

V. Conclusions

In our investigation into the adequacy of the private-sector supply of traceability, we found that the private sector has a number of reasons to establish and maintain traceability systems and, as a result, the private sector has a substantial capacity to trace. This does not mean that the wheat in every slice of bread is traceable to the field or that the apples in every glass of apple juice are traceable to the tree. Firms evaluate their costs and benefits with respect to supply management, safety, and credence-attribute marketing to determine the efficient breadth, depth, and precision for their traceability systems. The net benefits of establishing and maintaining traceability systems are not necessarily positive for every attribute, for every step of the supply chain, or for the highest degree of precision.

Traceability systems are a tool to help firms manage the flow of inputs and product to improve efficiency, food safety and product quality, and product differentiation. However, traceability systems do not accomplish any of these objectives by themselves. Simply knowing where a product is in the supply chain does not improve supply management unless the traceability system is paired with a real-time delivery system or some other inventory-control system. Tracking food by lot in the production process does not improve safety unless the tracking system is linked to an effective safety control system. And of course, traceability systems do not create credence attributes, they simply verify their existence. Traceability systems are one element of a firm's supply side management system, safety system, and production strategy. Traceability systems are built to complement the other elements in each system.

The development of traceability systems throughout the food supply system reflects a dynamic balancing of benefits and costs. Though many firms operate traceability systems for supply management, quality control, and product differentiation, these objectives have played varying roles in driving the development of traceability systems in different sectors of the food supply system. In the fresh produce sector, quality control and food scare problems have been the primary motivation pushing firms to establish traceability systems. In the grain sector, supply management and growing demand for high-value attributes is pushing firms to differentiate and track production. In the beef sector, food scares and demand for high-value traceability systems have only recently begun to motivate firms to adopt traceability systems tracking production from animal to final meat product.

The varying costs of traceability systems, reflecting different product characteristics, industry organization, production processes, and distribution and accounting systems, have also influenced the development of traceability systems across the food supply. The development of traceability systems in the fresh produce industry has been greatly influenced by the characteristics of the product. Perishability of and quality variation in fresh fruits and vegetables necessitate that the product be boxed and its quality attributes identified early in the supply chain, either in the field or in the packinghouse. This practice has facilitated the establishment of traceability for a number of objectives including marketing, food safety, supply management, and differentiation of new quality attributes. In grains, safety and quality are largely controlled at the elevator level, greatly reducing the need for traceability throughout the sector. For beef, institutional and philosophical barriers have slowed the adoption of traceability systems for tracking animals from farm to table. In every sector, technological innovations are helping to reduce traceability costs and to spur the adoption of sophisticated systems.

Our investigation of the private supply of traceability in the United States has led us to conclude that for the most part, the food industry is successfully developing and maintaining traceability systems to meet changing objectives. In the three food sectors we investigated, producers seem to be responding to consumer demand for product differentiation. When final or input demand is strong enough to cover the cost of product differentiation, producers have responded with new products and new traceability systems to substantiate credence attribute claims, including food safety claims. To control for potential fraud or unfair competition, industry groups and individual firms are increasingly relying on the services of third-party auditors to verify the existence of credence attributes.

For the most part, industry has also worked to strengthen food safety systems in response to new threats, though the speed and success of the response has varied. The fresh fruit and vegetable sector has probably been the most successful in adjusting traceability systems in response to new safety problems, while the beef industry, with its history of limited liability, seems to have had the most difficulties. In all three food sectors, alliances, vertical integration, and contracts are facilitating traceability for safety and other quality attributes.

Our analysis suggests that government mandated and managed traceability is usually not the best-targeted policy response to potential market failures involving traceability. Even in those cases where traceability is necessary for the development of differentiated markets, mandatory traceability systems often miss the mark. Systems that include attributes that are not of value to consumers generate costs without any corresponding benefits. Only systems that focus on attributes of value to consumers actually facilitate market development. In addition, the widespread voluntary adoption of traceability may complicate the application of mandatory systems. Mandatory systems that prescribe one traceability template and fail to allow for variation across systems are likely to impose costs that are not justified by efficiency gains.

One area where the government may be able to increase the supply of a valuable public good is by augmenting

tracking systems for contaminated food once it has been bought and consumed. By strengthening foodborne illness surveillance systems to speed the detection of foodborne illness outbreaks and the identification of the source of illness, the government could increase the capability of the whole food supply chain to efficiently and quickly respond to food safety problems. In addition, because they increase the likelihood that unsafe producers are identified, surveillance systems may provide producers with increased incentive to invest in safety systems, including traceability systems. In fact, any policy that increases the cost and probability of getting caught selling unsafe food provides producers with incentives to increase their traceback capabilities. These types of policies will encourage the development of more efficient systems for the swift removal of unsafe foods and for investment in safer food systems—which is the ultimate objective of food safety policy.