonality, and hemispheric differences. Buyers have scant incentive to directly engage sellers. This avoids incorporating upstream supply risk into the buyer's operations. Buyers prefer, when possible, to shift risk to the farmer-supplier. This risk shifting by buyers to farmer through commodity markets has not limited the number of ready suppliers, either locally or globally. Firms, from organic buyers to livestock feeders, reveal a thick market of farmers eager to supply their needs (Goldsmith and Bender, 2003) . In fact it can be argued that commodity markets are as "thick" as ever because of the global scale and scope of markets and the global location of agri-food firms.

For example, in terms of risk mitigation, when the Grocery Manufacturers Association explored how to address pharma farming in the Midwest to serve their European clients, their response was simple. They would not invest in high-cost procurement systems with traceback in the United States. Instead they would simply move off shore with their soft contract and commodity procurement model (Shuff). They appear capable of finding the competitively produced supply outside the Midwestern United States.

Conclusion

For policy makers, understanding identity preservation and traceability applications requires an understanding of the buy-side proposition. While more vertical information in the agri-food supply chain is seemingly better, no entity, from first handler to the final customer (organic and pharma being two exceptions), seems willing to pay the price.

The End-users' Proposition

Information is costly, so buyers balance investment in specific relationship assets with the market uplift or risk mitigation return it will generate. Buying from a competitively structured industry is beneficial as suppliers compete for buyers' businesses. After spot market transactions, the most common governance structure in the grain sector is soft contracts that involve segregated commodities and small premiums. This equilibrium reflects the current risk-adjusted value proposition farmer suppliers are delivering to end users. In the aggregate, at this juncture it appears buyers are willing to exchange less information for a competitive supply base. The market is working. Plenty of farmers around the world are willing to supply, and buyers appear to have access to the raw inputs they need. Though end-user benefits are on the horizon with the next generation of biotechnologies, their emergence is not enough to guarantee farmers greater returns. End users will always balance the risk mitigation and market uplift features of a supply offering with the risks of narrowing the supply base. This is the buyers' calculus.

The Farmers' Proposition

For farmers to move up the value chain, the challenge is not simply the creation of more value, but making buyers forgo the benefits of commodity supply. To date producers, producer groups, and cooperatives have done little to manage supply risk (both quality and quantity) for end-users. While buyer indemnification is prevalent between food manufacturing and retail or food processing and food manufacturing, it is not common further up the chain between production and processing (Goldsmith and Bender). To drive value up the chain, producers need to shift away from focusing solely on the products of the

future. Instead, then need to focus on the technologies, delivery systems, and organizational models that, when bundled with new products, solve end-user problems, better manage their risks, and make end-users more competitive.

In summary, the policy debate about implementing traceability and identity preservation systems into the US grain system has three distinct features. The first concerns the end-users' proposition. Is there a market failure such that buyers are unable to access the grains they need. Our research shows that at the current time this is not the case. End-users both domestically and internationally are able to find the raw ag products they need at prices they are willing to accept.

The second feature is the impact on farmers and their attempts to create more value. Will implementing public traceability systems drive value up the chain to farmers? Who would pay for the system? Our research shows that buyers are unwilling to pay because the value they receive is low and switching to a new procurement model is not cost effective.

This leads to the third feature of the debate, which concerns security of the food system. Can private traceability and identity preservation systems provide the necessary protection against bioterrorism? Is traceback from consumers through food manufacturing sufficient or does traceback need to be extended to the grain source? The industry has heralded the notion of "funnel" testing. This policy direction would replace full system mandates with much more focused testing that would be implemented closer to end-use or final consumption. The

challenge though is that while identifying a hazard may be more efficiently accomplished, tracing back to the source could still be cumbersome.

The key may be incentivizing private firms to help address the public safety problem while they continue developing quality systems that are sustainable in the current business environment. It is hard to obtain returns on investments in the short run on private bioterrorism investment. Marketers do not want consumers commingling thoughts of bioterrorism with their consumption experience. Private firms are much more likely to respond and effective systems much more likely to occur if public-private partnerships are formed specifically focusing on public safety problems.

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Endnotes

ⁱ Semi-structured interviews, most of which lasted between two and three hours, were conducted in the executives' offices. For proprietary reasons, interviews were not taped, but two researchers were present at each interview. Respondents were drawn from contacts within the industry and were known personally by at least one of the researchers. The respondents represented major food firms with a significant presence in the US as well internationally.

ⁱⁱ In the final minutes of the interview (10%) subjects were asked for their opinions about how research and policy could help U.S. farmers be better suppliers. Were there gaps where supply could be indirectly improved? Was there research in which land-grant universities could engage that would make U.S. suppliers more valuable and in turn make the subject firms more competitive in their markets? Similar questions were asked about other agricultural institutions such as USDA (GIPSA), Extension, and the commodity groups.